

APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION  
REGION IV

NRC Inspection Report: 50-482/82-08

Docket: 50-482

Licensee: Kansas Gas and Electric Company  
Post Office Box 208  
Wichita, Kansas 67201

Category: A2

Facility Name: Wolf Creek Generating Station, Unit No. 1

Inspection At: Burlington, Coffee County, Kansas

Inspection Conducted: June 8-11, 1982

Inspectors:

R. J. Redano  
R. T. Redano, Reactor Inspector, Engineering  
Section (paragraphs 1, 2a-2c, 3, 4, & 7)

7/23/82  
Date

D. M. Hunnicutt  
D. M. Hunnicutt, Chief, Engineering Section  
(paragraphs 1, 2d-2f, 5, & 6)

7/23/82  
Date

for D. M. Hunnicutt  
R. P. Mullikin, Reactor Inspector, Engineering  
Section (paragraphs 1, 2g-2i)

7/23/82  
Date

Approved:

D. M. Hunnicutt  
D. M. Hunnicutt, Chief, Engineering Section

7/23/82  
Date

Reviewed:

for R. E. Hall  
R. E. Hall, Chief, Reactor Project Section C

7/26/82  
Date

Inspection Summary

Inspection conducted on June 8-11, 1982 (Report 50-482/82-08)

Areas Inspected: Routine, unannounced inspection of quality assurance plans, instructions and procedures for electrical cables, terminations, and related equipment; observation and independent evaluation of work performance, work in progress, and completed work relative to electric cables, terminations, and related equipment; review of quality related records relative to electric cables, terminations, and related equipment; and review of QA plans, instructions, and procedures for containment penetrations and whether these documents meet the QA program. The inspection involved 93 hours onsite by three NRC inspectors.

Results: Within the four areas inspected, no violations or deviations were identified.

## DETAILS

### 1. Persons Contacted

#### Principal Licensee Employees

- \*D. W. Prigel, QA Manager, Wolf Creek Generating Station, Kansas Gas and Electric (KG&E)
- \*C. E. Parry, QA Technical Auditor, KG&E
- \*R. Bird, QA Engineer, KG&E
- \*J. L. Stokes, Project Support Supervisor, Construction (KG&E)
- G. W. Reeves, Assistant QA Manager, Wolf Creek Generating Station, KG&E

#### Daniel International Construction

- \*R. U. Kruggel, QA Engineer, Welding
- \*L. D. Bryant, Project Quality Manager
- \*C. M. Pruett, Project Quality Service, Engineer
- \*C. D. Mauldin, Project Quality Engineer
- B. Schryer, Senior Electrical Quality Supervisor
- H. Wood, Electrical Quality Inspector
- N. Rumold, Services Quality Supervisor
- B. Elliott, Lead Quality Inspector
- \*J. L. Patterson, Electrical Quality Supervisor

\*Denotes presence at the exit interview conducted on June 11, 1982. Other licensee and contractor personnel were contacted during the course of inspection activity.

### 2. QA Program and Procedures

The purpose of this inspection was to determine whether appropriate and adequate QA procedures exist to assure compliance with NRC requirements and licensee commitments for the performance of the following activities dealing with electrical cable: receipt inspection and storage, handling and installation, inspection and testing, identification, raceway separation and protection, cable redundancy and separation, raceway loading, cable nondestructive examination (NDE) after installation, and design changes and deviations.

#### a. Receipt Inspection and Storage

The NRC inspector examined the licensee's QA procedures for receipt inspection and storage of electrical cable. The procedures examined and the licensee's adherence to these procedures appeared to meet NRC requirements and licensee commitments. The procedures examined are listed below.

- . WP-XI-302, "Protection of Electrical Equipment," Revision 3, dated February 11, 1982
- . WP-I-01, "Special Receiving, Storage, Preservation and Maintenance Requirements for Safety and Non Safety Related Materials and Items," Revision 10, dated March 16, 1982
- . QCP-I-01, "Receipt, Storage and Preservation of Safety Related Materials and Items," Revision 12, dated February 19, 1982
- . QCP-X-303, "Installation of Cable," Revision 4, dated June 4, 1982

These procedures provide for adequate inspection of cable upon receipt to assure that it is undamaged and it conforms to purchase specifications. Documentation of inspection reports and qualification tests is adequately addressed by the examined procedures. Adherence to these procedures will assure that storage requirements, including environmental protection and segregation of nonconforming material, are met.

No violations or deviations were identified in this portion of the inspection.

b. Identification

The licensee's QA procedures for identification of electrical cable and cable terminations were examined by the NRC inspector. These identification procedures appeared to adequately assure cable traceability from receipt through installation and proper segregation of nonconforming cable. NRC requirements and licensee commitments appeared to be met by the examined procedures. The procedures examined are listed below.

- . AP-VI-02, "Nonconformance Control and Reporting," Revision 13, dated April 14, 1982
- . WP-I-01, "Special Receiving, Storage, Preservation and Maintenance Requirements for Safety and Non Safety Related Materials and Items," Revision 10, dated March 16, 1982
- . QCP-I-01, "Receipt, Storage and Preservation of Safety Related Materials and Items," Revision 12, dated February 19, 1982

No violations or deviations were identified in this portion of the inspection.

c. Raceway Loading

The NRC inspector examined the licensee's QA procedure dealing with raceway loading. The procedure examined appeared to adequately meet NRC requirements and licensee commitments. The procedure examined is listed below.

- . QCP-X-303, "Installation of Cable," Revision 4, dated June 4, 1982

No violations or deviations were identified in this portion of the inspection.

d. Design Changes, Deviations, and Unusual Problems

The NRC inspector reviewed Wolf Creek inspection (QA/QC) procedures and related documentation and determined that the established procedures and instructions assure adequate control of proposed, identified, and approved design changes; identified deviations (nonconformances or deficiency reports); and unusual problems (nonconformances, deficiency reports, and IEEE Standards and NRC requirements). The NRC inspector reviewed documentation, including the following:

- . Selected nonconformance and deficiency reports, and the disposition of the identified topics
- . Selected design change requests, including review, approval, and disposition
- . QCP-X-304, Cable Termination, Revision 2, dated January 27, 1982
- . Bechtel Drawing E-01013, Installation, Inspection, and Testing Details for Electrical Equipment and Cable

No violations or deviations were identified in this portion of the inspection.

e. Cable Redundancy and Separation

The NRC inspector reviewed Wolf Creek cable separation requirements, procedures, and instructions. The NRC inspector determined that the

applicant meets the separation criteria, redundancy requirements, and separation of cables (power, instrument, and control) and quality assurance implementing procedures by reviewing the following:

- . Computer printout of electrical equipment/instruments, dated April 2, 1982
- . Computer printout of cable and termination status report, dated May 21, 1982
- . Jumper Report, "Wolf Creek Nuclear Project," issue 36, dated April 2, 1982
- . Bechtel Drawing E-7000, "Basic Electric Termination Schedule," issue 35, February 10, 1982
- . Bechtel Drawing E-17000 (Site unique cables in power block listed), dated February 10, 1982
- . Field Change Requests (selected)
- . Design Change Requests (selected)
- . Cable Termination Cards (Daniel file)
- . QC Cable Termination Cards (vault) NOTE: Information identical to Cable Termination Cards

The NRC inspector's review of the above indicated that if the established procedures are followed, as specified, the as-installed records will reflect that the safety-related cable conforms to the applicable separation criteria. The cable separation requirements, as specified in the applicable procedures and indicated on the drawings and specifications were reviewed by appropriate KG&E or contractor personnel to assure that cable installation separation criteria are met. The procedures specified how redundant circuits would be routed and separated and routing cards are provided to provide routing information to the work crews and QA personnel. The procedures and routing cards and related information provide criteria for the separation of power cables from instrument and control cables, including reactor protection system cables.

No violations or deviations were identified in this portion of the inspection.

f. Inspection and Testing

The NRC inspector reviewed applicable site procedures and Chapter 17 of the SNUPPS (Wolf Creek) SAR to ascertain that the quality assurance responsibilities and requirements had been established. A review of the following documentation verified that the Wolf Creek organization conforms to the facility (SNUPPS) QA Program as described in Chapter 17 of the SAR:

- . WP-I-06, "Safety Tagging," Revision 2, dated August 4, 1982
- . QCP-X-300, "Installation of Electrical Raceway," Revision 8, dated April 15, 1982
- . Bechtel Drawing E-5000, "Electrical Cable and Raceway List"
- . Bechtel Raceway Drawing E-OR Series
- . QC Raceway Installation Card, Revision 3
- . Quality Raceway Checklist, Revision 5
- . QCP-X-302, "Installation of Electrical Raceway Supports," Revision 9, dated April 22, 1982
- . QCP-X-303, "Installation of Cable," Revision 3, dated July 27, 1981
- . Bechtel Drawing E-01013, "Installation, Inspection, and Testing Details for Electrical Equipment and Cable"
- . Administrative Procedure, AP-VI-04, "Calibration and Control of Construction Instruments and Tools"
- . QCP-X-304, "Cable Termination," Revision 2, dated January 27, 1982

The NRC inspector's review of the above procedures indicated that the construction testing and inspection procedures of installed electric cables, terminations, and raceways (cable ways) are established and being adhered to during testing and inspection. The procedures provide for adequate inspection and testing, as specified, of related materials, components, and special tools (e.g., cable insulation, compartment boundary seals, and fire retardent coatings). The results of inspections are transmitted to responsible QA and management personnel for review, approval, and permanent storage or

documentation. The acceptance criteria are specified in the applicable testing and inspection procedures.

No violations or deviations were identified in this portion of the inspection.

g. Cable NDE After Installation

The NRC inspector examined the licensee's procedures for verification of cable NDE. The following procedures were judged to satisfy the requirement:

- . Quality Control Procedures QCP-X-304, "Termination of Cable," Revision 6, dated June 2, 1982
- . Work Procedures WP-X-304, "Termination of Cable," Revision 5, dated February 23, 1982

No violations or deviations were identified in this portion of the inspection.

h. Handling and Installation

The NRC inspector examined the licensee's procedures pertaining to the handling and installation of cable, termination components and related equipment (cable raceways and raceway supports). It appears that the licensee has adequate procedures established for the installer, supervisor, and QA and QC personnel. The following procedures were reviewed:

- . Work Procedure WP-X-303, "Installation of Cable," Revision 7, dated February 10, 1982
- . Quality Control Procedure QCP-X-303, "Installation of Cable," Revision 4, dated June 4, 1982
- . Work Procedure WP-X-304, "Termination of Cable," Revision 5, dated February 23, 1982
- . Quality Control Procedure QCP-X-304, "Termination of Cable," Revision 6, dated June 2, 1982
- . Work Procedure WP-X-300, "Installation of Electrical Raceway," Revision 1C, dated April 23, 1982



- . Quality Control Procedure QCP-X-300, "Installation of Electrical Raceway," Revision 8, dated April 15, 1982
- . Work Procedure WP-X-302, "Installation of Electrical Raceway Supports," Revision 5, dated November 30, 1981
- . Quality Control Procedure QCP-X-302, "Installation of Electrical Raceway Supports," Revision 9, dated April 22, 1982
- . Administrative Procedure AP-VI-04, "Calibration and Control of Construction Instruments and Tools"
- . Quality Control Procedure QCP-I-02, "Calibration of Specific Test and Inspection Instruments and Equipment," Revision 8, dated May 18, 1982

No violations or deviations were identified in this position of the inspection.

i. Raceway (Cableway) Separation and Protection

The NRC inspector audited the licensee's QC procedure established for raceway separation and protection. The following quality control procedure was judged to be adequate.

- . QCP-X-300, "Installation of Electrical Raceway," Revision 8, dated April 15, 1982

No violations or deviations were identified in this portion of the inspection.

3. Observation of Electrical Cable Work (Cables & Terminations I)

The NRC inspector examined the licensee's activities dealing with storage, handling, identification and installation of cable. The storage, segregation, identification and traceability of cable in the lay down (storage) yard appeared to conform to the licensee's QA procedures.

The installation of cables through raceways and conduit was also observed by the NRC inspector. Raceway loading and cable pulling activity appeared to meet NRC requirements.

The NRC inspector verified that selected power cable and control cable terminations agreed with the specifications on the QC (Quality Control) Cable Termination Card. The scope of this verification included

reterminated and determined cable; all cable terminations inspected conformed to the specifications of the QC Cable Termination Card. The cables examined by the NRC inspector are listed below.

<u>Power</u>	<u>Control</u>
1BGG11BA	1ACI38JC
1ABK30BA	1ABK03KB
1ALY01AA	1ALG02BC
1BBG03BA	1BGK36AE
1BGY01AA	1BGK27AA
1BNG01AA	1ABK03AE
1BNG04BA	1ALB01AB
1ALG02CA	1BGB01AB
1BNG06AA	1ALI03BA
	1ABI02EB
	1ALI03AA
	1ALI03AD
	1ALI03AC

No violations or deviation were identified in this portion of the inspection.

#### 4. Review of Records (Cables and Terminations I)

The NRC inspector examined the licensee's QA records and reports dealing with receipt inspection, nonconformance, materials certification, test results and cable installation. The receipt inspection, material certification and test result records appeared to ensure that cable installed in-plant meets material specifications. The nonconformance reports reviewed by the NRC inspector adequately identified nonconforming items and reflected timely and appropriate corrective action of the identified items. The installation records reviewed by the NRC inspector agreed with the physical status of the cables that were inspected and appeared to ensure that electrical cable installation meets NRC requirements.

The QC Cable Termination Cards and the QC Termination Checklists were examined for the power and control cables listed below:

<u>Power</u>	<u>Control</u>
1BGG11BA	1ACI38JC
1ABK30BA	1ABK03KB
1ALY01AA	1ALG02BC
1BBG03BA	1BGK36AE
1BGY01AA	1BGK27AA
1BNG01AA	1ABK03AE
1BNG04BA	1ALB01AB
1ALG02CA	1BGB01AB

The NRC inspector also examined the following documents:

- . Purchase Order 10466-E-057A
- . Inspection Report 2407 written on October 29, 1981
- . Deficiency Report No. 15D 8418 ER
- . Nonconformance Report 4767
- . Procedure EO-1003
- . Bechtel Drawing No. M724272

It was noted by the NRC inspector that the flow of information between the licensee's electrical QC and warehouse QC staffs, appeared to facilitate cable traceability and resolution of nonconformance reports.

No violations or deviations were found in this portion of the inspection.

5. Electrical - Observation of Work and Work Activities (Cable & Terminations II)

a. Power and Control Inspected

The NRC inspectors selected ten power cables and ten control cables for components important to safety. The NRC inspectors had previously reviewed the Wolf Creek SAR and applicable work and quality assurance procedures. The NRC inspectors observed work performed, work in progress, and partially completed work during this inspection.

(1) The cables selected for inspection were:

- (a) 4160 volt cable from diesel generator 2 (FDR emergency diesel generator NE 02) to electrical cabinet NG-0211 in the control building, 2000-foot level, and included cable routed through electrical cable trays 4B1H62 and 4B1H60.
- (b) 4160 volt cable from AFW (auxiliary feedwater) pump DPAL01B to electrical cabinet NG-0205, in the control building, 2000-foot level.
- (c) 4160 volt cable from AFW pump DPAL01A to electrical cabinet NB-0105 in the control building, 2000-foot level. The electrical breaker for this pump had been physically removed from the switchgear cabinet for planned work.

- (d) 4160 volt cable from component cooling water pump DPBG05A to electrical cabinet NB-U104 in the control building, 2000-foot level. The breaker was in the switchgear location, but was not racked into the energized position.
  - (e) 480 volt limitorque operated essential service water system (ESWS) valve equipment #EF-HV-42 fed by electrical cable routed through 1U3001 (Note: this valve was tagged out by NCR-4694-E, dated May 12, 1982). Limitorque Corp. wiring diagram, Drawing 5-477-5636-3, dated February 15, 1975, and appropriately stamped with Bechtel Specification E-025, Revision 3, was attached to this valve's connection cover plate.
  - (f) 480 volt limitorque operated ESWS valve equipment #EF-HV-26 fed by electrical cable routed through conduit 4U3007.
  - (g) 480 volt limitorque operated ESWS valve equipment #EF-HV-47 fed by electrical cable routed through conduits 1U1075 and 1U1076.
  - (h) 480 volt limitorque operated ESWS valve equipment #EF-HV-49 fed by electrical cable routed through conduits 1U1073 and 1U1074.
  - (i) 125 volt (DC) sixty-cell Gould Battery in battery room 3, including electrical cable (000498) routed through conduits 3U3007 and 4V3008.
  - (j) 125 volt (DC) sixty-cell Gould Battery in battery room 4, including electrical cable routed through conduits 4U3047 and 4U3009.
- (2) The control cables selected for inspection were:
- (a) Termination on breaker DPHB07A, Motor Control Center (MCC) PG17M and termination on floor drain tank pump DPHB07A (completed).
  - (b) Termination on breaker DPHB04, MCC PG17M, and termination on chemical drain tank pump DPHB04 (completed).
  - (c) Termination of ESWS limitorque operators at valves EF-HV-47, EF-HV-49, EF-HV-26, and EF-HV-42 (all terminations completed).

- (d) Terminations in the starting circuit for emergency diesel generator 2, NE-02, and at MCC NG-04D (ten terminations completed and NRC inspectors observed work in progress on two terminations at the MCC).
  - (e) Termination on control room panel RP-068 - SA0-66B (NRC inspectors observed work in progress on two terminations). Approximately thirty terminations inside this panel had been completed prior to this inspection.
  - (f) Terminations on approximately fifteen cables to various safety-related systems were observed to have been completed behind the various control room panels.
  - (g) A total of approximately thirty cables, the respective terminations, and "finger checking" to assure completion of terminations were checked in the control room during this portion of the inspection.
  - (h) One Class IE cable (1SPI03DA) was observed during a partial pull through six of the scheduled twenty-four cable trays (raceways).
- (3) The NRC inspectors observed work performance, partially completed work, work in progress, and completed work relative to the power cables and control cables listed above. The requirements of applicable specifications and procedures was being accomplished on the work, including terminations and cable routing to the related equipment.

No violations or deviations were identified in this portion of the inspection.

b. Storage, Handling, and Identification

The NRC inspectors reviewed the applicable procedures; toured the site and storage, holding, and segregation areas; and observed work performance, work in progress, and partially completed work. Cables and other electrical equipment were stored as required by procedures and commercial standards to assure adequate protection from physical damage and/or adverse environment. Cables and related electrical components were identified and adequate control to assure control of issue from storage areas was maintained by designated personnel. Segregation and identification of nonconforming (rejected, identified for rework or reuse, and on hold for various causes) material was in accordance with procedures and general commercial standards.

No violations or deviations were identified in this portion of the inspection.

c. Use of Specified Material

The NRC inspectors reviewed applicable procedures, toured the site, and randomly checked electrical cables and components to determine that the issue control procedures are being adhered to, including confirmation that material is used as specified. The licensee had recently identified that solid copper wire, rather than stranded copper wire, had been used in electrical cabinet 4KJR16AH, equipment KJ 122. The licensee had asked for evaluation on this vendor-installed T/C wire and a surveillance report was being prepared by licensee. The NRC inspectors determined that the cables and electrical equipment were identified as required. The inspection indicated that the inspection procedures (QA/QC) for the above are being accomplished, as required.

No violations or deviations were identified in this portion of the inspection.

d. Installation

The NRC inspectors determined that:

- (1) The designated, approved drawings and work procedures were being utilized.
- (2) Work performance and inspection (QC) procedures are being adhered to.
- (3) Sizes and types of cables, termination components, raceways, raceway penetration seals, and fire barriers are being installed as specified.
- (4) Location, routing, protection and separation as specified, including separation of various circuits (power, control, instrument, redundant).
- (5) Grounding and bonding of raceways as specified.
- (6) Raceway (cableway) supports and anchorages as specified.

- (7) Raceway (cableway) identification system meets requirements.
- (8) Cable pulling procedures and equipment meet requirements.
- (9) Raceway loading within specified limits.
- (10) Cable terminations as specified.
- (11) Nondestructive tests (continuity, high potential, megger) as specified.

No violations or deviations were identified in this portion of the inspection.

e. Corrective Action

The NRC inspectors determined that the applicable procedures were being followed relative to identification, documentation, evaluation, and disposition of cables, (i.e., removing cables that indicated insulation damage, size wire incorrect, etc.) components, and equipment that did not meet procedure requirements. The overall corrective action program was in accordance with approved procedures.

No violations or deviations were identified during this portion of the inspection.

6. Containment (Penetrations)

The NRC inspector reviewed the QA implementing procedures for the containment penetrations. The NRC inspector ascertained that the Wolf Creek facility had appropriate, approved, and adequate procedures to assure that the following specific activities are controlled and performed in accordance with NRC requirements and Wolf Creek (SNUPPS) SAR commitments:

- a. Installation/erection, including position, alignment, and welding. The NRC inspector reviewed the following applicable facility procedures:
  - (1) WP-XI-300, "Installation of Electrical Equipment," Revision 5, dated April 22, 1982.
  - (2) WP-I-01, "Special Receiving, Storage, Preservation, and Maintenance Requirements for Safety and Nonsafety Related Materials and Items," Revision 10, dated March 16, 1982.

- (3) QCP-VII-200, "Inspection of Welding Process," Revision 12, dated May 26, 1982.
  - (4) QCP-XI-300, "Installation of Electrical Equipment," Revision 4, dated May 3, 1982.
- b. Testing (NDE and leak testing) and inspection, including leak control or leak testing components which are part of the penetration assembly. The NRC inspector reviewed the following applicable facility procedures:
- (1) QCP-XI-300 and WP-XI-300 (see a.1 and 4 above).
  - (2) Receiving and Maintenance Instructions (RMI's) referenced in WP-I-01, (see a.(2) above).
  - (3) All nondestructive testing (NDE) is performed by Peabody-GEO, KG&E contractor, in accordance with Peabody-GEO procedures that have been reviewed and approved by KG&E.
  - (4) The NRC inspector read four of the nitrogen ( $N_2$ ) pressure indicating gages on the electrical penetration assemblies to verify that the  $N_2$  pressure was maintained between 15 and 40 psig. Each of the four gages read by the inspector indicated a pressure of 18 psig. There are approximately 40 electrical penetration assemblies installed at the Wolf Creek site.
- c. QA audits of inspection (QC) activities relative to containment penetrations. The NRC inspector reviewed the following applicable facility procedures:
- (1) QCP-X-305, "Electrical Quality System Turnover," Revision 2, dated February 16, 1982
  - (2) QCP-I-02, "Calibration of Specific Test and Inspection Instruments and Equipment"
  - (3) AP-VI-02, "Nonconformance Control and Reporting"
  - (4) WP-XI-302, "Protection of Electrical Equipment," Revision 3, dated February 11, 1982
  - (5) QCP-XI-300, WP-XI-300, QCP-VII-200, and WP-I-01, as referenced in subparagraphs a. and b. above.
  - (6) Eleven nonconformance reports (NCR) and seven deficiency reports (DR).

No violations or deviations were identified in this portion of the inspection.



7. Exit Interview

An exit interview was conducted on June 11, 1982, with those persons denoted in paragraph 1 of this report. At the interview the inspectors discussed the findings indicated in the previous paragraphs. The licensee acknowledged these findings.