

APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-482/84-19

Construction Permit: CPPR-147

Docket: 50-482

Licensee: Kansas Gas and Electric Company (KG&E)
P. O. Box 208
Wichita, Kansas 67201

Facility Name: Wolf Creek Generating Station (WCGS)

Inspection At: Wolf Creek Site, Coffey County, Kansas

Inspection Conducted: July 30-August 3, 1984

Inspectors: *M. Murphy* 10/26/84
M. Murphy, Reactor Inspector, Special Projects and
Engineering Section, Reactor Project Branch 1 Date

son *M. Mullikin* 10/26/84
R. Mullikin, Reactor Inspector
Project Section A, Reactor Project Branch 2 Date

son *R. Ferguson* 10/26/84
R. Ferguson, NRR Date

son *C. Ramsey* 10/26/84
C. Ramsey, Region III Date

Other Inspectors: A. Coppola, Brookhaven National Laboratory (BNL)
H. Thomas, BNL

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Approved: R. E. Ireland 10/26/84
R. E. Ireland, Acting Chief, Special Projects and
Engineering Section, Reactor Project Branch 1 Date

L. E. Martin 11/5/84
L. E. Martin, Chief, Wolf Creek Task Force Date

Inspection Summary

Inspection Conducted July 30-August 3, 1984 (Report 50-482/84-19)

Areas Inspected: Special, announced inspection of the implementation of the fire protection program and compliance with the requirements of 10 CFR Part 50, Appendix R (safe shutdown) per FSAR commitments and SER evaluation. The inspection involved 276 inspector-hours onsite by four NRC inspectors and two consultants, including 24 inspector-hours during off-shifts.

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

DETAILS

1. Persons Contacted

KG&E

- J. Blackwell, Fire Protection Specialist
- A. DiCesaro, Licensing
- H. Chernoff, Licensing
- P. Dyson, Supervisor, Project Field Engineering
- K. Ellison, Supervisor, Startup Technical Support
- D. Green, Licensing Engineer
- N. Hoadley, Senior Engineer
- C. Hoch, Technician
- F. McLaurin, Assistant Startup Manager
- W. Lindsay, Supervisor, Quality Systems
- O. Maynard, Supervisor, Compliance
- J. Nelson, Supervisor, KG&E Construction Quality Control (QC)
- D. Smith, Superintendent, Plant Support
- C. Steinert, Quality Assurance (QA) Technician
- M. Williams, Superintendent, Regulatory Quality and Administration
- J. Zell, Superintendent of Operations

Union Electric

- S. Chomos, Fire Protection Engineer
- G. Patrissi, Fire Protection Consultant

Bechtel

- D. Arnold, Fire Protection Engineer
- D. Grimes, Senior Electrical Designer
- R. Jester, Electrical Designer
- B. Kenner, Electrical Group Leader
- J. Prebula, Deputy Supervisor, Mechanical Group
- A. Woolard, Mechanical Engineer

The inspection team also contacted other site personnel including operations and engineering.

2. List of Documents Reviewed

a. Procedures

<u>Title</u>	<u>Number</u>
Control of Ignition Sources	ADM 13-101
Control of Combustible Materials	ADM 13-102
Fire Protection: Impairment Control	ADM 13-103

Development and Use of Fire Preplans	ADM 13-104
Fire Protection Training Program	ADM 13-200
Fire Preplans Preparation Guide	ADM 13-300
Fire and Life Safety Inspections	ADM 13-903
Fire Protection Specialist Duties and Responsibilities	ADM 01-014
Fire Response	OFN 00-016
Control Building EL.2047, Control Room Area, Fire Preplan	FPP-C-27
Plant Shutdown From Outside Control Room During a Control Room Fire	OFN 00-013
Hot Standby to Cold Shutdown from Outside the Control Room	OFN 00-014

b. Installation/Inspection/Test Documents

<u>Title</u>	<u>Number</u>
Plant Public Address Communications System Preoperational Test Results	SU4•QF01 R1
Emergency Lighting System Preoperational Test Results	SU4•QD01 R0
Fire Barrier Inspection Record (July 28, 1984)	WC-WP-127.1
Fire Barrier Inspection Record (June 21, 1984)	WC-WP-127.1
Fire Barrier Inspection Record (June 27, 1984)	WC-WP-127.1
Installation of TSI Thermo-Lag Subliming Fire Barrier Materials	WP-X-306 R1
QC Cable Installation Card (April 12, 1983)	WC-QCP-117.3
QC Cable Installation Card (June 21, 1983)	WC-QCP-117.3
QC Cable Installation Card (December 29, 1983)	WC-QCP-117.3
QC Cable Installation Card (September 18, 1982)	WC-QCP-117.3
QC Cable Termination (July 19, 1983)	WC-QCP-118.1
QC Cable Termination (December 29, 1983)	WC-QCP-118.1
QC Cable Termination (March 17, 1984)	WC-QCP-118.1
Fire Protection Leak Rate Test Summary	FP-3B
Miscellaneous Component Test Record	K14-006
Fire Protection Performance Test for Fuel Building	KC-1B
Fire Protection Halon System	

Preoperational Test Procedure Fire Protection Water System	SU4•KC02
Preoperational Test Procedure Fire Protection Detection and Alarm	SU4•KC01B
Systems Preoperational Test Procedure Fire Protection System	SU4•KC03 SU4•FP03

c. Surveillance Tests

<u>Title</u>	<u>Number</u>
Diesel Fire Pump 1FP01PB Monthly Operation and Fuel Level Check	STS FP-601 R1
Electric Motor Driven Fire Pump 1FP01PA Monthly Operation	STS FP-602 R1
Flame Trip Actuating Device Operation Test	STS-1C-816 R0
Fire Pump 1FP01PB Diesel Engine Inspection	STS-MT-012 R0
Fire Pump (Diesel) Battery Electrolyte and Voltage Inspection	STS-MT-013 R0
Fire Pump (Diesel) Battery Specific Gravity	STS-MT-014 R0
Fire Barrier Penetrations and Sealing Devices	STS-MT-026 R0
Visual Inspection of Pipe Headers and Nozzle/Sprinkler Spray Areas	STS-MT-029 R0
Water Spray Systems Air Flow Test	STS-MT-030 R0
Fire Hose Station Coupling Gaskets and Hose Rackings	STS-MT-034 R0
Fire Hose Station Valve Operability and Hose Hydro	STS-MT-035 R0
Fire Brigade Equipment Maintenance	STN-FP-001 R0

d. Miscellaneous Documents

<u>Title</u>	<u>Number</u>
Systems Required for Safe Shutdown - SNUPPS	FSAR 7.4
SNUPPS Control Room Fire Hazards Analysis (November 15, 1982)	
Electrical Fire Hazards Analysis Program Safe Shutdown Analysis Sorted by Zone, Room, and Raceway	
Raceway Schedule, Race Conduits, Cables, and Equipment Number	E-1500
Fire Hazards Analysis Raceway Wrap Summary	
Availability Matrix	

Safety Evaluation Report Wolf Creek
Unit 1, Docket No. 50-482 NUREG-0881 of April 1982
Supplemental SER Wolf Creek Unit 1
Docket No. 50-482 Dated July 8, 1983
KG&E Internal Memo, Subject: Removing
Fire Wraps, dated July 30, 1984
KG&E Internal Memo, Subject: Removing
Fire Wrap, dated August 1, 1984
Contract for Fire Protection
(Offsite Support)
Contract for Fire Protection
Engineering Services
KG&E QA Audit - Operational Phase
Fire Protection KQWLKWD84-097
KG&E QA Audit Report - DIC Fire
Protection Program KQWLC 84-094

e. Drawings

<u>Title</u>	<u>Number</u>
Control Bldg. & Comm. Corridor Plan EL 1974'-0" & EL 1984'-0"	M-0G050-8
Control & Diesel Gens. Bldgs. Plan EL 2000'-0" & EL 2016'-0"	M-0G051-6
Control & Diesel Gens. Bldgs. Plan EL 2032'-0" & EL 2047'-6"	M-005052-7
Reactor & Auxiliary Bldgs. Plan Basement EL 1974'-0"	M-0G020-6
Auxiliary Building Partial Plan EL 1988'-0" & EL 2013'-6"	M-0G022-10
Reactor & Auxiliary Building Plan EL 2026'-0"	M-0G023-8
Reactor & Auxiliary Buildings Plan Operating Floor EL 2047'-6"	M-0G024-9
Standby Diesel Gen. "B" Cooling Water system	M-02KJ04(Q)-4
Borated Refueling Water Storage System	M-12-BN01(Q)-0
Chemical and Volume Control System	M-02BG03(Q)-17
Chemical and Volume Control System	M-02BG05(Q)-14
Chemical and Volume Control System	M-02BG01(Q)-12
Residual Heat Removal System	M-02E101(Q)-17
Essential Services Water System	M-K20F01(Q)-12
Reactor Coolant System	M-02BB01(Q)-15
Main Steam System	M-02AB01(Q)-11
Main Steam System	M-02AB02(Q)-12
Main Steam System	M-02AB03(Q)-8
Feedwater System	M-02AE-2(Q)-13
Auxiliary Feedwater System	M-02AL01(Q)-15

Reactor Coolant System	M-02BB02(Q)-12
Reactor Coolant System	M-02BB03(Q)-12
Essential Services Water System	M-02EF01(Q)-10
Essential Services Water System	M-02EF02(Q)-11
Component Cooling Water System	M-02EG01(Q)-11
Component Cooling Water System	M-02EG01(Q)-14
Component Cooling Water System	M-02EG03(Q)-15
Heating, Ventilation, and Air Conditioning System, Fuel Bldg., EL 2047'-6" and 2065'-0"	M-0H6311(Q)
Main Steam Supply Valve to Turbine Driven Auxiliary Feedwater Pump	E-03AB01Q Rev. D.
Motor Driven Auxiliary Feedwater Pump B	E-03AL01BQ Rev. 5
Motor Operated Valve - Schematic Diagram	E-03AL02BQ Rev. 1
Auxiliary Feedwater Pump Discharge Control - Motor Operated Valve	E-03AL03BQ Rev. 3
Supply From Essential Service Water System	E-03AL04BQ Rev. 2
Auxiliary Feedwater Discharge Control Air Operated Valve	E-03AL05BQ Rev. 1
Pressurizer Heater Backup Group B	E-03BB24 Rev. 9
Centrifugal Charging Pump B	E-03BG01AQ Rev. 3
Letdown Isolation Valve	E-03BG17Q Rev. 7
Volume Control Tank Outlet Isolation Valve	E-03BG12AQ Rev. 2
Pressurizer Relief Isolation Valves	E-03BB39Q Rev. 8
Essential Services Water Pump System Pump 1B	E-K3EF01AQ Rev. 4
Charging Pump Cold Leg Test Valve	E-03EM04AQ Rev. 1
Auxiliary Feedwater Pump Throttle Trip & Throttle	E-13FC23Q Rev. 0
Schematic Auxiliary Feedwater Pump Turbine Speed Control & Monitoring	E-13FC23Q Rev. 0
Auxiliary Feedwater Pump Turbine Governor Valve Position Indication	E-13FC25Q Rev. 0
4.16 KV XFMR Feeder Breaker 152NB0216	E-K3NG10AQ Rev. 1
480 Load Center - Mainfeeder Breaker 52NG0201	E-03NG11BQ Rev. 2
Circuit Breaker Coordination Curves	
ESF Transformer	E-11023QSH14 Rev. 0
480 V MCC	E-01024QSH P Rev. 0
Diesel Generator Overload	E-01102 5 QSH7 Rev. 0
Component Cooling Pump B	E-03G10 Q Q Rev. 4
4.16 KV Diesel Generator NE02 Feeder Breaker 152NB0211	E-13NE11Q Rev. 2
Diesel Generator KKJ01B Engine Control (D/G Trips)	E-03KJ03AQ Rev. 5
Diesel Generator KKJ01B Engine Control (Start/Stop Circuit)	E-03KJ03AQ Rev. 11

3. Fire Protection/Prevention Program

a. Summary

This inspection was conducted to determine whether the applicant had established a program for fire protection and prevention that is in conformance with regulatory requirements, FSAR commitments, and industry guides and standards.

The NRC inspectors reviewed the licensee's fire protection program description and operating procedures. This review determined that the licensee's program includes the following elements unless otherwise stated:

- (1) Qualified personnel are designated to implement the program.
- (2) Combustible materials, flammable and combustible liquids, and gas are restricted or controlled in areas containing safety-related equipment and components.
- (3) Welding and cutting operations and other activities involving open flame ignition sources in safety-related areas are properly controlled by a work permit.
- (4) Transient combustibles are restricted and controlled in safety-related areas.
- (5) Fire protection systems and fire brigade equipment maintenance, inspection, and testing requirements and frequency are defined.
- (6) Fire reporting instructions for all plant personnel are included in general employee training.
- (7) Fire brigade organization and qualification of brigade members are stipulated.
- (8) Fire brigade training and retraining requirements, including periodic drills, have been established and implemented.
- (9) Fire fighting strategies are being developed for all safety-related areas of the plant.

b. Administrative Procedures

The following procedures were reviewed and the apparent deficiencies, as indicated, were discussed with the applicant's representatives:

- (1) "Control of Ignition Sources," ADM 13-101, provides controls for transient ignition sources for safety-related areas. This procedure appears deficient as follows:

- (a) The shift supervisor may designate an "other knowledgeable person" to perform certain responsibilities. This does not adequately define the persons that may administer this control. The applicant has agreed to revise the procedure to clearly define the qualified designees.
 - (b) The assignment of a fire watch is optional. This is not in compliance with NRC guidelines. The applicant has agreed to revise the procedure to require assignment of a fire watch.
 - (c) The ignition source permit requires confirmation that "automatic sprinkler systems" are in service or a higher level signature is required. Many fire areas are protected by "automatic halon systems" which would not be considered in issuing these permits. The applicant has agreed to require the confirmation that "automatic suppression systems" are in service.
 - (d) The ignition source permit specifies certain distances (i.e. IIc-35 feet; IIe-5 feet; and IIf-5 feet) to define the work area to be protected against spark travel. The applicant has stated that the 5-foot dimension is a typographical error and will be revised to be 35 feet.
- (2) "Control of Combustible Materials," ADM 13-102, provides controls for the transfer, use, and/or storage of transient combustible materials in safety-related fire areas. This control appears deficient in that criteria are not provided for assigning a fire watch when certain amounts, types, or configurations of transient combustible materials are introduced into safety-related fire areas. The applicant has agreed to revise this procedure to provide threshold criteria.
- (3) "Fire Protection: Impairment Control," ADM 13-103, provides controls for the impairment of fire protection systems. This control appears deficient in that the shift supervisor may designate an "other knowledgeable person" to perform certain responsibilities. This does not adequately define the persons that may administer the control. The applicant has agreed to revise the control to clearly define the qualified designees.
- (4) "Fire Response," OFN-00-016, provides instructions for the response to fire-related emergencies. These instructions appear deficient in that they do not require the fire brigade to check fire areas adjacent to the fire area, in which a fire occurs, to assure that the fire is contained within the initial fire area. The applicant has agreed to revise this procedure to include such a requirement.

- (5) "Development and Use of Fire Preplans," ADM-13-104, provides instructions for the preparation of fire preplans. These instructions appear adequate for their intended purpose.
- (6) "Fire Preplans Preparation Guide," ADM-13-300, provides instructions for the preparation of fire preplans and fire preplan summaries. These instructions appear adequate for their intended purpose.
 - (a) "Control Building EL 2047, Control Room Area, Fire Preplan," FPP-C-27, describes the fire hazards and control strategies for the control room. This preplan appears adequate for its intended purpose. Fire preplans are prepared for each fire area. Most have been issued; a few are in the final concurrence phase.
- (7) "Fire Protection Training Program," ADM-13-200, prescribes the training required for fire watch/fire patrol, fire brigade members, fire brigade team leaders, offsite fire department personnel, fire protection maintenance/inspection, and fire protection training staff. This procedure appears adequate for its intended purpose.
- (8) "Fire and Life Safety Inspection," ADM 13-903, provides instructions for conducting the subject inspections. This procedure appears adequate for its intended purpose.
- (9) "Fire Protection Specialist Duties and Responsibilities," ADM 01-014, provides an outline of the responsibilities for the administration and implementation of the fire protection plan. This document appears adequate to define the responsibilities of this position.

Incorporation of the revisions, committed to by the applicant, and issue of the procedures as well as completing the issue of all fire preplans will be considered an open item, to be completed prior to the issue of an operating license. (50-482/8419-01)

c. Offsite Fire Protection Support

The NRC inspector reviewed a copy of the contract entered into between KG&E and the city of Burlington, Kansas, for fire protection support services from the City of Burlington Fire Department. This agreement provides for supplying men and equipment when requested as well as the conduct of training and participation in site drills.

d. Quality Assurance

The NRC inspectors reviewed recently completed QA audits conducted in the area of fire protection. This review and subsequent discussions with applicant representatives verified that the fire protection QA

program is a graded program under the management of the applicant's QA organization. The applicant is making efforts to effectively fulfill the responsibilities of the QA program for fire protection.

However, the applicants QA audit did identify one area of concern with the fire dampers. It is not clear that the installed fire dampers have been qualified to function with the ventilation fans operating. In most areas (e.g., those areas not protected by halon systems) there is no automatic shutdown of the ventilation fans when a fire is detected or confirmed. In addition, it is not clear that the fire dampers have been tested for operability in the construction or preoperational test phases. The applicant does not now plan to perform an operational test on many fire dampers throughout the life of the plant. The applicant has been requested to provide evidence that the dampers are qualified to close with the ventilation flow and that the dampers have been operationally tested in the installed configuration. The applicant has also been requested to propose a preventive maintenance operational test program to provide, on a sampling basis, assurance of continued operability. Pending response from the applicant this will be considered an open item.
(50-482/8419-02)

e. Communications Systems

Preoperational Test No. SU4•QF01, Revision 1, verified that the applicant has tested the functional operability of the plant's public address system by:

- (1) Operating the system from a standby power source during loss of offsite power.
- (2) Demonstrating combined handset/speaker amplifier stations installed throughout the plant operated as designed.
- (3) Demonstrating the electrically powered maintenance jack system operated and was independent of conversations conducted from the control room to designated areas.
- (4) Demonstrating the public address system could broadcast an audible evacuation alarm throughout the plant via the paging channel, supplemented by visual alarms in high noise areas.
- (5) Demonstrating the operability of an independent page and party system available for communication between the fuel handling area and the control room.

This capability was demonstrated assuming no fire damage to the system. Given fire damage to the system due to a control room fire or fires in certain plant areas, the applicant did not provide the inspectors with an analysis to demonstrate the level of plant communications that would be available under these conditions. The

applicant stated that given the loss of the plant's communication system, portable radios would be used. However, the applicant failed to provide the inspectors with acceptable evidence that portable radios had been tested throughout safe shutdown areas and determined to be an adequate reliable source of communications to support the safe shutdown function. Pending the development and review by the NRC of such acceptable evidence, this will be considered an open item. (50-482/8419-03)

f. Emergency Lighting System

The NRC inspectors examined the emergency lighting system required for safe shutdown. Section III.J of Appendix 9.5E to the SNUPPS FSAR and Section D.5 of Appendix 9.5A to the Wolf Creek Site Addendum require that emergency lighting units with at least 8-hour battery power supply be provided in all areas needed for operation of safe shutdown equipment and access routes thereto.

The licensee's installed emergency lighting system appears inadequate to allow efficient conduct of required safe shutdown actions in the following areas:

- (1) The one emergency lighting unit in the control room a/c filtration unit room E is located in such a position that the panel for MCC NG04C is not fully illuminated.
- (2) The north electrical penetration room lighting unit is located behind MCC NG01B and only gives reflected light to a portion of the panel.
- (3) The emergency lighting unit for MCC NG02B in the south electrical penetration room gives little or no illumination to one side of the panel.

The above lighting inadequacies were discovered during a test arranged for the NRC inspectors by the licensee where normal lighting was switched off and emergency lighting only was used. The licensee representatives agreed to either relocate or redirect the units as needed. The resolution of the inadequate emergency lighting in the three areas listed will be tracked as an open item. (50-482/8419-04)

g. Preoperational Test Procedures

The NRC inspectors reviewed selected procedures to determine that the procedures were available, being conducted as written, and that completed procedures contained all required information and data.

It was determined that all preoperational test procedures were not written and, therefore, a number of tests have not yet been conducted. During the review of SU4*FP03, "Fire Protection System," it was noted that the acceptance fire pump curves were questionable

when compared to the manufacturer's test curves. This was discussed extensively with the applicant's representatives and they agreed to verify a set of acceptable fire pump curves.

The completion of all preoperational tests and verification of an acceptable set of fire pump operation curves will be considered an open item. (50-482/8419-05)

h. Fire Barrier Penetrations

Inspection of selected fire areas disclosed a number of unsealed penetrations through 3-hour rated fire barriers. Representatives of the applicant advised the NRC inspectors that penetration seals were approximately 85 percent complete. All seals are presently scheduled to be complete by October 1, 1984. Pending completion of all fire barrier penetrations, this will be considered an open item. (50-482/8419-06)

i. Control Room Ventilation System

The NRC inspector reviewed installation of fire protection detectors in the control room ventilation ducting. This inspection raised questions as to the adequacy of the present installation and this was discussed with the applicants representatives. The concerns of the inspector were not responded to before the end of the inspection time and this will be considered an open item. (50-482/8419-07)

4. Post-Fire Safe Shutdown Capability

a. Systems Required for Safe Shutdown

The systems listed below are grouped under the headings of the goals identified in 10 CFR 50 Appendix R as requirements for PWR Safe Shutdown, for both hot standby and cold shutdown.

(1) Reactivity Control

Insertion of all control rods (SCRAM) from control room or from room 1413. Additional negative reactivity by boration using refueling water storage tank as source (2000 PPM Boron), injected via charging pumps.

(2) Reactor Coolant Makeup

Centrifugal charging pump (using RWST as source), via normal charging path and/or reactor coolant pump seals.

(3) Reactor Coolant System Pressure Control and Decay Heat Removal

Natural circulation transfers heat to steam generators. Steam generators are isolated from turbine, condenser, and normal feedwater systems. Auxiliary feedwater pump (either B motor

driven pump or turbine driven pump) maintains steam generator level. Condensate storage tank contains enough water for up to 9 hours, then source is switched over to essential service water systems (lake), pressure control is by feed and bleed. PORVs blocked and safeties available if required. Pressurizer heaters available under certain fire scenarios. Steam generator pressure maintained by atmospheric steam dump valves or safeties if required.

(4) Support Systems

One train of component cooling water and essential service water are required. Emergency diesels (one) and associated emergency switchgear. HVAC (room coolers) for all spaces housing safe shutdown equipment including control room.

(5) Process Monitoring

The following instrumentation is available at the auxiliary shutdown panel (A or B), and in the control room:

- Reactor Coolant Temperatures (Hot and Cold Leg)
- Pressurizer Pressure
- Pressurizer Level
- Steam Generator Pressure
- Steam Generator Level
- Auxiliary Feed Pump Pressure (suction and discharge)
- Condensate Storage Tank Level
- Source Range Monitors

(6) Cold Shutdown

The RHR pumps, heat exchangers, and valves necessary to align coolant flow from hot leg through RHR heat exchanger and back to cold leg are required. Component cooling is used to remove heat to ESW system (lake).

b. Alternative Safe Shutdown

(1) Areas Where Alternative Safe Shutdown is Not Required

All areas of this plant will meet the requirements of IIIG.2 of Appendix R, and therefore do not require alternative safe shutdown capability except for the control room. All of the equipment required for safe shutdown outside of the control room has adequate separation and/or fire barriers between redundant trains. There are a number of locations where redundant cabling must be wrapped with material equivalent to a 1 or 3-hour fire barrier in order to meet the requirements of IIIG.2. These areas were delineated by the applicant and inspected by the inspection team. No additional areas requiring additional cable

protection were found. Completion of the identified fire barrier wrapping is considered an open item. (50-482/8419-08)

(2) Control Room

For fires which require evacuation of the control room, the applicant has installed two auxiliary shutdown panels (ASP) at elevation 2026' in the auxiliary building. These two panels are separated by a 3-hour fire barrier. The train B panel (RP118B) is preferred for shutdown outside of the control room because the instrumentation associated with it is electrically isolated from the control room. All of the controls required for achieving and maintaining hot standby are available on the train B panel, but, these controls are not electrically isolated from the control room. Cold shutdown is attainable by operator action at various other locations outside of the control room.

For fires in the control room, the applicant has developed an alternate shutdown path which is not completely independent of the control room. Upon detection of a fire in the control room (which may take time ranging from several seconds to several minutes), the applicant's procedure calls for starting the emergency diesel B by simulating a loss of offsite power, and properly loading the diesel with safe shutdown loads and aligning valves (isolating them from the control room) so that shutdown from the ASP B panel is possible without spurious signals due to the control room fire. These actions (performed in the control room) may take as little as 4½ minutes (applicant's estimate of maximum time required), however, if fire damages the diesel control panels in the control room during this time, the ability to load the emergency diesel busses with the safe shutdown equipment may be lost (see Section 6.b.3 in discussion of associated circuits). Therefore, the present alternative safe shutdown method proposed does not meet the requirements of IIIG.3 or IIIL. Pending the applicants completion of actions required to meet the requirements of III G.3 and III L this will be considered an open item. (50-482/8419-09)

5. Safe Shutdown Procedures

The procedures reviewed during this inspection included OFN 00-013, Revision 1 and Revision 2, "Plant Shutdown From Outside The Control Room During a Control Room Fire," and OFN 00-014, Revision 0, "Hot Standby to Cold Shutdown From Outside the Control Room." Procedure OFN 00-013 is based on the applicants control room fire analysis and allows a certain period of time (4½ minutes according to applicant), to start and load diesels with safe shutdown loads, align valves and isolate controls from the control room, before assuming control of the primary and secondary systems at the ASP-B.

Procedure OFN 00-013, Revision 2, was walked through with members of the applicant's operating staff (licensed reactor operators). It was evident that the operator designated as operator A in the procedure would have to accomplish switching operations at a minimum of three different panels in the control room, and that the control room must be habitable and the controls undamaged during this time. It is probable that the actions require less than 10 minutes, and possibly as little as 4½ minutes as claimed by the applicant.

The procedure contained alternate steps to be taken in case of damage to specific circuits. These actions were to be taken by operators B, C, or D and included manual operation of the 4160 V emergency breakers for the pumps required for hot standby. If the more general criteria of a disabling control room fire is applied to Wolf Creek (i.e., time only to scram reactor before leaving control room, and damage to any or all controls occurring at this time), then all or most of these alternate steps would have to be accomplished within the time constraints existing for establishing feedwater flow to the steam generators, and reactor coolant makeup to the reactor. The procedure has not been timed under these circumstances, nor was it evident that the actions required by the procedure could be accomplished in time.

Procedure OFN 00-0014, Revision 0, "Hot Standby to Cold Shutdown from Outside of Control Room," was reviewed. This procedure assumes sufficient personnel onsite to accomplish any repairs necessary to establish RHR operation, and local manual operation of valves. Since this procedure assumes that stable hot standby conditions exist at the start, it will enable the attainment of a cold shutdown condition within 72 hours, as required by Appendix R.

Pending the issuance of an acceptable hot shutdown procedure (OFN 00-013), training of operators and demonstration of the procedure to the NRC, this will be considered an open item. (50-482/8419-10)

6. Protection For Associated Circuits

The Wolf Creek Plant was inspected for compliance with the Associated Circuit Provisions of 10 CFR 50.48, Appendix R.

- Common Bus Concern
- Spurious Signal Concern
- Common Enclosure Concern

a. Common Bus Concern

The common bus concern is found in circuits, either non safety-related or safety-related, where there is a common power source with shutdown equipment and the power source is not electrically protected from the circuit of concern.

Coordination of circuit breaker protection was checked for the ESF transformer, the 4160 V breaker for 480 V MCC, and the emergency diesel generator feeder breaker to the 4160 volt bus.

The fuse coordination for the 125 V D.C. buses was also checked.

The coordination for all samples of fuses, circuit breakers, and relays was found to be satisfactory.

b. Spurious Signal Concern

The spurious signal concern is made up of two items:

- The false instrument readings such as occurred at the 1975 Browns Ferry fire. These could be caused by fire initiated grounds, shorts or open circuits.
- Spurious operation of safety-related or non safety-related components that would adversely affect shutdown capability (e.g., RHR/RCS isolation valves).

(1) Current Transformer Secondaries

The current transformer circuitry for the diesel control circuits was reviewed. The applicant has installed transducers for circuit isolation. This was found to be satisfactory.

(2) High-Low Pressure Interfaces

The pressurizer relief isolation valves and the RHR isolation valves were identified as high-low pressure interfaces. The pressurizer relief isolation valve control circuitry can be isolated by a switch at the motor control center. An alternate source of power which is independent of the control room will be required in order to have the capability to operate these valves without replacing fuses. Pending the licensee's resolution of power supply to the pressurizer relief isolation valves, this will be considered an open item. (50-482/8419-11)

The RHR isolation valves will have their power removed by racking out a breaker.

(3) Isolation of Other Fire Instigated Spurious Signals

Control circuits were inspected for the following components:

- Start/Stop Emergency Diesel Generator
- Essential Service Water Pump B
- Component Cooling Water Pump B
- Charging Pump B
- Diesel Generator NE02 Feeder Breaker 152NG0211

A fire in the control room could cause extensive damage to the control circuitry for the above components. The emergency diesel generator B could not be started should a control room fire blow the fuse in the 125 V D.C. control circuit; this would eliminate the availability of emergency power. Similar damage to fuses in the control circuitry for the other components would require manual operation of their respective circuit breakers in order to obtain starting power. The acceptability of a manual mode of operation is dependent on the available time to achieve shutdown goals.

Two auxiliary shutdown panels; one for train A and one for train B, each enclosed in a separate 3-hour enclosure, are provided to enable the achievement of cold shutdown from outside of the control room.

Instrumentation independent of the control room has been provided at the train B auxiliary shutdown panel for the following parameters:

- Reactor coolant System T_{hot} and T_{cold}
- Pressurizer Pressure and Level
- Steam Generator Pressure and Level
- Source Range Neutron Flux

With the exception of the source range instrumentation, the isolation devices for these instruments are located in cabinets - SB184B 9 (train B) and SB184A (train A). The signal processor for the source range instrumentation is located in the auxiliary building and has two independent outputs, one for the control room and one for the auxiliary shutdown panel.

The spurious signal concern was not satisfactorily addressed since it was found that spurious signals could inhibit the capability of the licensee to operate the following components:

- The Pressurizer Isolation Valves
- Emergency Diesel Generator
- Essential Service Water Pump B
- Component Cooling Water Pump B
- Charging Pump B
- Diesel Generator NE02 Feeder Breaker 152NB0211

Pending the licensee's compliance with the spurious signal concern of Appendix R III.L, this will be considered a part of open item 50-482/8419-09.

c. The Common Enclosure Concern

The common enclosure concern is found when redundant circuits are routed together in a raceway or enclosure and they are not

electrically protected or fire can destroy both circuits due to inadequate fire protection means.

Samples of raceways for the feedwater and main steam systems were examined. The raceways in the feedwater system which were examined are as follows:

011U0K5C	
011U1037	011J01B
011U1038	011J1064
011U1039	014J3C1C
011J1L01	014J1014

The raceways in the main steam system were:

012J046	012J1042
012J1047	012J1043
012J1B9G	013J1027
012J1B1H	013J1031
012J1035	013J1024
012J1036	013J1034
012J1037	

At the Wolf Creek Plant, the concern was answered satisfactorily when a sample of selected circuits was found to be routed in separate raceway or conduit and to be electrically protected. Non safety-related cables are not run in the same trays as safety-related cables unless they are fed from the safety-related power source. In this instance the non safety-related cable is routed with the same separation group.

7. Exit Interview

An exit interview was conducted August 3, 1984, with the personnel denoted in paragraph 1 of this report present. The NRC resident inspector also attended this meeting. At this meeting, the scope of the inspection and the findings were summarized.