



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

April 16, 1993

Docket Nos. 50-269, 50-270,  
and 50-287

LICENSEE: Duke Power Company

FACILITY: Oconee Nuclear Station, Units 1, 2, and 3

SUBJECT: SUMMARY OF MARCH 29, 1993, MANAGEMENT MEETING ON OCONEE ELECTRICAL SYSTEM

On March 29, 1993, the NRC staff met with representatives of Duke Power Company (DPC) to discuss issues related to the Oconee electrical system. The meeting was requested by NRC due to the relatively large number of deficiencies reported by DPC related to this system, the Loss of Off-site Power event which occurred at Oconee Unit 2 in October 1992, the recent reorganization of the Keowee hydrostation management, and the recent completion of an Electrical Distribution System Functional Inspection. The NRC had provided DPC a list of issues to be covered at the meeting in a letter dated March 8, 1993 (Enclosure 1).

After opening remarks, Jim Hampton, Oconee Site Vice President, introduced the DPC presentation. His remarks included background information on the electrical system at Oconee and a discussion of the recently developed Oconee Emergency Power Management Plan. This plan is intended to be a comprehensive plan to upgrade the management and operation of all aspects of the emergency power system, and in particular, the Keowee hydrostation.

Following this introduction, Jack Peele, Site Engineering Division Manager, provided a brief description of the Loss of Off-site Power event which occurred at Oconee Unit 2. Following this description, corrective actions involving electrical equipment design and testing were discussed. Brew Barron, Oconee Station Manager, then described changes which had been made or were planned in the management, procedures, and training in the area of the on-site electrical system. Included in the future plans were plans to have the Keowee operator training program accredited by the Institute for Nuclear Power Operations under the non-licensed operator category.

Jack Peele then described DPC's position regarding compliance of the Oconee electrical system design to the intent of General Design Criteria (GDC) 17. Although DPC acknowledged that the Oconee design did not meet the letter of the GDC-17 criteria for independence of on-site and off-site power sources, DPC felt that the Oconee design provided equivalent reliability. However, the NRC staff did not agree with the DPC position regarding the ability to withstand failures. After a period of discussion, it was decided that resolution of this issue would be handled as a separate issue. Jim Hampton then provided closing remarks for DPC.

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April 16, 1993

The NRC staff requested that the licensee commit to three actions:

1. Provide a list of remaining actions, both short term and long term, including proposed evaluations of potential modifications and a scheduled completion date for each item. The list should be submitted on the docket within 30 days of the date of this meeting, and should include a schedule for periodic status reports to the NRC.
2. Submit the test procedure for the integrated test of the "overhead" emergency power path for NRC review prior to conducting the test.
3. Provide a commitment to review the Keowee hydrostation and Oconee 230 KV switchyard against the recommendations of prior NRC generic communications and determine the applicability of proposed actions. A proposed completion date should also be provided.

DPC agreed to the above requests and the meeting was then adjourned.

Meeting participants are listed in Enclosure 2. Handouts distributed by DPC during the presentation are provided in Enclosure 3.

/s/

Leonard A. Wiens, Project Manager  
 Project Directorate II-3  
 Division of Reactor Projects - I/II  
 Office of Nuclear Reactor Regulation

Enclosures:

1. March 8, 1993 letter
2. List of Attendees
3. Handouts

cc w/enclosures:  
See next page

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 D Matthews  
 4/16/93

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Project Directorate II-3  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

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See next page

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DISTRIBUTION

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

March 8, 1993

Docket Nos. 50-269, 50-270  
and 50-287

Mr. H. B. Tucker  
Senior Vice President  
Nuclear Generation  
Duke Power Company  
P. O. Box 1006  
Charlotte, North Carolina 28201-1006

Dear Mr. Tucker:

SUBJECT: CONFIRMATION OF MEETING ARRANGEMENTS - OCONEE UNITS 1, 2, AND 3

This letter confirms the arrangements made in a phone conversation between Mr. J. Hampton, Vice President, Oconee Site, and Mr. A. Herdt of the NRC Region II staff concerning a Management Meeting to be conducted at the Nuclear Regulatory Commission offices in Rockville, Maryland. The meeting is scheduled for Monday, March 29, 1993, at 1 p.m. in One White Flint North, Room 10B11.

The purpose of the meeting will be for you to discuss the October 19, 1992, event in which there was a reactor trip and Loss of Offsite Power to Oconee Unit 2 and several equipment problems and operator errors in the operation of the Keowee units. We are particularly interested in hearing a description of those actions, both completed and planned, designed to improve the reliability of the emergency power system for the Oconee Station. Specific issues we would like addressed are identified in the enclosure. Additional issues you feel should be addressed relating to this event may be added to the agenda. Duke Power Company representatives will be expected to commit to firm schedules for completion of corrective actions identified as a result of this event.

If you have questions regarding this matter, you may contact me at (301) 504-1490 or Len Wiens of my staff at (301) 504-1495.

Sincerely,

David B. Matthews, Director  
Project Directorate II-3  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Enclosure:  
Management Meeting Issues

cc w/enclosure: See next page

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ENCLOSURE

OCONEE AIT MANAGEMENT MEETING ISSUES

1. DPC comments on NRC AIT inspection report 92-26 dated November 27, 1992.
2. Results of DPC's review of this event, cause determination and proposed corrective actions and schedule, including design modifications.
3. Conformance of Oconee Electrical System to the intent of GDC-17, particularly in relation to the independence between the offsite and onsite electrical sources and the independence between the preferred offsite sources.
4. Discuss testing performed on the Keowee Overhead Emergency Path in accordance with Technical Specifications 4.6.1.b and 4.6.5 and any proposed changes to this testing.
5. Description of the organizational groups responsible for technical support to the Keowee facility, both under normal and abnormal/emergency conditions. Include definition and assignment of responsibility for all activities important to the safe operation of the facility.
6. Discussion of management of Oconee and Keowee support items such as training, maintenance, surveillance testing, and EOP implementation. Include actions taken and planned to improve Keowee and Oconee operator training on Keowee and actions taken and planned to improve abnormal and emergency operating procedures at Keowee.

## DUKE MANAGEMENT MEETING ATTENDEES

<u>NAME</u>	<u>ORGANIZATION</u>
Len Wiens	NRR/PDII-3
Dave Matthews	NRR/PDII-3
Steve Varga	NRR/DRPE
Jim Partlow	NRR/ADP
Hal B. Tucker	DPC - Charlotte, NC
J. W. Hampton	DPC - Oconee
Donna Smith	NRR/HHFB
Mark Lesser	NRC/RII
Fred Burrows	NRR/EELB
Bill Raughley	AEOD/ROAB
Milton Shymlock	DRS/RII
Fred Manning	AEOD/DSP/ROAB
Hal Ornstein	AEOD/DSP/ROAB
Don Hickman	AEOD/DSP/TPAB
S. K. Mitra	EELB/DE/NRR
J. E. Rosenthal	AEOD/DSP/ROAB
G. C. Lainas	NRR/AD RII Reactors
Frank Ashe	NRR/EELB
Duc Nguyen	NRR/EELB
Eric Weiss	NRR/EELB
D. M. Jamil	DPC - Oconee
R. L. Dobson	Duke/Oconee
Gary E. Rothenberger	Duke/Oconee
Earl J. Brown	AEOD/DSP/ROAB
William Troskoski	OE
Paul Harmon	NRC RII
Warren Swenson	NRR/HHFB
Carl H. Berlinger	NRR/DE/EELB
Mark E. Patrick	Duke/Oconee
Henry B. Barron	Duke/Oconee
Jack Peele	Duke/Oconee
Albert Gibson	NRC/RII
MaryAnn Biamonte	NRR/HHFB



**Duke Power Company  
Oconee Nuclear Station**

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**NRC Management Meeting  
March 29, 1993**

March 8, 1993 NRC Letter  
Oconee AIT Management Meeting Issues

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- DPC comments on NRC AIT inspection report
- Event review, cause, corrective action, and schedule
- Conformance to intent of GDC-17
- Overhead emergency path testing
- Organization & responsibility for Keowee support
- Oconee and Keowee management support:
  - Training
  - Maintenance
  - Surveillance
  - EOP implementation

Oconee AIT Management Meeting  
AGENDA  
March 29, 1993

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Introduction (Jim Hampton)

Event Description (Jack Peele)

Equipment, Design, and Testing (Jack Peele)

Management, Procedures, and Training (Brew Barron)

Intent of GDC-17 (Jack Peele)

Closing Remarks (Jim Hampton)

# Oconee Emergency Power Management Plan Format

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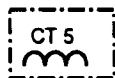
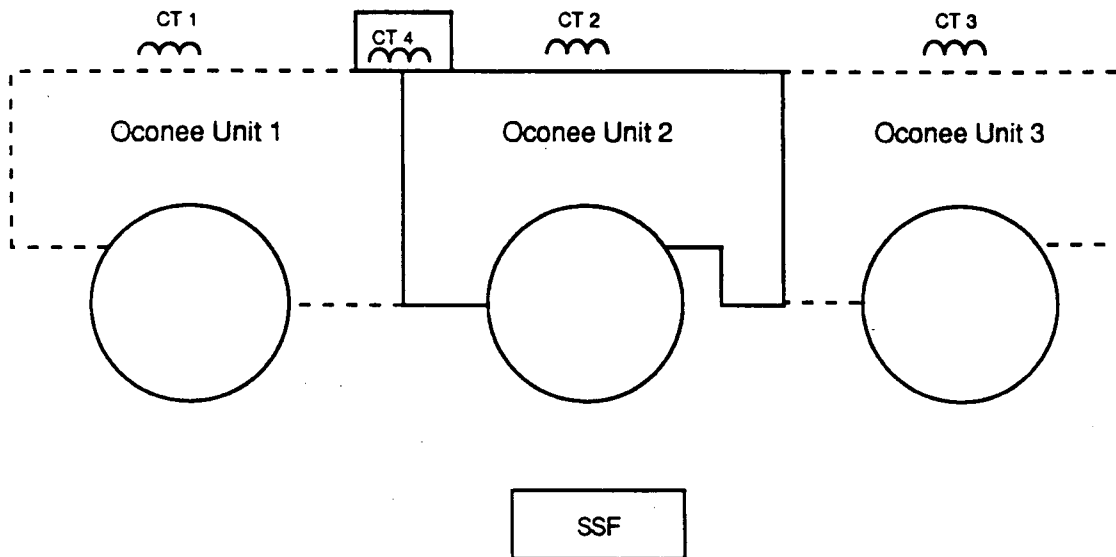
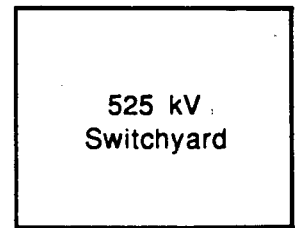
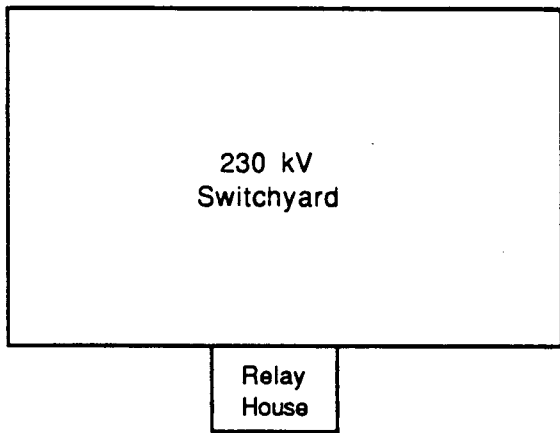
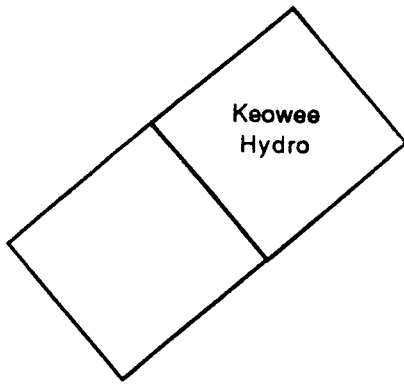
- I. Introduction and Scope
- II. Conduct of Operations
- III. Training
- IV. Maintenance Program
- V. Engineering Program
- VI. Status / Schedules

## Event Description

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- Status Prior to Event
- Initiating Event
- Response of Units
- Keowee Degraded
- First Recovery
- Keowee Temporarily Lost
- Second Recovery

OCONEE EMERGENCY POWER



## Equipment, Design and Testing Switchyard Equipment

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- Battery chargers
- Breaker failure relays
- Switchyard synchroscope
- Overhead path testing

## Equipment, Design and Testing Keowee Auxiliary Power Systems

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- Westinghouse DB Breakers
- MG-6 Relays
- Keowee auxiliary power transfer
- Keowee "black start"

## Equipment, Design, and Testing Keowee Unit Protection

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- Keowee Circuitry
- Keowee Field Circuits
- Keowee Load Rejection
- Keowee Zone Relay Protection
- Keowee Overspeed Switch

## Equipment, Design and Testing Keowee Support Equipment

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- Computer typer
- Statalarm panel power supply
- Events recorder
- IEB 79-27 related power supplies

## Organizational Relationship

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- Oconee Superintendent of Operations fully accountable for Keowee Operations
- Oconee Management Procedures implemented
  - duties & accountabilities
  - watch standing
  - log keeping
- Shift rotation alignment
- Plant status communications standards

## Communications Systems

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- Telephone system upgraded
- Load dispatch phone system
- Base radio system
- Hand held radios
- Security radio system
- All independent of Keowee aux power system

## **Keowee Operator Training Upgrade Plan**

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- All Keowee personnel trained on Operations Management Procedures (OMPs)
- Previously task qualified to operating, testing, and maintenance procedures
- Job and Task Analysis in progress
- Lesson plan development - complete by Aug 1993
- Individual operator knowledge and skills assessment and upgrade - complete by Dec 1993

## **Keowee Emergency Response Procedure**

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- "Emergency Start Actuated" indicating light installed
- Operator verification of automatic actions
- Directions for manual start in the event of failure to respond to emergency signal
- Directions for troubleshooting and corrective actions in the event of auxiliary power system failures



## Keowee Emergency Response Training

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- 5 JPMs developed to verify all possible failure scenarios
- Keowee personnel trained and qualified to all 5 JPMs
- Oconee licensed operators given walk-through training on JPMs
- Oconee operators task qualified to perform remote startup and operation from Oconee control room
- All Oconee shift operators to be qualified to all aux power JPMs

## Oconee Loss of Offsite Power Procedure

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- Proceduralized all steps necessary to recover offsite power
- Dead bus and live bus transfer options
- Live bus transfer parallels Keowee and Oconee to grid without interruption of power to Oconee
- Live bus transfer functionally tested and verified
- 10/25/92 test deficiencies related to hardware and procedures
- Live bus transfer training for Oconee licensed operators via simulator in progress

## GDC-17

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- Offsite and onsite power systems sufficient to:
  - (1) Assure fuel design and RCS pressure boundary design conditions not exceeded due to AOOs
  - (2) Assure core cooled, containment integrity & other vital functions maintained in event of postulated accidents
- Onsite system, including batteries and distribution system shall have: independence, redundancy, testability, assuming single failure.
- Offsite network to onsite distribution shall have two independent circuits: Each available in time to meet (1) above, one available within few seconds to meet (2) above
- Minimize probability of losing power from remaining supplies

## Offsite Power System Power Sources

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- 230kV switchyard, served by 8 transmission lines
- 525kV switchyard, served by 3 transmission lines, via autotransformer to 230kV switchyard
- 100kV transmission line
  - Connected to substation at Central, SC or
  - Isolated from grid and aligned to one of three CTs at Lee Steam Station

## Onsite Power Supplies and Distribution System

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- Power Sources:
  - Keowee Hydro Units 1 & 2 (87.5 MVA)
- Paths to Onsite Distribution System
  - Underground to CT4 to 4160V standby buses
  - Overhead to 230kV switchyard to startup transformer of each Oconee Unit

## Paths to Onsite Distribution System

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- Immediate:
  - 230kV switchyard to startup transformer of each Oconee Unit
- Delayed:
  - 230kV switchyard thru each Oconee Unit's main transformer via main generator bus (with generator disconnected) to auxiliary transformer ("backcharge")
- Other Alternatives:
  - 100kV transmission line to CT-5 transformer
  - 230kV switchyard to startup transformer of neighbor Oconee Unit

## Independence and Redundancy

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- Offsite and Onsite systems taken together can take a single failure and maintain all safety functions
- Onsite systems can take a single failure and maintain all safety functions
- Offsite and Onsite systems taken together can take a double failure with one being complete loss of Offsite power and maintain all safety functions
- Analysis completed which shows that failures in either the Offsite/Onsite sources would not impact the Onsite/Offsite source

## Closing Remarks

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- Lessons Learned
- Original Licensing Basis
- Accident Precursor Analysis
- Emergency Power System

# GDC 17

## MINIMIZING PROBABILITY OF LOSING ELECTRIC POWER

	LOSS OF OCONEE UNIT	LOSS OF GRID	LOSS OF KEOWEE
EFFECT ON OCONEE		Oconee will trip. Bounded by LOOP Analysis.	No effect on an operating Oconee Unit, (except LCO).  No single failure of Keowee can affect an Oconee unit being supplied emergency power.
EFFECT ON GRID	Included in grid stability analysis.  Demonstrated during unit trips.		Bounded by loss of Oconee unit.
EFFECT ON KEOWEE	No effect. Design basis for Keowee.	Generating Keowee unit will isolate. Proven by Keowee load rejection test.	