

# Safety Evaluation Report

NUREG-0019  
(Suppl 1 to NUREG-75/080)

U. S. Nuclear  
Regulatory Commission

related to construction of

Office of Nuclear  
Reactor Regulation

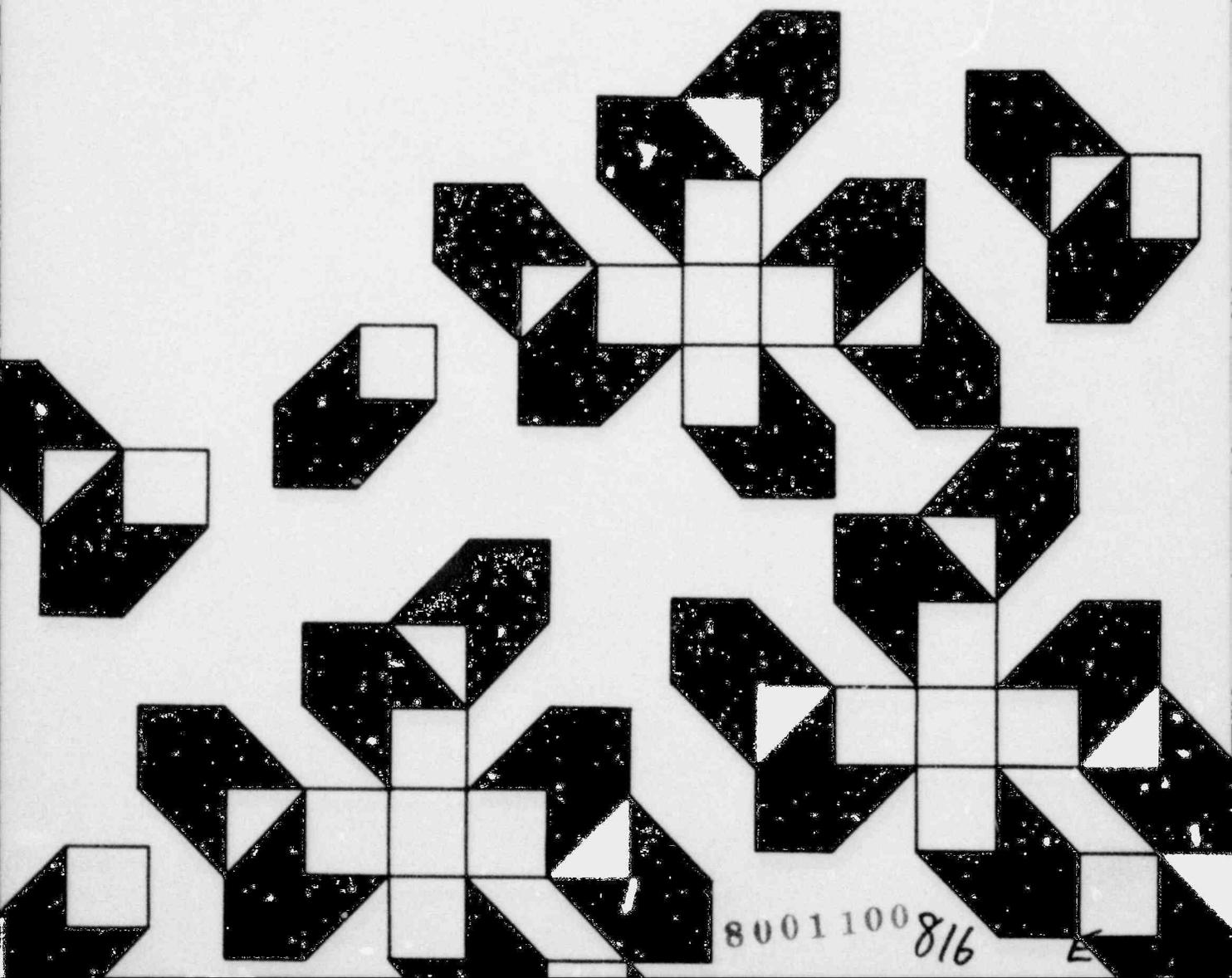
## Wolf Creek Generating Station, Unit No. 1

Docket No. STN 50-482

January 1976

Kansas Gas & Electric Company  
Kansas City Power & Light Company

Supplement No. 1



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NUREG-0019  
(Suppl 1 to NUREG-75/080)  
January 14, 1976

SUPPLEMENT NO. 1

TO THE

SAFETY EVALUATION REPORT

BY THE

OFFICE OF NUCLEAR REACTOR REGULATION

U.S. NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF

KANSAS GAS & ELECTRIC COMPANY

AND

KANSAS CITY POWER & LIGHT COMPANY

WOLF CREEK GENERATING STATION UNIT 1

DOCKET NO. STN 50-482

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## 1.0 INTRODUCTION AND GENERAL DISCUSSION

### 1.1 Introduction

The Nuclear Regulatory Commission's (Commission) Safety Evaluation Report in the matter of the application by the Kansas Gas & Electric Company and the Kansas City Power & Light Company (applicants) to construct and operate the proposed Wolf Creek Generating Station Unit 1 was issued on September 3, 1975. In this Safety Evaluation Report, we indicated certain matters (1) where additional information was required of the applicants, and (2) where our review was not yet complete.

The purpose of this Supplement is to update the Safety Evaluation Report by addressing the outstanding issues identified in Section 1.8 of the Safety Evaluation Report and by providing our evaluation of the additional information submitted by the applicants since the issuance of the Safety Evaluation Report, and to address the comments made by the Advisory Committee on Reactor Safeguards in its report of October 16, 1975. In addition, a review of the Safety Evaluation Report has revealed areas where corrections or further explanations are in order. Each of the following sections in this Supplement is numbered the same as the section of the Safety Evaluation Report that is being updated and except where specifically noted, is supplementary to and not in lieu of the discussion of the Safety Evaluation Report.

Appendix A to this Supplement is a continuation of the chronology of our principal actions related to the processing of the application. The report of the Advisory Committee on Reactor Safeguards is attached as Appendix B. Appendix C is a listing of errata to the Safety Evaluation Report.

## 5.0 REACTOR COOLANT SYSTEM

### 5.6 Steam Generator Tubes

The Nuclear Regulatory Commission staff has evaluated the measures that will be taken to assure that the steam generator tubes in the Wolf Creek plant will not be subjected to conditions that will cause degradation of tube wall integrity. We have also evaluated the provisions made by the applicants to detect such degradation, should it occur, before it has progressed far enough to affect the safety of the plant.

The facilities, steam generators, and operating procedures described in this construction permit application for the Wolf Creek plant are of more recent design than those facilities that have experienced steam generator tube degradation. Nuclear steam supply system vendors of pressurized water reactors that have experienced significant steam generator tube corrosion have redesigned steam generators and have made significant changes in the secondary system water chemistry so that the new pressurized water reactor plants, including the Wolf Creek plant, should not experience degradation. The affected nuclear steam supply system vendors are obtaining experimental data on compatibility of the tube material with simulated secondary coolant conditions.

For the Wolf Creek steam generators, current regulatory requirements in combination with the applicants' planned provisions for detection of degradation are considered sufficient at the construction permit stage of review to assure plant safety. If future Nuclear Regulatory Commission staff action on this issue or future inspections of operating Westinghouse steam generators develop significant safety issues concerning design features of systems or components for which preliminary designs are proposed in this application, post construction permit design changes may be required of the applicants.

We have concluded that these measures are adequate. There is no reason to believe that plant safety will be compromised by steam generator tube degradation. Our conclusions are based on the following considerations:

- (1) The steam generators will be of advanced design with improved secondary water flow characteristics, providing more tolerance for occasional lack of water chemistry control.
- (2) The applicants will use an all volatile type of water chemistry that has been shown by service experience to minimize the probability of tube degradation.
- (3) Provisions for monitoring the secondary water chemistry will be included. These will be used to detect the presence of deleterious impurities before significant tube degradation can occur.

- (4) Provisions for monitoring reactor coolant leakage to the secondary side are included in the design, and the limits on such leakage that will be imposed will assure that tube degradation, should it occur, will be detected before loss of integrity results in tube failure.
  
- (5) The design of the steam generators permits inservice inspection of the tubes by methods that will detect tube degradation. Tubes that could degrade to marginal conditions can be taken out of service by plugging.

## 6.0 ENGINEERED SAFETY FEATURES

### 6.2 Containment Systems

#### 6.2.1 Containment Functional Design

In the Safety Evaluation Report we stated that we had been reviewing recent information submitted by the applicants on the containment response to postulated main steam line breaks inside containment. Subsequently, the applicants submitted additional information which provided the results of the analysis of this postulated accident using a conservative mass and energy release model. We have now completed our evaluation of all the information submitted by the applicants and our findings are presented in the following discussion.

The applicants have analyzed the containment pressure response for postulated main steam line failures inside the containment by considering several categories of breaks to provide an envelope of breaks. For the first break category, the most severe case was a 1.4 square-foot steam line break which resulted in the maximum containment temperature. This break corresponds to the size of the flow restrictor located in the steam generator. In this first category, reliance is placed on a signal generated by the primary protection system for main feedwater isolation and steam line isolation. Maximum containment pressure for the break categories considered was calculated for the second break category. For this break category, a break size of one square foot was considered and reliance is placed on the high containment pressure signal for main feedwater isolation and the mid-high containment pressure signal for steam line isolation.

We have reviewed the calculational methods used by the applicants and have found them acceptable. In addition, we have performed confirmatory containment pressure and temperature calculations for these accidents and find that our results are in good agreement with those of the applicants. The applicants calculated a peak containment pressure of 48 pounds per square inch gauge for the limiting steam line failure. This is lower than the peak calculated containment pressure for the primary coolant system cold leg, pump suction double-ended rupture and is, therefore, acceptable since the calculated margin is greater than what we have accepted for the postulated loss-of-coolant accident case.

### 6.3 Emergency Core Cooling System

#### 6.3.3 Performance Evaluation

In the Safety Evaluation Report we stated that we would report on our evaluation of the emergency core cooling system analysis to demonstrate compliance with the requirements of Appendix K to 10 CFR Part 50 (Final Acceptance Criteria), after the applicants had submitted the analysis. This analysis has now been submitted.

The applicants submitted analyses for loss-of-coolant accidents that addressed small breaks and major reactor coolant system pipe breaks. For the large breaks, a spectrum of three break sizes was submitted that was specifically analyzed for the SNUPPS plant. To supplement this analysis, the applicants incorporated by reference Westinghouse Topical Report WCAP-8566, "Westinghouse ECCS Four-Loop Plant (17 x 17) Sensitivity Studies", which covered other break sizes, types and locations in conformance with the break spectrum requirements in Section 50.46(a) of 10 CFR Part 50. The analyses submitted were performed with an acceptable Westinghouse evaluation model which is in conformance with Appendix K to 10 CFR Part 50, as documented in the Commission's letter to Westinghouse Electric Corporation, dated May 30, 1975.

The analyses submitted by the applicants identified the worst break size as the double-ended cold leg guillotine break with a Moody multiplier of 0.6. The calculated peak clad temperature was 2178 degrees Fahrenheit which is below the acceptable limit of 2200 degrees Fahrenheit as specified in Section 50.46(b) of 10 CFR Part 50. In addition, the calculated maximum local metal/water reaction of 7.6 percent and total core wide metal/water reaction of less than 0.3 percent are well below the allowable limits of 17 percent and one percent, respectively. The analyses were performed based on an assumed total peaking factor of 2.32, 102 percent of the rated nuclear steam supply system power level of 3411 megawatts thermal, and 102 percent of the peak linear power density of 12.6 kilowatts per foot. These analyses also assumed that there was a coincident loss of offsite power at the initiation of the loss-of-coolant accident, which would result in pump coastdown and, therefore, increase the peak clad temperature.

The assumptions made by the applicants for the containment net free volume, passive heat sinks, and operation of the containment heat removal systems, result in a conservative containment backpressure for the emergency core cooling system analysis as discussed in Section 6.2.1 of the Safety Evaluation Report.

Appendix K to 10 CFR Part 50 of the Commission's regulations also requires that the combination of emergency core cooling subsystems to be assumed operative shall be those available after the most severe single failure of emergency core cooling system equipment has occurred. The worst single failure was identified by the applicants as the loss of a low pressure emergency core cooling system pump, which provided within a consistent set of assumptions (1) the maximum containment cooling and a reduction in emergency core cooling flow, and (2) the maximum calculated peak clad temperature.

The applicants proposed to use a single valve in the line between the refueling water storage tank and the suction side of the safety injection pumps. This valve did not meet our single failure criterion. We informed the applicants of the unacceptability of the single valve and stated that the provision of a parallel valve would resolve our concern. The applicants have committed to such a provision but have indicated their

intent to continue discussions to convince us of the acceptability of alternative provisions. In the event that the applicants provide information to convince us that an alternative design provides an equivalent degree of protection, we will permit the alternative design to be used. With the applicants' commitment we consider this matter resolved.

With the above recommended condition for valve redundancy, we can conclude that the emergency core cooling system performance will be adequate in the event of any postulated failure of a single component.

We have also reviewed the proposed procedures and the system design for preventing excessive boric acid buildup in the reactor vessel during the long-term cooling phase following a loss-of-coolant accident. One of the following two procedures would be implemented after the initial cold leg injection: (1) simultaneous injection of borated water into the hot and cold legs, or (2) alternate injection of borated water into the hot and cold legs with injection times short enough to prevent excessive buildup of boric acid. We find that the procedures and the systems available for implementing the procedures will prevent the concentration of the boric acid in the core region from exceeding solubility limits. At the operating license stage of review, the applicants will justify the injection times to be used in the long-term cooling procedures following a postulated loss-of-coolant accident, and will demonstrate that all of the pertinent valves are qualified to operate in their post loss-of-coolant accident environment.

The analyses presented by the applicants were based on the plant operating with all four loops. At the operating stage of review, the applicants will submit analyses to address plant operation with less than four loops. At that time, the Technical Specifications will incorporate the appropriate limits on plant operation to be consistent with the required performance of the emergency core cooling system, including any required limitations on plant operation with idle loops.

#### 6.3.5 Conclusions

On the basis of our review of the information submitted by the applicants, we have concluded that (1) the loss-of-coolant accident analyses that were performed are representative of the SNUPPS plants design and are wholly in conformance with the requirements of Appendix K to 10 CFR Part 50, (2) the emergency core cooling system performance conforms to the peak clad temperature and maximum oxidation and hydrogen generation criteria of Section 50.46 to 10 CFR Part 50, (3) with the addition of the redundant valve discussed in Section 6.3.3 of this Supplement, the emergency core cooling system performance will be adequate despite any postulated failure of a single component, and (4) adequate systems are available to provide long-term core cooling. Therefore, we conclude that with the addition of a redundant valve, the design of the Wolf Creek plant emergency core cooling system is acceptable. Further, we conclude that the applicants will comply with the Final Acceptance Criteria.

## 7.0 INSTRUMENTATION AND CONTROLS

### 7.3 Engineered Safety Features Initiation and Actuation Systems

In the Safety Evaluation Report we stated that we had requested the applicants to address for their application, their resolution of the deficiencies of Westinghouse Report WCAP-7705, "Engineered Safeguards Final Device Actuator Testing", identified in our letter to Westinghouse, dated July 14, 1975. The applicants have now provided their resolution, for the SNUPPS plants, of the deficiencies identified for WCAP-7705. The information provided includes the proposed testing of valves within the engineered safety features system. The applicants also state that the main steam isolation valves and the main feedwater isolation valves and associated actuators and controls are of a design which permits partial stroking (closing) of the valves, thus providing a capability for testing during reactor operation.

We have reviewed the information provided and conclude that the applicants' proposed resolution of the WCAP-7705 deficiencies is acceptable for the SNUPPS plants since the resolution provides for a capability of periodically testing containment isolation valves.

In the Safety Evaluation Report we stated that we were reviewing the applicants proposed resolution for meeting the single failure criterion for manually-controlled, electrically-operated valves. We find that the applicants' proposal, which is to lock out power to the controller for these valves, is in conformance with our position, attached as Appendix C to the Safety Evaluation Report. Therefore, we conclude that the proposed resolution is acceptable.

## 8.0 ELECTRIC POWER SYSTEMS

### 8.5 Fire Stops and Seals

In the Safety Evaluation Report, we stated that we had requested the applicants to provide information regarding design criteria and procedures for the fire stops and seals to be used in the electrical design of the facility. The applicant had provided the requested information and we have now completed our review.

Based on our review of the information provided, we have determined that the design of the facility will provide for physical separation of redundant control and protection system cables, use of nonpropagating cable insulation materials, fire stops between rooms and floors and includes fire protection and detection systems as well as inspection capabilities for use both during construction and after the start of plant operation.

We conclude that the electrical design will incorporate features that will minimize the spreading of fires which could damage safety-related electrical equipment and associated circuitry and, therefore, is acceptable.

## 11.0 RADIOACTIVE WASTE MANAGEMENT

### 11.1 Summary Description

In the Safety Evaluation Report we stated that we were reassessing the parameters and mathematical models used in calculating releases of radioactive materials in effluents to effectively implement the requirements of the new Appendix I to 10 CFR Part 50. The Commission subsequently announced on September 4, 1975 an optional method for complying with the guidelines on nuclear power plant effluents. This option allows for compliance with the "as low as practicable" regulation without making a cost-benefit analysis if the radioactive waste management systems meet the guidelines of the proposed Appendix I used by the staff before the new Appendix I became effective.

We have now completed our reassessment of the parameters and mathematical models. As a result, we requested the applicants to provide additional information which we will use to reevaluate the radioactive waste management systems with the new models, and requested the applicants to advise us of which option they plan to use to comply with Appendix I. The applicants have provided the requested information and have stated that they choose to select the option of not performing a cost-benefit analysis.

We have not completed our review of the information provided by the applicants. After we complete our evaluation of the additional information supplied by the applicants, we will report our findings in a supplement to the Safety Evaluation Report.

In the Safety Evaluation Report we stated that the radioactive waste management systems, which include the liquid waste system discussed in Section 11.2, the gaseous waste system discussed in Section 11.3, and the solid waste system discussed in Section 11.4, will all be located in a seismic Category I structure. We also stated that the components of the liquid waste system will be seismically designed as Quality Group C. We found all of these criteria acceptable for the radioactive waste management system.

We have recently revised our requirements for the seismic classification of radioactive waste management systems. These revised requirements permit the radwaste building to be seismically designed to safely withstand the operating basis earthquake instead of the safe shutdown earthquake (seismic Category 1). They also permit the components of the radioactive waste management systems to be seismically designed as Quality Group D, instead of Quality Group C, if the requirements of Quality Group D are augmented with some additional requirements. These additional requirements, plus the background, the bases and the currently acceptable requirements for radioactive waste management systems are presented in staff Technical Position - ETSB No. 11-1, "Design

Guidance for Radioactive Waste Management Systems Installed in Light-Water-Cooled Nuclear Power Reactor Plants", included with Standard Review Plan Section 11.2, "Liquid Waste Management Systems."

Subsequently, the applicants modified the seismic design criteria for the radwaste building from a seismic Category I design to a design which will safely withstand the forces associated with the operating basis earthquake. In addition, the applicants have revised the Quality Group classification for components of the liquid waste system and the gaseous waste system from Quality Group C to Quality Group D as augmented by the additional requirements described by Note 1 of Table 3.2-2 in the SNUPPS PSAR. With this change in classification, all of the components listed in Table 11.1 of the Safety Evaluation Report will be designed as Quality Group D, Augmented.

We have evaluated the revised seismic classification for the radwaste building and for the components of the liquid waste system and the gaseous waste system and find that they are in conformance with our current requirements presented in the staff Technical Position--ETSB No. 11-1. Therefore, we conclude that the revised seismic classifications are acceptable.

#### 14.0 INITIAL TESTS AND OPERATIONS

In the Safety Evaluation Report we concluded that an acceptable test and startup program can and will be implemented by the applicants. We have subsequently determined there is one test we require that the applicants had not committed to performing. The test, which is described in Section C 3b(2) of Regulatory Guide 1.79, "Preoperational Testing of Emergency Core Cooling Systems for Pressurized Water Reactors", involves a test of the emergency core cooling system during the recirculation phase following a postulated loss-of-coolant accident. The test includes recirculation of water from the containment sump to verify vortex control and acceptable pressure drops across screening and suction lines and valves. We have informed the applicants of our requirement for this test. As a result, the SNUPPS applicants have committed to provide the capability for performing this test, in conformance with Regulatory Guide 1.79, on the first SNUPPS unit. As the SNUPPS schedules presently stand, this capability will be provided in the first unit of the Callaway Plant, Units 1 and 2, which is the SNUPPS plant proposed by the Union Electric Company. The SNUPPS applicants state that the sump design for all the SNUPPS plants are identical since the design is part of the standard portion of the plant. Therefore, the results of a sump test performed on the first SNUPPS unit will be applicable to all the SNUPPS plants. The Wolf Creek applicants state that additional checkout tests will be performed on the Wolf Creek plant to assure that the sump system is operational.

We concur with the SNUPPS applicants that the results of a sump test performed on the first SNUPPS unit will be applicable to all the SNUPPS plants. Therefore, on the basis of the SNUPPS applicants' commitment to provide a sump test capability on the first SNUPPS unit in conformance with Regulatory Guide 1.79, we consider this matter resolved.

## 15.0 ACCIDENT ANALYSES

### 15.5 Loss-of-Coolant Accident Dose Model

In the Safety Evaluation Report we reported on the radiological consequences of a postulated loss-of-coolant accident based on the assumptions presented in Table 15.2 of the Safety Evaluation Report.

We have reevaluated this postulated accident to reflect the following changes in the assumptions, which are included in the revised Table 15.2 presented in this Supplement:

- (1) A change in the containment leakage rate (from 0.1 percent per day to 0.2 percent per day) to correctly reflect the SNUPPS design leakage rate, and
- (2) A change in the containment atmosphere mixing rate between sprayed and unsprayed volumes to give credit for the flow distributions established by the containment fan coolers and hydrogen mixing fans.

The resultant radiological doses for this reevaluation are included in the revised Table 15.5 presented in this Supplement. We find that the calculated low population doses resulting from containment purging following a postulated loss-of-coolant accident, as discussed in Section 15.5 of the Safety Evaluation Report, when added to the revised loss-of-coolant accident doses, are well within the guidelines of 10 CFR Part 100.

TABLE 15.2

ASSUMPTIONS USED FOR CALCULATION OF  
LOSS-OF-COOLANT ACCIDENT DOSES

Power Level (megawatts thermal):	3636
Operating Time (years):	3
Fraction of Core Inventory Available for Leakage (percent):	
Iodines	25
Noble Gases	100
Initial Iodine Composition in Containment (percent):	
Elemental	91
Organic	4
Particulate	5
Containment Leak Rate (percent per day):	
0-24 hours	0.2
> 24 hours	0.1
Containment Volume:	
Total Volume (cubic feet)	$2.5 \times 10^6$
Unsprayed Fraction (percent)	11
Containment Mixing Rate between Sprayed and Unsprayed Volume:	
Forced Ventilation Rate (affecting 90 percent of unsprayed volume) (cubic feet per minute)	85,000
Natural Convection Rate (affecting 10 percent of unsprayed volume) (volume changes per hour)	2
Containment Spray System:	
Maximum Elemental Iodine Decontamination Factor Removal Coefficients (per hour):	100
Elemental Iodine	10
Particulate Iodine	0.45
Organic Iodine	0
Relative Concentration Values (seconds per cubic meter):	
0-2 hours	$1.9 \times 10^{-4}$
0-8 hours	$2.7 \times 10^{-5}$
8-24 hours	$1.8 \times 10^{-5}$
1-4 days	$7.4 \times 10^{-6}$
4-30 days	$2.0 \times 10^{-6}$

TABLE 15.5

RADIOLOGICAL CONSEQUENCES OF ACCIDENTS (REM)

<u>ACCIDENT</u>	<u>EXCLUSION AREA</u> <u>(1200 meters)</u>		<u>LOW POPULATION ZONE</u> <u>(4023 meters)</u>	
	<u>Thyroid</u>	<u>Whole Body</u>	<u>Thyroid</u>	<u>Whole Body</u>
Loss-of-Coolant	90	5	83	2
Fuel Handling	2.8	0.9	--	--
Hydrogen Purge Dose	--	--	9	1.2

18.0 REVIEW BY THE ADVISORY COMMITTEE  
ON REACTOR SAFEGUARDS

The Advisory Committee on Reactor Safeguards completed its review of the application for a construction permit for the Wolf Creek Generating Station Unit 1 at its 186th meeting held on October 9-11, 1975. A copy of the Committee's report for the Wolf Creek plant dated October 16, 1975, which contains certain comments and recommendations, is attached as Appendix B. The actions we have taken or plan to take in response to these comments and recommendations are described in the following paragraphs:

- (1) The Committee stated that it wishes to be kept informed on the resolution of the following issues.
  - (a) The emergency core cooling system evaluation in compliance with the Final Acceptance Criteria.
  - (b) The analyses of the effects of anticipated transients without scram.
  - (c) The evaluation of the plant design to meet the requirements of the new Appendix I of 10 CFR Part 50.

Our evaluation of the emergency core cooling system is addressed in Section 6.3 of this Supplement. This matter has been resolved in a manner satisfactory to the staff. By means of this Supplement the Committee is being advised of the results of our evaluation.

As stated in Section 7.2 of the Safety Evaluation Report we are reviewing the analysis of the effects of anticipated transients without scram on a generic basis for Westinghouse plants. We will require that any design changes that are required as a result of our generic review, when it is completed, be implemented in the design of the Wolf Creek plant.

The status of our evaluation of the plant design to meet the requirements of the new Appendix I is addressed in Section 11.1 of this Supplement. After we complete our review of this matter we will report our conclusions in a supplement to the Safety Evaluation Report.

- (2) The Committee recommended that the applicants and the Nuclear Regulatory Commission staff give particular attention to assuring proper coordination with appropriate state agencies in the development of effective emergency plans for the Wolf Creek plant since it will be the first commercial nuclear power plant in the State of Kansas.

We will assure that the emergency plan, to be submitted with the Final Safety Analysis Report, includes the necessary written agreements between the applicants and the various Federal, State and local agencies whose services may be required to cope with emergencies in the environs of the plant.

- (3) The Committee stated they believe that the applicants and the Nuclear Regulatory Commission staff should continue to review the Wolf Creek plant design for features that could reduce the possibility and consequences of sabotage.

The Office of Nuclear Regulatory Research has funded studies concerning possible modes of sabotage at nuclear power plants. Any recommendations resulting from these studies, regarding additional design features to protect against acts of industrial sabotage, will be considered by the staff for incorporation in the Wolf Creek plant design.

- (4) The Committee recommended that the Nuclear Regulatory Commission staff and the applicants review the design features that are intended to prevent the occurrence of damaging fires and to minimize the consequences to safety-related equipment should a fire occur. The Committee requested that it be kept informed concerning this matter.

The staff is considering a program to conduct a comprehensive review and evaluation of all nuclear power plants. The review will consider experience gained from the Browns Ferry Nuclear Generating Station fire, recommendations from the Nuclear Energy Liability-Property Insurance Association and from other qualified fire protection consulting agencies. Any recommendations resulting from these studies will be considered by the staff to determine if any additional measures will be required to upgrade the fire protection systems for the Wolf Creek plant. We will inform the Committee of the results of our review.

- (5) The Committee stated that generic problems relating to large water reactors, should be dealt with appropriately by the applicants and the Nuclear Regulatory Commission staff. These generic problems are discussed in a report by the Advisory Committee on Reactor Safeguards dated March 12, 1975. These problems are being worked on by the staff, various reactor vendors and other industrial organizations and will be the subject of continuing attention by the staff.

## 20.0 FINANCIAL QUALIFICATIONS

### 20.1 Introduction

Section 50.33(f) and Appendix C of 10 CFR Part 50 are the Commission's regulations which relate to financial data and information required to establish financial qualifications for an applicant for a facility construction permit. In accordance with these regulations, the applicants, Kansas Gas and Electric Company and Kansas City Power and Light Company, submitted financial information with their application, as well as providing additional financial information in response to a request by the staff. The following analysis summarizes our review of the application and the additional information and addresses the qualifications of each applicant to finance its 50 percent undivided interest in the costs for the design and construction of the Wolf Creek Generating Station, Unit No. 1.

The analysis focuses on the reasonableness of each company's projected system-wide financing plan (or sources of funds statement) for the period of construction of the subject facility and the assumptions underlying that plan. In that regard, each company submitted both a summary financing plan and a detailed financing plan with underlying assumptions. The applicants have requested, in accordance with Section 2.790 of 10 CFR Part 2, that the detailed financing plans and underlying assumptions be withheld from public disclosure and that the information provided therein be treated as proprietary to the extent that it is not disclosed in this analysis. Nevertheless, the details and assumptions of these plans have been considered in our determination of the financial qualifications of the applicants.

### 20.2 Construction Cost Estimates

The applicants have submitted construction cost estimates for the facility as follows:

	<u>(dollars in millions)</u>
Nuclear production plant costs-----	\$ 941.6
Transmission, distribution and general plant costs -----	5.4
Nuclear fuel inventory cost for first core -----	<u>56.1</u>
TOTAL	<u>\$1,003.1</u>

The estimated cost of the proposed Wolf Creek facility has been compared with costs estimated by the CONCEPT computer costing model. The Oak Ridge National Laboratory, which does the CONCEPT computer work for the staff states that "estimates produced by the CONCEPT code are not intended as substitutes for detailed engineering cost estimates, but were prepared as a rough check on the applicants' estimate." The CONCEPT costing

model projected the cost of the Wolf Creek plant to be \$1,074 million which is a variation of 12.3 percent from the applicants' estimate. The staff has concluded that it is reasonable to use the applicants' estimate for purposes of this analysis because of the relative closeness of the two estimates and because the applicants' estimate represents the more detailed engineering cost study for this specific project.

### 20.3 Kansas Gas and Electric Company

#### 20.3.1 General

Kansas Gas and Electric Company is an investor-owned electric utility operating in southeastern Kansas. It serves approximately 200,000 residential, commercial, and industrial customers as well as selling power at wholesale to municipalities and rural electric cooperatives. Kansas Gas and Electric Company's operating revenues increased from \$91.3 million for the 12 months ended September 30, 1974, to \$119.9 million for the 12 months ended September 30, 1975, and net income increased from \$10.1 million to \$17.6 million over the same period. Invested capital on August 31, 1975 amounted to \$392.3 million and consisted of 56.1 percent long-term debt, 13.8 percent preferred stock, and 30.1 percent common equity. The company's first mortgage bonds are rated "Aa" by Moody's and "AA-" by Standard and Poor's, both high grade ratings.

#### 20.3.2 Construction Program and Source of Funds

Kansas Gas and Electric Company plans to finance its fifty percent portion of the Wolf Creek plant design and construction costs as part of its overall construction program. The funds will be provided from a combination of internally-generated funds (including retained earnings, depreciation, and deferred income taxes) and from the issuance of securities including long-term debt, preferred stock, and common stock. Interim funding requirements will be met with bank loans and the sale of commercial paper. In response to a staff request, the company has submitted a sources of funds statement (or financing plan) for its system-wide construction expenditures for the period 1975 through 1982, the estimated year of commercial operation of the Wolf Creek Generating Station. The sources of funds statement was submitted in both summary and detailed form. Kansas Gas and Electric Company's summary sources of funds statement is included in Table 20.1. As noted in Section 20.1 above, the detailed sources of funds statement and underlying assumptions were considered in our analysis but are not disclosed herein pending resolution of the applicants' request for proprietary treatment of those submissions.

Kansas Gas and Electric Company's gross construction expenditures (including allowance for funds used during construction) for the near-term period 1975 through 1977 are presently estimated at \$273 million or an average annual expenditure of \$91 million. This compares to actual 1974 gross construction expenditures of \$48.1 million. For the years 1978 through 1982, when commercial operation of the unit is planned, Kansas Gas and Electric Company plans average annual gross construction expenditures of

\$146.6 million. These planned annual expenditures, while larger than recent actual expenditures and the near term plans, are not unreasonable when one considers the effect on construction costs of future inflation and if one assumes a rational regulatory environment which allows the company a return on investment sufficient to attract new capital and a resumption of growth in demand for electricity occurring in conjunction with a general economic recovery from the recession.

Kansas Gas and Electric Company plans \$69.6 million of external financing in 1975 (net of reductions in short-term debt) or 77 percent of the planned \$90.1 million gross construction expenditures for the year. During the eight months ended August 31, 1975, the company has completed \$45.0 million of this net external financing including a \$14.0 million common stock issuance, a \$20.0 million preferred stock issuance, a \$40.0 million first mortgage bond issuance, and an overall reduction in short-term debt of \$29.0 million. The security issues are 99 percent of total issuances planned for the year and the reduction in short-term debt through August 1975 is greater than had been planned for the entire calendar year (\$5.0 million). The proceeds of the security issues were used to finance the company's construction program as well as to reduce short-term debt. The short-term debt has been incurred to finance temporarily the company's construction program.

One measure of the company's ability to issue first mortgage bonds is its coverage of interest requirements through earnings as specified in the bond indenture. The most restrictive coverage test in Kansas Gas and Electric Company's indenture requires that adjusted net earnings after depreciation reserve requirements for 12 out of the 15 months preceding the issuance of the additional bonds be at least 2.0 times the annual interest requirements on all bonds outstanding plus the bonds applied for and any other indebtedness of prior rank. The company's coverage for the 12 months ended August 31, 1975 under the most restrictive test was 3.08. Assuming an interest rate of 9.5 percent, the company could have issued an additional \$81.7 million in first mortgage bonds at that time. The 3.08 coverage is an improvement from the 2.72 coverage at the time the company issued \$40 million of first mortgage bonds in June 1975.

Recent improvement in the company's earnings is primarily responsible for the increased interest coverage. Kansas Gas and Electric Company's net income increased 74 percent from the 12 months ended September 30, 1974 (\$10.1 million) to the 12 months ended September 30, 1975 (\$17.6 million) or from \$1.73 to \$2.96 per average share of common stock. Cash earnings available for common stock (defined as net income after preferred dividends, plus depreciation, deferred income taxes, investment tax credit adjustments, and minus the allowance for funds used during construction) increased from \$5.03 to \$5.89 per average common share over the same period, which indicates fully adequate coverage of the company's common dividend which was \$1.56 per share in 1974 and which is being paid in 1975 at the annual rate of \$1.60 per share. This substantial difference between cash earnings available for common stock and the common dividend indicates a favorable trend in internally-generated cash available for construction expenditures. It also is a positive factor in the marketability of the company's securities.

### 20.3.3 Regulatory Environment

Kansas Gas and Electric Company is subject to regulatory jurisdiction as to its retail rates by the Kansas Corporation Commission and as to its wholesale rates by the Federal Power Commission. The company's most recent retail rate increase was granted by the Kansas Corporation Commission to be effective July 30, 1975, and to increase annual revenues by \$3.8 million. A rate of return on common equity of 14.85 percent was allowed. In determining the fair rate of return for Kansas Gas and Electric Company, the Kansas Corporation Commission stated in its order that the Kansas Corporation Commission is bound to the precept that "a fair rate of return is that which will provide the company sufficient revenues to maintain its credit and to attract capital at a rate of return commensurate with other investments and enterprises having corresponding risks, and to preserve the financial integrity of the utility." Effective with the Kansas Corporation Commission's November 1973 Order, the company is permitted to pass on increased fuel costs to virtually all of its customers through an automatic fuel adjustment clause. Other retail rate increases granted in recent years were \$8.3 million effective in April 1974 (supplemented in October 1974 with \$5.2 million by order of a Kansas court), and a \$1.4 million increase effective in July 1972. The company's earned rate of return on average common equity has improved from 9.4 percent for the year ended December 31, 1974, to 12.1 percent for the 12 months ended August 31, 1975.

The company's most recent wholesale rate increases allowed by the Federal Power Commission were \$778,000 annually (effective March 14, 1975) applicable to its rural cooperative customers and \$401,000 annually (effective April 30, 1975) applicable to its non-generating municipal electric system customers. In addition, the company has applied to the Federal Power Commission for a \$176,000 annual increase in the rates it charges to its generating municipal electric system customers.

Our analysis includes the assumption that there will be rational regulatory policies with respect to the setting of rates. This implies that rates will be set to at least cover the cost of service, including the cost of capital.

## 20.4 Kansas City Power and Light Company

### 20.4.1 General

Kansas City Power and Light Company is an investor-owned electric utility operating in northeast Kansas and northwest Missouri, including the Kansas City metropolitan area. It serves approximately 320,000 residential, commercial, and industrial customers as well as providing power at wholesale to other public utilities. Approximately 78 percent of its electric sales are made in Missouri and the remainder in Kansas. It also furnishes steam heat to downtown Kansas City, Missouri. The company's operating revenues increased from \$164.1 million for the 12 months ended September 30, 1974, to \$205.5 million for the 12 months ended September 30, 1975, and net income increased from \$19.0 million to \$24.7 million over the same period. Invested capital on August 31, 1975 amounted to \$609.8 million and consisted of 53.2 percent long-term

debt, 12.6 percent preferred stock, and 34.2 percent common equity. The company's first mortgage bonds are rated "AA," a high grade rating, by both Moody's and Standard and Poor's.

#### 20.4.2 Construction Program and Source of Funds

The company plans to finance its fifty percent undivided ownership in the Wolf Creek plant as part of its overall construction program. The funds will be provided both from internally-generated funds including retained earnings, deferred taxes, and depreciation and from the issuance of additional securities in the form of long-term debt and common and preferred stock. Interim, short-term funding will be provided through bank loans and the sale of commercial paper. At the staff's request, Kansas City Power and Light Company has provided a sources of funds statement (or financing plan) with underlying assumptions for its overall construction program for the period 1975 through 1982, the estimated year of commercial operation of the Wolf Creek unit. The sources of funds statement was submitted in both summary and detailed form and, as noted in Section 20.1 above, the detailed statement and underlying assumptions were considered in our analysis but are not disclosed herein pending resolution of the applicants' request for proprietary treatment of those submissions. The summary sources of funds statement is included in Table 20.2.

The company's gross construction expenditures (including allowance for funds used during construction) for the near-term period of 1975 through 1977 are presently estimated at \$348 million or an average annual expenditure of \$116 million. This compares to actual 1974 gross construction expenditures of \$63.2 million. For the years 1978 through 1982, when commercial operation of the unit is planned, the company plans average annual gross construction expenditures of \$175.4 million. These planned annual expenditures, while larger than recent actual expenditures and the near term plans, are not unreasonable when one considers the effect on construction cost: of future inflation and if one assumes a rational regulatory environment which allows the company a return on investment sufficient to attract new capital and a resumption of growth in demand for electricity occurring in conjunction with a general economic recovery from the recession.

Kansas City Power and Light Company plans \$47.8 million of external financing in 1975 (net of reductions in short-term debt) or 49 percent of the planned \$98.1 million gross construction expenditures for the year. During the eight months ended August 31, 1975, the company had completed \$26.1 million of this net external financing including a \$19.6 million common stock issuance, a \$20.0 million preferred stock issuance, and an overall reduction in short-term debt of \$13.5 million. The security issuances are 67 percent of total issuances planned for the year and the reduction in short-term debt through August 1975 is greater than had originally been planned for the entire calendar year (\$11.6 million). The short-term indebtedness consists of unsecured bank loans and commercial paper and is issued from time to time to temporarily finance construction expenditures. Thus, the company has completed a significant portion of its 1975 external financing plan.

The company's coverage of interest requirements as specified in the bond indenture is a measure of the company's ability to issue first mortgage bonds. Kansas City Power and Light Company's indenture requires that net earnings for 12 consecutive months within the 15 months preceding the issue be at least 2.0 times the annual interest charges on all bonds outstanding plus the proposed bonds and any prior lien bonds. The Company's coverage for the 12 months ended August 31, 1975 was 3.40. The company states that with this coverage it could have issued an additional \$125 million in first mortgage bonds at that time. The 3.40 coverage is an improvement from the company's 3.27 coverage for the 12 months ended June 30, 1975.

Recent improvement in the company's earnings is primarily responsible for the favorable interest coverage. Kansas City Power and Light Company's net income increased 30 percent from the 12 months ended September 30, 1974 (\$19.0 million) to the 12 months ended September 30, 1975 (\$24.7 million) or from \$2.72 to \$3.51 per average share of common stock. Cash earnings available for common stock (defined as net income after preferred dividends, plus depreciation, deferred income taxes, investment tax credit adjustments, and minus the allowance for funds used during construction) increased from \$6.94 to \$8.08 per average common share over the same period, which indicates fully adequate coverage of the company's common dividend which was \$2.20 per share in 1974 and which is being paid in 1975 at the annual rate of \$2.28 per share. This substantial difference between cash earnings available for common stock and the common dividend indicates a favorable trend in internally-generated cash available for construction expenditures. It also is a positive factor in the marketability of the company's securities.

#### 20.4.3 Regulatory Environment

With regard to retail rates, the company is subject to the regulatory jurisdiction of the Missouri Public Service Commission and the Kansas Corporation Commission. The Federal Power Commission has regulatory jurisdiction over the company's wholesale rates. The company's most recent Missouri electric rate increase was effective July 16, 1974 based on a partially projected test year and amounted to \$21.1 million on an annual basis. A rate of return of 12.8 percent on common equity was allowed. In April 1974, the Missouri Public Service Commission allowed a \$437,000 annual increase in rates the company charges for steam service to Kansas City. The company's most recent Kansas retail rate increase amounted to \$4.7 million and was granted in September 1974. However, the Kansas Corporation Commission, in a supplemental order, increased the total to \$6.2 million annually, effective December 23, 1974. A 13.0 percent rate of return on common equity was authorized in this case. The Federal Power Commission ordered a \$531,000 wholesale rate increase to become effective on March 18, 1974, allowing a 12.0 percent rate of return on common equity. The company's earned rate of return on average common equity has

increased from 9.3 percent for the 12 months ended December 31, 1974 to 10.9 percent for the 12 months ended August 31, 1975. In addition, the company recovers substantially all of the increases in its total fuel costs through adjustment clauses in effect in Missouri and Kansas.

The company's pending rate increase requests include a \$30.4 million request in Missouri, which would allow a 14.5 percent rate of return on common equity, and a \$10.5 million request in Kansas, which would also amount to a 14.5 percent rate of return on common equity. In addition, the company requested a \$543,000 increase in its steam service rates.

Our analysis includes the assumption that there will be rational regulatory policies with respect to the setting of rates. This implies that rates will be set to at least cover the cost of service, including the cost of capital.

#### 20.5 Conclusions

Based on the preceding analysis, we have concluded that Kansas Gas and Electric Company and Kansas City Power and Light Company are financially qualified to design and construct the Wolf Creek Generating Station. Our conclusion is based on the determination that the applicants have reasonable assurance of obtaining the funds necessary to complete the design and construction activities including related fuel cycle costs. It is also based on the basic assumptions of rational regulatory environment and viable capital markets due to the lengthy future period involved and the expected heavy dependence on external financing.

TABLE 20.1

SUMMARY SOURCES OF FUNDSKANSAS GAS AND ELECTRIC COMPANY

## FINANCING CONSTRUCTION PROGRAM 1975-1982

	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>Total</u>
	(Millions of Dollars)								
<u>External Funds</u>									
Financing:									
New Money	\$74.6	\$74.5	\$49.6	\$87.5	\$129.0	\$99.0	\$48.0	\$81.0	\$643.2
Refunding	-	-	-	5.0	3.0	1.0	2.0	14.0	25.0
Short-Term Borrowing Inc./ (Dec.)	<u>(5.0)</u>	<u>(3.4)</u>	<u>3.4</u>	<u>(7.7)</u>	<u>14.3</u>	<u>19.1</u>	<u>23.2</u>	<u>(32.5)</u>	<u>11.4</u>
Total	69.6	71.1	53.0	84.8	146.3	119.1	73.2	62.5	679.6
<u>Internal Generation</u>									
Depreciation	13.3	13.8	16.4	19.1	20.1	21.6	22.6	36.0	162.9
Tax Deferrals	6.0	8.9	11.2	11.2	14.3	12.2	11.1	16.7	91.6
Other	<u>1.2</u>	<u>3.3</u>	<u>5.6</u>	<u>9.6</u>	<u>16.3</u>	<u>8.2</u>	<u>30.8</u>	<u>(2.5)</u>	<u>72.5</u>
Total	20.5	26.0	33.2	39.9	50.7	42.0	64.5	50.2	327.0
<u>Construction Expenditures</u>	90.1	97.1	86.2	124.7	197.0	161.1	137.7	112.7	1,006.6

TABLE 20.2

SUMMARY SOURCES OF FUNDSKANSAS CITY POWER AND LIGHT COMPANY

NOTE: This data is submitted at the request of the Nuclear Regulatory Commission and is not intended to induce, or to be used in connection with, any sale or purchase of any securities of the Company. The data is not intended, and should not be considered, as a forecast of what will actually occur. It is a projection based on anticipated construction expenditures and capital requirements and on certain assumptions, among others, as to cost of additional capital, appropriate rate relief by regulatory agencies, and the adequacy of revenues. The data has been estimated and is subject to significant revision as the outlook for the future changes.

Applicant: Kansas City Power & Light Company Nuclear Plant: Wolf Creek

Sources of Funds for System-Wide Construction Expenditures During Period  
of Construction of Subject Nuclear Power Plant  
(millions of dollars)

<u>Available Funds</u>	<u>Construction Years of Subject Nuclear Power Plant</u>							
	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Common stock	\$ 19.6	\$ ---	\$ 30.0	\$ 20.0	\$ ---	\$ ---	\$ 15.0	\$ ---
Preferred stock	19.8	15.0	---	25.0	20.0	15.0	20.0	---
Long-term debt	20.0	35.0	50.0	60.0	80.0	30.0	---	25.0
Notes payable increase-(decrease)	(11.6)	13.2	(14.8)	20.0	(1.8)	(15.4)	5.8	(2.6)
Contributions from parent-net	---	---	---	---	---	---	---	---
Internal funds	33.4	40.8	57.4	57.3	67.6	86.5	90.1	121.0
Other funds	11.2	2.0	.5	.5	.5	.5	.5	.5
<b>TOTAL FUNDS</b>	<b>\$ 92.4</b>	<b>\$106.0</b>	<b>\$123.1</b>	<b>\$182.8</b>	<b>\$166.3</b>	<b>\$116.6</b>	<b>\$131.4</b>	<b>\$143.9</b>
<u>Construction expenditures*</u>								
Nuclear power plants	\$ 5.7	\$ 16.1	\$ 36.3	\$ 76.1	\$124.7	\$ 78.9	\$ 37.5	\$ 5.8
Other	86.7	89.9	86.8	106.7	41.6	37.7	93.9	138.1
Total const. exp's.	\$ 92.4	\$106.0	\$123.1	\$182.8	\$166.3	\$116.6	\$131.4	\$143.9
Subject nuclear plant	\$ 5.7	\$ 16.1	\$ 36.3	\$ 76.1	\$124.7	\$ 78.9	\$ 37.5	\$ 5.8

\*Exclusive of AFDC (allowance for funds used during construction)

## 21.0 CONCLUSIONS

Our conclusion that the issuance of a permit for construction of the facility will not be inimical to the common defense and security or to the health and safety of the public, as stated in the Safety Evaluation Report, Section 21.0 was conditioned on the favorable resolution of outstanding matters identified in Section 1.8 of the Safety Evaluation Report. We have discussed each of these outstanding issues in this Supplement and, except for the Appendix I evaluation discussed in Section 11.1, have indicated a favorable resolution of each matter. Therefore, subject a favorable finding in our Appendix I evaluation, we can reaffirm our conclusions as set forth in Section 21.0 of the Safety Evaluation Report.

APPENDIX A  
CONTINUATION OF CHRONOLOGY OF RADIOLOGICAL REVIEW OF  
WOLF CREEK PLANT

August 22, 1975	Letter to applicants requesting information concerning main steam line break analysis
September 3, 1975	Issuance of Safety Evaluation Report
September 5, 1975	Letter from SNUPPS transmitting Revision 10 to SNUPPS PSAR, incorporating information previously submitted, information concerning fire stops and seals, ECCS, site data, and design changes
September 5, 1975	Letter from applicants incorporating Revision 10 of SNUPPS PSAR as Amendment No. 22
September 8, 1975	Letter from SNUPPS concerning changes in seismic design of the radwaste equipment and building
September 9, 1975	Letter from applicants incorporating SNUPPS letter dated September 8, 1975
September 9, 1975	Letter to applicants requesting updated financial information
September 10, 1975	Meeting with applicants to discuss meteorology
September 12, 1975	Letter to applicants requesting information for Appendix I evaluations
September 12, 1975	Letter from SNUPPS transmitting information concerning main steam line break analysis, in response to request of August 22, 1975
September 15, 1975	Submittal of Amendment 23 (Revision 4 to Environmental Report)
September 16, 1975	Letter from applicants incorporating SNUPPS letter of September 12, 1975
September 23, 1975	Letter to applicants concerning containment design leakage rate
September 24, 1975	Letter from SNUPPS transmitting Revision 11 to SNUPPS PSAR, incorporating information previously submitted and revisions concerning changes in the seismic design of the radwaste building and equipment
September 26, 1975	ACRS subcommittee meeting with staff and applicants
September 30, 1975	Letter from applicants incorporating Revision 11 to SNUPPS PSAR as Amendment No. 24
October 2, 1975	Meeting with SNUPPS Utilities to discuss main steam line break analysis
October 3, 1975	Letter from applicants transmitting updated financial information
October 6, 1975	Letter from SNUPPS transmitting information concerning containment design leakage rate, in response to request of September 23, 1975
October 6, 1975	Meeting with SNUPPS Utilities to discuss outstanding issues
October 7, 1975	Letter from applicants transmitting proprietary financial information
October 8, 1975	Letter from applicants incorporating SNUPPS letter dated October 6, 1975

October 9, 1975 ACRS meeting with staff and applicants

October 10, 1975 Letter from SNUPPS transmitting additional information concerning containment design leakage rate, in response to request of September 23, 1975

October 13, 1975 Submittal of Amendment 25 (Revision 5 to Environmental Report)

October 13, 1975 Letter from SNUPPS transmitting Revision 12 to SNUPPS PSAR, consisting of clarification and minor changes to the SNUPPS PSAR

October 14, 1975 Letter from applicants incorporating Revision 12 to SNUPPS PSAR as Amendment No. 26

October 15, 1975 Letter from applicants incorporating SNUPPS letter dated October 10, 1975

October 16, 1975 ACRS Report

October 21, 1975 Letter to applicants requesting response to staff positions

October 24, 1975 Submittal of Amendment No. 27 (Revision 9 to Site Addendum), consisting of changes reflecting commitments and corrections

October 28, 1975 Letter from SNUPPS providing partial response to request of October 21, 1975 concerning ECCS

October 31, 1975 Letter from SNUPPS transmitting information concerning main steam line break analysis

October 31, 1975 Letter from applicants incorporating SNUPPS letter dated October 28, 1975

November 3, 1975 Letter from applicants incorporating SNUPPS letter dated October 31, 1975

November 7, 1975 Letter to applicants requesting response to staff position regarding WCAP-7705

November 10, 1975 Letter from SNUPPS concerning main steam isolation valves and main feedwater isolation valves

November 10, 1975 Letter from SNUPPS providing information in response to request of November 7, 1975

November 11, 1975 Letter from SNUPPS providing additional information in response to request of October 21, 1975 concerning ECCS

November 18, 1975 Meeting with SNUPPS Utilities to discuss outstanding issues

November 18, 1975 Letter from applicants incorporating SNUPPS letters dated November 10, 1975 (concerning main steam and main feedwater isolation valves) and November 11, 1975

November 21, 1975 Letter from SNUPPS providing information regarding verbal commitments made at November 18, 1975 meeting

November 24, 1975 Letter from applicants incorporating SNUPPS letter of November 21, 1975

November 26, 1975 Letter from SNUPPS transmitting Revision 13 to SNUPPS PSAR, which incorporates information previously submitted by letters, and provides information concerning research and development plans

December 2, 1975 Letter from applicants incorporating Revision 13 to SNUPPS PSAR as Amendment No. 28

APPENDIX B

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

October 16, 1975

Honorable William A. Anders  
Chairman  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Subject: REPORT ON THE WOLF CREEK GENERATING STATION, UNIT 1

Dear Mr. Anders:

During its 186th meeting, October 9-11, 1975, the Advisory Committee on Reactor Safeguards reviewed the application of Kansas Gas and Electric Company and Kansas City Power and Light Company for a permit to construct Wolf Creek Generating Station Unit 1. The site was visited on September 25, 1975, and a Subcommittee meeting was held in Emporia, Kansas on September 26, 1975. The "Standardized Nuclear Unit Power Plant System" (SNUPPS), to be utilized at the Wolf Creek site and three other plant sites, was also reviewed at a Subcommittee meeting held in Washington, D. C. on August 19, 1975, and at the 185th and the 186th meetings of the Committee. During its reviews, the Committee had the benefit of discussions with the Nuclear Regulatory Commission (NRC) Staff, and representatives of the applicants, the Westinghouse Electric Corporation and the Bechtel Corporation. The Committee also had the benefit of the documents listed below.

The Wolf Creek plant will be located on a 10,000-acre site in the Neosho River Basin in Coffey County, Kansas, about 28 miles east-southeast of Emporia, the nearest population center (1970 population: about 23,000). The exclusion area extends radially from the center of the reactor building a distance of 1200 meters. Except for several existing public roads which the applicants have assured can and will be abandoned prior to the start of construction, the applicants own all the area within the exclusion zone.

The SNUPPS will utilize the RESAR-3 Consolidated Version, four-loop pressurized water nuclear reactor having a core power output of 3411 MW(t). This design is similar to that utilized at the Comanche Peak Steam Electric Station Units 1 and 2, reported on by the Committee in its letter of October 18, 1974. The Committee's continuing review of the SNUPPS was reported on in its Callaway letter dated September 17, 1975. It is anticipated that the Committee's report on the remainder of its review of SNUPPS will be included in its report on the Tyrone application.

The NRC Staff has identified several items in its review of the Wolf Creek application which are not yet completed. The Committee recommends that any outstanding issues which may develop in the course of completing these reviews be dealt with in a manner satisfactory to the NRC Staff. The Committee wishes to be kept informed on the resolution of the following items:

1. The emergency core cooling system evaluation in compliance with the Final Acceptance Criteria.
2. The analyses of the effects of anticipated transients without scram.
3. The evaluation of the plant design to meet the requirements of the new Appendix I of 10CFR Part 50.

The RESAR-3 Consolidated Version nuclear design utilizes the Westinghouse 17x17 fuel assembly. Westinghouse has identified an integrated test program to confirm the safety margins associated with this design, which it plans to complete late this year. The RESAR-3 reactor core design has been calculated by Westinghouse to be stable against radial xenon oscillations. Westinghouse has agreed to verify this stability in a startup physics test for a 193 fuel assembly core similar to SNUPPS. The Committee will continue to review these matters as appropriate documentation is submitted.

The Committee recommended in its report of September 10, 1973, on acceptance criteria for ECCS, that significantly improved ECCS capability should be provided for reactors for which construction permit requests are filed after January 7, 1972. The SNUPPS design is in this category. These units will use the 17x17 fuel assemblies similar to those to be used in Comanche Peak Steam Electric Station, Units 1 and 2. Although calculated peak clad temperatures in the event of a postulated LOCA are less for 17x17 assemblies than for a 15x15 array, the Committee believes that the applicants should continue studies that are responsive to the Committee's September 10, 1973 report. If studies establish that significant further ECCS improvements can be achieved, consideration should be given to incorporating them into this unit.

The Wolf Creek Plant, Unit 1 will be the first commercial nuclear power plant in the State of Kansas. For this reason, the Committee recommends that the applicant and the NRC Staff give particular attention to assuring proper coordination with appropriate state agencies in the development of effective emergency plans for this facility.

October 16, 1975

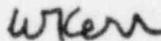
The Committee believes that the applicants and the NRC Staff should continue to review the Wolf Creek plant design for features that could reduce the possibility and consequences of sabotage.

The Committee recommends that the NRC Staff and the applicants review the design features that are intended to prevent the occurrence of damaging fires and to minimize the consequences to safety-related equipment should a fire occur. This matter should be resolved to the satisfaction of the NRC Staff. The Committee wishes to be kept informed.

Generic problems relating to large water reactors are discussed in the Committee's report dated March 12, 1975. These problems should be dealt with appropriately by the NRC Staff and the applicants.

The Advisory Committee on Reactor Safeguards believes that the items mentioned above and the items mentioned in its Callaway letter, which are relevant to the Wolf Creek application, can be resolved during construction, and that if due consideration is given to the foregoing, the Wolf Creek Generating Station Unit 1 can be constructed with reasonable assurance that it can be operated without undue risk to the health and safety of the public.

Sincerely yours,



W. Kerr  
Chairman

References

1. SNUPPS Preliminary Safety Analysis Report with Revisions 1 through 10 and the Wolf Creek Site Addendum Report with Revisions 1 through 7.
2. RESAR-3 Consolidated Version, Westinghouse Reference Safety Analysis Report with Amendments 1 through 6.
3. Safety Evaluation Report NUREG 75/080 related to the construction of the Wolf Creek Generating Station, Unit No. 1, Docket No. STN 50-482, September, 1975.

APPENDIX C

CHANGES AND CORRECTIONS TO THE  
SAFETY EVALUATION REPORT

Page 1-1, Line 1 of First Paragraph

Change "Kansas Power & Light Company" to "Kansas City Power & Light Company"

Page 1-3, Lines 6 and 7 of Second Paragraph

Delete "radioactive waste treatment systems,"

Page 1-3, Second Paragraph

Add the following sentence at the end of the paragraph "The radwaste building, which will be separate from the other structures, will house the radioactive waste treatment systems."

Page 2-10, Table on Bottom of Page

Delete duplicate entry for 1-4 days data

Page 3-3, Section 3.3, Line 6 of Third Paragraph

Change "structures will be" to "structures, systems and components will be determined by appropriate combination"

Page 3-11, Section 3.8.2, Line 5 of Second Paragraph

Change "shipping" to "whipping"

Page 4-6, Section 4.3.1, Line 13 of First Paragraph

Change "demonstrates" to "indicates"

Page 5-8, Section 5.2.8, Line 7 of First Paragraph

Change "29" to "39"

Page 6-6, Section 6.2.3, Line 3 of Second Paragraph

Change "2,000,000" to "2,230,000"

Page 6-9, Section 6.3.1, Line 6 of the First Paragraph

Change "steam leak break" to "steam line break"

Page 6-11, Section 6.3.2, Line 2 of Second Paragraph

Change "850 cubic feet and 500 cubic feet" to "950 cubic feet and 400 cubic feet"

Page 9-2, Section 9.2.1, Line 7 of First Paragraph

Change "0.98." to "0.95."

Page 9-?, Section 9.2.1, First Paragraph

Add the following sentence at the end: "For optimum moderation, such as fogging or misting conditions,  $K_{eff}$  will not exceed 0.98."

Page 11-2, Section 11.2, Line 1 of First Paragraph

Change "consint" to "consist"

Page 17-15, Section 17.6, Line 1 of Second Paragraph

Add the word "through" after "QA organization"