



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA STREET, N.W., SUITE 2900
 ATLANTA, GEORGIA 30323-0199

JUN 02 1994

Report Nos.: 50-269/94-10, 50-270/94-10 and 50-287/94-10

Licensee: Duke Power Company
 422 South Church Street
 Charlotte, NC 28242

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

License Nos.: DPR-38, DPR-47,
 and DPR-55

Facility Name: Oconee 1, 2 and 3

Inspection Conducted: May 9-12, 1994

Inspector: *William M. Sartor, Jr.* 6/1/94
 W. M. Sartor, Jr., Team Leader Date Signed

Team Members: K. Barr, RII
 D. Barss, PEPB/NRR
 A. Gooden, RII

Approved by: *K. P. Barr* 6/2/94
for K. P. Barr, Chief Date Signed
 Emergency Preparedness Section
 Radiological Protection and Emergency Preparedness Branch
 Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, announced inspection involved the observation and evaluation of the annual emergency preparedness exercise. Emergency organization activation and response were selectively observed in the licensee's Emergency Response Facilities, including the Simulator Control Room, Technical Support Center, Operations Support Center, Emergency Operations Facility, and Joint Information Center. The inspection also included a review of the exercise scenario and observation of the licensee's critique. This announced exercise was conducted on May 10, 1994, between the hours of 8:00 a.m. and 12:50 p.m. The exercise was full participation by Oconee and Pickens Counties and partial participation by the State of South Carolina. The offsite participation by the counties and State was evaluated by the Federal Emergency Management Agency.

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Results:

In the areas inspected, violations or deviations were not identified. One Exercise Weakness was identified for the failure to communicate the need for the fire brigade response in a timely manner. Exercise strengths included the challenging scenario; the interchange of information between the Emergency Coordinator, and the Recovery Manager and their respective staffs; notifications to the offsite agencies; and information provided to the public.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

D. Berkshire, Radiological Assessment Manager
*P. Brandt, Specialist, Emergency Preparedness
*R. Brown, Senior Technical Specialist, Emergency Preparedness
N. Constance, Unit Supervisor
*L. Crouse, Commodities and Facilities
B. Dolan, Recovery Manager
*D. Durham, Security
*T. Grant, Specialist, Emergency Preparedness
*M. Greene, Corporate Communications
*J. Hampton, Vice President, ONS
*D. Hubbard, Superintendent, Maintenance
*C. Jennings, Manager, Emergency Preparedness
*T. Kelly, Safety Manager
*J. Long, Radiation Protection
*B. Peele, Station Manager, ONS
*T. Pettit, Community Relations, Duke Power
*G. Rothenberger, Superintendent, Operations
*D. Stratton, Business Manager
*R. Sweigart, Work Control Superintendent/EC
*C. Yongue, Radiation Protection

Other licensee employees contacted during this inspection included craftsmen, engineers, operators, mechanics, security force members, technicians, and administrative personnel.

Nuclear Regulatory Commission

P. Harmon, Senior Resident Inspector
*L. Keller, Resident Inspector
*N. Stinson, PEPB/NRR

*Attended exit interview

Abbreviations used throughout this report are defined in the last paragraph.

2. Exercise Scenario (82302)

The scenario for the emergency exercise was reviewed to determine whether provisions had been made to test the integrated emergency response capability and a major portion of the basic elements within the licensee's Emergency Plan, as required by 10 CFR 50.47(b)(14) and Section IV.F of Appendix E to 10 CFR Part 50.

The scenario for this exercise was reviewed in advance of the scheduled exercise date and discussed with licensee representatives prior to the exercise. The exercise scenario was well organized and provided

sufficient information to the State and local governments for their participation in the exercise. Some minor inconsistencies became apparent during the review of the offsite radiological field team data; however, these inconsistencies did not detract from the overall performance of the EROs.

No violations or deviations were identified.

3. Onsite Emergency Organization (82301)

The licensee's organization was observed during the exercise to determine whether the requirements of Paragraph IV.A of Appendix E to 10 CFR Part 50 (as addressed in the Emergency Plan) were implemented with respect to descriptions, responsibilities, and assignment of the onsite ERO.

The inspector determined that the initial onsite emergency organization was adequately defined and the primary and alternate assignments for the positions in the augmented emergency organization were clearly designated. During the exercise, the inspector observed that staff was available to fill key functional positions within the initial onsite emergency organization.

No violations or deviations were identified.

4. Emergency Response Support and Resources (82301)

This area was observed to determine whether arrangements for requesting and effectively using assistance resources were made, whether arrangements to accommodate State and local personnel at the EOF were adequate, and whether organizations capable of augmenting the planned response were identified as specified by 10 CFR 50.47(b)(3), Paragraph IV.A of Appendix E to 10 CFR Part 50, and guidance promulgated in Section II.C of NUREG-0654 (Revision 1).

State staff was accommodated at the EOF. Both State and local staff were accommodated in the JIC. Arrangements were in place to request additional resources to support the emergency response. The fire and medical responses from the offsite agencies were simulated in this exercise.

No violations or deviations were identified.

5. Emergency Classification System (82301)

This area was observed to verify that a standard emergency classification and action level scheme was in use by the licensee as required by 10 CFR 50.47(b)(4) and Paragraph IV.C of Appendix E to 10 CFR Part 50, and to determine whether that scheme was adequately implemented.

The licensee effectively used their procedure RP/O/B/1000/01, "Emergency Classification," to classify each emergency condition and to escalate to more severe classifications as the simulated accident progressed. The Operations Shift Manager declared an Alert at 8:15 a.m. based on design basis earthquake, tremor felt, and seismic trigger alarm actuated. Both the SAE and the GE classifications were declared by the Recovery Manager in the EOF. The events were declared at 9:44 a.m. and 10:56 a.m., respectively.

No violations or deviations were identified.

6. Notification Methods and Procedures (82301)

This area was observed to determine that procedures had been established for notification by the licensee of State and local response organizations and emergency personnel, and the content of initial and followup messages to response organizations had been established; and a means to provide early notification to the population within the plume exposure pathway had been established as required by 10 CFR 50.47(b)(5), 10 CFR 50, Appendix E, Paragraph IV.D, and the specific criteria in NUREG-0654, Section II.E.

The inspector reviewed the licensee's procedure (RP/O/B/1000/15), "Offsite Communications," for providing emergency information to Federal, State, and local response organizations. The inspector noted that the implementing procedure was adequate to provide guidance to personnel responsible for initial notification to the State, local, and Federal authorities. During the exercise, the notifications to the offsite authorities were well formulated, properly approved, and provided the information within required time restraints.

No violations or deviations were identified.

7. Emergency Communications (82301)

This area was observed to verify that provisions existed for prompt communications among principal response organizations and emergency personnel as required by 10 CFR 50.47(b)(6), 10 CFR 50, Appendix E, Paragraph IV.E, and the specific criteria in NUREG-0654, Section II.F.

The inspector observed that communications among the licensee's ERFs and emergency organization and between the licensee's ERO and offsite authorities were good with one noted exception. The exception was when the TSC was notified at 1059 hours that Warehouse #6 was on fire. A significant level of concern was apparent due to the Appendix R equipment stored in the warehouse. The equipment was being considered as needed to mitigate the current plant situations. The TSC Offsite Communicator was directed to request offsite assistance to fight the fire. It was not until 11:21 a.m. that the onsite fire brigade was directed to respond to the fire at Warehouse #6. This failure to

communicate the need for response of the onsite fire brigade to the scene of the fire in a timely manner was identified as an EW. The licensee also identified this issue during their critique process.

IFI 50-269, 270, 287/94-10-01: EW for failure to request in a timely manner the response of the onsite fire brigade to a simulated fire within the protected area.

No violations or deviations were identified.

8. Public Education and Information (82301)

This area was observed to determine whether information concerning the simulated emergency was made available for dissemination to the public as required by 10 CFR 50.47(b)((7), 10 CFR 50, Appendix E, Paragraph IV.D, and specific criteria in NUREG-0654, Section II.G.

Information was provided to the media and the public in advance of the exercise. The licensee activated a JIC at the Clemson Operations Center on Issaqueena Trail in Clemson. The licensee issued a total of three News Bulletins which were timely and informative. The release information was described in good layman's terms.

No violations or deviations were identified.

9. Emergency Facility and Equipment (82301)

This area was observed to determine whether adequate emergency facilities and equipment to support an emergency response were provided and maintained as required by 10 CFR 50.47(b)(8), 10 CFR 50, Appendix E, Paragraph IV.E, and the specific criteria in NUREG-0654, Section II.H.

The inspector observed activation, staffing, and operation of the ERFs to include the SCR, TSC, OSC, and the EOF. In all cases, the facility and its dedicated equipment facilitated the emergency response.

a. Simulator Control Room

The SCR was adequately equipped to support the emergency response. Procedures were effectively used to classify the emergency and make required notifications.

b. Technical Support Center

The TSC was declared operational 20 minutes after the Alert classification. The facility and its equipment were effectively used by the EC to receive his turnover briefing, to keep the TSC staff informed, and to provide emergency information to the OSC and EOF.

c. Operational Support Center

The OSC was promptly staffed and declared operational 17 minutes after the Alert. The OSC was equipped and the facility provided sufficient space for effective damage control activities.

d. Emergency Operations Facility

Observations of EOF activities during the exercise reflected a facility with the necessary equipment to support emergency response. Communications with the site were effective for making informed emergency management decisions from the EOF and the interface with State and local authorities was effective.

No violations or deviations were identified.

10. Accident Assessment (82301)

This area was observed to assure that methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency conditions were in use as required by 10 CFR 50.47(b)(9), Appendix E, Paragraph IV.B, and the specific criteria in NUREG-0654, Section II.I.

The accident assessment reviewed by the inspector included an engineering assessment of plant status and an assessment of radiological hazard to both onsite and offsite personnel resulting from the simulated accident. The inspector noted that the engineering assessment provided by the TSC staff was very effective in identifying sources of water to refill the borated water storage tank.

The primary dose assessment function was in the EOF and was staffed in a timely manner. The initial dose projection was completed at 9:53 a.m. approximately nine minutes following the declaration of a SAE. Projections were periodically made between the SAE and the declaration of the GE. Those projections indicated that release was initially below operating limits.

Field monitoring teams established communications with the EOF dose assessment area and periodically relayed information from the field concerning the measured dose rates and, in several cases, the concentration of Iodine-131 from measurements of air samples. Additionally, the field teams reported on the condition of the bridges in the plant vicinity that might have been weakened by the scenario earthquakes.

The declaration of the GE occurred at 10:56 a.m. and resulted from the loss of two fission product barriers and the potential loss of the third barrier. As part of the scenario, the light indicators for the personnel hatch into containment showed the hatch was not fully closed. This provided a release path to the environment but the leak rate was not known. The Rad Assessment Manager requested support from

engineering to obtain an estimate of the leakage rate so that he could perform offsite dose projections. That leakage rate estimate was not received from engineering until approximately 12:15 p.m., about an hour and fifteen minutes following the declaration of the GE. The Rad Assessment Manager attempted to bound the release by using a field monitoring measurement of I-131 equivalent and a leakage rate identified in the procedure for the 48" hatch being wide open. He considered the dose projections made at 11:42 a.m. based on field measurement results being too low because of other plant parameters. Also, he considered that a release through a 48" hatch would be unrealistically too high. At about 11:40 a.m., the Rad Assessment Manager made a judgement to use the leakage rate through a 4" diameter hole for a dose projection. The engineering estimated leakage rate provided at about 12:15 p.m., supported the use of a leakage rate from a 4" diameter hole to do the earlier offsite dose projections.

In subsequent discussions with the Rad Assessment Manager, he indicated he was aware that the public was being evacuated from the downwind sectors. Because of that evacuation, he believed he could take the necessary time to develop an accurate leakage rate and dose projection. He indicated he did not want to greatly overestimate the projected offsite doses because an unrealistic dose projection might cause offsite officials to take actions that were not warranted.

In this exercise, the delay in performing offsite dose projections did not impact any PARs. The dose projections did not alter the licensee's PARs. Also, the State had already made the decision to evacuate the public from the downwind sectors based on plant conditions. In the licensee's player critique, the issue of the delay in obtaining leakage estimates from engineering was identified as an area for action.

No violations or deviations were identified.

11. Protective Responses (82301)

This area was observed to verify that guidelines for protective actions during the emergency, consistent with Federal guidance, were developed and in place, and protective action for emergency workers, including evacuation of non-essential personnel were implemented promptly as required by 10 CFR 50.47(b)(10), and the specific criteria in NUREG-0654, Section II.J.

The inspector verified that the licensee had emergency procedures for formulating PARs for the offsite populace within the 10-mile EPZ. The PARs were quickly formulated and promptly provided to the State and local authorities with the GE notification message. The EN Form #6 that provided the PARs for the GE did not include the sheltering of the EPZ that was not evacuated. The sheltering had been provided verbally and Follow-up Message #7 was promptly dispatched to include the omission.

The inspector also observed that protective actions were instituted for onsite emergency responders which included periodic radiation surveys in the ERFs, and continued accountability of emergency response personnel. The licensee's procedure RP/O/B/1000/10, "Procedure for Emergency Evacuation/Relocation of Site Personnel," provided guidance and criteria for initiating and conducting site evacuations. During the exercise, the inspector observed that licensee personnel followed procedural guidance and appropriately considered the evacuation of non-essential personnel. The decision was made to evacuate the non-essential personnel from the site at the SAE. Site radiological and meteorological conditions as well as plant status were evaluated in making the evacuation plans. The licensee then simulated the actual evacuation.

No violations or deviations were identified

12. Medical and Public Health Support

This area was observed to determine whether arrangements were made for medical services for contaminated injured individuals as required by 10 CFR 50.47(b)(12), 10 CFR 50, Appendix E, Paragraph IV.E, and specific criteria in NUREG-0654, Section II.L.

A Medical Emergency Response Team drill was conducted as part of the exercise but not observed by the NRC. The licensee evaluated the drill and found it to be satisfactory.

No violations or deviations were identified.

13. Recovery and Re-Entry Planning

This area was observed to determine that general plans are made for recovery and re-entry as required by 10 CFR 50.47(b)(13), 10 CFR 50, Appendix E, Paragraph IV.H and specific criteria in NUREG-0654, Section II.M.

The licensee conducted recovery planning following accident mitigation. As a result of this effort, the licensee identified the need to enhance their Re-Entry Recovery Procedures.

No violations or deviations were identified.

14. Exercise Critique (82301)

The licensee's critique of the emergency exercise was observed to determine whether the deficiencies identified as a result of the exercise, and the weaknesses noted in the licensee's ERO were formally presented to licensee management for corrective actions as required by 10 CFR 50.47(b)(14), 10 CFR 50, Appendix E, Paragraph IV.F, and specific criteria in NUREG-0654, Section II.N.

The licensee conducted player critiques on the day following the exercise. On May 11, 1994, the licensee also conducted evaluator/controller critiques prior to the formal presentation to facility management on the following day. The licensee's critique to their management on May 12 was comprehensive and addressed numerous issues for further evaluation and corrections as necessary.

No violations or deviations were identified.

15. Action on Previous Inspection Findings

- a. (Closed) IFI 50-269, 270, 287/93-18-01: EW - Manager in the EOF ERO failed to notify the ED that suspect information would be provided to the State and offsite agencies in an EN message.

The inspector noted that the licensee's EOF Director Procedure (RP/O/B/1000/20) was revised to require a group discussion among managers be held once every hour during an Alert classification and once every half hour for SAE and GE classifications. During this exercise, the inspector observed frequent discussions involving the EOF Director and his various EOF Managers. Additionally, the offsite radiological data provided to the offsite agencies was reviewed by the EOF Director prior to its transmittal.

- b. (Closed) IFI 50-269, 270, 287/93-18-02: Review the licensee's evaluation of fire response capabilities during Emergency Plan implementation and any corrective actions to improve responsiveness in a future inspection.

The inspector noted that the fire brigade's response to the scene of the reported fire was timely and effective following the announcement for them to respond. The timely response of the fire brigade from the OSC corrected the issue. The failure of the TSC to communicate the need for the fire brigade to respond is a separate issue being followed as described in Paragraph 7 of this report.

- c. (Closed) IFI 50-269, 270, 287/93-18-03: Review the licensee's evacuation criteria and procedures for non-essential personnel onsite during a radiological release.

This issue is closed based on the inspector observations made in Paragraph 11 of this report.

16. Federal Evaluation Team Report

The report by the Federal Evaluation Team (Regional Assistance Committee and FEMA, Region IV staff) concerning the activities of offsite agencies during the exercise will be forwarded by separate correspondence.

17. Exit Interview

The inspection scope and results were summarized on May 12, 1994, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

<u>Item No.</u>	<u>Status</u>	<u>Description and Reference</u>
50-269, 270, 287/94-10-01	Open	IFI - EW for failure to communicate the need for the fire brigade response in a timely manner (Paragraph 7).
50-269, 270, 287/93-18-01	Closed	IFI - Exercise Weakness for failure of the EOF staff to notify the ED of suspect radiological information prior to its transmission (Paragraph 13).
50-269, 270, 287/93-18-02	Closed	IFI - Review the licensee's evaluation of fire brigade response (Paragraph 13).
50-269, 270, 287/93-18-03	Closed	IFI - Review the licensee's evacuation criteria and procedures for non-essential personnel onsite during a radiological release (Paragraph 13).

18. Index of Abbreviations Used in This Report

CFR	Code of Federal Regulations
EC	Emergency Coordinator
ED	Emergency Director
EN	Emergency Notification
EOF	Emergency Operations Facility
EPZ	Emergency Planning Zone
ERF	Emergency Response Facility
ERO	Emergency Response Organization
EW	Exercise Weakness
FEMA	Federal Emergency Management Agency
GE	General Emergency
IFI	Inspection Follow-up Item
JIC	Joint Information Center
NRR	Office of Nuclear Reactor Regulation
ONS	Oconee Nuclear Station
OSC	Operations Support Center
PAR	Protective Action Recommendations

PEPB Emergency Preparedness Branch
RP Radiological Protection
SAE Site Area Emergency
SCR Simulator Control Room
TSC Technical Support Center

Attachment:
Exercise Scope and
Objectives

**OCONEE NUCLEAR SITE
1994 EMERGENCY RESPONSE ANNUAL EXERCISE
SCOPE**

A. SCOPE

The 1994 Oconee exercise scheduled to be conducted on May 10th is designed to meet the exercise requirements of 10CFR50, Appendix E, Section IV.F. The 1994 exercise will involve full participation by Oconee and Pickens Counties and partial participation by the State of South Carolina. This participation will also include activation of the Alert and Notification System for Oconee. This exercise will involve full participation of Oconee Nuclear Site's emergency response organization and will require activation of the Technical Support Center, Operational Support Center, and Emergency Operations Facility.

A critique involving exercise participants and controllers will be conducted prior to the formal critique involving Oconee Nuclear Site management and the NRC. These critiques will be held at Oconee Nuclear Site.

A public critique will be held at the Duke Power Operations Center on May 11, 1994 at 1200.

*OCONEE NUCLEAR SITE
1994 EMERGENCY RESPONSE ANNUAL EXERCISE
OBJECTIVES*

A. EMERGENCY RESPONSE ORGANIZATION

- a. Demonstrate ability to mobilize staff (TSC, OSC, EOF, JIC) and activate facilities as required by Figure B-8 in ONS Emergency Plan after declaring an Alert or higher emergency classification.
- b. Demonstrate the ability to fully staff facilities and maintain staffing around the clock.
- c. Demonstrate precise and clear transfer of responsibility from the Shift Supervisor in the Control Room/ TSC to the Emergency Coordinator in the TSC.
- d. Demonstrate precise and clear transfer of responsibility from the Emergency Coordinator in the TSC to the EOF Director in the EOF.
- e. Demonstrate the ability to assess the incident and determine/ implement mitigation strategies.

B. EMERGENCY CLASSIFICATION

- a. Demonstrate the ability to properly classify emergency situations in accordance with plant procedures.
- b. Demonstrate the ability to notify counties and state within 15 minutes after declaring an emergency or after changing classification.
- c. Demonstrate proper use of message format and authentication methodology for messages transmitted to state and counties.

C. COMMUNICATIONS

- a. Test onsite and offsite communications equipment:
 - Selective Signaling
 - Duke Offsite Radio System (FMTs and TSC/ EOF)
 - Duke Onsite Radio System
 - FTS-2000 System: ENS
 - Intercom Systems
- b. Demonstrate the ability to communicate with all appropriate locations, organizations, and field personnel.

*OCONEE NUCLEAR SITE
1994 EMERGENCY RESPONSE ANNUAL EXERCISE
OBJECTIVES*

C. COMMUNICATIONS (continued)

- c. Demonstrate the ability to notify the NRC not later than 1 hour after declaring one of the emergency classes.
- d. Demonstrate the ability to provide current plant data to appropriate locations, organizations, and field personnel.
- e. Test adequacy and operability of emergency equipment/ supplies.

D. ACCESS AND CONTROL

- a. Demonstrate the ability to account for onsite personnel within 30 minutes.
- b. Demonstrate the ability to locate unaccounted personnel determined by site assembly.
- c. Demonstrate the ability to effect an orderly evacuation of non-essential personnel (planning process will occur, evacuation of personnel will be simulated).
- d. Demonstrate the ability to provide controlled access to the plant and EOF.

E. RADIOLOGICAL MONITORING

- a. Onsite:
 - Demonstrate appropriate equipment and procedures for determining ambient radiation levels.
 - Demonstrate appropriate equipment and procedures for measurement of airborne radioiodine concentrations.
 - Demonstrate the ability to provide offsite dose projection in accordance with site procedures.
 - Demonstrate the ability to continuously monitor and control emergency worker exposure.
 - Demonstrate the ability to make the decision (based on predetermined criteria) whether to issue KI to emergency workers and then to issue same.

**OCONEE NUCLEAR SITE
1994 EMERGENCY RESPONSE ANNUAL EXERCISE
OBJECTIVES**

E. RADIOLOGICAL MONITORING (continued)

- b. Offsite:
 - Demonstrate the ability to mobilize teams in the 10 mile EPZ to locate and track the plume for noble gases and radioiodine concentrations in a timely manner.
 - Demonstrate the ability to transmit field measurement data to TSC/ EOF.
- c. Dose Calculations and Protective Action Recommendations:
 - Demonstrate the ability to provide timely and appropriate protective action recommendations in accordance with site procedures.

F. OFFSITE AGENCY ASSISTANCE

- d. Demonstrate county and state participation in exercises/ drills.
 - Full (Counties)
 - Partial (State)

G. JOINT INFORMATION CENTER

- a. Demonstrate the ability to brief the media in a clear, accurate, and timely manner.
- b. Demonstrate the ability to provide advance coordination of information released.
- c. Demonstrate the ability to establish and operate rumor control in a coordinated fashion.

H. RECOVERY AND REENTRY

- a. Demonstrate the ability to determine and implement appropriate measures for controlled recovery and reentry.
- d. Demonstrate adequate equipment and procedures for decontamination of workers, equipment, etc.

OCONEE NUCLEAR SITE
1994 EMERGENCY RESPONSE ANNUAL EXERCISE
OBJECTIVES

I. EXERCISE/DRILL MANAGEMENT

- b. The Annual Exercise will be scheduled during different seasons of the year.
- d. Drills/ exercises will be under the control of a Drill/ Exercise Director. Controllers/ Evaluators will be utilized to keep the scenario on track and to allow for "free play".
- e. Critiques will be held after all drills/ exercises to determine any corrective actions that may need to be made.

MISCELLANEOUS

- a. Demonstrate the adequacy of procedure revision to **RP/0/B/1000/20, Emergency Operations Facility Director Procedure** requiring round-table discussions between EOF Director and managers for information exchange. This will ensure that EOF Director is aware of information that could be provided to offsite agencies. (Corrective action for **Exercise Weakness 50-269, 270, 287/93-18-01**).

OCONEE NUCLEAR SITE
1994 EMERGENCY RESPONSE ANNUAL EXERCISE
INITIAL CONDITIONS/SEQUENCE OF EVENTS

INITIAL CONDITIONS

Unit 1 100% Power

Core is at 410 Effective Full Power Days (EFPD) with a continuous run of 185 days. End Of Cycle (EOC) - 15 refueling outage is scheduled to begin on May 19th.

At 0700 the control room received an alarm indicating low oil level in 1A2 Reactor Coolant Pump (RCP). Maintenance personnel are in the Reactor Building investigating the alarm.

KI Inverter is bypassed.

Unit 2 Shutdown with the reactor defueled. Unit was shutdown based on B&W analysis and NRC recommendation to investigate potential of core barrel cracking. Cracks were found earlier in April in another B&W unit.

Condensate System is being maintained in recirc/ cleanup mode. Condenser and Upper Surge Tank are full. Condenser Cooling Water (CCW) System is in operation with A, B, and D CCW pumps in service.

Main Transformer is backcharged to provide power to unit's auxiliary electrical loads.

Unit 3 Shutdown with the reactor defueled. Unit was shutdown based on B&W analysis and NRC recommendation to investigate potential of core barrel cracking. Cracks were found earlier in April in another B&W unit.

Condensate System is being maintained in recirc/ cleanup mode. Condenser and Upper Surge Tank are full. Condenser Cooling Water (CCW) System is in operation with A, B, and C CCW pumps in service.

Main Transformer is backcharged to provide power to unit's auxiliary electrical loads.

Keowee Hydro Units 1&2 are operable.

The Aux Service Water Pump Switchgear is energized from CT-5 for performance test of the Aux Service Water Pump. Testing of the Aux Service Water Pump is scheduled to begin at approximately 0800.

**OCONEE NUCLEAR SITE
1994 EMERGENCY RESPONSE ANNUAL EXERCISE
INITIAL CONDITIONS/SEQUENCE OF EVENTS**

INITIAL CONDITIONS

Weather Forecast

A slow moving Low Pressure Front has moved into South Carolina with a stationary Low Pressure Area located near Columbia. Thunderstorms are expected later in the afternoon. Winds from South - South-SouthEast (160 - 230°) and from 0 - 15 mph are expected. The low temperature for May 10 is expected to be 55°F with a high of 80°F.

SEQUENCE OF EVENTS

0745 Two Maintenance Technicians enter Unit 1's R_XB to determine the oil level in 1A2 RCP Lower Oil Pot.

While closing the personnel hatch from inside the reactor building, the keyway key on the door's hand wheel drops out and falls between the personnel hatch and the reactor building floor. The maintenance technician's are unable to retrieve this key.

0800 Design Basis Earthquake (>0.05g, ~0.08g actual) occurs:

- ◆ Control Room/ Site personnel feel tremor
Seismic Trigger Alarm, 1SA-9, E-1, actuates
MC SEISMIC RECORDER (D0201) is recorded on alarm typer
Strong Motion Accelerometer (SMA-3) event indicator changed from black to white
- ◆ 1A Feedwater (FDW) Pump Recirc piping shears at condenser
Condenser loses vacuum
Turbine trips
1A and 1B FDW Pumps trip
Reactor (R_X) trips
- ◆ All Emergency FDW pumps start
- ◆ Aux Service Water pump suction piping fails at pump - Aux Building begins to flood ~ 800-1000 gpm.
Unit 1 & 3 Low Activity Waste Tank levels start to slowly increase
Miscellaneous Waste Holdup Tank levels start to slowly increase
LPI Pump Rooms start to flood
- ◆ Maintenance Technicians exit the R_XB through the **Emergency Personnel Hatch**
While exiting the hatch, the Inner Hatch Door fails to secure and latch; Outer Hatch Door is secured. Control room does not receive Inner Hatch Door Open light due to an electrical fault.

OCONEE NUCLEAR SITE
1994 EMERGENCY RESPONSE ANNUAL EXERCISE
INITIAL CONDITIONS/SEQUENCE OF EVENTS

SEQUENCE OF EVENTS

- 0805 Control Room personnel initiate AP/1/A/1700/05, Earthquake
- Shift Supervisor initiates Emergency Plan using RP/0/B/1000/01, Emergency Classification
- Conditions for an Alert classification exist
- 0805 - 0815 Shift Supervisor initiates RP/0/B/1000/02, Control Room Emergency Coordinator Procedure
- ◆ TSC, OSC, EOF activation initiated
 - ◆ Site Assembly initiated per RP/0/B/1000/09, Procedure For Site Assembly
 - ◆ Control Room Offsite Communicator prepares Emergency Notification Form per RP/0/B/1000/15, Offsite Communications
 - ◆ Control Room personnel request I&E to analyze data from Tendon Gallery Peak Acceleration Recorder (PAR-400) and the Strong Motion Accelerometer (SMA-3)
 - ◆ Control Room personnel notified of flooding in Aux Building and of damage to the World Of Energy
- 0825 - 0830 Alert declared based on Design Basis Earthquake, Tremor Felt and Seismic Trigger Alarm Actuates (0.05g).
- ◆ Offsite agencies notified as per RP/0/B/1000/15, Offsite Communications
- 0835 - 0845 Site Assembly Completed (30 minutes after initiation of Site Assembly)
- TSC/ OSC Staffed and operational, turnover completed between Shift Supervisor and TSC Emergency Coordinator
- Operations personnel secure Aux Service Water leakage by securing Unit 2 Condenser Cooling Water (CCW) pumps and closing their respective discharge valves. Even with the discharge valves close ≈ 3.5 hours of water remains in the CCW piping.

OCONEE NUCLEAR SITE
1994 EMERGENCY RESPONSE ANNUAL EXERCISE
INITIAL CONDITIONS/SEQUENCE OF EVENTS

SEQUENCE OF EVENTS

- 0845 - 0900 OSC teams assess plant damage - damage is observed at the Oconee Office Building and Administration Building
- Efforts in progress to recover from Aux Building Flood
- Emergency Coordinator may relocate personnel from the Oconee Office Building and Administration Building based on observed damage and personnel safety concerns. If personnel are relocated, RP/0/B/1000/10, Procedure For Emergency Evacuation/Relocation Of Site Personnel and Site Directive 4.4.1, Site Evacuation/Relocation Plan would be utilized to determine appropriate actions. *Actual relocation of personnel will be simulated.*
- 0855 OSC notified of potential Hazardous Material Spill by damage assessment team
- ◆ Spill is a SCDHEC reportable hazardous material spill (not an EPA Reportable Quantity) involving ≈ 110 gallons of lubricating oil (R&O-68)
 - ◆ Spill is located in the Drum Storage inside the PAP and covers an area of ≈20'x20'. The spill is contained within this area with no threat of reaching any storm drains/ or wet land areas.
 - ◆ OSC reports information to the TSC; the Environmental Management (EM) Group is requested to provide support.
- 0856 - 0090 TSC/ EM enters RP/ 0/ B/ 1000/ 17, Hazardous Substance Release
- ◆ Environmental Management should determine if a Reportable Quantity (RQ) is involved and to determine reportability of spill.
 - ◆ Environmental Management should advise TSC that release is reportable.
 - ◆ Spill involves a hazardous material that is less than the RQ.
 - ◆ Counties and SC State Bureau of Solid and Hazardous Waste Management should be contacted. Control Room should document on Hazardous Substance Release form.
 - ◆ TSC personnel recognize that a four hour NRC ENS call is required pursuant to 10CFR50.72(b)(2)(vi), *Four-hour reports* and then provide this information to NRC.

OCONEE NUCLEAR SITE
1994 EMERGENCY RESPONSE ANNUAL EXERCISE
INITIAL CONDITIONS/SEQUENCE OF EVENTS

SEQUENCE OF EVENTS

- 0900 NRC notified over ENS; ERDS started and providing data to NRC
- EOF Director notifies TSC Emergency Coordinator that the EOF is Operational and ready for turnover
- Field Monitoring Team(s) report damage to Highway 183/ 130 approaches to bridge over intake canal
- 0915 - 0925 Turnover completed between TSC and EOF; EOF declared activated
- 0920 1A2 RCP motor seizes due to loss of oil
- ◆ Control room receives indications of severe vibration
 - ◆ 1A2 RCP breaker trips open
- 0925 1% Fuel Clad damage occurs as a result of metal fragments generated by damage to 1A2 RCP Impeller
- 0930 Small break LOCA (≈400 gpm) occurs inside Reactor Building (R_xB) on 1B1 RCP discharge line
- ◆ R_xB pressure increases
 - ◆ Full High Pressure Injection is unable to maintain Sub Cooling Margin > 0° F
 - ◆ 1B LPI pump starts on ES Signal
 - ◆ 1A LPI pump will not start on ES Signal; if Control Room operators attempt to manually start 1C LPI pump it will not start either (*Both pumps are in the same room and have been affected by flooding*)
- Conditions exist for Site Area Emergency classification
- 0945 **Site Area Emergency declared based on RCS Leakage Greater Than Available Makeup Pump Capacity, Full HPI Unable To Maintain Subcooling > 0° F**
- EOF Director notifies State/ County Emergency Preparedness Director(s) of classification upgrade
- TSC notifies NRC of classification upgrade

OCONEE NUCLEAR SITE
1994 EMERGENCY RESPONSE ANNUAL EXERCISE
INITIAL CONDITIONS/SEQUENCE OF EVENTS

SEQUENCE OF EVENTS

Emergency Coordinator may relocate/ evacuate non-essential personnel. Site Evacuation/ Relocation would be conducted using RP/ O/ B/ 1000/ 10, Procedure For Emergency Evacuation/ Relocation Of Site Personnel and Site Directive 4.4.1, Site Evacuation/ Relocation Plan. *Actual evacuation/relocation of personnel will be simulated.*

- 0945 - 1000 Alert and Notification System activated by Counties (Sirens and EBS Message)
- 0900 - 1000 A craft person supporting OSC team in Auxiliary Building slips on the floor and sustains a compound fracture to their arm. Victim is contaminated.
- ◆ MERT is dispatched from the OSC to respond
- 1045 1B LPI pump trips (*if in service*) due to flooding in the B LPI Pump room
If not in service, 1B LPI pump will not start on ES Signal
- After 1045 Aftershock with a magnitude of ≈ 0.05 g occurs
- ◆ Aftershock enables Emergency Personnel Outer Hatch door to fail
 - ◆ Control Room receives open indication lights for both the Inner and Outer Emergency Personnel Hatch doors
Due to other control room activities, operators may not notice open indication lights (red)
 - ◆ Smoke observed in #6 Warehouse, reported to Control Room Emergency Number and OSC
- 1045 - 1100 Steam is observed leaking from the R_xB around R_xB Emergency Personnel Hatch
- Field Monitoring Teams begin to detect activity at Site Boundary
- Conditions exist for General Emergency Classification
- 1A and 1B BS Pumps unavailable due to flooding conditions
- Fire Brigade dispatched to respond to report of smoke/ fire at #6 Warehouse

**OCONEE NUCLEAR SITE
1994 EMERGENCY RESPONSE ANNUAL EXERCISE
INITIAL CONDITIONS/SEQUENCE OF EVENTS**

SEQUENCE OF EVENTS

1115

General Emergency declared based on:

Loss Of 2 Of 3 Fission Product Barriers With A Potential For Loss Of 3rd Barrier - Loss Of Containment, R_xB Penetrations Are Not Isolated AND LOCA \geq 50 gpm (non-isolable fault).

OR

Small And Large LOCAs With Failure Of ECCS - Leads To Core Melt, LOCA Site Area Emergency #1 Emergency Action Level Satisfied and Loss Of All Injection Or Imminent Loss Of Injection Capability

1120 - 1130

EOF Director notifies State/ Counties

The following Protective Action Recommendations are provided to State/Countries:

**Evacuate sectors in a two mile radius and five miles downwind.
Shelter any sectors not evacuated.**

Additional Protection Action Recommendations may be made, depending upon Field Monitoring Team readings/ Dose Assessment recommendations.

1115 - 1400

Exercise continues until State/ County objectives are completed.

TSC/ OSC/ EOF develop Recovery/ Re-entry plan