KANSAS GAS AND ELECTRIC COMPANY

GLENN L. KOESTER
VICE PRESIDENT - NUCLEAR

March 9, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

KMLNRC 84-028
Re: Docket No. STN 50-482
Ref: Letter of 1/4/84 from DGEisenhut, NRC, to GLKoester, KG&E
Subj: Wolf Creek Design Verification Activities

Dear Mr. Denton:

The Reference requested KG&E provide to the NRC additional information concerning the design process used in constructing Wolf Creek. KG&E personnel met with members of the NRC Staff on February 6, 1984, to discuss KG&E's planned response to the request.

The Attachment provides the information requested. The Attachment discusses the nearly identical design of Callaway and Wolf Creek; the minor design features unique to Wolf Creek which are limited to less than 5% of the total plant design and deal mainly with the post-accident source of cooling water and plant siting factors; the nearly identical design process for Callaway and Wolf Creek; the minor design process differences for Wolf Creek; the applicability of the Callaway Integrated Design Inspection (IDI) findings to Wolf Creek; and the quality assurance programs for Callaway and Wolf Creek.

The NRC's IDI performed on the Callaway Auxiliary Feedwater System constituted an independent verification of the design and design processes utilized for Wolf Creek because of the nearly identical design of the two SNUPPS units and the design process and design process controls utilized at both units. Because of the limited extent of Wolf Creek site-specific design activities and because these activities have been subjected to vigorous design reviews and controls, it appears evident to KG&E that the applicability of NRC's IDI precludes the need for further independent review of veritification activities for Wolf Creek.

Yours very truly,

Glenn L Koester

GLK:bb, w/a
cc: JCollins, Reg. IV, w/a
WSSchum, w/a
PWO'Connor (2), w/a

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OATH OF AFFIRMATION

STATE OF KANSAS)
) SS:
COUNTY OF SEDGWICK)

I, Glenn L. Koester, of lawful age, being duly sworn upon oath, do depose, state and affirm that I am Vice President - Nuclear of Kansas Gas and Electric Company, Wichita, Kansas, that I have signed the foregoing letter of transmittal, know the contents thereof, and that all statements contained therein are true.

KANSAS GAS AND ELECTRIC COMPANY

By Glenn L. Koester
Glenn L. Koester
Vice President - Nuclear

ATTEST:

E.D. Prothro
E.D. Prothro, Assistant Secretary

STATE OF KANSAS)
) SS:
COUNTY OF SEDGWICK)

BE IT REMEMBERED that on this 9th day of March, 1984, before me, Evelyn L. Fry, a Notary, personally appeared Glenn L. Koester, Vice President - Nuclear of Kansas Gas and Electric Company, Wichita, Kansas, who is personally known to me and who executed the foregoing instrument, and he duly acknowledged the execution of the same for and on behalf of and as the act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal the date and year above written.

EVELYN L. FRY
NOTARY
PUBLIC
STATE OF KANSAS

Evelyn L. Fry
Evelyn L. Fry, Notary

My Commission expires on August 15, 1984.

Attachment to KMLNRC 84-028

Wolf Creek Generating Station,

Unit No. 1

Design Verification Activities

Response to D.G. Eisenhut Letter to G.L. Koester

Dated January 4, 1984

Kansas Gas and Electric Company

March 9, 1984

WOLF CREEK DESIGN VERIFICATION ACTIVITIES

1.0 INTRODUCTION

This Attachment provides a condensed description of the design and design processes for Wolf Creek to demonstrate how these processes worked to ensure that NRC regulations and licensing commitments have been carried through to construction implementation at the plant. KG&E believes that this response satisfactorily demonstrates that no additional independent design verification activities are necessary for Wolf Creek.

1.1 INTEGRATED DESIGN INSPECTION REPORT

The NRC conducted an integrated design inspection (IDI) of the SNUPPS auxiliary feedwater system during November and December 1982. The IDI team consisted of personnel from the Office of Inspection and Enforcement, Office of Nuclear Reactor Regulation, Region IV Office and consultants. The team visited the Callaway Plant site, Union Electric's Corporate Offices; and Bechtel, Westinghouse, and SNUPPS Staff offices. The Inspection Report was issued to Union Electric in Reference 1.

Reference 1 acknowledged the standard design of the two SNUPPS units and that most findings and conclusions would apply equally to Wolf Creek. The Reference 1 Report was forwarded to KG&E for information only and stated that separate responses with respect to Wolf Creek were not needed.

The "vertical slice" type inspection done by the NRC of the SNUPPS auxiliary feedwater system, did not result in evaluation of the Callaway site architect-engineering firm (Sverdrup and Parcel) since this system is entirely within the design scope of the power block or lead architect-engineer (Bechtel) and the NSSS vendor (Westinghouse). This is also the case for Wolf Creek in that the site architect/engineer (Sargent and Lundy) has no interfacing responsibilities with Bechtel or Westinghouse on the auxiliary feedwater system.

1.2 RESPONSES TO THE INTEGRTAED DESIGN INSPECTION REPORT

Union Electric provided responses to the requested items for the SNUPPS Project in Reference 2. The NRC requested additional information on seven of the IDI items in Reference 3. Reference 4 provided second responses for the SNUPPS Project for the seven requested items. SNUPPS Staff and KG&E personnel participated in the review of the responses to the IDI items which were provided under Union Electric's cover letters to the NRC. Consequently the responses, except for a few site-specific items discussed later in Section 4.0 which deal specifically with Callaway only, were responses for the SNUPPS Utilities. KG&E received in Reference 5 a request to discuss how the applicable Callaway IDI findings have been addressed for Wolf Creek. A response to that request is contained in this report.

1.3 STATUS OF INSPECTION REPORT RESOLUTION

A meeting was held in Union Electric's corporate offices on January 27, 1984 to review the status of the resolution of all IDI items. Office of Inspection and Enforcement, Region III Office, Union Electric, Bechtel, SNUPPS Staff and KG&E personnel were in attendance. The status review indicated that the majority of the items had already been resolved. For those items yet outstanding a resolution plan was discussed and agreed upon. When all items are resolved, Region III plans to document the close out of the IDI in an Inspection Report.

2.0 SNUPPS STANDARD DESIGN/DESIGN PROCESS

2.1 CONCEPT OF STANDARD POWER BLOCK DESIGN

The SNUPPS standard design concept was established in response to an Atomic Energy Commission (now the Nuclear Regulatory Commission) policy statement issued in early 1972. The policy encouraging nuclear power plant standardization has been implemented through development of a single generic design applicable to both Callaway and Wolf Creek units. The SNUPPS standard design concept applies to the Reactor (Containment), Auxiliary, Turbine, Diesel Generator, Fuel, Control and Radwaste Buildings, several external storage tanks, transformers and vaults, and is referred to as the Power Block. Design of the Power Block is based upon meteorological, hydrological, geotechnical, and seismological characteristics which envelope the two sites.

Responsibility for the standard plant design has been assigned by Kansas Gas and Electric Company and Union Electric Company to the lead Architect/Engineer (AE), Bechtel Power Corporation. The two units utilize identical nuclear steam supply systems (NSSS) and turbine-generator systems furnished by Westinghouse and General Electric, respectively. Utility review and administration of the standard Power Block design effort is coordinated through the SNUPPS Staff who are employees of Nuclear Projects, Inc. Responsibility for design of plant and site features outside the power block; (e.g. Ultimate Heat Sink, ESW Pumphouse, excavation and backfill) is retained by the individual utilities.

As indicated above, design of the standard Power Block, including related stress and seismic analyses, is by the lead AE, Bechtel. Bechtel is also responsible for design integration of the nuclear steam supply and turbine-generator system, thus providing a single point of interface control between the AE and principal design contractors. The entire Power Block effort has, since project inception, been carried out under a full scope 10CFR50, Appendix B Quality Assurance Program.

2.2 STANDARD POWER BLOCK DESIGN FEATURES

A single, Standard Plant FSAR describes the SNUPPS Power Block design. The standard design is based upon site data compiled by each utility and subsequently used to create an envelope of site characteristics generically applicable to Wolf Creek and Callaway. The standard plant design enveloped the most restrictive requirements of the four (4) sites which initially comprised the SNUPPS Project (Callaway, Wolf Creek, Tyrone and Sterling). Of the four, only Wolf Creek and Callaway have been carried through to construction. With cancellation of the Tyrone and Sterling units, the four-site enveloping approach was modified in the seismic design area for work not yet completed.

Implementation of standard design and design commitments cited in the FSAR is accomplished through the development of standardized design criteria; system descriptions; P&IDs; logic and schematic drawings and detailed design

drawings simultaneously issued to each site for installation and erection. Design details and features are supported by standard engineering analyses, calculations, verification testing and computer codes. Materials and equipment procured for each plant use the same standard specifications or material requisitions. Vendor generated drawings, process procedures and test specifications are also standardized and apply to both SNUPPS units.

A detailed engineering model (scale 3/4"-1') has been constructed by Bechtel to reflect the generic design and is used in resolving interferences, performing hazards analyses and as a vehicle in the design evolution/design verification process. All design activity within the lead AE scope of work is accomplished by a Bechtel-SNUPPS Project design team. Site liaison personnel are assigned by Bechtel to each site to assist in resolution of field problems, including disposition of selected categories of Nonconformance Reports (NCRs) and Field Change Requests (FCRs); however, there is essentially no Field Engineering activity performed at either site. Design activity is performed on a generic basis at the home office. This applies to all elements of design including piping layout, instrument tubing design, pipe support and conduit (except for lighting and communications) detailing, cable tray and support design and structural and rebar detailing.

The preceding description for the standard Power Block design applies to all design activities within the Power Block, regardless of safety classification.

2.3 NONSTANDARD POWER BLOCK DESIGN FEATURES

Limited site-specific design features are contained within the Power Block. Mainly, these are in the form of instrumentation and controls for equipment located outside the Power Block. Elsewhere, nonstandard design features within the SNUPPS Power Block are limited to those resulting from resolution of field problems and deficiencies. Control and resolution of field-identified problems is accomplished through use of generic project procedures developed to assure that standardization of design is effectively controlled and that any required deviations are rigidly managed. The procedures for handling site problems are included below.

2.4 STANDARD DESIGN PROCESS

2.4.1 DESIGN ACTIVITIES

Development of the standard Power Block design has been accomplished in accordance with written and approved procedures applicable to all SNUPPS design activities. Within Bechtel, Engineering Department Project Instructions (EDPIs) are used to prescribe the design process and to establish methods for design verification and interface control. The EDPIs apply to and are used by all SNUPPS Project Engineering disciplines. The generic procedures establish project requirements and process controls to be used in the development of design criteria; preparation of design drawings and specifications; performance of engineering studies, analyses and

calculations; qualification and application of standard computer codes; processing of design document changes and in the management of internal and subvendor interfaces. The procedures establish mechanisms for handling design changes and assure that changes, other than those resulting from site unique construction problems, are implemented on a generic, SNUPPS basis. The procedures are supplemented within Bechtel by division-wide design guides and standards; special scope and desktop procedures; engineering checklists and formal indoctrination and training sessions for cognizant Project Engineering personnel. Subvendor procedural controls have been developed which provide for review and approval of subvendor drawings and process procedures; specification change controls and control of subvendor deviations and nonconformances. The subvendor activities are similarly carried out in accordance with project procedures generically applicable to all subvendor design activity regardless of safety classification.

Design and design process controls for design activity within the Westinghouse scope of supply is also carried out using generic procedures described in Westinghouse WRD Policy and Procedures Manual (WCAP 9550).

Special scope studies and analysis such as those used for hazards analyses; i.e. high energy line break analyses and analyses of non-Category 1 Seismic systems and components located within Seismic Category 1 structures (referred to as II/I items) are performed on a generic basis using the Power Block plant engineering model described previously.

2.4.2 DEFICIENCY RESOLUTION

The control of site unique problems and deficiencies generated at either Wolf Creek or Callaway site is also performed within Bechtel utilizing generic procedures applicable to the two SNUPPS Plants. These procedures address design interferences, equipment deficiencies and construction/-installation nonconformances which are identified at one site or another in the course of construction and startup testing. These problems are documented using a standardized Nonconformance Report (NCR), Startup Field Report (SFR) or Field Change Request (FCR) format and are processed to the AE for resolution and disposition. Similar standard report format is used to document field problems within the Westinghoue scope of work and is similarly processed through the NSSS supplier in accordance with generic Westinghouse procedures. Where the problem involves an AE and NSSS interface, Bechtel review and concurrence is also provided.

The process used in the handling and resolution of NCRs, FCRs and SFRs requires that the problem (deficiency, interference, equipment malfunction, etc.) described on the site-initiated document be examined by Bechtel for applicability to the other SNUPPS site. For example, interferences and design detailing errors involving rebar and structural steel detailing identified during early construction at the Callaway site have been continuously examined for applicability to Wolf Creek. In many instances, generic detailing errors were identified and corrected by revision to the standard plant (Bechtel or subvendor) drawing prior to initiation of similar erection/construction activity at Wolf Creek.

The obligation to examine FCRs, NCRs and SFRs for applicability to the alternate SNUPPS unit is reflected in Bechtel EDPIs that have been in effect since the start of construction. The process of evaluating field problems for applicability to the other SNUPPS site is being carried through the preoperational test phase at each site and is a principal vehicle for identifying and correcting generic vendor deficiencies which had not been picked up in the course of equipment design and fabrication. The resolution of generic vendor discrepancies and design deficiencies is often reflected on revised standard plant drawings. Site unique problems; e.g. construction nonconformances and interferences, which can be resolved without generic drawing revision are in many instances incorporated onto site-specific "as-built" drawings. The generation of site-specific as-builts including criteria for determining need for an "as-built" is also reflected in a generic Bechtel/SNUPPS procedure.

2.5 SUMMARY

In summary, the design processes and design process controls utilized by Bechtel and Westinghouse for work on the standard Power Block are applicable to both SNUPPS Plants. Consequently, there are no differences in the Power Block design processes or in the Power Block design process controls between the two SNUPPS plants.

3.0 WOLF CREEK SPECIFIC DESIGN/DESIGN PROCESS

3.1 INTRODUCTION

The previous paragraphs described the design process and controls which were implemented for the standard Power Block portion of Wolf Creek. The standard Power Block comprises approximately 95% of the design work required for Wolf Creek. This section describes the design and design processes for the remaining 5% of the Wolf Creek design.

A similar design control program was established at the beginning of the project for the Wolf Creek-specific portion of safety-related design work. Design of Wolf Creek-specific, safety-related structures, systems and components was an inter-related effort among Bechtel (Lead AE), Sargent & Lundy (Site AE), and Dames & Moore (Geotechnical/Meteorological Consultant). Since the design work was inter-related, KG&E established methods to control the design process, design verification, and design interfaces among all three organizations. The integrated design controls ensure that the design of Wolf Creek-specific buildings and systems are compatible with the Power Block, and that the design process, design bases, analytical methods and safety classifications imposed in Wolf Creek-specific design work are consistent with those imposed on the Power Block.

Safety-related design work which is Wolf Creek specific is described in the Wolf Creek FSAR Addendum and includes the Essential Service Water (ESW) Pumphouse, the ESW pipes/ductbank corridor, the ESW Discharge Structure, the excavation and backfill for safety-related structures, the Ultimate Heat Sink and the 10CFR100 site investigation analyses. The delineation of major design responsibilities for these Wolf Creek-specific structures and analyses is:

* Dames & Moore performed the geotechnical site investigations and established the design soil parameters for the design analysis by both Bechtel and Sargent & Lundy.
* Dames & Moore assembled and reviewed historical and Wolf Creek-specific meteorological data.
* Bechtel designed the ESW Pumphouse, the ESW pipe/ductbank corridor and the cross-over reinforcements where the ESW pipes/ductbank pass over non-safety-related underground facilities.
* Sargent & Lundy designed the excavation and backfill for the Power Block structures, the ESW Pumphouse, and the ESW pipe/ductbank corridor.
* Sargent & Lundy designed the Ultimate Heat Sink, including heat injection analysis and design of the basin, slopes, and dam.

Table 1 lists the design organizations and their major responsibilities for both Callaway and Wolf Creek and shows that most of the two plants' design functions were performed by the same organizations.

3.2 DELINEATION OF DESIGN RESPONSIBILITIES FOR WOLF CREEK SPECIFIC-DESIGN WORK

Beginning with the initial stages of the project, KG&E implemented administrative procedures for identifying and controlling both the design responsibilities and the design interface responsibilities among Sargent & Lundy, Bechtel, and Dames & Moore. Design responsibilities and design interfaces were coordinated through routine meetings, correspondence and teleconferences among KG&E and the three design organizations, as appropriate. Each design organization's design and interface responsibilities were documented by KG&E in written procedures. In addition, each design organization's scope of work and specific interface responsibilities with the other design organizations were documented in scope, design criteria, and report documents generated by each design organization. Scope of work and design criteria documents are reviewed by KG&E, as described in paragraph 3.3.4.

3.2.1 SITE SPECIFIC ESW SYSTEM

Bechtel is responsible for the design of the Wolf Creek specific portions of the ESW System, including the ESW Pumphouse and all systems and components within the Pumphouse, the ESW pipes and ductbanks between the Pumphouse and the Power Block, and the seismic non-category I reinforcement of non-safety-related underground piping systems where these non safety-related systems cross the ESW pipes and ductbank. The design of the site specific portions of the ESW System is based upon the Wolf Creek specific layout, seismological, geotechnical, meteorological and hydrological design bases, and is coordinated with the design work of both Sargent & Lundy and Dames & Moore, as described below. The Bechtel Project management team responsible for the Power Block design was also used on the ESW system.

3.2.2 EXCAVATION AND BACKFILL

Sargent & Lundy Geotechnical Division was responsible for design of the excavation and backfill for all Power Block and Wolf Creek-specific structures and systems. The design bases for excavation and backfill are described in the FSAR Addendum and are based on design bases data and requirements from both Dames & Moore and Bechtel.

Dames & Moore was retained during the preliminary stages of the project to perform the 10CFR100 site investigations at all four SNUPPS sites including a detailed investigation of the subfoundations at the Power Block structures. KG&E also retained Dames & Moore to perform geotechnical investigations of the subfoundations at the Wolf Creek-specific safety-related structures, onsite rock quarries and cohesive fill borrow pits. As a result of the site investigations, Dames & Moore established excavation and backfill recommendations, static and dynamic properties of in situ rock and backfill materials, design basis ground water elevation, design basis frost elevation and recommendations for surveillance and inspection of earthwork during construction.

Bechtel designed the foundations for the Power Block structures based upon an envelope of the results of the geotechnical investigations at all four original SNUPPS sites. The design of the ESW Pumphouse, ESW pipe/ductbank corridor, and the ESW Discharge Structure is based upon the results of the Wolf Creek-specific geotechnical investigation. The design of all safety-

related structures by Bechtel also included the calculation of the static and dynamic foundation bearing pressures, the maximum allowable total and differential settlement for each safety-related structure, and the maximum allowable lateral earth and hydrostatic pressures.

Sargent & Lundy Geotechnical Division performed the detailed design for the excavation and backfill for all safety-related structures at Wolf Creek. The excavation and backfill design is based upon the foundation design prepared by Bechtel, and incorporates the results of the geotechnical investigations performed by Dames & Moore.

Based upon the design for the foundations and excavation/backfill, Dames & Moore calculated the maximum anticipated settlement for each safety-related structure to verify that the anticipated settlement was below the maximun allowable settlement criteria established by Bechtel. Dames and Moore has also been responsible for evaluating the results of the ongoing settlement monitoring program for Wolf Creek.

3.2.3 ULTIMATE HEAT SINK (UHS), HEAT REJECTION ANALYSIS

Sargent & Lundy Mechanical Analytical Division was responsible for the UHS heat rejection analysis. The design bases and analytical methods employed for the UHS heat rejection analysis are described in the FSAR Addendum, and are based upon design inputs from Dames & Moore, Bechtel and Sargent & Lundy Environmental Division and Geotechnical Division.

Bechtel established the Power Block design bases accident conditions which govern the design of the UHS. Bechtel calculated the design intake and discharge flow rates, the design maximum allowable intake temperature, the design discharge temperature, and the minimum ESW water intake elevation.

As part of the geotechnical investigation at Wolf Creek, Dames & Moore recommended excavation of the in situ soils down to bedrock at the UHS, established the bedrock elevations, and established the permeability rate of the in situ rock materials.

Dames & Moore assembled the historical meteorological data for the Wolf Creek site and the surrounding region. Sargent & Lundy Environmental Division reviewed the meteorological data compiled by Dames & Moore, and developed the environmental design basis inputs for the heat rejection analysis.

3.2.4 UHS, PHYSICAL DESIGN

Sargent & Lundy Geotechnical Division was responsible for the physical design of the UHS, including the basin excavation, slopes, dam and intake channel. The design bases and analytical methods employed during design of the UHS are described in the FSAR Addendum and are based upon design bases data and requirements from Dames & Moore, Sargent & Lundy Mechanical Analytical Division and Bechtel.

Dames and Moore performed a geotechnical investigation of the UHS area, the borrow areas for cohesive fill material, and the rock quarries for rip rap and granular bedding materials. As result of the investigations, Dames and Moore established excavation and rock surface preparation recommendations, static and dynamic properties of cohesive and granular fill materials, acceptance criteria for rip rap material and recommendations for surveillance and inspection of earthwork during the construction and lake fill phases. The Sargent & Lundy Mechanical Analytical Division determined the minimum volume of water required in the UHS, based upon the heat rejection analysis.

The design of the UHS to ESW Pumphouse intake channel was coordinated between Sargent & Lundy and Bechtel to ensure that the designs for the UHS intake channel and the ESW Pumphouse intake bay were compatible. The intake elevation and size, separation of safety trains and methods to prevent formation of ice at the ESW intake were also resolved jointly by Sargent & Lundy and Bechtel.

3.3 INTERNAL DESIGN PROCESS

Development of the Wolf Creek-specific design was accomplished in accordance with written and approved procedures to ensure the accurate translation of design basis and regulatory commitments into drawings, specifications and procedures. KG&E imposed design control requirements on each design organization performing safety-related work. Bechtel, Sargent & Lundy and Dames and Moore are required to perform their respective scopes of design responsibilities in accordance with written procedures. Each organization's procedures, instructions and standards describe the design process and prescribe methods for the planning, performance, verification, internal interface, and release of design work and changes to design work.

3.3.1 BECHTEL INTERNAL DESIGN CONTROL

Bechtel's design of the ESW System has been accomplished in accordance with the same EDPI's, design guides and standard desktop procedures as described for the SNUPPS design effort in Section 2.4.1.

3.3.2 SARGENT & LUNDY INTERNAL DESIGN CONTROL

Safety-related design processes within all divisions of Sargent & Lundy are governed by Sargent & Lundy's Quality Assurance (QA) Program. This program describes the Sargent & Lundy design process and policy, and contains procedures for controlling the design process. The QA program prescribes methods to develop, document and control design documents including safety classifications, design criteria, functional descriptions, SAR sections, calculations, drawings, specifications and engineering reports, as well as requirements for verification method and verification method selection for these design documents. Interdivisional design interfaces within Sargent & Lundy are procedurally controlled; procedures within the QA program require the preparation of scope documents which delineate design activities by the division with primary design

responsibility as well as those divisions with design input responsibilities. Procedures also prescribe the methods and responsibilities for intra-divisional reviews prior to the release of a design document for construction. Changes in design are accomplished in the same manner as the original design. Procedures in the QA program also prescribe methods to establish, prepare and maintain project status reports which plan the sequence and scope of design and review activities, and track the completion of design activities to ensure that all appropriate design verification and review activities are completed prior to release of a design document for construction.

The procedures of the QA program are supplemented by departmental standards which include standard analytical methods, drawings and specifications, as well as detailed instructions for the preparation and verification of design documents within the department. When necessary to supplement the QA program procedures and the departmental standards, written and controlled project instructions are issued to prescribe project specific design administrative controls.

3.3.3 DAMES AND MOORE INTERNAL DESIGN CONTROL

Dames and Moore's geotechnical and meteorological consulting activities were accomplished in accordance with an Appendix B QA program imposed on Dames and Moore by KG&E's purchase order. These consulting activities were not as much "design oriented" as the work of Bechtel and Sargent and Lundy. Dames and Moore did, however, conduct safety-related testing, analyses and evaluations as described above which were documented in accordance with prescribed procedures and instructions.

3.3.4 KG&E INVOLVEMENT IN THE DESIGN PROCESS

In addition to the procedural controls implemented by each design organization, KG&E has implemented written procedures for the technical review of selected documents generated by the site-specific design organizations. At the direction of the KG&E Manager Nuclear Plant Engineering, a technical review is performed on designated lead documents, including design criteria, functional descriptions, drawings and specifications. The technical review considers operability and maintainability, compatibility between the SNUPPS design and the site design, inclusion of acceptance criteria for inspections and tests, and requirements imposed by plant operating equipment. Any comments generated as a result of the technical review are transmitted in written form to the responsible design organization for resolution and close out.

3.4 EXTERNAL DESIGN INTERFACE CONTROLS

KG&E is responsible for the review and administration of the Wolf Creek-specific safety-related design efforts. Coordination of the design interfaces among Bechtel, Sargent & Lundy and Dames and Moore is through KG&E. KG&E has defined the design responsibilities and established the interfaces among these organizations so that the design is performed in a controlled manner, is compatible with the standard Power Block, and is complete.

KG&E has written procedures which prescribe the methods to establish and control the design interfaces for work outside of the Power Block scope of work, and which prescribe methods for documentation, external information exchanges and responsibilities for the flow of design bases information across external design interfaces.

Based upon the scope of work assignments described in paragraph 3.2 above, KG&E implemented written procedural assignments to each responsible design organization outlining their responsibility for management and coordination of the design work of other design organizations which contribute design bases inputs to the responsible organization's work.

All of KG&E's external design interface control requirements are imposed on Bechtel, Sargent & Lundy and Dames and Moore. These organizations' programs were subjected to periodic QA audit/surveillance by KG&E QA as described in Section 5.0.

3.5 DESIGN DEVELOPMENT

During the design development stages, preliminary design interface data was coordinated through meetings, teleconferences and correspondence among KG&E and the three design organizations. The objectives of these coordination discussions and correspondence was to ensure that the design effort among all three organizations was in accordance with the same design bases and was compatible with the Power Block design standards prior to the start of detailed design. Safety classifications, design interface data clarifications, analytical methods and design bases information were all resolved prior to the start of detailed design. As the design bases, design interface data and selection of analytical methods became finalized, each design organization issued preliminary drafts of SAR sections and other controlled documents (design criteria specifications, system descriptions, investigative reports and/or sketch drawings, depending upon the design organization) to KG&E, with copies to the other interfacing design organizations for review and comment. KG&E performed a technical review of the design criteria documents. In addition, each design organization was responsible for reviewing the design criteria documents of the other design organizations to verify that their design interface data was accurately translated into the other organizations' design bases. The responsible design organization was required to coordinate and track the resolution of any comments generated during the design criteria reviews. Upon resolution of all comments, each design organization revised and reissued the final SAR Section material and controlled design criteria documents to KG&E and the other design organizations.

If it was necessary to revise a design criteria document after the first formal issue, the revised design criteria was transmitted to KG&E, with copies to the other design organizations, via letters which summarized the nature of the change. If the design criteria or design bases change from one organization directly affected a design basis input for another organization's work, the proposed change was, if necessary, resolved through meetings and/or teleconferences prior to formal revision and reissue of the design criteria.

3.6 DETAILED DESIGN

The coordination and interface of the detailed design phase proceeded in a manner similar to that of the design development phase of the project. As each design organization's analyses became finalized, and prior to release of the drawings and specifications for construction, key drawings and specification documents were issued to KG&E, with copies to the other design organizations for review and comment. KG&E performed a technical review of designated key documents and each design organization reviewed key interface drawings and specifications from the other organizations to verify that their design work was compatible with that of the other interfacing organizations and that their design inputs were correctly reflected in the design product of the other interfacing organization. All comments were resolved and incorporated into drawings and specifications by the responsible design organization prior to release of the documents for construction.

When the drawings and specifications were released for construction, the designated key interface specifications and drawings were placed on controlled distribution to the other design organizations. Transmittal of the documents, and any revisions to the documents, was via letter of transmittal to KG&E, with copies to the other appropriate design organizations. Proposed drawing or specification revisions which could affect the design bases of other organizations were discussed and resolved among KG&E and the affected design organizations prior to the release of the drawing or specification revision for construction.

3.7 DEFICIENCY RESOLUTION

During the construction phase, changes in the Wolf Creek-specific design as a result of site interference problems, deficiencies, or material unavailability, are controlled in the same manner as described for the Power Block portion of Wolf Creek. Construction or Startup proposed changes are documented in the same standardized FCR, NCR and SFR forms, and in accordance with the same procedures as for the standard Power Block portion of Wolf Creek. The forms are transmitted to either Sargent & Lundy or Bechtel for resolution and disposition, depending upon the organization responsible for the design.

Prior to approving a change to the design, Bechtel and Sargent & Lundy are procedurally required to check the change against the design bases, as documented in the FSAR and other design criteria documents. Both Bechtel and Sargent & Lundy were required to revise the FSAR, when affected, and to incorporate design changes into as-built documents, including design criteria specifications, construction specifications and drawings, and/or design compilation reports.

When a proposed construction change could affect the design basis of both Bechtel and Sargent & Lundy, (i.e. the backfill material around a portion of the ESW pipes), the constructor was required to document and transmit the proposed change in two separate FCR or NCR forms to both Bechtel and Sargent & Lundy. Resolution and disposition of the proposed change was coordinated

between the two design organizations and each design organization dispositioned the change for their respective design responsibilities. Duplicate documentation of the proposed change on separate FCR or NCR forms ensured that both Bechtel and Sargent & Lundy reviewed the change and incorporated the change into their respective design.

In addition to the control of constructor-proposed design changes, a surveillance and inspection program was implemented during the safety-related earthwork, including the excavation and backfill for safety-related structures and piping systems, and construction of the Ultimate Heat Sink. Dames and Moore provided onsite geotechnical inspectors to perform the inspection and surveillance requirements specified in the Sargent & Lundy specifications. The Dames and Moore geotechnical inspectors were responsible for verifying that the earthwork materials conformed to the specification criteria, that placement and compaction of earthwork materials conformed to the specification requirements, and that the as-built locations of excavation and backfill materials were documented. However, the authority to approve changes to earthwork specification and drawing criteria was retained by Sargent & Lundy. Upon completion of earthwork construction, Dames and Moore prepared final geotechnical surveillance reports which summarized the as-placed materials by source, tested soil properties, and location, as well as any changes in design approved by Sargent & Lundy during the course of construction. Sargent and Lundy reviewed the earthwork surveillance reports to verify that the as-placed earthwork conformed to the specifications and drawings.

3.8 SUMMARY

In summary, KG&E established the needed interface controls which have ensured through all phases of the project life that the Wolf Creek site-specific safety-related design activities were coordinated among the organizations performing those safety-related activities. The same or similar design process and design process controls utilized for the standard Power Block portions of the Wolf Creek design were also used for the Wolf Creek-specific design activities; consequently, there are essentially no differences in the design process or design process controls for the entire scope of the plant design at both Callaway and Wolf Creek.

TABLE 1

ORGANIZATIONS PERFORMING MAJOR DESIGN ACTIVITIES
AT CALLAWAY AND WOLF CREEK

Design Activity	Callaway Organization	Wolf Creek Organization
Power Block	Bechtel	Bechtel
ESW Components	Bechtel	Bechtel
Excavation and Backfill	Bechtel	Sargent & Lundy
Ultimate Heat Sink	Bechtel	Sargent & Lundy
Geotechnical Consultant	Dames & Moore	Dames & Moore
Meteorological Consultant	Dames & Moore	Dames & Moore

4.0 APPLICABILITY OF CALLAWAY IDI REPORT FINDINGS TO WOLF CREEK

4.1 INTRODUCTION

The IDI report contained many favorable conclusions and findings about SNUPPS Project design activities. Such findings were neither numbered or flagged by the IDI team. However, when the team felt a procedural violation or an error had occurred, or they could not gather enough information to come to a conclusion, or they had suggestions for consideration, such items were flagged and numbered. These items were categorized findings, unresolved items, and observations, respectively. The NRC grouped the IDI items in the mechanical systems, mechanical components, civil and structural engineering, electric power and instrumentation and control areas. There were 50 total numbered items.

The NRC requested in Reference 1 responses to each finding and unresolved item. The applicability to Wolf Creek of each of the findings and unresolved items as provided in References 2 and 4 is discussed below.

4.2 MECHANICAL SYSTEMS

This portion of the inspection focused on mechanical systems design aspects of the auxiliary feedwater system in the exchange and control of interface information by Bechtel. All the findings and the unresolved item identified in this area (eight total) are directly applicable to Wolf Creek and will be corrected for Wolf Creek as well as Callaway.

Section 2.2 of the Report contains a section addressing Union Electric supervisory personnel responsible for mechanical design. The KG&E management individual responsible for mechanical design is the Manager Fluid Systems Engineering who has more than 8 years associated with the SNUPPS Project and 12 years of professional experience. The mechanical engineer responsible for the auxiliary feedwater system (among other systems) has been with the Wolf Creek Project for 3 years and has 4 years of professional experience.

The Inspection Report acknowledged that a controlled design process was indicated in the mechanical systems area. As demonstrated herein, KG&E believes the NRC can also make the same conclusion concerning Wolf Creek activities in this area.

4.3 MECHANICAL COMPONENTS

This portion of the inspection focused on the Bechtel mechanical components design aspects of the auxiliary feedwater system in the control of design information and evaluation assumptions by Bechtel. The NRC identified eight findings and eight unresolved items in the Report in this inspection area. Fifteen of the sixteen apply directly to Wolf Creek and will be corrected for Wolf Creek as well as Callaway.

The sixteenth (Finding No. 3-3) concerns a Callaway specific "as-built" condition. While this specific condition did not apply to Wolf Creek, had a similar deviation occurred, the same controls and processes are in place at Wolf Creek to evaluate such inconsistencies as were described for Callaway in Reference 2 and which were also described in Section 2.4.2 above. Additionally, the SNUPPS IE 79-14 walkdown program is presently underway at Wolf Creek to reconcile differences between the "as-built" configuration and the approved design.

The Inspection Report acknowledged that the SNUPPS design process appeared to be controlled in the mechanical components area. As demonstrated herein, KG&E believes the NRC can also make the same conclusion concerning Wolf Creek activities in this area.

4.4 CIVIL AND STRUCTURAL ENGINEERING

This portion of the inspection focused on the civil and structural design aspects of the auxiliary feedwater system and Bechtel's control and exchange of information and technical design execution in these disciplines. Also evaluated were personnel qualifications of the involved SNUPPS Project personnel.

4.4.1 FINDINGS AND UNRESOLVED ITEMS

4.4.1.1 Finding 4-1

This finding deals with Union Electric conducting reviews of safety-related design in 1973 and 1974 prior to formal procedural controls for such reviews. Had the NRC inspected KG&E design review activities, the exact same finding would have resulted. KG&E instituted procedural controls for review of safety-related design activities in February 1974. This was prior to application to the NRC (then the AEC) for the construction permit and operating license for Wolf Creek in April 1974. Design document review activities subsequent to February 1974 were carried out in accordance with procedural controls subject to Quality Assurance audit and surveillance.

4.4.1.2 Finding 4-7

This finding deals with the excessive period of time between a Callaway concrete placement and the subsequent documentation on a Nonconformance Report (NCR) of honeycombing imperfections experienced during the placement. Placement of concrete at Wolf Creek also resulted in some honeycombing. Disposition of such imperfections are handled in the same manner (NCR) at Wolf Creek and the same technical method of repair used (nonshrink grout) and by means of the same procedural controls used at Callaway. Consequently, the same design process was used at Wolf Creek as was used at Callaway. Nonconformance tracking systems are utilized to ensure proper resolution and closeout of deficiencies. Long resolution times sometime occur due to, for example, scheduling priority or material delivery considerations, but what is important is that such deficiencies are tracked to resolution and closeout.

4.4.1.3 Unresolved Item 4-3

This item deals with a Callaway specific design nonconformance which appeared at the time of the NRC's inspection to not have been documented. Subsequent to the inspection, a NCR was located which was generated and dispositioned in 1979 to approve the as-built configuration. The discussions above concerning Findings 3-3 and 4-7 and the design process for "as-built" and NCR disposition apply equally to Wolf Creek as they did for this specific item discovered at Callaway.

4.4.2 WOLF CREEK PERSONNEL INVOLVEMENT

Sections 4.1 and 4.2 of the Inspection Report discuss involvement of Union Electric personnel in the civil and structural engineering design process. KG&E personnel were involved in the same design review process through the SNUPPS Committee concept discussed in Section 5.3 below. The SNUPPS Technical Committee and Construction Review Group activities outlined in the Report included KG&E involvement. KG&E's major partner in the Wolf Creek Project, Kansas City Power & Light Company, also participates in selected SNUPPS committees including the Technical Committee and Management Committee.

Civil and structural engineering responsibilities for the Wolf Creek Project rest with KG&E's Nuclear Plant Engineering (NPE) Division. Presently NPE has 51 engineers and specialists, 5 of which have civil-structural responsibilties. KG&E's Manager NPE has had overall engineering design responsibility for Wolf Creek since coming to the Project in 1973. The Manager NPE has B.S. and M.S. degrees in Mechanical engineering and over 30 years of professional experience. The specific individuals and group responsible for Wolf Creek civil-structural design have changed at various times in the eleven year project life, but the Manager NPE has always maintained overall design responsibility. Currently, the section responsible for civil-structural design is headed by the Manager Facilities Engineering and Analysis who has an architectural engineering degree, has been with the Project 3 years and has over 10 years of professional experience.

Section 4.7 of the Report discusses the Bechtel Site Liaison Engineering Group located at the Callaway site. Wolf Creek has a similar group as discussed in Section 2.2 above. Since the inspection, the size of both plants' site liaison groups has increased considerably to enable prompter field disposition of nonconformance documentation. Guidelines of what can be dispositioned in the field are utilized; those items which potentially require detailed analysis or may affect FSAR commitments are forwarded to the Bechtel home office for disposition.

4.4.3 CONCLUSIONS

The Inspection Report acknowledged that the project civil and structural design and engineering aspects were controlled and the design function was being completed in conformance with the commitments of the FSAR. Concerning

personnel involvement, the Report concludes that such involvement had been effective in controlling design and engineering efforts and that the SNUPPS concept played an important role to this end. As demonstrated herein, KG&E believes the NRC can also make the same conclusions concerning Wolf Creek activities in this area.

4.5 ELECTRICAL POWER

This portion of the inspection evaluated the electrical power portion of the SNUPPS design. Since auxiliary feedwater system power supplies are not designed independently of other plant electrical system supplies, the team also reviewed design, issues, and information associated with other plant systems. The Inspection Report identified three findings in this area. All three apply directly to Wolf Creek and will be corrected for Wolf Creek as well as Callaway.

Also evaluated were relay coordination, test procedures, tracking NRC generic communications, and storage of Class IE equipment. All these activities concern site specifics but no findings were identified at Callaway. Such activities at Wolf Creek are conducted under procedural controls, and KG&E is confident that under similar scrutiny acceptable programs would be demonstrated.

Concerning electrical power, the Inspection Report acknowledged controlled handling of interface information, considerable involvement of the SNUPPS Utilities in the design and procurement process, and proper implementation of procedures which provided reasonable assurance of the quality of design and procurement activities. As demonstrated herein, KG&E believes the NRC can also make the same conclusions concerning Wolf Creek activities in this area.

4.6 INSTRUMENTATION AND CONTROL

This portion of the inspection evaluated the instrumentation and control aspects of the SNUPPS auxiliary feedwater system. The Inspection Report identified four findings in this area. All four apply directly to Wolf Creek and will be corrected for Wolf Creek as well as Callaway.

Also evaluated were auxiliary feedwater system installation and the preoperational testing program. Both of these activities concern site specifics but no findings were identified at Callaway. Such activities at Wolf Creek are conducted under procedural controls and KG&E is confident that under similar scrutiny acceptable programs would be demonstrated.

The Inspection Report acknowledged that a controlled design process was indicated in the instrumentation and controls area. As demonstrated herein, KG&E believes the NRC can also make the same conclusion concerning Wolf Creek activities in this area.

4.7 SUMMARY AND CONCLUSIONS

Each IDI finding and unresolved item was evaluated for its applicability to Wolf Creek. Of the fifty numbered items in the Inspection Report, just four

of these were concerned with specifics applicable only to the Callaway project. They had to do with "as-built" conditions, nonconformances, and procedural controls for Callaway. Had the IDI team looked at Wolf Creek they could have found similar nonconformances and procedural discrepancies, which potentially could have resulted in a finding or unresolved item. However, conceptually their resolution would have been the same because the same project controls and project management team are in place to deal with such situations. Therefore, corrective actions taken in response to the Inspection Report findings were generically applicable to both Callaway and Wolf Creek.

The IDI team evaluated other SNUPPS Project and Union Electric activities which did not result in negative findings or conclusions and in many cases resulted in positive findings and conclusions. For those activities of Union Electric which the team evaluated and had no finding, information has been provided above for the equivalent KG&E activities to the extent necessary to demonstrate that similar positive findings and conclusions could be made.

In summary, the IDI on the Callaway auxiliary feedwater system was really an inspection of the SNUPPS Project design process and the conclusions drawn from the inspection apply to Wolf Creek activities as well as to those at Callaway.

5.0 DESIGN QUALITY ASSURANCE PROGRAM

5.1 INTRODUCTION

As previously indicated, design of the SNUPPS standard Power Block has been concentrated in a single AE and NSSS supplier, both of whom have performed their respective design functions under full scope, Appendix B QA controls. These controls are described in Chapter 17.1, Quality Assurance Programs for Design and Construction and in the SNUPPS Standard QA Manual and are applicable to all Power Block design activities. Sargent & Lundy, site AE for the Wolf Creek excavation, backfill, and Ultimate Heat Sink design, and Dames and Moore, geotechnical and meteorological consultant, also worked to Appendix B programs. Sargent & Lundy's QA program is also described in Chapter 17.1. Dames and Moore's QA program is not described in detail in the FSAR but was required by KG&E purchase order to perform their work under an approved QA program and written procedures, as described in Section 17.1.2 of the FSAR Addendum.

The generic design quality assurance consists of several elements which are mutually reinforcing from a QA viewpoint and which provide for continuous examination and assessment of the design process and design controls in place throughout the project. Major elements of the generic program are described in the following sections.

5.2 AE, NSSS, CONSULTANT AND SUBVENDOR DESIGN QA

The QA controls described in Chapter 17.1 have been contractually imposed on the Power Block AE and NSSS supplier and, through them or through KG&E, passed on to all consultants, subvendors and subcontractors responsible for furnishing safety-related goods and services.

The Bechtel and Westinghouse QA Program Manuals are subject to SNUPPS/Utility review and approval; subvendor QA descriptions and manuals likewise require Bechtel (or Westinghouse) acceptance prior to initiation of design. In addition, a graded QA program has been established within Bechtel providing appropriate controls for special scope design activities, i.e. fire protection, Quality Group D systems and non-Category I Seismic Systems (II/I).

The effectiveness of subvendor QA control is examined through a process of audit and surveillance which consists of full-scope quality assurance audits performed periodically by Bechtel (or Westinghouse) and supplemented by frequent, in-plant monitoring and inspection of subvendor design and fabrication activity. These audits and surveillance inspections provide a focused examination on the control of design interfaces between the subvendor and design agency and are intended to provide assurance that design input data is controlled and updated and correctly translated into subvendor drawings, procedures and specifications. Quality assurance audit and surveillance inspection personnel, both resident and itinerant, are sensitized to the importance of standardization in all phases of subvendor design and fabrication activity and understand the impact unilateral waiver

or modification of generic design specification requirements could have on the Power Block design and supporting engineering analyses. Emphasis has been placed on examination and monitoring of subvendor performance in these areas.

Implementation of Bechtel and Westinghouse quality assurance programs for design is carried out on the basis of generic procedures and management controls governing all phases of design development and design process/interface control. The nature and scope of these generic procedural controls was discussed earlier. These controls are subject to continuing internal quality assurance surveillance, inspection and audit with appropriate emphasis placed on controls in place to preclude unauthorized waiver or departure from the generic Power Block design bases and criteria. Audit discrepancies and potentially adverse trends are reviewed with cognizant management and tracked through closeout resolution.

In addition to the traditional design assurance techniques employed by Bechtel and Westinghouse, the use of the engineering model provides an additional tool for use in the process of design development and for design review and verification. For example, the engineering model is used to confirm equipment and piping layout arrangements, to resolve field-reported interferences and design discrepancies and to perform special studies such as those associated with pipe whip and pipe break analyses. Consequently, the generic SNUPPS model is considered an important part of the total design assurance program.

Sargent & Lundy and Dames and Moore were committed to and functioned under Appendix B QA programs. The Sargent & Lundy scope of work was limited to design with its supporting functions and did not include any procurement responsibilities except for the generation of specifications. Safety-related activities by Dames and Moore were limited in scope to field and lab testing and data assimulating and analyzing. The QA Program Manual and changes thereto for both organizations were reviewed and approved by KG&E.

As with Bechtel and Westinghouse, both Sargent & Lundy and Dames and Moore utilized procedures and management controls to ensure that the design process progressed in accordance with Appendix B requirements and good engineering practice. These controls were subjected to internal auditing by independent quality assurance groups within both organizations, with any adverse finding being brought to management attention for resolution.

5.3 SNUPPS/UTILITY DESIGN REVIEW AND VERIFICATION

Another important element of the design quality assurance program involves a program of coordinated SNUPPS/Utility reviews of key design features and AE generated design documentation. At the initial stages of the Power Block design, a review was undertaken by the SNUPPS Utilities and NPI/SNUPPS Staff to identify key design documents requiring consolidated utility review. This review process was carried out by the SNUPPS Technical Committee which is made up of senior engineering representatives from each of the SNUPPS Utilities (Note: The SNUPPS Utilities from 1973 to 1979, the time frame

during which the basic plant design configuration was established, consisted of Union Electric, Kansas Gas and Electric, Kansas City Power & Light, Northern States Power and Rochester Gas and Electric, the last two having extensive experience in the design and operation of commercial nuclear power plants). This review process, described in SNUPPS Staff and Utility procedures, requires Staff and Utility review and approval of system descriptions, P&IDs, logic and schematic drawings, major equipment specifications and other key design documentation developed by the AE. Individual utility design review comments and concerns are reconciled through the SNUPPS Technical Committee review process. Subsequent to this review, consolidated comments and direction are furnished to the AE for resolution prior to release of the design document to the field. The generic review process is supplemented by Plant Review Group studies and assessments of selected design features of interest; e.g. human factors, inservice inspection access engineering and computer systems evaluation. (Note: The Plant Review Group consists of Utility specialists selected for study of selected design features and topics and operates within the framework of the Technical Committee). Where required, Utility capability is supplemented by design reviews and studies provided by outside consultants and technical specialists under contract to SNUPPS/NPI and/or KG&E. As an example, technical specialists were utilized to provide independent review and assessment of the auxiliary feedwater pump design and to provide expertise in the review of generic fire protection systems.

In addition to the Power Block design reviews, KG&E was also involved in the technical aspects of the Sargent & Lundy, Bechtel and Dames and Moore work through review of design documentation as described in Sectior 3.3.4. Coordination and compatibility of design between the various design organizations was accomplished and controlled by KG&E as described in Section 3.4.

As noted above, the process of SNUPPS/Utility review of key design features and documentation is described in SNUPPS Staff and in Utility procedures and is subject to individual audit and surveillance by SNUPPS Staff and by each Utility QA organization. Audit findings have been systematically tracked through closeout resolution.

5.4 SNUPPS/UTILITY AUDIT OF AE AND NSSS DESIGN PROCESSES AND CONTROLS

Independent Utility verification of the management systems, design process, and interface controls utilized by the AE and NSSS supplier in the course of design of Wolf Creek Generating Station has, since inception, been provided by means of a preplanned program of QA audit and surveillance. Audits of Bechtel and Westinghouse design activity have been accomplished through the SNUPPS QA Committee (representing senior Utility/SNUPPS Staff QA personnel) and by the SNUPPS/NPI organization. These audits provide assessments of the design process in vital areas such as...

*SAR change control;
*AE/NSSS design interface control;
*Control of standard (Bechtel) design-oriented computer programs;
*AE program for reconciliation of "as-built" data with final piping seismic analyses;

*Design review and design change control programs;
*Design feedback program (from operating nuclear plants)
*NCR, FCR and SFR processing and control.

These audits have been supplemented by Quality Assurance Committee-initiated audits of major Bechtel and Westinghouse equipment subvendors such as Combustion Engineering (Reactor Pressure Vessel) and the Westinghouse Tampa (Steam Generator/Pressurizer) and Pensacola (Reactor Internals) Divisions. These audits, which supplement the routine Bechtel and Westinghouse subvendor audit effort, were initiated because of the importance and safety significance of the specific equipment and provide independent SNUPPS/Utility examination and assessment of principal designer/subvendor design interfaces.

The SNUPPS Project also has had a program of technical design audits since 1977. These audits are conducted by independent, off-project designer personnel and provide focused examination and technical evaluation of key design features of the standard Power Block design. This effort, established by the SNUPPS Utilities, is managed by the Bechtel Quality Assurance Project Manager and utilizes non-project, technical specialists from the various Chief Engineer staffs at the Gaithersburg office. Subject matter covered by these technical audits include:

*Hanger and Pipe Support Design
*Piping Stress Analysis and Calculations
*Design of Pressure Relieving Devices
*Seismic Analysis of the Reactor, Auxiliary and Control Buildings
*HELBA (high energy line break analyses) Design Analyses

The audits provide examination of subunit design discipline interface and provide an independent verification of design calculations and analysis utilized in the design process. Findings, discrepancies or items of concern are reviewed and tracked through closeout.

KG&E has provided Utility QA monitoring of the Sargent & Lundy design process through audits which were conducted during the course of the activity. Specific areas covered during these audits included:

*Establishment of Design Criteria
*Design and Design Review Process
*Sargent & Lundy Internal Auditing and Corrective Action System
*Management Overview
*Computer Program Certification

KG&E also performed numerous field and home office audits and surveillances of Dames and Moore during the course of their role as seismological/geotechnical/meteorological consultants. Examples of the scope of these activities are:

*Meteorological Tower Instrument Maintenance and Calibration
*Site Core Borings and Geophysical Testing
*Investigation and Recording of Geological Features
*Atmospheric Dispersion Calculations

In addition to Utility audit activity, two INPO-sponsored design evaluations have been conducted focusing on both design product and design processes. These audits provide further independent examination of the total design process and generally attest to the adequacy of the generic design effort.

5.5 SUMMARY

In summary, the design assurance program described above has been in place since the start of design of the Wolf Creek Generating Station and is considered in full compliance with NRC regulations and standards. This program provides prerequisite assurance of the Wolf Creek design product and process.

6.0 SUMMARY AND CONCLUSIONS

This Attachment has discussed that the SNUPPS plants, Callaway and Wolf Creek, have essentially the same design. There are only limited safety-related design differences between the two units, amounting to an estimated 5% of the total plant design, and which are associated with the post-accident source of cooling water and plant siting factors . The design process and design process controls are nearly identical for both units since the methods associated with the Power Block design activities were also utilized in controlling site-specific design activities. Extensive reviews and controls have been conducted and imposed for Wolf Creek site-specific design activities. The Callaway IDI findings have been evaluated and conceptually all findings, their resolution and corrective actions also applied for Wolf Creek. As for design process activities, QA program activities for both units were also nearly identical. The differences are minor in nature and associated with the limited extent of Wolf Creek site-specific design.

In conclusion, because the Callaway IDI applies to Wolf Creek and because the balance of the Wolf Creek design which was not reviewed by the Callaway IDI is minor in extent and has been properly controlled by KG&E, it does not appear to KG&E that additional independent review or verification activities are warranted for Wolf Creek.

7.0 REFERENCES

1. Letter of 4/4/83 from RCDeYoung, NRC, to DFSchnell, UE.
2. Letter ULNRC-636 dated 6/15/83 from DFSchnell, UE, to JCKeppler, NRC.
3. Letter of 11/16/83 from CENorelius, NRC, to DFSchnell, UE.
4. Letter ULNRC-706 dated 12/18/83 from DFSchnell, UE, to CENorelius, NRC.
5. Letter of 1/4/84 from DGEisenhut, NRC, to GLKoester, KG&E.