U.S. Department of Homeland Security
Region IV
3003 Chamblee Tucker Road
Atlanta, GA 30341

FEMA

Final Exercise Report

Oconee Nuclear Station

Licensee: **Duke Energy**

Exercise Date: **January 13, 2004**

Report Date: **April 15, 2004**

Tim McGinty

U.S. Department of Homeland Security
Region IV
3003 Chamblee Tucker Road
Atlanta, GA 30341

FEMA

April 15, 2004

Mr. Luis A. Reyes
Regional Administrator - RII
Nuclear Regulatory Commission
61 Forsyth Street, SW, Suite 23T85
Atlanta, Georgia 30303

Dear Mr. Reyes:

Enclosed is the final report for the Oconee Nuclear Station Exercise that was conducted on January 13, 2004. This was a full participation, plume exposure pathway exercise designed to evaluate the offsite radiological emergency response plans site-specific to the Oconee Nuclear Station. The report addresses the evaluation of the plans and preparedness for the State of South Carolina and Oconee and Pickens counties within the 10-mile Emergency Planning Zone (EPZ), and Anderson and Greenville, host counties. The final exercise report was prepared by the Federal Emergency Management Agency Region IV staff. Copies of this report will be forwarded to the State of South Carolina, FEMA Headquarters, and NRC Headquarters by my staff.

In addition to the Oconee Nuclear Station, State and county personnel, many volunteers, and several elected officials participated in this exercise. Out-of-sequence activities included lake clearance, state traffic control points, protective actions for schools, emergency worker decontamination and reception and congregate care centers. The LP-1 Emergency Alert System radio station for the site, WFBC in Greenville, participated and added realism to the overall exercise. The State conducted operations from their facility on Fish Hatchery Road in West Columbia, and the Department of Health and Environmental Control operated from a forward location at the National Guard Armory in Clemson.

All agreed upon evaluation area criteria for the exercise were demonstrated. No Deficiencies or Areas Requiring Corrective Action (ARCA) were identified during this exercise. All ARCAs identified during the 2002 exercise have been corrected.

Based on the results of the January 13, 2004, exercise and FEMA's review of the State's Annual Letter of Certification for 2002 and 2003, the offsite radiological emergency response plans for the State of South Carolina and the affected local jurisdictions, site-specific to the Oconee Nuclear Station, can be implemented, and are

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adequate to provide reasonable assurance that appropriate measures can be taken offsite to protect the health and safety of the public in the event of a radiological emergency at the site. The Title 44 CFR, Part 350, approval of the State of South Carolina's offsite radiological emergency response plans and preparedness site-specific to the Oconee Nuclear Station, granted on February 23, 1983, will remain in effect.

Should you have any questions, please contact Lawrence A. Robertson at 770/220-5466.

Sincerely,

Mary Lynne Miller
Acting Regional Director

Enclosure

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I. EXECUTIVE SUMMARY

On January 13, 2004, a partial participation exercise was conducted in the plume exposure pathway emergency planning zone (EPZ) around the Oconee Nuclear Station. The purpose of the exercise was to assess the level of State and local preparedness in responding to a radiological emergency. The State of South Carolina, Oconee and Pickens Counties, the risk counties, and Anderson and Greenville Counties, the host counties, participated in the exercise. This exercise was held in accordance with DHS/FEMA's policies and guidance concerning the exercise of State and local radiological emergency response plans (RERP) and procedures.

The previous exercise at this site was conducted on September 17, 2002. The qualifying emergency preparedness exercise was conducted on March 10 and 11, 1982.

DHS/FEMA wishes to acknowledge the efforts of the many individuals, both paid staff and volunteers, in South Carolina, and in Oconee, Pickens, Anderson, and Greenville Counties who planned and participated in this exercise. The State and counties through the efforts of these individuals demonstrated their commitment to protect the health and safety of the residents within the 10-mile EPZ. The support of volunteers is essential to the emergency response efforts. Cooperation and teamwork of all the participants were evident during this exercise. The State and local organizations demonstrated knowledge of their emergency response plans and procedures and implemented them.

During this exercise no Deficiencies or Areas Requiring Corrective Action (ARCA) were identified. During the 2002 Oconee exercise five ARCAs were identified. Two ARCAs were corrected immediately, two ARCAs concerning the condition of field monitoring team equipment were corrected during the July 2003 V. C. Summer exercise. One remaining ARCA concerning laboratory contamination control was corrected during this exercise.

II. INTRODUCTION

On December 7, 1979, the President directed DHS/FEMA to assume the lead responsibility for all offsite nuclear planning and response. DHS/FEMA's activities are conducted pursuant to 44 Code of Federal Regulations (CFR) Parts 350, 351 and 352. These regulations are a key element in the Radiological Emergency Preparedness (REP) Program that was established following the Three Mile Island Nuclear Station accident in March 1979.

DHS/FEMA Rule 44 CFR 350 establishes the policies and procedures for DHS/FEMA's initial and continued approval of State and local governments' radiological emergency planning and preparedness for commercial nuclear power plants. This approval is contingent, in part, on State and local government participation in joint exercises with licensees.

DHS/FEMA's responsibilities in radiological emergency planning for fixed nuclear facilities include the following:

- Taking the lead in offsite emergency planning and in the review and evaluation of radiological emergency response plans (RERP) and procedures developed by State and local governments;

- Determining whether such plans and procedures can be implemented on the basis of observation and evaluation of exercises of the plans and procedures conducted by State and local governments;

- Responding to requests by the NRC pursuant to the Memorandum of Understanding between the NRC and DHS/FEMA dated June 17, 1993 (Federal Register, Vol. 58, No. 176, September 14, 1993).

- Coordinating the activities of Federal agencies with responsibilities in the radiological emergency planning process:

    - Department of Agriculture,
    - Department of Commerce,
    - Department of Energy,
    - Department of Health and Human Services,
    - Department of the Interior,
    - Department of Transportation,
    - Environmental Protection Agency,
    - Food and Drug Administration and
    - Nuclear Regulatory Commission.

Representatives of these agencies serve on the DHS/FEMA Region IV Regional Assistance Committee (RAC) which is chaired by DHS/FEMA.

Formal submission of the RERPs for the Oconee Nuclear Station to DHS/FEMA Region IV by the State of South Carolina and involved local jurisdictions occurred on May 7, 1982. Formal approval of the RERP was granted by DHS/FEMA on February 23, 1983, under 44 CFR 350. The State of South Carolina certifies the currency of these plans and preparedness through submittal of an Annual Letter of Certification to DHS/FEMA.

A partial participation plume exposure pathway exercise was conducted on January 13, 2004. DHS/FEMA Region IV assessed the capabilities of State and local emergency preparedness organizations in implementing their RERPs and procedures to protect public health and safety during a radiological emergency involving the Oconee Nuclear Station. The purpose of this report is to present the results and findings on the performance of the offsite response organizations (ORO) during a simulated radiological emergency.

The findings presented are based on the evaluations of the Federal evaluator team, with final determinations made by the Chief Evaluator and RAC Chairperson, and approved by the Regional Director.

The criteria utilized in the DHS/FEMA evaluation process are contained in:

- NUREG-0654/FEMA-REP-1, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980;

- "Interim REP Program Manual," August, 2002.

Section III of this report, entitled "Exercise Overview," presents basic information and data relevant to the exercise. This section contains a description of the plume pathway EPZ, a listing of all participating jurisdictions and functional entities which were evaluated, and a tabular presentation of the time of actual occurrence of key exercise events and activities.

Section IV of this report, entitled "Exercise Evaluation and Results," presents detailed information on the demonstration of applicable exercise evaluation area criteria at each jurisdiction or functional entity. This section also contains the description of the correction of the ARCA concerning contamination control at the mobile laboratory identified during the 2002 Oconee Exercise.

III. EXERCISE OVERVIEW

This section contains data and basic information relevant to the January 13, 2004, exercise to test the offsite emergency response capabilities in the area surrounding the Oconee Nuclear Station.

A. Plume EPZ Description

The Oconee Nuclear Station is located in eastern Oconee County, South Carolina, approximately 8 miles northeast of Seneca, South Carolina, on the eastern shore of Lake Keowee. The Oconee Nuclear Station has three Babcock & Wilcox pressurized water nuclear reactors with a combined electric power generating capacity of approximately 2,658 megawatts. Unit 1 began commercial operation on July 15, 1973. Unit 2 began commercial operation on September 8, 1974 followed by Unit 3 on December 16, 1974.

The 10-mile plume exposure pathway EPZ encompasses parts of Oconee and Pickens Counties in South Carolina, with the site being physically located in Oconee County. Land use is primarily agriculture and timber, with light industries scattered throughout both counties. The Oconee County Airport is located west of Clemson, South Carolina, inside the 10-mile EPZ. The Norfolk & Southern Railway passes within six miles of the plant. Railways connect the towns of Walhalla, Seneca, Clemson, and Norris.

The major population centers within the 10-mile EPZ include Walhalla, Seneca, and Clemson, including Clemson University. Total population for the 10-mile EPZ is 74,185.

Prevailing winds move generally from west to east over the facility, but due to foothill terrain, may not always follow this pattern. There are 13 emergency response planning areas.

B. Exercise Participants

In addition to the Oconee Nuclear Station, the following agencies, organizations, and units of government participated in the Oconee Nuclear Station exercise on January 13, 2004.

STATE OF SOUTH CAROLINA

Office of the Adjutant General, Emergency Management Division
Department of Health & Environmental Control, Bureau of Land Waste Management
Department of Social Services
Department of Public Safety, Bureau of Protective Services, and Highway Patrol
Department of Natural Resources, Law Enforcement Division

RISK JURISDICTIONS

Oconee County
Pickens County

HOST JURISDICTIONS

Anderson County
Greenville County

PRIVATE/VOLUNTEER ORGANIZATIONS

American Red Cross
Radio Amateur Civil Emergency Service
Salvation Army

C. Exercise Timeline

Table 1, on the following page, presents the time of key events and activities during the Oconee Nuclear Station exercise on January 13, 2004.

Table 1. Exercise Timeline

DATE AND SITE: January 13, 2004 – Oconee Nuclear Station

Emergency Classification Level or Event	Time Utility Declared	Time That Notification Was Received or Action Was Taken					
		SEOC	DOSE-FEOC	LP-1 Radio Station	JIC	OCONEE CO	PICKENS CO
Alert	0816	0836	0844		0836	0829	0835
Site Area Emergency	0952	1007	1008		0959	1005	0944
General Emergency	1115	1125	1115		1118	1129	1100
Simulated Rad. Release Started	0952	1051	0945		1050	1044	0935
Simulated Rad. Release Terminated	End Exercise						
Facility Declared Operational [EOF 1008]		0855	0845		0939	1006	0842
Declaration of State of Emergency		0900	0900		0905	0922	0940
Exercise Terminated [EOF 1250]		1214	1310		1248	1212	1143
Early Precautionary Actions: Clemson University Evacuation Schools evacuated/relocated and special needs notified and/or evacuated Lake clearing		0836			1055	1018 1040	0830 1044 1044
1st Protective Action Decision: Notify public, stay tuned		1044				1044	1044
1st Siren Activation – Actual		1047			1050	1047	1049
1st EAS Message		1050		1050	1050	1052	1050
2nd Protective Action Decision Evacuate Zone(s): A1, A2, B1, B2, F1 Shelter-in-Place: All other zones		1140		1150	1150	1140	1140
2nd Siren Activation – Simulated		1145		1150	1150	1145	1145
2nd EAS Message – Simulated		1148		1150	1150	1148	1148
KI Administration Decision: Distribute to EWs and institutionalized only "Do not ingest."		1040		1200	1200	1104	1044

IV. EXERCISE EVALUATION AND RESULTS

Contained in this section are the results and findings of the evaluation of all jurisdictions and functional entities, which participated in the January 13, 2004 exercise to test the offsite emergency response capabilities of State and local governments in the 10-mile EPZ, surrounding the Oconee Nuclear Station.

Each jurisdiction and functional entity was evaluated on the basis of its demonstration of criteria delineated in the Exercise Evaluation Areas, Interim REP Program Manual, August 2002. The agreed upon Exercise Evaluation Criteria and the extent-of-play agreement used in this exercise, are listed in Appendix 3 of this report.

A. Summary Results of Exercise Evaluation – Table 2

The matrix presented in Table 2, on the following page(s), presents the status of all exercise evaluation area criteria, Interim REP Program Manual, August 2002, which were scheduled for demonstration during this exercise, by all participating jurisdictions and functional entities. Exercise evaluation areas are listed and the demonstration status of the criteria is indicated by the use of the following letters:

M - Met (No Deficiency or ARCAs assessed and no unresolved ARCAs from prior exercises)

D - Deficiency assessed

A - ARCA(s) assessed or unresolved ARCA(s) from prior exercise(s)

N - Not Demonstrated (Reason explained in Subsection B)

Table 2. Summary Results of Exercise Evaluation

DATE AND SITE: January 13, 2004 – Oconee Nuclear Station

ELEMENT/Criterion	SEOC*	DHEC	OCONEE COUNTY	PICKENS COUNTY	ANDERSON COUNTY	GREENVILLE COUNTY
1. EMERGENCY OPERATIONS MANAGEMENT						
1.a.1. Mobilization	M	M	M	M		
1.b.1. Facilities						
1.c.1. Direction and Control	M	M	M	M		
1.d.1. Communications Equipment	M	M	M	M	M	M
1.e.1. Equipment & Supplies to Support Operations	M	M	M	M		
2. PROTECTIVE ACTION DECISION MAKING						
2.a.1. Emergency Worker Exposure Control		M	M	M		
2.b.1. Radiological Assessment & PARs Based on Available Information		M				
2.b.2. PADs for the General Public	M	M	M	M		
2.c.1. Protective Action Decisions for Special Populations			M	M		
2.d.1. Radiological Assessment & Decision Making for Ingestion Exposure						
2.e.1. Rad Assessment & Decision Making for Relocation, Re-entry & Return						
3. PROTECTIVE ACTION IMPLEMENTATION						
3.a.1. Implementation of Emergency Worker Control	M	M	M	M	M	M
3.b.1. Implementation of KI Decisions	M	M	M	M		
3.c.1. Implementation of PADs for Special Populations			M	M		
3.c.2. Implementation of PADs for Schools			M	M		
3.d.1. Implementation of Traffic and Access Control	M					
3.d.2. Impediments to Evacuation and Traffic and Access Control	M					
3.e.1. Implementation of Ingestion Decisions Using Adequate Information						
3.e.2. Implementation of IP Decisions Showing Strategies and Instructional Materials						
3.f.1. Implementation of Relocation, Re-entry and Return Decisions						
4. FIELD MEASUREMENT and ANALYSIS						
4.a.1. Plume Phase Field Measurement & Analysis Equipment						
4.a.2. Plume Phase Field Measurement & Analysis Management		M				
4.a.3. Plume Phase Field Measurements & Analysis Procedures						
4.b.1. Post Plume Field Measurement & Analysis						
4.b.2. Laboratory Operations		M				
5. EMERGENCY NOTIFICATION & PUBLIC INFORMATION						
5.a.1. Activation of Prompt Alert and Notification	M		M	M		
5.a.2. Activation of Prompt Alert and Notification 15 Minute [Reserved]						
5.a.3. Activation of Prompt Alert and Notification Backup Alert and Notification	M		M	M		
5.b.1. Emergency Information and Instructions for the Public and the Media	M		M	M		
6. SUPPORT OPERATIONS/FACILITIES						
6.a.1. Monitoring and Decon of Evacuees and EWs and Registration of Evacuees			M	M	M	M
6.b.1. Monitoring and Decontamination of Emergency Worker Equipment			M	M		
6.c.1. Temporary Care of Evacuees					M	M
6.d.1. Transportation and Treatment of Contaminated Injured Individuals						

LEGEND: M = MET A = ARCAs D = DEFICIENCY

* SEOC includes traffic control and lake clearing

B. Status of Jurisdictions Evaluated

This subsection provides information on the evaluation of each participating jurisdiction and functional entity, in a jurisdiction based, issues only format. Presented below is a definition of the terms used in this subsection relative to criterion demonstration status.

- **Met** – Listing of the demonstrated exercise criteria under which no Deficiencies or ARCAs were assessed during this exercise and under which no ARCAs assessed during prior exercises remain unresolved.

- **Deficiency** – Listing of the demonstrated exercise criteria under which one or more Deficiencies was assessed during this exercise. Included is a description of each Deficiency and recommended corrective actions.

- **Area Requiring Corrective Actions** – Listing of the demonstrated exercise criteria under which one or more ARCAs were assessed during the current exercise or ARCAs assessed during prior exercises that remain unresolved. Included is a description of the ARCAs assessed during this exercise and the corrective action demonstrated if ARCA was corrected on the spot or the recommended corrective action to be demonstrated before or during the next biennial exercise.

- **Not Demonstrated** – Listing of the exercise criteria which were not demonstrated as scheduled during this exercise and the reason they were not demonstrated.

- **Prior ARCAs – Resolved** – Descriptions of ARCAs assessed during a previous exercise, which were resolved in this exercise, or during a previous exercise, and the corrective actions demonstrated.

- **Prior ARCAs – Unresolved** – Descriptions of ARCAs assessed during a previous exercise, which were not resolved in this exercise. Included is the reason the ARCA remains unresolved and recommended corrective actions to be demonstrated before or during the next biennial exercise.

The following are definitions of the only two types of exercise issues which may be discussed in an exercise report.

- A **Deficiency** is defined in DHS/FEMA- REP Interim Program Manual, August 2002: "...an observed or identified inadequacy of organizational performance in an exercise that could cause a finding that offsite emergency preparedness is not adequate to provide reasonable assurance that appropriate protective measures can be taken in the event of a radiological emergency to protect the health and safety of the public living in the vicinity of a nuclear power plant."

- An **ARCA** is defined in DHS/FEMA-"REP Interim Program Manual," August 2002 as "...an observed or identified inadequacy of organizational performance in an exercise that is not considered, by itself, to adversely impact public health and safety."

DHS/FEMA has developed a standardized system for numbering exercise issues (Deficiencies and ARCAs). This system is used to achieve consistency in numbering exercise issues among DHS/FEMA Regions and site-specific exercise reports within each Region. It is also used to expedite tracking of exercise issues on a nationwide basis.

The identifying number for Deficiencies and ARCAs includes the following elements, with each element separated by a hyphen (-).

- **Plant Site Identifier** – A two-digit number corresponding to the Utility Billable Plant Site Codes.

- **Exercise Year** – The last two digits of the year the exercise was conducted.

- **Exercise Evaluation Element** - A number, letter and number corresponding to the evaluation area criteria number, REP Interim Program Manual, August 2002.

- **Issue Classification Identifier** – (D = Deficiency, A = ARCA). Only Deficiencies and ARCAs are included in exercise reports.

- **Exercise Issue Identification Number** – A separate two digit indexing number assigned to each issue identified in the exercise.

1. STATE OF SOUTH CAROLINA

1.1 State Emergency Operations Center

The State Emergency Operations Center (SEOC) is a modern facility with state of the art technology. Direction and control was coordinated and demonstrated by the Emergency Management Director and Chief of Operations, which resulted in a well executed emergency response by the overall staff. The Internet Routed Information System (IRIS) and checklists being utilized by all staff members provided up-to-date situational information and a systematic approach to problem solving. Protective action recommendations (PAR) and decisions were made in coordination with the counties. They were discussed during periodic briefings in the SEOC with input from Department of Health and Environmental Control (DHEC) and the utility. The SEOC staff is commended for their attention to detail in the decision-making process. Alert and notification of the public following the Site Area Emergency (SAE) and General Emergency (GE) were well executed and performed with a sense-of-urgency.

a. **MET EVALUATION AREAS:** 1.a.1, 1.c.1, 1.d.1, 1.e.1, 2.b.2, 5.a.1 and 5.b.1

b. **DEFICIENCY:** NONE

c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAs – RESOLVED:** NONE

f. **PRIOR ARCAs – UNRESOLVED:** NONE

1.2 Dose Assessment – EOC Liaison

The DHEC Emergency Response Coordinator (ERC) demonstrated the ability to organize and coordinate DHEC's operation supporting PARs and radiological exposure control. The ERC was aggressive in getting data both from the Forward Emergency Operations Center (FEOC) and the plant. One instance of note was obtaining clarification directly from the plant when there was confusion concerning the extent of the radiological release. The DHEC staff at the SEOC maintained close communications with all DHEC field elements throughout the exercise. The ERC developed appropriate and timely PARs for the Emergency Management Director. The ERC monitored exposure control and conducted an ongoing assessment regarding the use of potassium iodide (KI). The ERC demonstrated an excellent understanding of the accident conditions at the Oconee Nuclear Station as portrayed in the exercise. The ERC and staff were knowledgeable of the State Plan and the agency specific standard operating procedures (SOP).

a. **MET EVALUATION AREAS:** 1.a.1, 1.c.1, 1.d.1, 2.a.1, 2.b.1 and 2.b.2

b. **DEFICIENCY:** NONE

c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAs – RESOLVED:** NONE

f. **PRIOR ARCAs – UNRESOLVED:** NONE

1.3 Dose Assessment – Clemson

The Director of the FEOC demonstrated good command and control. Proactive efforts were made to obtain data in a timely manner by directly contacting the Oconee dose assessment staff. The use of the IRIS system for monitoring events and logging in key activities was effectively demonstrated. The dose assessment coordinator competently performed dose projections using the RASCAL computer model. Reasonable agreement was obtained with the Oconee plant dose model results. This information was provided to the DHEC Emergency Response Coordinator at the SEOC. Field team management and coordination with the Oconee plant field teams was effectively demonstrated. The mobile laboratory capability to receive, screen and analyze field samples was demonstrated.

a. **MET EVALUATION AREAS:** Criteria 1.a.1, 1.c.1, 1.d.1, 1.e.1, 2.a.1, 2.b.1, 3.a.1, 3.b.1 and 4.a.2

b. **DEFICIENCY:** NONE

c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAs RESOLVED:** NONE

f. **PRIOR ARCAs UNRESOLVED:** NONE

1.4 Radiological Laboratory

DHEC's Radiological Laboratory personnel demonstrated their ability to conduct analysis of environmental samples out-of-sequence. The laboratory staff is qualified in radioanalytical techniques and contamination control procedures. The personnel were also knowledgeable of radiological exposure control. The DHEC radiological laboratory staff demonstrated the capability to perform laboratory analyses of radioactivity in air, liquid and environmental samples.

The mobile laboratory was deployed to the FEOC. The staff demonstrated the use of forms and contamination control techniques. They successfully demonstrated the correction of the ARCA identified during the 2002 Oconee exercise.

a. **MET EVALUATION AREAS:** 1.e.1, 3.a.1 and 4.c.1

b. **DEFICIENCY:** NONE

c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAs – RESOLVED:**

Mobile Laboratory

Issue No: 42-02-4.c.1-A-02

Description: Existing practices and procedures by both the field monitoring teams and mobile laboratory staff were inadequate to control and prevent cross-contamination of environmental samples. 1) The chain-of-custody form has spaces for recording multiple samples and if used for more than one sample could easily be separated from its associated samples during processing in the mobile lab. 2) A standardized method of labeling environmental samples was not used. 3) Environmental samples were not double-bagged to prevent cross-contamination. 4) At the mobile lab, the technician assigned to sample receipt used one pair of rubber gloves throughout the entire exercise. This same technician also performed vehicle and personnel radiation monitoring activities. There was no organization or segregation between potentially contaminated areas and the known clean area at the sample reception area. The sample receipt table was not dedicated to that task. Instruments, personnel dosimeter documents, various supplies and an empty soda can were all on the table at one time. Although a step off pad was established several individuals crossed the pad ignoring standard exit control practices.

Corrective Action Demonstrated: The mobile laboratory was pre-staged at the FEOC. Laboratory personnel arranged a sample receipt and screening process in the back yard of the armory referred to in procedures as a restricted area. A table covered in disposable paper was placed at the back gate of the armory. A sample relay carrier or field teams were to be stopped at this point. A laboratory person dressed in protective clothes was responsible for unloading the bagged field samples and also for conducting a radiological survey of personnel and the delivery vehicle. If the vehicle is found to be contaminated the FEOC Coordinator was to be contacted as to where the vehicle should be sent for decontamination. Any sample reading above the background level was taken to the table for smears and smear counting. The samples were placed in a zip lock bag and the bag smear was attached along with the results of the smear count.

The sample delivery person or field team member would then be asked to proceed to processing station two. At this location personnel would step through a portal monitor. If it alarmed they would be stopped for manual survey and appropriate processing. The bagged samples were handed to the receiving table where they were surveyed. If the surface dose rate was below 100 milli rem per hour the bags were to be processed for transfer to the laboratory in Columbia. If the dose rate exceeded this level it was to be processed for counting at the mobile laboratory.

At Station 2, the chain of custody form on the sample was filled out and a unique identification number assigned. One chain of custody form per sample was prepared. Contamination control was exercised. A demonstration of this process was conducted using an iodine air cartridge sample.

All laboratory personnel wore protective clothing including gloves and eye protection. Contamination control measures were in effect. Adequate contamination control supplies were available.

The bagged air cartridge sample and the chain of custody form were transferred to the mobile laboratory for counting. The mobile laboratory is equipped with a Lithium drifted Germanium detector and a Canberra gamma spectrum analyses system. The iodine cartridge information was input into the computer and the cartridge was counted for a representative time. A print out of the results displayed the unique identification number and other chain of custody information.

Laboratory personnel demonstrated their capability to screen samples, maintain chain of custody, exercise contamination control, and process samples in the mobile laboratory.

f. **PRIOR ARCAs – UNRESOLVED:** NONE

1.5 Lake Clearing

Two law enforcement officers from the Department of Natural Resources (DNR) successfully demonstrated the ability to clear the lake. The officers were well trained and knowledgeable of their procedures and individual radiological protection. The officers took the evaluator, by boat, over Lake Hartwell to other designated public boat landings. The signage pertaining to public emergency actions in event of siren activation was inspected at the boat landings. The signs were clearly visible and generally well maintained. The DNR law enforcement personnel were professional and well prepared.

a. **MET EVALUATION AREAS:** 1.d.1, 3.a.1, 3.b.1 and 5.a.3

b. **DEFICIENCY:** NONE

c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAs – RESOLVED:** NONE

f. **PRIOR ARCAs – UNRESOLVED:** NONE

1.6 LP-1 Radio Station – WFBC

The primary Emergency Alert System (EAS) radio station for the Oconee Nuclear Station is WFBC (93.7 FM) in Greenville, South Carolina. At 1045, the station received a request from the SEOC to broadcast a pre-approved test message for the Oconee Nuclear Station drill. The radio station personnel followed established procedures for authenticating the message with the SEOC before initiating a live broadcast of message at 1050. The station's staff was knowledgeable of their role in supporting the EAS process and very professional in performing their responsibilities.

a. **MET EVALUATION AREA:** 5.a.1

b. **DEFICIENCY:** NONE

c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAs RESOLVED:** NONE

f. **PRIOR ARCAs UNRESOLVED:** NONE

1.7 State Traffic Control Points

A Lieutenant of the South Carolina Highway Patrol (SCHP) was interviewed at the Oconee County Emergency Operations Center (EOC). He discussed SCHP operating procedures, the information packets provided troopers staffing traffic control points (TCP), and the pre-deployment briefing provided to the troopers. The packets contained operating instructions, dosimetry equipment, a copy of the Oconee Nuclear Station 2004 Emergency Planning Calendar, and information to assist the public. SCHP troopers established two designated TCPs. They were interviewed and demonstrated their knowledge of the operation of each TCP, radiological exposure control procedures and the use of KI. The troopers and the Lieutenant were aware of how to obtain assistance from the Department of Transportation for establishment of barriers and information on the removal of evacuation impediments.

All members of the SCHP were well trained, very well prepared, and highly professional in the execution of their assigned responsibilities.

a. **MET EVALUATION AREAS:** 1.d.1, 1.e.1, 3.a.1, 3.b.1, 3.d.1 and 3.d.2

b. **DEFICIENCY:** NONE

c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAs – RESOLVED:** NONE

f. **PRIOR ARCAs – UNRESOLVED:** NONE

2. JOINT OPERATIONS

2.1 Joint Information Center

The performance of the State, county and utility members of the Oconee Nuclear Station Joint Information Center (JIC) exemplified cooperation, coordination, and high professional standards. In the preparation and conduct of three media briefings and numerous emergency news releases, the experience of the more senior individuals ensured that utility and government spokespersons were well prepared to meet the media and impart timely, correct, and detailed information to the public. Actions taken in response to public and media inquiries were timely. Upon identification of trends or rumors, rapid actions were initiated to quell them. Concern for the safety of the population in the 10-mile EPZ was paramount in the actions of the JIC.

a. **MET EVALUATION AREAS:** 1.a.1, 1.c.1, 1.d.1, 1.e.1 and 5.b.1

b. **DEFICIENCY:** NONE

c. AREAS REQUIRING CORRECTIVE ACTION: NONE

d. NOT DEMONSTRATED: NONE

e. PRIOR ARCAs – RESOLVED: NONE

f. PRIOR ARCAs – UNRESOLVED: NONE

2.2 Emergency Operations Facility

The utility operator's Emergency Operations Facility (EOF) is an excellent facility from which all participating response organizations can effectively manage ongoing emergency operations. Communications, coordination, and the flow of technical information between the utility operator and the State officials were outstanding. All of the State officials deployed to the EOF were well trained, followed procedures; and overall, they performed their respective responsibilities in an efficient and professional manner.

a. MET EVALUATION AREAS: 1.b.1, 1.c.1; 1.d.1, 1.e.1 and 2.b.1

b. DEFICIENCY: NONE

c. AREAS REQUIRING CORRECTIVE ACTION: NONE

d. NOT DEMONSTRATED: NONE

e. PRIOR ARCAs – RESOLVED: NONE

f. PRIOR ARCAs – UNRESOLVED: NONE

3. RISK JURISDICTIONS

3.1 OCONEE COUNTY

3.1.1 Emergency Operations Center

The EOC is staffed by a dedicated and progressive thinking group of professionals. The Emergency Management Director provided excellent direction and control. During briefings he requested frequent staff inputs. The flow of information and communication between the agencies was outstanding. The alert and notification of the public was accurate and timely with input from the County Council. The special needs program plans and procedures were superb.

a. MET EVALUATIONS AREAS: 1.a.1, 1.c.1, 1.d.1, 1.e.1, 2.a.1, 2.b.2, 2.c.1, 3.b.1, 3.c.1, 3.c.2, 5.a.1, 5.a.3 and 5.b.1

b. **DEFICIENCY:** NONE

c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAs – RESOLVED:** NONE

f. **PRIOR ARCAs – UNRESOLVED:** NONE

3.1.2 Protective Actions for Schools

Oconee County demonstrated the ability to implement protective actions for schools through interviews with the principals and staff at the James Brown Elementary, Code Elementary, Keowee Elementary, Ravenel Elementary and Tamassee-Salem Middle/High Schools. All schools had detailed plans and the staff was knowledgeable of their procedures and responsibilities for evacuation. The County has sufficient resources to relocate all students.

a. **MET EVALUATION AREAS:** 3.a.1 and 3.c.2

b. **DEFICIENCY:** NONE

c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAs – RESOLVED:** NONE

f. **PRIOR ARCAs – UNRESOLVED:** NONE

3.1.3 Emergency Worker Decontamination

The emergency worker and vehicle decontamination demonstration was conducted at the Westminster Middle School. Members of the Walhalla Fire Department were the primary workers. The Westminster Fire Department supplied members for support roles. The firefighters described the procedures for monitoring and documentation of individuals and equipment in accordance with their plans. Members of both departments reviewed the vehicle monitoring and decontamination process, and subsequent individual monitoring process. Communications was provided by mobile and hand held radios; both systems had repeater and local capability on six radio channels. The Walhalla Fire Department was dispatched to respond to a structure fire, and the remainder of the demonstration was curtailed.

a. MET EVALUATION AREAS: 1.e.1, 3.a.1, 6.a.1 and 6.b.1

b. DEFICIENCY: NONE

c. AREAS REQUIRING CORRECTIVE ACTION: NONE

d. NOT DEMONSTRATED: NONE

e. PRIOR ARCAs – RESOLVED: NONE

f. PRIOR ARCAs – UNRESOLVED: NONE

3.2 PICKENS COUNTY

3.2.1 Emergency Operations Center

The EOC Director and the Assistant Director effectively managed emergency response operations. They involved a competent and cooperative staff in the decision making process. EOC staff consistently coordinated with the State and Oconee County in implementing precautionary actions and protective action decisions (PAD). EOC briefings and informative agency updates were conducted. Message distribution, public inquiry, and public information functions, and coordination to activate the sirens and issue EAS messages were accomplished. The participation of the County Administrator, a County Councilman, the State liaison, and the utility representative provided vital input to this successful EOC operation.

a. MET EVALUATION AREAS: 1.a.1, 1.c.1, 1.d.1, 1.e.1, 2.a.1, 2.b.2, 2.c.1, 3.b.1, 3.c.1, 3.c.2, 5.a.1, 5.a.3 and 5.b.1

b. DEFICIENCY: NONE

c. AREAS REQUIRING CORRECTIVE ACTION: NONE

d. NOT DEMONSTRATED: NONE

e. PRIOR ARCAs – RESOLVED: NONE

f. PRIOR ARCAs – UNRESOLVED: NONE

3.2.2 Protective Actions for Schools

Pickens County successfully demonstrated the ability to formulate and implement protective actions for schools through interviews conducted with the principals of Clemson Elementary, R.C. Edwards Middle School, and Daniel High School. The Clemson University representative, the Pickens County Transportation Coordinator, and the Pickens County Emergency Management Director also participated in the interview. All were conscientious and very knowledgeable of the plans and procedures for emergency preparedness and evacuation of their institutions. All schools are equipped with primary and backup means of communications and are able to coordinate with buses supporting the evacuation. Clemson University provides its own transportation as needed for students, while public school buses are provided for the three other schools.

a. **MET EVALUATION AREAS:** 3.a.1 and 3.c.2

b. **DEFICIENCY:** NONE

c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAs – RESOLVED:** NONE

f. **PRIOR ARCAs – UNRESOLVED:** NONE

3.2.3 Emergency Worker Decontamination

Members of the Pickens County Hazardous Materials Team (HAZMAT) successfully demonstrated emergency worker and vehicle decontamination at the Pickens County Prison Farm. An emergency vehicle was monitored, after which, the driver and passenger exited and were monitored for contamination. The HAZMAT team properly monitored the emergency workers and equipment and documented their findings on the appropriate forms according to their procedures. The Pickens County Command Unit provided external communications and coordination.

a. **MET EVALUATION AREAS:** 1.e.1, 3.a.1, 6.a.1 and 6.b.1

b. **DEFICIENCY:** NONE

c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAs - RESOLVED:** NONE

f. **PRIOR ARCAs - UNRESOLVED:** NONE

4. HOST JURISDICTIONS

4.1 ANDERSON COUNTY

4.1.1 Reception and Congregate Care

Anderson County used the T. L. Hanna High School as its reception and congregate care facility. Experienced, well-trained personnel provided an excellent demonstration of vehicle and personnel monitoring and decontamination. The command and control function was strong and communication was very good. The setup for vehicle and evacuee monitoring and decontamination was excellent.

The American Red Cross (ARC) managed the congregate care facility. The shelter manager and support staff demonstrated that they could provide services consistent with ARC guidelines. Congregate care staff assured that evacuees had been monitored before being registered into the facility. Anderson County management and staff are to be commended

a. **MET EVALUATION AREAS:** 1.e.1, 3.a.1, 6.a.1 and 6.c.1

b. **DEFICIENCY:** NONE

c. **AREA REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAs RESOLVED:** NONE

f. **PRIOR ARCAs UNRESOLVED:** NONE

4.2 GREENVILLE COUNTY

4.2.1 Reception and Congregate Care

Greenville County demonstrated its procedures to monitor, decontaminate, register, and care for evacuees at its reception and congregate care centers at the Berea and Wade Hampton High Schools. Well-trained and professional members of the Berea Fire Department and the Wade Hampton Fire Department conducted the monitoring and decontamination of evacuees and their vehicles. They were knowledgeable of radiological exposure control, and successfully demonstrated their ability to monitor and decontaminate evacuees and their vehicles.

The Upstate and Greenville County Chapters of the ARC managed the congregate care centers with assistance from the South Carolina Department of Social Services (DSS) and the Sheriff's Department. The ARC verified that evacuees had been monitored prior to

being allowed to enter the congregate care facility. The ARC shelter managers and support staff demonstrated that the centers had the resources to provide services and accommodations consistent with ARC planning guidelines. Volunteers were well versed in their responsibilities and extremely professional in their demeanor.

a. **MET EVALUATION AREAS:** 1.e.1, 3.a.1, 6.a.1 and 6.c.1

b. **DEFICIENCY:** NONE

c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE

d. **NOT DEMONSTRATED:** NONE

e. **PRIOR ARCAs - RESOLVED:** NONE

f. **PRIOR ARCAs - UNRESOLVED:** NONE

5. SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION

5.1 PRIOR ARCAs RESOLVED

5.1.1 42-02-4.c.1-A-01
State of South Carolina Radiological Laboratory (Mobile Laboratory)

Description: Existing practices and procedures by both the field monitoring teams and mobile laboratory staff were inadequate to control and prevent cross-contamination of environmental samples. 1) The chain-of-custody form has spaces for recording multiple samples and if used for more than one sample could easily be separated from its associated samples during processing in the mobile lab. 2) A standardized method of labeling environmental samples was not used. 3) Environmental samples were not double-bagged to prevent cross-contamination. 4) At the mobile lab, the technician assigned to sample receipt used one pair of rubber gloves throughout the entire exercise. This same technician also performed vehicle and personnel radiation monitoring activities. There was no organization or segregation between potentially contaminated areas and the known clean area at the sample reception area. The sample receipt table was not dedicated to that task. Instruments, personnel dosimeter documents, various supplies and an empty soda can were all on the table at one time. Although a step off pad was established several individuals crossed the pad ignoring standard exit control practices.

Corrective Action Demonstrated: The mobile laboratory was pre staged at the FEOC. Laboratory personnel arranged a sample receipt and screening process in the back yard of the armory referred to in procedures as a restricted area. A table covered in disposable paper was placed at the back gate of the armory. A sample relay carrier or field teams were to be stopped at this point. A laboratory person dressed in protective clothes was responsible for

unloading the bagged field samples and also for conducting a radiological survey of personnel and the delivery vehicle. If the vehicle is found to be contaminated the FEOC Coordinator was to be contacted as to where the vehicle should be sent for decontamination. Any sample reading above the background level was taken to the table for smears and smear counting. The samples were placed in a zip lock bag and the bag smear was attached along with the results of the smear count.

The sample delivery person or field team member would then be asked to proceed to processing station two. At this location personnel would step through a portal monitor. If it alarmed they would be stopped for manual survey and appropriate processing. The bagged samples were handed to the receiving table where they were surveyed. If the surface dose rate was below 100 milli rem per hour the bags were to be processed for transfer to the laboratory in Columbia. If the dose rate exceeded this level it was to be processed for counting at the mobile laboratory.

At Station 2, the chain of custody form on the sample was filled out and a unique identification number assigned. One chain of custody form per sample was prepared. Contamination control was exercised. A demonstration of this process was conducted using an iodine air cartridge sample.

All laboratory personnel wore protective clothing including gloves and eye protection. Contamination control measures were in effect. Adequate contamination control supplies were available.

The bagged air cartridge sample and the chain of custody form were transferred to the mobile laboratory for counting. The mobile laboratory is equipped with a

Lithium drifted Germanium detector and a Canberra gamma spectrum analyses system. The iodine cartridge information was input into the computer and the cartridge was counted for a representative time. A print out of the results displayed the unique identification number and other chain of custody information.

Laboratory personnel demonstrated their capability to screen samples, maintain chain of custody, exercise contamination control, and process samples in the mobile laboratory.

APPENDIX 1

ACRONYMS AND ABBREVIATIONS

The following is a list of the acronyms and abbreviations, which may have been used in this report.

ARC	American Red Cross
ARCA	Area Requiring Corrective Action
CFR	Code of Federal Regulations
DHEC	South Carolina Department of Health and Environmental Control
DHS	Department of Homeland Security
DNR	Department of Natural Resources
DSS	South Carolina Department of Social Services
EAS	Emergency Alert System
EOC	Emergency Operations Center
EOF	Emergency Operations Facility
EOP	Extent of Play
EPZ	Emergency Planning Zone
FEMA	Federal Emergency Management Agency
FEOC	Forward Emergency Operations Center
GE	General Emergency
IRIS	Internet Routed Information System
JIC	Joint Information Center
KI	Potassium Iodide
NRC	Nuclear Regulatory Commission
NUREG-0654	NUREG-0654/FEMA-REP-1, Rev. 1, *"Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, November 1980*
ORO	Offsite Response Organization
PAD	Protective Action Decision
PAR	Protective Action Recommendation

RAC	Regional Assistance Committee
RACES	Radio Amateur Civil Emergency Service
REP	Radiological Emergency Preparedness
RERP	Radiological Emergency Response Plan
SAE	Site Area Emergency
SCHP	South Carolina Highway Patrol
SEOC	State Emergency Operations Center
SOP	Standard Operating Procedure
TCP	Traffic Control Point

APPENDIX 2

EXERCISE EVALUATORS

The following is a list of the personnel who evaluated the Oconee Nuclear Station exercise on January 13, 2004. The organization represented by each evaluator is indicated by the following abbreviations:

DHS/FEMA	- Department of Homeland Security/ Federal Emergency Management Agency
ICF	- ICF Incorporated
NRC	- Nuclear Regulatory Commission

Lawrence A. Robertson — **Co-RAC Chairman**

EVALUATION SITE	EVALUATOR	ORGANIZATION
STATE OF SOUTH CAROLINA		
State Emergency Operations Center	Stan Copeland	DHS/FEMA
	Helen Wilgus	DHS/FEMA
DHEC Liaison	Dale Petroff	ICF
Radiological Laboratory	Dale Petroff	ICF
Emergency Operations Facility	Robert Trojanowski	NRC
Joint Information	Bill Larrabee	ICF
	Henry Christiansen	ICF
Dose Assessment	Reginald Rogers	ICF
State TCP	Daniel Inman	ICF
Lake Clearing	Daniel Inman	ICF
LP-1 Radio Station WFBC–Greenville 501 Rutherford Street	Rosemary Samsel	ICF
OCONEE COUNTY		
Emergency Operations Center	Tom Reynolds	DHS/FEMA
	Beth Massey	DHS/FEMA
	Mike Dolder	DHS/FEMA

Protective Actions for Schools	Rosemary Samsel	ICF
Emergency Worker Decontamination	Paul Ringheiser	ICF

PICKENS COUNTY

Emergency Operations Center	Robert Perdue	DHS/FEMA
	Wendy Swygert	ICF
Protective Actions for Schools	Wendy Swygert	ICF
Emergency Worker Decontamination	Paul Ringheiser	ICF

GREENVILLE COUNTY

Reception/Congregate Care	James Lightner	ICF
	Wendy Swygert	ICF

APPENDIX 3

EXERCISE CRITERIA AND EXTENT-OF-PLAY AGREEMENT

This appendix contains the exercise criteria and the extent-of-play agreement which were scheduled for demonstration during the Oconee Nuclear Station exercise on January 13, 2004.

A. Exercise Evaluation Area Criteria

B. Extent-of-Play Agreement

The extent-of-play agreement on the following pages was submitted by the State of South Carolina, and was approved by DHS/FEMA Region IV. The extent-of-play agreement includes any significant modification or change in the level of demonstration of each criterion listed.

Extent of Play Agreement
Oconee Nuclear Site Partial Participation REP Exercise
January 13, 2004

1. Emergency Operations Management.

Sub-element 1.a, Mobilization

Criterion 1.a.1: OROs use effective procedures to alert, notify, and mobilize emergency personnel and activate facilities in a timely manner. (NUREG-0654, A.4, D.3, 4, E.1, 2, H.4)

All state and local government personnel will be pre-positioned. Alert rosters will be provided to FEMA evaluators and a discussion of call-down procedures will be conducted.

Sub-element 1.b, Facilities

Criterion 1.b.1: Facilities are sufficient to support the emergency response. (NUREG -0654, H)

Counties were evaluated to establish a baseline for this exercise evaluation criteria during the September 17, 2002 biennial exercise.

Sub-element 1.c, Direction and Control

Criterion 1.c.1: Key personnel with leadership roles for the ORO provide direction and control to that part of the overall response effort for which they are responsible. (NUREG-0654, A.1.d., 2.a., b.)

Direction and Control will be at the State Emergency Operations Center (SEOC). County Direction and Control will take place at the Oconee County and Pickens County Emergency Operations Centers (EOC). State Emergency Response Team (SERT) participants include the Emergency Management Division (EMD); ESF 8, Health and Medical Services (Department of Health & Environmental Control); ESF 10, Hazardous Materials, (Department of Health and Environmental Control); and ESF 16, Emergency Traffic Management, (Department of Public Safety). A simulation cell will represent the Office of the Governor, Office of the Adjutant General, FEMA Region IV, Georgia, North Carolina and non-playing South Carolina state agencies. All telephone calls will be made by calling the simulation cell.

Sub-element 1.d, Communications

Criterion 1.d.1: At least two communications systems are available, at least one operates properly, and communication links are established and maintained with appropriate locations. Communications capabilities are managed in support of emergency operations. (NUREG-0654, F.1., 2.)

The Selective Signaling System (SSS) is the primary means of communication to notify off-site response forces. Backup to the SSS are commercial telephone lines, satellite telephone and the Local Government Radio (LGR).

Sub-element 1.e, Equipment and Supplies to Support Operations

Criterion 1.e.1: Equipment, maps, displays, dosimetry, Potassium Iodide (KI), and other supplies are sufficient to support emergency operations. (NUREG-0654, H., J.10.a.b.e.f.j.k., 11, K.3.a.)

Potassium Iodide for emergency workers will be simulated by candy or other means (empty envelope marked KI). A 14-day supply of KI for 7000 Emergency Workers and Institutionalized Individuals is stored at FNF County EOCs, and Health Departments and at DHEC headquarters in Columbia, SC. Advance rosters of emergency workers are not maintained.

All radiation detection equipment will be inspected, inventoried, and operationally checked before each use. SCEMD maintained equipment will be calibrated or leak tested in accordance with existing plans by the South Carolina Emergency Management Division Radiological Lab.

At locations where traffic and access control personnel are deployed, the availability of appropriate equipment (e.g., vehicles, barriers, traffic cones and signs, etc,) will be described by law enforcement personnel.

2. Protective Action Decision Making.

Sub-element 2.a., Emergency Worker Exposure Control

Criterion 2.a.1: OROs use a decision-making process, considering relevant factors and appropriate coordination, to insure that an exposure control system, including the use of KI, is in place for emergency workers including provisions to authorize radiation exposure in excess of administrative limits or protective action guides. (NUREG-0654, K.4.)

Dose limits for emergency workers are pre-determined. Emergency workers may voluntarily exceed dose limits only after being fully informed by DHEC of

the biological effects of radiation and possible consequences of excessive exposure.

Sub-element 2.b. Radiological Assessment and Protective Action Recommendations and Decisions for the Plume Phase of the Emergency

Criterion 2.b.1: Appropriate protective action recommendations are based on available information on plant conditions, field monitoring data, and licensee and ORO dose projections, as well as knowledge of on-site and off-site environmental conditions. (NUREG-0654, I.8., 10., 11. and Supplement 3.)

Protective action recommendations by DHEC will be based on an evaluation of information received from the licensee, independent dose assessments and simulated field monitoring data input.

Dose Assessment will be demonstrated and evaluated at the SCARNG Armory, Clemson, SC.

Criterion 2.b.2: A decision-making process involving consideration of appropriate factors and necessary coordination is used to make protective action decisions (PADs) for the general public (including the recommendation for the use of KI, if ORO policy). (NUREG-0654, J.9., 10.M.)

Sub-element 2.c, Protective Action Decisions Consideration for the Protection of Special Populations

Criterion 2.c.1: Protective action decisions are made, as appropriate, for special population groups. (NUREG-0654, J.9., 10.c.d.e.g.)

3. Protective Action Implementation.

Sub-element 3.a, Implementation of Emergency Worker Exposure Control

Criterion 3.a.1: The OROs issue appropriate dosimetry and procedures, and manage radiological exposure to emergency workers in accordance with the plans and procedures. Emergency workers periodically and at the end of each mission read their dosimeters and record the readings on the appropriate exposure record or chart. (NUREG-0654, K.3.)

Emergency Workers or emergency worker teams will use Self Reading Dosimeters (SRDs) and simulated Permanent Record Dosimeters (PRDs) to monitor and control their radiation exposure. Emergency workers in low exposure rate areas will use PRDs and may use direct reading dosimeters or place them in centralized areas.

Dosimeters are distributed through county emergency operations centers. Each county has an adequate inventory to support first-shift personnel. Supplemental dosimeters will be provided in accordance with the South Carolina Dosimetry Redistribution Standard Operating Procedures, and will be discussed at the State Emergency Operations Center (SEOC). Department of Public Safety, Highway Patrol and DHEC maintain and distribute their own SRDs.

Emergency workers will be interviewed to determine their knowledge of radiation exposure limits.

Sub-element 3.b, Implementation of KI Decision

Criterion 3.b.1: KI and appropriate instructions are available should a decision to recommend use of KI be made. Appropriate record keeping of the administration of KI for emergency workers and institutionalized individuals (not general public) is maintained. (NUREG-0654, E.7., J., 10.e.,f.)

KI is distributed to Emergency Workers prior to their being dispatched. KI is ingested by emergency workers on order by the DHEC State Health Officer or designee. Record keeping will be discussed at Oconee County and Pickens County EOCs.

Sub-element 3.c, Implementation of Protective Actions for Special Populations

Criterion 3.c.1: Protective action decisions are implemented for special populations other than schools within areas subject to protective actions. (NUREG-0654, E.7., J.9., 10.c.d.e.g.)

Oconee County and Pickens County will demonstrate the ability and resources to implement appropriate protective actions for special population groups. A list of people with special transportation needs will be provided to evaluators. Evacuation assistance will not take place.

Criterion 3.c.2: OROs/School officials decide upon and implement protective actions for schools. (NUREG-0654, J. 10.c., d., g.)
Oconee County will simulate school evacuations by out-of-sequence interviews with key school staff members.

Oconee County schools to be evaluated at 1:00 P.M., January 14, 2004 are:

James Brown Elementary
Code Elementary
Keowee Elementary
Ravenel Elementary
Tamassee-Salem Middle/High School

Pickens County schools to be evaluated at 8:00 A.M., January 14, 2004 are:

Clemson Elementary	Edwards Jr. High
Daniel High	Clemson University

Criterion 3.d.1: Appropriate traffic and access control is established. Accurate instructions are provided to traffic and access control personnel. (NUREG-0654, J.10.g., j., k.)

Traffic and Access Control Points (TACP's) are pre-determined. The South Carolina Highway Patrol will demonstrate Traffic and Access Control on-scene. TACPs to be evaluated are:

A-1, Gap Hill and SC 183
B-1, Ridgedale Road and Dan Ross Road
B-2, Old Seneca Road and Jones Mill Road
C-1, Old Seneca Road and Toby Hills Road
D-1, SC 130 and Katelynn Lane
E-1, SC 130 and SC 183

Lake clearing operations will immediately follow TACP demonstration at Lawrence Bridge Public Boat Landing, Oconee County.

Oconee County Public Boat Landings to be inspected are:

Holder's Landing	Seneca Creek
Lawrence Bridge	Seneca Marina

Pickens County Public Boat Landings are:

Clemson Park and Recreation
Twelve Mile

Criterion 3.d.2: Impediments to evacuation are identified and resolved. (NUREG-0654, J.10.,k.)

Actions to identify and remove impediments to evacuation will be demonstrated by discussion with the highway patrol supervisor at the Oconee County EOC.

4. Field Measurement and Analysis.

Sub-element 4.c, Plume Phase Field Measurements and Analyses

Criterion 4.c.1: The laboratory is capable of performing required radiological analyses to support protective action decisions. (NUREG-0654, C.3., I.8., 9., J.11.)

The DHEC Mobile Radiological Laboratory and staff will be pre-staged for sample screening evaluation at the SCARNG Armory, Clemson, SC.

Laboratory sample analysis will be demonstrated out of sequence, 9:00 a.m., January 14, 2004 at the DHEC Radiological Laboratory, 2600 Bull Street, Columbia, SC.

Transportation of radiological samples will be simulated. Analysis will be performed in compliance with (NUREG-0654, C.3., I.8., 9., J.11.)

5. Emergency Notification and Public Information

Sub-element 5.a, Activation of the Prompt Alert and Notification System

Criterion 5.a.1: Activities associated with primary alerting and notification of the public are completed in a timely manner following the initial decision by authorized off-site emergency officials to notify the public of an emergency situation. The initial instructional message to the public must include as a minimum the elements required by current FEMA REP guidance. (10 CFR Part 50, Appendix E & NUREG-0654, E.1., 4., 5., 6., 7.)

The State will coordinate Protective Action Decisions (PAD) with the Chief South Carolina county elected officials or designees. At Site Area Emergency, sirens and the Emergency Alert System (EAS) will be activated. A test EAS message will be transmitted to the Local Primary (LP-1) EAS station, (WFBC, Greenville, SC). A simulated EAS message and follow-on news release will be prepared but will not be transmitted to the LP-1 station. Copies of the simulated EAS message and news release will be provided to the FEMA evaluator at the SEOC. The LP-1 station will have staff available for interview during the EAS demonstration. At General Emergency, activation of the sirens and EAS broadcast will be simulated.

Criterion 5.a.3: Activities associated with FEMA approved exception areas (where applicable) are completed within 45 minutes following the initial decision by authorized off-site emergency officials to notify the public of an emergency situation. Backup alert and notification of the pubic is completed

within 45 minutes following the detection by the ORO of a failure of the primary alert and notification system. (NUREG-0654, E.6., Appendix 3.B.2.c) If there is a siren failure, Oconee County and Pickens County will describe the back-up alerting system.

Sub-element 5.b, Emergency Information and Instructions for the Public and the Media

Criterion 5.b.1: OROs provide accurate emergency information and instructions to the public and the news media in a timely manner. (NUREG-0654, E. 5., 7., G.3.a., G.4, a., b., c.)

The State, Oconee County and Pickens County will demonstrate the ability to coordinate the formulation and dissemination of accurate information and instructions to the news media at the Joint Information Center (JIC). Rumor control for the State will be demonstrated at the JIC. Rumor control for Oconee and Pickens Counties will be demonstrated at the county EOC. Rumor control personnel will provide a rumor calls log to the FEMA Evaluator.

6. Support Operations/ Facilities

Sub-element 6.a, Monitoring and Decontamination of Evacuees and Emergency Workers, and Registration of Evacuees

Criterion 6.a.1: The reception center/emergency worker facility has appropriate space, adequate resources, and trained personnel to provide monitoring, decontamination, and registration of evacuees and/or emergency workers. (NUREG-0654, J.10.h.; K.5.b.)

Reception Centers will be demonstrated out-of-sequence. At least six people will be monitored and registered. Personnel decontamination will be demonstrated via walk-through and discussion. All necessary supplies will be on-hand. Walkways will not be covered with barrier material. A monitoring productivity rate will be developed by the FEMA evaluator. Demonstration will include the necessary portable portal monitors and monitoring teams required to monitor 20% of the population allocated to the facility within 12 hours. At least two vehicles will be monitored and one vehicle decontaminated in accordance with local SOPs. Water will be used to demonstrate vehicle decontamination procedures.

Reception Centers to be evaluated are:

Anderson County, T. L. Hanna High School
Greenville County, Berea High School and Wade Hampton High School

Sub-element 6.b, Monitoring and Decontamination of Emergency Worker Equipment

Criterion 6.b.1: The facility/ORO has adequate procedures and resources for the accomplishment of monitoring and decontamination of emergency worker equipment including vehicles. (NUREG-0654, K.5.b)

Emergency Worker Monitoring and Decontamination will be demonstrated out of sequence. Two emergency workers will be monitored. Personnel decontamination will be demonstrated via walk-thru and discussion. One emergency vehicle will be monitored and decontaminated in accordance with local SOPs.

DHEC will provide technical liaisons to the respective county EOC's for consultation.

Emergency Worker Decontamination Points to be evaluated are:

Oconee County, Westminster Middle School
Pickens County, County Prison Farm, 6:30 P.M., January 12, 2004

Sub-element 6.c, Temporary Care of Evacuees

Criterion 6.c.1: Managers of congregate care facilities demonstrate that the centers have resources to provide services and accommodations consistent with American Red Cross planning guidelines (found in MASS CARE-Preparedness Operations, ARC 3031). Managers demonstrate the procedures to assure that evacuees have been monitored for contamination and have been decontaminated as appropriate prior to entering congregate care facilities. (NUREG-0654, J.10.h., 12.)

County shelters will be demonstrated out-of-sequence and concurrently with Evaluation Area 6.a, above. Procedures that assure that only non-contaminated persons enter shelters will be demonstrated.

APPENDIX 4

EXERCISE SCENARIO

This appendix contains a summary of the simulated sequence of events, which was used as the basis for invoking emergency response actions by OROs in the Oconee Nuclear Station exercise on January 13, 2004.

This exercise scenario was submitted by the State of South Carolina and approved by DHS/FEMA Region IV.

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) - 22 refueling outage is scheduled to begin on January 24th. 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. 1KI 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 December 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 December 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; no problems
Lee	Combustion Turbines available if needed; no problems

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.

INITIAL CONDITIONS

Weather Forecast	A slow moving Low Pressure Front has moved into South Carolina with a stationary Low Pressure Area located near Columbia. Winds from South-West (225°) and from 0 - 15 mph are expected. The low temperature for January 13 is 32°F with a high of 58°F.

SEQUENCE OF EVENTS

0800 Two Maintenance Technicians enter Unit 1's RxB 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.

0810 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 looses vacuum

Turbine trips

1A and 1B FDW Pumps trip

Reactor (Rx) 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 RxB 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.

SEQUENCE OF EVENTS

0815 Control Room personnel initiate **AP/1/A/1700/05, Earthquake**

Operations Shift Manager (OSM) initiates Emergency Plan using **RP/0/B/1000/01, Emergency Classification**

Conditions for an *Alert* classification exist

0815 - 0825 OSM 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/1000/15A, Offsite Communications From The Control Room**
- → 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 **Tremor Felt and Seismic Trigger Alarm Actuates (0.05g).**

- → Offsite agencies notified as per **RP/0/B/1000/15A, Offsite Communications From The Control Room**

0845 - 0855 Site Assembly Completed (30 minutes after initiation of Site Assembly)

TSC/OSC Staffed and operational, turnover completed between OSM and TSC Emergency Coordinator. TSC is activated.

Operations personnel secure Aux Service Water leakage by securing Unit 2 Condenser Cooling Water (CCW) pumps and closing their respective discharge valves and 2CCW-41. Even with the discharge valves close ≈ 3.5 hours of water remains in the CCW piping.

SEQUENCE OF EVENTS

0855 - 0910	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 **NSD 114, Site Assembly/Site Evacuation** would be utilized to determine appropriate actions.
	Actual relocation of personnel will be simulated.
0910	NRC notified over ENS; ERDS started (data ***will not*** be provided 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
0920	1A2 RCP motor seizes due to loss of oil
	→ Control room receives indications of severe vibration
	→ 1A2 RCP breaker trips open
≈0925	≈4% Fuel Clad damage occurs as a result of metal fragments generated by damage to 1A2 RCP Impeller
0925 - 0935	Turnover completed between TSC and EOF; EOF declared activated
	RCS samples indicate DEI ≈ 300 µCi/ml; increase in Aux Bldg RIAs observed
0945	Small break LOCA (≈400 gpm) occurs inside Reactor Building (RxB) on 1B1 RCP discharge line
	→ RxB pressure increases
	→ Full High Pressure Injection is unable to maintain Sub Cooling Margin > 0° F
	→ 1A LPI pump starts on ES Signal

SEQUENCE OF EVENTS

0945	→	1B 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 rooms that have been affected by flooding*)
	→	RIA-57 increases to 80 R/hr; RIA-58 increases to 40 R/hr
		Conditions exist for *Site Area Emergency* classification
1000		*Site Area Emergency* declared based on **Loss Any Two Barriers - RCS Leak Rate > Available Makeup Capacity As Indicated By A Loss Of Subcooling; RIA 57/58 ≥ 80/40 R/hr (or Coolant Activity ≥ 300 µCi/ml DEI)**
		EOF Director notifies State/County Emergency Preparedness Director(s) of classification upgrade
		TSC notifies NRC of classification upgrade
		Emergency Coordinator may relocate/evacuate non-essential personnel. Site Evacuation/Relocation would be conducted using **RP/0/B/1000/10, Procedure For Emergency Evacuation/Relocation Of Site Personnel** and **NSD 114, Site Assembly /Site Evacuation.** ***Actual evacuation/relocation of personnel <u>will</u> be simulated.***
1000 - 1015		Alert and Notification System activated by Counties (Sirens and EAS Message)
1030		1A LPI pump trips (*if in service*) due to flooding in the A LPI Pump room *If not in service, 1A LPI pump will not start on ES Signal*
After 1100		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 - Stat Alarm Activated *Due to other control room activities, operators may not notice open indication lights (red)*
1100 - 1145		Steam is observed leaking from the RxB around RxB 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

SEQUENCE OF EVENTS

1115 *General Emergency* declared based on:

Loss Of All Three Barriers - RCS Leak Rate > Available Makeup Capacity As Indicated By A Loss Of Subcooling; RIA 57/58 ≥ 80/40 R/hr (or Coolant Activity ≥ 300 µCi/ml DEI); and, Containment Isolation Is Incomplete And A Release Path To The Environment Exists

1115 - 1130 EOF Director notifies State/Counties

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

- **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.

1130 - 1300 Exercise continues until objectives are tested

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