



Final Exercise Report

Browns Ferry Nuclear Power Plant

Licensee: **Tennessee Valley Authority**

Exercise Date: **June 6, 2001**

Report Date: **September 6, 2001**

FEDERAL EMERGENCY MANAGEMENT AGENCY

REGION IV

3003 Chamblee Tucker Road

Atlanta, Georgia 30341

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I. EXECUTIVE SUMMARY

On June 6, 2001, a full participation exercise was conducted for the plume exposure emergency planning zone (EPZ) around the Browns Ferry Nuclear Power Plant by the Federal Emergency Management Agency (FEMA) Region IV. The purpose of the exercise was to assess the level of State and local preparedness in responding to a radiological emergency. This exercise was held in accordance with FEMA's policies and guidance concerning the exercise of State and local radiological emergency response plans (RERP) and procedures. The previous evaluated exercise at this site was conducted on May 27, 1999. The qualifying emergency preparedness exercises were conducted on September 10, 1981 and November 4, 1987.

FEMA wishes to acknowledge the efforts of the many individuals from the State of Alabama, and Lauderdale, Lawrence, Limestone, Madison and Morgan Counties and the numerous volunteers from organizations such as the American Red Cross (ARC), the Salvation Army, the Decatur Amateur Radio Club, and the Radio Amateur Civil Emergency Services (RACES) who participated in this exercise.

Protecting the public health and safety is the full-time job of some of the exercise participants and an additional assigned responsibility for others. Still others have willingly sought this responsibility by volunteering to provide vital emergency services to their communities. Cooperation and teamwork of all the participants was evident during this exercise.

This report contains the evaluation of the biennial exercise as well as the evaluation of out-of-sequence activities. The State and local organizations, except where noted in this report, demonstrated knowledge of their emergency response plans and procedures and implemented them. No Deficiencies and one Area Requiring Corrective Action (ARCA) were identified as a result of this exercise. One ARCA from the 1999 exercise was corrected at that exercise and the other ARCA regarding schools was corrected during out-of-sequence demonstration of protective action for schools. Due to the occurrence of actual events, credit was issued to the State of Alabama and to Lauderdale, Lawrence, Limestone and Morgan Counties for objectives 30, 32 and 33. (See "Letter of Credit" at Appendix 5).

II. INTRODUCTION

On December 7, 1979, the President directed FEMA to assume the lead responsibility for all offsite nuclear planning and response. 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.

FEMA Code 44 CFR 350 establishes the policies and procedures for 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.

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

- Taking the lead in off-site emergency planning and in the review and evaluation of RERPs 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 U.S. Nuclear Regulatory Commission (NRC) pursuant to the Memorandum of Understanding between the NRC and FEMA dated June 17, 1993 (Federal Register, Vol. 58, No. 176, September 14, 1993); and
- Coordinating the activities of Federal agencies with responsibilities in the radiological emergency planning process:
 - Department of Commerce (DOC)
 - Nuclear Regulatory Commission (NRC)
 - Environmental Protection Agency (EPA)
 - Department of Energy (DOE)
 - Department of Health and Human Services (DHHS)
 - Department of Transportation (DOT)
 - Department of Agriculture (USDA)
 - Department of the Interior (DOI)
 - Food and Drug Administration (FDA)

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

Formal submission of the RERPs for the Browns Ferry Nuclear Power Plant to FEMA Region IV by the State of Alabama and involved local jurisdictions occurred on August 30, 1982. A revised plan was submitted to FEMA on February 10, 1989. Formal approval of the RERP was granted by FEMA on July 6, 1990, under 44 CFR 350.

A REP exercise was conducted on June 6, 2001, by FEMA Region IV to assess the capabilities of State and local emergency preparedness organizations in implementing their RERPs and procedures to protect the public health and safety during a radiological emergency involving the Browns Ferry Nuclear Power Plant. The purpose of this exercise report is to present the exercise results and findings on the performance of the off-site response organizations (ORO) during a simulated radiological emergency.

The findings presented in this report are based on the evaluations of the federal evaluator team, with final determinations made by the Chief Evaluator and the Region IV RAC Chairperson, and approved by the Regional Director.

The criteria utilized in the 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;
- FEMA-REP-14, "Radiological Emergency Preparedness Exercise Manual," September 1991; and
- FEMA-REP-15, "Radiological Emergency Preparedness Exercise Evaluation Methodology," September 1991.

Section III of this report, entitled "Exercise Overview," presents basic information and data relevant to the exercise. This section of the report 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 objectives at each jurisdiction or functional entity evaluated in a jurisdiction-based, issues-only format. This section also contains: (1) descriptions of all Deficiencies and ARCAs assessed during this exercise, recommended corrective actions, and the State and local governments' schedule of corrective actions for each identified exercise issue and (2) descriptions of unresolved ARCAs assessed during previous exercises and the status of the ORO's efforts to resolve them.

III. EXERCISE OVERVIEW

Contained in this section are data and basic information relevant to the June 6, 2001 exercise to test the offsite emergency response capabilities in the area surrounding the Browns Ferry Nuclear Power Plant.

A. Plume and Ingestion Emergency Planning Zone Description

The Browns Ferry Nuclear Power Plant is located approximately 10 miles north west of the City of Decatur, Alabama, on the bank of the Tennessee River. Parts of the Counties of Lauderdale, Lawrence, Limestone and Morgan are within the 10-mile EPZ. Although the EPZ is largely rural and agricultural in use, parts of the EPZ are a mix of industrial, business and residential. The population of the 10-mile EPZ is approximately 40,100.

B. Exercise Participants

The following agencies, organizations, and units of government participated in the Brown Ferry Nuclear Power Plant exercise on June 6, 2001.

STATE OF ALABAMA

Emergency Management Agency
Department of Public Health
Governor's Office
National Guard
Department of Public Safety
Department of Environmental Management
Department of Human Resources
Department of Agriculture and Industries
Department of Conservation
Department of Transportation
Forestry Commission

RISK JURISDICTIONS

Lauderdale County
Lawrence County
Limestone County
Morgan County

SUPPORT JURISDICTION

Madison County

PRIVATE/VOLUNTEER ORGANIZATIONS

American Red Cross
Decatur Amateur Radio Club
Radio Amateur Civil Emergency Service
Salvation Army

C. Exercise Timeline

Table 1, on the following page, presents the time at which key events and activities occurred during the Browns Ferry Nuclear Power Plant exercise on June 6, 2001. Included are times notifications were made or actions taken by the participating jurisdictions/functional entities.

Table 1. Exercise Timeline

DATE AND SITE: June 6, 2001 - Browns Ferry Nuclear Power Plant

Emergency Classification Level or Event	Time Utility Declared	Time That Notification Was Received or Action Was Taken									
		SEOC	RCA	SRMAC	FEOC	JIC	LAUDERDALE COUNTY	LAWRENCE COUNTY	LIMESTONE COUNTY	MORGAN COUNTY	MADISON COUNTY - HOST
Unusual Event											
Alert	0835	0835	0844	0850	0850	N/A	0857	0858	0858	0857	0858
Site Area Emergency	1043	1043	N/A	1048	1048	1044	1057	1057	1057	1057	1050
General Emergency	1205	1216	N/A	1210	1210	1214	1213	1213	1213	1212	1213
Simulated Rad. Release Started	Puff 0940 Offsite 1215		N/A							1248	
Simulated Rad. Release Terminated			N/A								
Facility Declared Operational				0951	0951	1000	0906	0915	1118	0914	0858
Declaration of State of Emergency		1048				1210	1140	Local 1123	Local 1120	Local 1140	
Exercise Terminated			0953	1326	1326	1327	1330	1328	1328	1327	1328
Early Precautionary Actions: Restricted Access within 2 miles School relocation River clearance Special needs notification Limestone area health facility relocation							1140	1110 1110 1110	1130 1110	1110 1110 1110	
1st Protective Action Decision Public Warning							1104	1101	1102	1102	N/A
1st Siren Activation							1110	1110	1110	1110	
1st EAS Message							1110	1110	1110	1110	
2nd Protective Action Decision GE Declaration Notification							1216	1216	1217	1217	
2nd Siren Activation:							1228	1226	1225	1225	
2nd EAS Message							1234	1227	1227	1226	
3rd Protective Action Decision Evacuate Zones: A2,B2,F2,G2,A5 and G5 Shelter Zones: G10,H10,I10,J10,K10 and A10							1238	1238	1238	1238	
3rd Siren Activation							1248	1248	1248	1248	
3rd EAS Message							1250	1248	1250	1248	

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 June 6, 2001, exercise to test the offsite emergency response capabilities of State and local governments in the 10-mile EPZ surrounding the Browns Ferry Nuclear Power Plant.

Each jurisdiction and functional entity was evaluated on the basis of its demonstration of criteria delineated in exercise objectives contained in FEMA-REP-14, REP Exercise Manual, September 1991. Detailed information on the exercise objectives and the extent-of-play agreement used in this exercise are found in Appendix 3 of this report.

A. Summary Results of Exercise Evaluation - Table 2

The matrix presented in Table 2, on the following page presents the status of all exercise objectives from FEMA-REP-14 which were scheduled for demonstration during this exercise by all participating jurisdictions and functional entities. Exercise objectives are listed by number and the demonstration status of those objectives 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)
- C - Credit Granted for response to emergencies

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 objective demonstration status.

- **Met** - Listing of the demonstrated exercise objectives 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 objectives 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 objectives under which one or more ARCAs were assessed during the current exercise or ARCAs assessed during prior exercises remain unresolved. Included is a description of the ARCAs assessed during this exercise and the recommended corrective action to be demonstrated before or during the next biennial exercise.
- **Not Demonstrated** - Listing of the exercise objectives which were not demonstrated as scheduled during this exercise and the reason they were not demonstrated.
- **Prior ARCAs - Resolved** - Descriptions of ARCAs assessed during previous exercises which were resolved in this exercise and the corrective actions demonstrated.
- **Prior ARCAs - Unresolved** - Descriptions of ARCAs assessed during prior exercises 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 two types of exercise issues which are discussed in this report.

- A **Deficiency** is defined in FEMA-REP-14 as "... an observed or identified inadequacy 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 FEMA-REP-14 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."

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 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.
- **Objective Number** - A two-digit number corresponding to the objective numbers in FEMA-REP-14.
- **Issue Classification Identifier** - (D = Deficiency, A = ARCA). Only Deficiencies and ARCAs are included in exercise reports.
- **Exercise Issue Identification Number** - A separate two (or three) digit indexing number assigned to each issue identified in the exercise.

1. STATE OF ALABAMA

1.1 State Emergency Operations Center

The Alabama State Emergency Operations Center (SEOC) staff demonstrated the capabilities to constitute the SEOC into a functional direction and control facility to professionally manage the State's emergency response. The enhancements put in place by the Alabama Emergency Management Agency (AEMA) allowed for the sharing of critical operational information and task management that ensured a coordinated response.

The SEOC staff was kept informed by briefings and through the use of EM2000 computer software that kept all agencies and counties operating on current factual information. The Director of Operations monitored requests through the EM2000 software and affected agencies ensuring no tasking was forgotten as well as the efficient use of personnel and resources.

- a. **MET:** Objectives 1, 2, 3, 5, 10, 11, 12 and 23
- b. **DEFICIENCY:** NONE
- c. **AREAS REQUIRING CORRECTIVE ACTION:**

Issue No.: 07-01-11-A-01

Description: A systemic problem was identified concerning information flow and release of information to the public, therefore this ARCA has been placed at the SEOC for resolution. At 1226 Emergency Health Orders 3 and 4 were issued. These Health Orders directed the evacuation of zones A-2, B-2, F-2, G-2, A-5 and G-5, as well as, shelter-in-place zones H-10, I-10, J-10, K-10, A-10 and G-10. This information was received by the Joint Information Center (JIC) at 1227 and was transmitted to the SEOC, who provided the information to the counties. The JIC was having a briefing at 1230 and this information was communicated to the media during that briefing. AEMA also issued a press release at 1245 detailing the evacuation and shelter information.

At 1238 the counties concurred on the protective actions indicated in the Health Orders and agreed to activation of the sirens at 1248 and issue the EAS messages between 1248 and 1250.

The Code of Alabama and the Alabama Radiological Emergency Response Plan for Nuclear Power Plants (REP Plan) recognize the authority of the Health Officer to determine precautionary and protective actions to protect the public from excessive exposure to radiation. The REP Plan, the Alabama Emergency Management Agency Browns Ferry Nuclear Power Plant Standard Operating

Guide (SOG) and the Alabama Emergency Management Agency Fixed Nuclear Facility Public Information-Education Standard Operating Procedures also address the procedures for the release of information to the public. The latter states (page 1) "Specifically the state's role is **not** to accomplish "first notification" to inform the affected public to evacuate or take protective actions. That responsibility belongs to the affected county PIO." As a corollary, the SOG states (page 37) "The decision to shelter or evacuate will be made by Radiological Control Agency. The EOC will have the staff function to communicate directions to *Birmingham Weather* -and advise the county EOCs to notify the public."

During this exercise the JIC became the facility that provided "first notification" to the public of the evacuation and shelter-in-place protective actions by providing the media information concerning protective actions before the counties had completed their process of concurrence and decision making on siren activation and broadcast of EAS messages to notify the public of the protective actions. While the counties made no changes in protective actions during this exercise, confusion could have resulted from the issuance of this information prior to the EAS activation by the counties.

Recommendation: Review and revise Radiological Control Agency (RCA) and AEMA procedures to ensure that information still in process for emergency instruction is not released to the media by the JIC or through other avenues prior to the activation of the public alert and notification system by the counties.

Schedule of Corrective Actions:

- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

1.2 Forward Emergency Operations Center

The Forward Emergency Operations Center (FEOC) is co-located with the State Radiological Monitoring and Assessment Center (SRMAC). The State Liaison Officer in the FEOC was knowledgeable of the functions and requirements of the position and professionally demonstrated them.

- a. **MET: Objective 4**
- 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

RCA personnel in Montgomery, upon receiving notice at 0844 of an Alert at the Browns Ferry Nuclear Power Plant activated the dose assessment center and provided direction and control for the initial phase of the event. The RCA team leader conducted an excellent analysis of the initial event. The team leader directed the dispatch of a field monitoring team (FMT) at 0934 to a location one mile downwind of the plant. The field team was dispatched after consideration of mobilization and travel time to ensure a team would be in position if the situation deteriorated. At 0950, the RCA responsibility in Montgomery was transferred to the RCA personnel at the SRMAC in the Morgan County Courthouse. All responsibilities up to the time of transfer were carried out in accordance with the plan and procedures.

- a. **MET: Objectives 2, 7 and 9**
- 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 State Radiological Monitoring Assessment Center

The SRMAC, co-located with the Morgan County Emergency Management Agency in Decatur, is a facility from which all participating response organizations can effectively manage ongoing emergency operations. Communications and the flow of technical information between the utility operator and the applicable State government officials were outstanding. The SRMAC staff also briefed Morgan County staff on the situation. The State staff performed independent accident analyses, to include radiological dose assessment, the fielding of radiological monitoring teams, and the ordering and implementation of appropriate protective actions consistent with the preservation of public health and safety. All State officials deployed to the SRMAC were well trained, followed applicable procedures and performed their respective responsibilities in a professional and efficient manner.

- a. **MET: Objectives 1, 2, 3, 4, 7 and 9**

- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

1.5 Radiological Field Monitoring Teams

FMTs successfully demonstrated the ability to continuously monitor their assigned area while limiting their external exposure to radiation. The teams displayed the knowledge and ability to implement the procedures for determining field radiation measurements and the appropriate use of field monitoring equipment. The teams also successfully demonstrated the measurement of airborne radioiodine and particulate activity.

- a. **MET: Objectives 1, 4, 5, 6 and 8**
- 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 Joint Information Center

The activation and subsequent operational activities of the Browns Ferry Nuclear Power Plant JIC reflected professionalism, competence and close cooperation between the utility and governmental public information representatives. The facility is well equipped to support all JIC roles. Personnel were quite knowledgeable of their respective roles. Three media briefings were conducted for members of the actual and simulated press. The JIC staff coordinated the release of ten utility and State press releases, monitored releases prepared and disseminated by the counties, responded to several public and media queries, and took action to correct inaccuracies being broadcast by the media.

- a. **MET: Objectives 2, 11, 12 and 13**
- b. **DEFICIENCY: NONE**

- c. **AREA REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

2. RISK JURISDICTIONS

2.1 LAUDERDALE COUNTY

2.1.1 Emergency Operations Center

The Emergency Operations Center (EOC) was fully operational at 0906 following notification of the Alert at 0857. The EOC has sufficient space, furnishings, equipment, maps, displays and communications systems to support extended periods of operation. Direction and control was effectively demonstrated and the staff was knowledgeable of their duties. Alert and notification of the public was accomplished within the specified time frames.

- a. **MET: Objectives 1, 2, 3, 4, 10, 11, 14 and 15**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

2.1.2 Traffic Control Points/River Evacuation

Traffic control points (TCP) and river notification procedures were successfully demonstrated through interviews with representatives of the Anderson, Killen, Lexington and Rogersville Police Departments, the Alabama Marine Police and the Emergency Rescue Squad. All representatives discussed the issuance of dosimetry and potassium iodide (KI). All TCPs are located at intersections on main highways. Marine Police and Emergency Squad personnel described the procedures to be followed in blockading the river to preclude entry into the 10-mile EPZ, as well as alerting those on and along the river of a potential emergency situation. Emergency workers would report to the

emergency worker reception center for issuance of emergency items. Sufficient personnel and equipment are available to promptly implement river alert and evacuation procedures.

- a. **MET:** Objectives 5, 10 and 17
- b. **DEFICIENCY:** NONE
- c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE
- d. **NOT DEMONSTRATED:** NONE
- e. **PRIOR ARCAs - RESOLVED:** NONE
- f. **PRIOR ARCAs - UNRESOLVED:** NONE

2.1.3 Reception and Congregate Care

Monitoring, decontamination and registration of evacuees, vehicles and emergency workers at the reception center were demonstrated at Lauderdale County High School. Evacuees and a vehicle were monitored in accordance with the county plan. Areas were designated for temporary storage of clean vehicles and decontamination of dirty vehicles if required. Workers were knowledgeable of procedures for monitoring their own exposure, as well as, limiting cross-contamination. The Department of Human Resources (DHR) provided personnel to register evacuees once they were cleared for entry. The DHR personnel had standard operating procedures (SOPs) on hand and were knowledgeable of procedures they would follow in registering and tracking evacuees.

Congregate care was successfully demonstrated by the Northwest Alabama Chapter of the American Red Cross (ARC) by interview with the Chapter President, Director of Emergency Services and facility manager. This included a partial walkthrough of Bradshaw High School and discussion of how the facility would be laid out and operated. The Florence Police Department representative indicated officers would be assigned to assist in traffic control and security following activation of the facility. The facility is capable of accommodating 1000 individuals. Additional evacuees could be accommodated by the use of additional school resources.

- a. **MET:** Objectives 5, 18, 19 and 22
- 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 LAWRENCE COUNTY

2.2.1 Emergency Operations Center

The EOC staff was professional, cooperative and accomplished all exercise objectives. The County Emergency Management Director and Deputy Director provided regular staff briefings, involved the staff in the decision making process, and requested updates from agency representatives. Three County Commissioners and the district seven representative were present and participated in decision-making, including issuing a local declaration of emergency. The staff coordinated consistently with the State, JIC and other EPZ counties. The 15-minute alert and notification requirement was met and the staff successfully coordinated and implemented the evacuation and sheltering in-place protective action decision (PAD). The State liaison supported the EOC staff and transmitted information from the County to the State on the EM 2000 computer system.

- a. **MET: Objectives 1, 2, 3, 4, 10, 11, 14 and 15**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

2.2.2 Protective Action For Schools

Protective action for schools was satisfactorily demonstrated on March 6, 2001, through interviews with the Superintendent of Schools and two principals. Lawrence County has determined that as a precautionary safeguard students within the 10-mile EPZ would be evacuated at Site Area Emergency (SAE). Each school interviewed has transportation resources readily available on-site to support an evacuation of their total population. The school buses would travel in convoys preceded and followed by law enforcement personnel. The law enforcement personnel carry radiological exposure control equipment.

- a. **MET: Objectives 5 and 16**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**

- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

2.2.3 Traffic Control Points/River Evacuation

Traffic control point and river notification procedures were successfully demonstrated through interview with representatives of the Moulton City Police, Lawrence County Sheriff's Department, Alabama Marine Police and the Lawrence County Rescue Squad. All representatives were familiar with the use of individual dosimetry, record keeping requirements and turn back values. Binders providing detailed information on the establishment of the TCPs have been prepared for officers assigned to TCPs. Marine Police and Rescue Squad personnel discussed the procedures for conducting alert and notification along the river. Sufficient personnel and equipment are available to promptly implement river alert and evacuation procedures.

- a. **MET: Objectives 5, 10 and 17**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

2.2.4 Reception and Congregate Care

The monitoring, decontamination and registration of evacuees and emergency workers were successfully demonstrated at the Moulton Recreation Center. The demonstration of vehicle monitoring followed established procedures. The area provides ample space for well-controlled monitoring, decontamination and temporary storage of vehicles. Individuals arriving at the center are directed to enter the building through a controlled entrance that precludes contamination of the clean area. The DHR personnel assigned to register evacuees were fully knowledgeable of procedures to be followed. Congregate care activities were also successfully demonstrated by interviews with the Chapter President, and Director of Emergency Services of the Morgan/Lawrence Chapter of the ARC. The facility can accommodate 430 evacuees with more than enough space to meet this requirement. In addition to the ARC, Health and Mental Services representatives support the facility, and the Alabama Baptist Mobile Feeding Program will provide food.

- a. **MET:** Objectives 5, 18, 19 and 22
- b. **DEFICIENCY:** NONE
- c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE
- d. **NOT DEMONSTRATED:** NONE
- e. **PRIOR ARCAs - RESOLVED:** NONE
- f. **PRIOR ARCAs - UNRESOLVED:** NONE

2.3 LIMESTONE COUNTY

2.3.1 Emergency Operations Center

The County has a well-equipped EOC and a very knowledgeable and well trained staff. The EOC Director held briefings and solicited information from the staff. Alert and notification of the public was timely and coordinated with the surrounding counties. The city and county elected officials present provided additional leadership and guidance to the EOC Director.

- a. **MET:** Objectives 1, 2, 3, 4, 10, 14 and 15
- b. **DEFICIENCY:** NONE
- c. **AREAS REQUIRING CORRECTIVE ACTION:** NONE
- d. **NOT DEMONSTRATED:** NONE
- e. **PRIOR ARCAs - RESOLVED:** NONE
- f. **PRIOR ARCAs - UNRESOLVED:** NONE

2.3.2 Protective Action For Schools

Protective action for schools was satisfactorily demonstrated through interview with the principal of Coward Elementary School on March 7, 2001 in the County EOC. Schools are notified by phone and tone alert radios. Control of the student population is facilitated by the use of radios by staff and faculty. If an evacuation were required, local police would escort bus convoys.

- a. **MET:** Objectives 5 and 16

- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED:**

Issue No.: 07-99-16-A-02

Description: The Tanner High School Intern-Administrator was unaware of emergency procedures in the event of an incident at the Browns Ferry Nuclear Power Plant. There are no procedures readily available for administrative staff to utilize in an emergency.

Corrective Action Demonstrated: The Tanner High School staff was knowledgeable of its current plans and procedures. The principal and support staff demonstrated a high degree of understanding of evacuation procedures and followed its current plans and procedures without error. Noteworthy was Tanner High School's evacuation procedures, security and accountability of students as well as bus support to and from school.

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

2.3.3 Traffic Control Points/River Evacuation

Traffic control point and river notification procedures were demonstrated through interviews with representatives of the County Sheriff's Department, Alabama Marine Police and the Athens/Limestone Rescue Squad. All TCP and rescue personnel report to the Rescue Squad for emergency equipment and instructions. Each vehicle has a copy of the law enforcement SOP. Sheriff and rescue representatives were knowledgeable of the use of individual dosimetry, record keeping and turn back values.

- a. **MET: Objectives 5, 10 and 17**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

2.3.4 Reception and Congregate Care

The monitoring, decontamination and registration of personnel at the reception center was demonstrated at Elkmont High School on March 7, 2001. The reception center is equipped with a portal monitor and personnel were knowledgeable of personal safeguards as well as operation of the monitor. Evacuees, once monitored, are stamped and directed to the registration desk. Contaminated individuals are directed to a decontamination area and are then re-monitored. DHR personnel assigned to register evacuees were fully knowledgeable of procedures. Department of Public Health staff were present and prepared to issue KI to the general public if so directed.

Congregate care activities were demonstrated by interview with members of the Limestone County Chapter of the ARC and a walkthrough of the congregate care facility at Elkmont High School. The facility can accommodate 243 evacuees. Alabama Baptist Mobile Feeding will assist in feeding evacuees.

- a. **MET: Objectives 5, 18 and 19**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

2.3.5 Emergency Worker Decontamination

A very good demonstration of emergency worker decontamination was performed out of sequence after the exercise. One vehicle and driver were monitored. Good contamination control procedures were used throughout the demonstration. The monitor demonstrated the use of the survey instrument, used excellent monitoring techniques and knew the personal turn back values and use of dosimetry.

- a. **MET: Objectives 5 and 22**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**

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

2.4 MORGAN COUNTY

2.4.1 Emergency Operations Center

The EOC is an excellent facility that is well equipped to handle emergency operations. Communication during the exercise was clear and effective, with backup access to the County 911 center and participation by the Decatur Amateur Radio Club. The co-location of the FEOC and SRMAC further enhanced the EOC information exchange. Mobilization of personnel was timely. The EOC was declared operational at 0914. The Emergency Management Agency (EMA) Director and the Emergency Planner demonstrated direction and control throughout the exercise. Early precautionary protective actions were timely and appropriate for plant conditions. Coordination of protective action recommendations (PAR) and alert and notification of the public were well within the allotted time requirements. Participation in the EOC by numerous volunteer organizations, all four County Commissioners, a representative from the Decatur Mayor's Office and a city councilman added realism to the exercise and enhanced this excellent operation.

- a. **MET: Objectives 1, 2, 3, 4, 10 and 11**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCA - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

2.4.2 Protective Action For Schools

Morgan County demonstrated protective action for schools, out-of-sequence, by interview on March 9, 2001 at the EOC. Representatives of Decatur City Schools and the Director of Morgan County Schools were knowledgeable of the plans and procedures for the seven schools within the 10-mile EPZ. Copies of each school SOP was available at the EOC. The County EMA also sends a welcome letter to each new resident outlining key information on schools and other useful emergency information.

- a. **MET: Objectives 5 and 16**
- b. **DEFICIENCY: NONE**

- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

2.4.3 Traffic Control Points

Traffic control for Morgan County was demonstrated by interview, out-of-sequence at the EOC. Two representatives from the Decatur City Police Department displayed exceptional knowledge of the plans and procedures. Each officer successfully demonstrated dosimeter knowledge, turnback levels and other key information to include location of the designated relocation center.

- a. **MET: Objectives 5 and 17**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

2.4.4 River Evacuation

River evacuation was demonstrated by interview, out-of-sequence at the EOC. Two members of Morgan County Rescue Squad were knowledgeable of current plans and procedures for river evacuation. An inspection of boats, support vehicles and facilities complimented the plans, procedures and ability for Morgan County to provide river warning and blockades along the Tennessee River at the eastern boundary of the 10-mile EPZ.

- a. **MET: Objectives 5 and 10**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**

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

2.4.5 Reception and Congregate Care

Reception and congregate care was successfully demonstrated, out-of-sequence, at Hartselle Reception Center located at Hartselle Junior High gymnasium. The facility was well prepared and staffed by ARC, Salvation Army and the Alabama DHR. Backup communication was provided by amateur radio and other volunteer staff. Plans and procedures, to include a flow chart, were followed to process evacuees in a timely manner. Staff interviewed displayed an exceptional knowledge of procedures and followed its plan without error.

- a. **MET: Objectives 5, 18 and 19**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

2.4.6 Emergency Worker Decontamination

Vehicle monitoring and decontamination was successfully demonstrated, out-of-sequence, at the Hartselle Junior High parking lot. Members from the Hartselle Fire and Police Departments demonstrated their ability to follow current plans and procedures for processing suspected contaminated emergency workers and vehicles without error.

- a. **MET: Objectives 5 and 22**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

3. SUPPORT JURISDICTION

3.1 MADISON COUNTY

3.1.1 Emergency Operations Center

The EOC staff performed all duties associated with this exercise. Although, short on personnel, the staff was proactive and attentive to actions and issues including responding to a real world hazardous materials event. Direction and control was excellent. The acting Emergency Management Director gave frequent briefings and updates to the staff. The EOC is a small, but functional facility equipped for responding to all types of emergencies. Communication equipment and back-up capabilities, including participation by RACES operators, worked well throughout the exercise. Staff were very knowledgeable of their duties, worked exceptionally well as a team and should be commended for their accomplishments.

- a. **MET: Objectives 1, 2, 3, 4 and 11**
- 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 Traffic Control Points

Traffic control procedures were satisfactorily demonstrated through interviews with representatives of the Huntsville Police Department, Huntsville Traffic Engineering and the Alabama Department of Transportation. Major routes into the county have signs directing evacuees to the appropriate reception center. Police are assigned to major intersections to facilitate the smooth flow of traffic. Sufficient personnel and equipment are readily available to execute Madison County's responsibilities. Personnel from the Madison County Health Department satisfactorily demonstrated emergency worker exposure control procedures by demonstrating their knowledge and understanding of procedures to follow in monitoring their own exposure levels.

- a. **MET: Objectives 5 and 17**
- 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 Reception and Congregate Care

The monitoring, decontamination and registration of personnel was satisfactorily demonstrated at the Alabama A&M University Reception Center. Upon arrival at the reception center, evacuees are interviewed by representatives of DHR to ensure they had been processed in their home county prior to relocating to Madison County. Anyone not processed are directed to monitors for screening. Processed individuals are referred to ARC for registration. Monitoring personnel are equipped with portable monitors, and satisfactorily demonstrated procedures for their personal safety as well as procedures to conduct individual monitoring. Security for the area is provided by the Alabama A&M University Police. Congregate care activities were satisfactorily demonstrated by interview and walkthrough of the First Baptist Church with the Madison/Marshall Chapter of the ARC. The facility can accommodate 200 evacuees, and has ample rooms to meet special requirements (e.g., children's playrooms) and a dining facility is on site.

- a. **MET: Objectives 5, 18 and 19**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs - RESOLVED: NONE**
- f. **PRIOR ARCAs - UNRESOLVED: NONE**

4. SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION

4.1 2001 ARCAs

4.1.1 07-01-11-A-01 SEOC

Description: A systematic problem was identified concerning information flow and release of information to the public, therefore this ARCA has been placed at the SEOC for resolution. At 1226 Emergency Health Orders 3 and 4 were issued. These Health Orders directed the evacuation of zones A-2, B-2, F-2, G-2, A-5 and G-5, as well as, shelter-in-place zones H-10, I-10, J-10, K-10, A-10 and G-10. This information was received by the Joint Information Center (JIC) at 1227 and transmitted to the SEOC, who provided the information to the counties. The JIC was having a briefing at 1230 and this information was communicated to the media during that briefing. AEMA also issued a press release at 1245 detailing the evacuation and shelter information.

At 1238 the counties concurred on the protective actions indicated in the Health Orders and agreed to activation of the sirens at 1248 and issue the EAS messages between 1248 and 1250.

*The Code of Alabama and the Alabama Radiological Emergency Response Plan for Nuclear Power Plants (REP Plan) recognize the authority of the Health Officer to determine precautionary and protective actions to protect the public from excessive exposure to radiation. The REP Plan, the Alabama Emergency Management Agency Browns Ferry Nuclear Power Plant Standard Operating Guide (SOG) and the Alabama Emergency Management Agency Fixed Nuclear Facility Public Information-Education Standard Operating Procedures also address the procedures for the release of information to the public. The latter states (page 1) "Specifically the state's role is **not** to accomplish "first notification" to inform the affected public to evacuate or take protective actions. That responsibility belongs to the affected county PIO." As a corollary, the SOG states (page 37) "The decision to shelter or evacuate will be made by*

Radiological Control Agency. The EOC will have the staff function to communicate directions to *Birmingham Weather* -and advise the county EOCs to notify the public.”

During this exercise the JIC became the facility that provided “first notification” to the public of the evacuation and shelter-in-place protective actions by providing the media information concerning protective actions before the counties had completed their process of concurrence and decision making on siren activation and broadcast of EAS messages to notify the public of the protective actions. While the counties made no changes in protective actions during this exercise, confusion could have resulted from the issuance of this information prior to the EAS activation by the counties.

Recommendation: Review and revise Radiological Control Agency (RCA) and AEMA procedures to ensure that information still in process for emergency instruction is not released to the media by the JIC or through other avenues prior to the activation of the public alert and notification system by the counties.

Schedule of Corrective Actions:

4.2 PRIOR ARCAs RESOLVED

4.2.1 07-99-08-A-01 Field Monitoring Teams

Description: The RC-14 Monitoring Team did not properly demonstrate the air sampling operation because of the following: 1) the particulate filter was not positioned properly in the sample holder, as evidenced by an abnormally high flow rate of 4 cubic feet per minute; no effort was made to correct the situation; 2) the radioiodine cartridge purging began immediately after the sample was taken and no mention was made of moving to a “low background” area to complete the operation; and 3) the air sample media (particulate filter and simulated silver zeolite cartridge) were bagged and labeled without an effort to measure their activity until questioned by the evaluator.

Corrective Action Demonstrated: On May 27, 1999, FMT RC-14 successfully re-demonstrated procedures for obtaining air samples. This re-demonstration took place in the parking lot of the Tri-County Health Department. The corrective action demonstrated included: 1) the particulate filter was positioned properly in the sample holder, flow rate was approximately 2.2 cubic feet per minute; 2) the operator stated that he had simulated moving to a low background area prior to purging the radioiodine cartridge; 3) the air sample media (particulate filter and simulated silver-zeolite cartridge) were counted using the Eberline E-520 survey meter with pancake probe attached before simulated bagging and labeling; and 4) radioiodine activity was calculated and reported to the SRMAC.

**4.2.2 07-99-16-A-02
Protective Action
For Schools**

Description: The Tanner High School Intern-Administrator was unaware of emergency procedures in the event of an incident at the Browns Ferry Nuclear Power Plant. There are no procedures readily available for administrative staff to utilize in an emergency.

Corrective Action Demonstrated: The Tanner High School staff was knowledgeable of its current plans and procedures. The principal and support staff demonstrated a high degree of understanding of evacuation procedures and followed its current plans and procedures without error. Noteworthy was Tanner High School's evacuation procedures, security and accountability of students as well as bus support to and from school.

APPENDIX 1

ACRONYMS AND ABBREVIATIONS

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

AEMA	Alabama Emergency Management Agency
ACP	Access Control Point
ADEM	Alabama Department of Environmental Management
ARC	American Red Cross
ARCA	Area Requiring Corrective Action
CD-V	Civil Defense - Victoreen
CFR	Code of Federal Regulations
CPM	Counts Per Minute
DHHS	Department of Health and Human Services
DOC	Department of Commerce
DOE	Department of Energy
DOI	Department of the Interior
DOT	Department of Transportation
DRD	Direct Reading Dosimeter
EAS	Emergency Alert System
EEM	Exercise Evaluation Methodology
EMA	Emergency Management Agency
EMS	Emergency Medical Services
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
EPZ	Emergency Planning Zone
EW	Emergency Worker
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FEOC	Forward Emergency Operations Center
FMT	Field Monitoring Team
FR	Federal Register
GE	General Emergency
JIC	Joint Information Center
KI	Potassium Iodide
mR	milliroentgen

mR/h	milliroentgen per hour
NRC NUREG-0654	U.S. Nuclear Regulatory Commission NUREG-0654/FEMA-REP-1, Rev. 1, <i>"Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980</i>
ORO	Offsite Response Organization
PAD	Protective Action Decision
PAR	Protective Action Recommendation
PIO	Public Information Officer
R	Roentgen
RAC	Regional Assistance Committee
RACES	Radio Amateur Civil Emergency Service
RC	Reception Center
RCA	Radiation Control Agency
REP	Radiological Emergency Preparedness
RERP	Radiological Emergency Response Plan
R/h	Roentgen(s) per hour
SEOC	State Emergency Operations Center
SOP	Standard Operating Procedures
SRMAC	State Radiological Monitoring and Assessment Center
TCP	Traffic Control Point
TLD	Thermoluminescent Dosimeter
TVA	Tennessee Valley Authority
USDA	U.S. Department of Agriculture

APPENDIX 2

EXERCISE EVALUATORS

The following is a list of the personnel who evaluated the Browns Ferry Nuclear Power Plant exercise on June 6, 2001. The organization represented by each evaluator is indicated by the following abbreviations:

FEMA	- Federal Emergency Management Agency
DOT	- Department of Transportation
ICF	- ICF Consulting, Incorporated
NRC	- Nuclear Regulatory Commission
USDA	- US Department of Agriculture

Lawrence A. Robertson

RAC Chairman

<u>EVALUATION SITE</u>	<u>EVALUATOR</u>	<u>ORGANIZATION</u>
Don Cornell	Chief Evaluator	FEMA
STATE OF ALABAMA		
State Emergency Operations Center	Randy Hecht	FEMA
Forward Emergency Operations Center (Decatur, AL)	Helen Wilgus	FEMA
State Radiological Monitoring & Assessment Center (SRMAC)	Robert Trojanowski	NRC
Dose Assessment (Montgomery)	Dale Petroff	ICF
Radiological Field Monitoring Teams	Thomas Brown James Lightnar	ICF ICF
Joint Information Center	Bill Larrabee	ICF
Lauderdale County		
Emergency Operations Center	Tom Trout	FDA
Protective Action for Schools	Don Cornell Bill Larrabee	FEMA ICF

<u>EVALUATION SITE</u>	<u>EVALUATOR</u>	<u>ORGANIZATION</u>
Traffic Control Points	Don Cornell Bill Larrabee	FEMA ICF
River Evacuation	Don Cornell Bill Larrabee	FEMA ICF
Reception and Congregate Care Center	Don Cornell Bill Larrabee	FEMA ICF
Lawrence County		
Emergency Operations Center	Robert Perdue	FEMA
Protective Action for Schools	Don Cornell Bill Larrabee	FEMA ICF
Traffic Control Points	Don Cornell Bill Larrabee	FEMA ICF
River Evacuation	Don Cornell Bill Larrabee	FEMA ICF
Reception and Congregate Care Center	Don Cornell Bill Larrabee	FEMA ICF
Emergency Worker Decontamination	Don Cornell Bill Larrabee	FEMA ICF
Limestone County		
Emergency Operations Center	Tom Reynolds	FEMA
Protective Action for Schools	Don Cornell Bill Larrabee	FEMA ICF
Traffic Control Points	Don Cornell Bill Larrabee	FEMA ICF
River Evacuation	Don Cornell Bill Larrabee	FEMA ICF
Reception and Congregate Care	Don Cornell	FEMA

<u>EVALUATION SITE</u>	<u>EVALUATOR</u>	<u>ORGANIZATION</u>
	Bill Larrabee	ICF
Emergency Worker Decontamination	Don Cornell	FEMA
	Bill Larrabee	ICF
Morgan County		
Emergency Operations Center	Joseph Canoles	FEMA
Protective Action for Schools	Don Cornell	FEMA
	Bill Larrabee	ICF
Reception Congregate Care Center	Don Cornell	FEMA
	Bill Larrabee	ICF
Traffic Control Points	Don Cornell	FEMA
	Bill Larrabee	ICF
Emergency Worker Decon	Don Cornell	FEMA
	Bill Larrabee	ICF
Madison County (Host)		
Emergency Operations Center	Eddie Hickman	FEMA
Traffic Control Points	Don Cornell	FEMA
	Bill Larrabee	ICF
Reception Center and Congregate Care	Don Cornell	FEMA
	Bill Larrabee	ICF

APPENDIX 3

EXERCISE OBJECTIVES AND EXTENT-OF-PLAY AGREEMENT

This appendix lists the exercise objectives which were scheduled for demonstration in the Browns Ferry Nuclear Power Plant exercise on June 6, 2001 and the extent-of-play agreement approved by FEMA Region IV.

A. Exercise Objectives

On the following pages are the specific radiological emergency preparedness objectives scheduled for demonstration during this exercise.

(Included in Final Report only)

B. Extent-of-Play Agreement

The extent-of-play agreement on the following pages was submitted by the State of Alabama, and was approved by FEMA Region IV in preparation for the Browns Ferry Nuclear Power Plant exercise on June 6, 2001. The extent-of-play agreement includes any significant modification or change in the level of demonstration of each exercise objective listed in Subsection A of this appendix.

(Included in Final Report only)

LAUDERDALE COUNTY
EXTENT-OF-PLAY

- OBJECTIVE 1 Mobilization of Emergency Personnel.
Scenario dependant, EOC personnel will be pre-staged.
- OBJECTIVE 2 Facilities, equipment etc.
Scenario dependant.
- OBJECTIVE 3 Direction and Control
Scenario dependant.
- OBJECTIVE 4 Communications
Scenario dependant.
- OBJECTIVE 5 Emergency Worker Exposure Control
Demonstrated during the week of March 5th, 2001. Note #1.
- OBJECTIVE 10 Alert and Notification
County will simulate sounding the sirens and activating the Alert and Notification System. Messages will not be read over the Notification System. Counties that are not impacted by the plume may elect to decide not to activate their sirens, but will simulate activating the Notification System.
- OBJECTIVE 11 Public Instruction and Emergency Information
Scenario dependant. Note #6
- OBJECTIVE 12 Emergency Information-Media
Scenario dependant. Note #6
- OBJECTIVE 14 Use of KI
Demonstrated during the week of March 5th, 2001. Note #1.
- OBJECTIVE 15 PA Special Populations
Demonstrated during the week of March 5th, 2001. Note #1.
- OBJECTIVE 16 Protective Actions - Schools
Lauderdale County has no schools in the 10-mile EPZ
- OBJECTIVE 17 Traffic and Access Control
Demonstrated during the week of March 5th, 2001. Note #1.

OBJECTIVE 18 Reception Center - Monitoring, Decontamination and registration
Demonstrated during the week of March 5th, 2001. Note #1.

OBJECTIVE 19 Congregate Care
Demonstrated during the week of March 5th, 2001. Note #1.

OBJECTIVE 22 Emergency Workers, Equipment and Vehicles - Monitoring and
Decontamination
Demonstrated during the week of March 5th, 2001. Note #1.

Notes: #1 Demonstrated Out of Sequence 03/05-03/09/01
#6 County liaisons at the JIC coordinate information flow.

LAWRENCE COUNTY
EXTENT-OF-PLAY
AND SIMULATIONS

- OBJECTIVE 1 Mobilization of Emergency Personnel.
Scenario dependant, EOC personnel will be pre-staged.
- OBJECTIVE 2 Facilities, equipment etc.
Scenario dependant.
- OBJECTIVE 3 Direction and Control
Scenario dependant.
- OBJECTIVE 4 Communications
Scenario dependant.
- OBJECTIVE 5 Emergency Worker Exposure Control
Demonstrated during the week of March 5th, 2001.Note #1.
- OBJECTIVE 10 Alert and Notification
County will simulate sounding the sirens and activating the Alert and Notification System. Messages will not be read over the Notification System. Counties that are not impacted by the plume may elect to decide not to activate their sirens, but will simulate activating the Notification System.
- OBJECTIVE 11 Public Instruction and Emergency Information
Scenario dependant. Note #6
- OBJECTIVE 12 Emergency Information-Media
Scenario dependant. Note #6
- OBJECTIVE 14 Use of KI
Demonstrated during the week of March 5th, 2001.Note #1.
- OBJECTIVE 15 PA Special Populations
Demonstrated during the week of March 5th, 2001.Note #1.
- OBJECTIVE 16 Implementation of Protective Actions - Schools
Demonstrated during the week of March 5th, 2001.Note #1.
- OBJECTIVE 17 Traffic and Access Control
Demonstrated during the week of March 5th, 2001 Note #1.

OBJECTIVE 18 Reception Center - Monitoring, Decontamination, and Registration
Demonstrated during the week of March 5th, 2001. Note #1.

OBJECTIVE 19 Congregate Care
Demonstrated during the week of March 5th, 2001. Note #1.

OBJECTIVE 22 Emergency Workers, Equipment, and Vehicle - Monitoring and
Decontamination Note #1.
Demonstrated during the week of March 5th, 2001. Note #1.

Notes: #1 Demonstrated Out of Sequence 03/05-03/09/01
#6 County liaisons at the JIC coordinate information flow.

LIMESTONE COUNTY
EXTENT-OF-PLAY
OUT OF SEQUENCE AND SIMULATIONS

- OBJECTIVE 1 Mobilization of Emergency Personnel.
Scenario dependant, EOC personnel will be pre-staged.
- OBJECTIVE 2 Facilities, equipment etc.
Scenario dependant.
- OBJECTIVE 3 Direction and Control
Scenario dependant.
- OBJECTIVE 4 Communications
Scenario dependant.
- OBJECTIVE 5 Emergency Worker Exposure Control
Demonstrated during the week of March 5th, 2001. Note #1.
- OBJECTIVE 10 Alert and Notification
County will simulate sounding the sirens and activating the Alert and Notification System. Messages will not be read over the Notification System. Counties that are not impacted by the plume may elect to decide not to activate their sirens, but will simulate activating the Notification System.
- OBJECTIVE 11 Public Instruction and Emergency Information
Scenario dependant. Note #6.
- OBJECTIVE 12 Emergency Information-Media
Scenario dependant. Note #6.
- OBJECTIVE 14 Use of KI
Demonstrated during the week of March 5th, 2001. Note#1.
- OBJECTIVE 15 PA Special Populations
Demonstrated during the week of March 5th, 2001. Note #1.
- OBJECTIVE 16 Implementation of Protective Actions - Schools
Demonstrated during the week of March 5th, 2001. Note #1.
- OBJECTIVE 17 Traffic and Access Control
Demonstrated during the week of March 5th, 2001. Note #1.

- OBJECTIVE 18 Reception Center - Monitoring, Decontamination, and Registration
Demonstrated during the week of March 5th, 2001. Note #1.
- OBJECTIVE 19 Congregate Care
Demonstrated during the week of March 5th, 2001. Note #1.
- OBJECTIVE 22 Emergency Workers, Equipment, and Vehicle - Monitoring and
Decontamination Note #3.

Notes: #1 Demonstrated Out of Sequence 03/05-03/09/01

#3 Will demonstrate out of sequence at the Limestone County EOC after exercise termination on June 6th,
2001

#6 County liaisons at the JIC coordinate information flow.

MORGAN COUNTY
EXTENT-OF-PLAY
AND SIMULATIONS

- OBJECTIVE 1 Mobilization of Emergency Personnel.
Scenario dependant, EOC personnel will be pre-staged.
- OBJECTIVE 2 Facilities, equipment etc.
Scenario dependant.
- OBJECTIVE 3 Direction and Control
Scenario dependant.
- OBJECTIVE 4 Communications
Scenario dependant.
- OBJECTIVE 5 Emergency Worker Exposure Control
Demonstrated during the week of March 5th, 2001.Note #1.
- OBJECTIVE 10 Alert and Notification
County will simulate sounding the sirens and activating the Alert and Notification System. Messages will not be read over the Notification System. Counties that are not impacted by the plume may elect to decide not to activate their sirens, but will simulate activating the Notification System.
- OBJECTIVE 11 Public Instruction and Emergency Information
Scenario dependant. Note #6.
- OBJECTIVE 12 Emergency Information-Media
Scenario dependant. Note #6.
- OBJECTIVE 14 Use of KI
Demonstrated during the week of March 5th, 2001.Note #1.
- OBJECTIVE 15 PA Special Populations
Demonstrated during the week of March 5th, 2001. Note #1.
- OBJECTIVE 16 Implementation of Protective Actions - Schools
Demonstrated during the week of March 5th, 2001. Note #1
- OBJECTIVE 17 Traffic and Access Control
Demonstrated during the week of March 5th, 2001. Note #1.

OBJECTIVE 18 Reception Center - Monitoring, Decontamination, and Registration
Demonstrated during the week of March 5th, 2001.Note #1.

OBJECTIVE 19 Congregate Care
Demonstrated during the week of March 5th, 2001.Note #1.

OBJECTIVE 22 Emergency Workers, Equipment, and Vehicle - Monitoring and
Decontamination. Note #1.
Demonstrated during the week of March 5th, 2001. Note #1.

Notes: #1 Demonstrated Out of Sequence 03/05-03/09/01
#6 County liaisons at the JIC coordinate information flow.

**MADISON COUNTY
EXTENT-OF-PLAY
AND SIMULATIONS**

Madison will demonstrate objectives as host county scenario dependent.

- OBJECTIVE 1** Mobilization of Emergency Personnel.
Scenario dependant, EOC personnel will be pre-staged.
- OBJECTIVE 2** Facilities, equipment etc.
Scenario dependant.
- OBJECTIVE 3** Direction and Control
Scenario dependant.
- OBJECTIVE 4** Communications
Scenario dependant.
- OBJECTIVE 5** Emergency Worker Exposure Control
Demonstrated during the week of March 5th, 2001. Note #1
- OBJECTIVE 10** Alert and Notification
County will simulate activating the Alert and Notification System.
Messages will not be read over the Notification System. County will coordinate with other EPZ counties.
- OBJECTIVE 11** Public Instruction and Emergency Information
Scenario dependant. Note #6.
- OBJECTIVE 12** Emergency Information-Media
Scenario dependant. Note #6.
- OBJECTIVE 14** Use of KI
Will demonstrate on June 6th at EOC, scenario dependant
- OBJECTIVE 17** Traffic and Access Control
Demonstrated during the week of March 5th, 2001. Note #1
- OBJECTIVE 18** Reception Center - Monitoring, Decontamination, and Registration
Demonstrated during the week of March 5th, 2001. Note #1
- OBJECTIVE 19** Congregate Care
Demonstrated during the week of March 5th, 2001. Note # 1.

Notes: #1 Demonstrated Out of Sequence 03/05-03/09/01

#6 County liaisons at the JIC coordinate information flow.

RADIATION CONTROL AGENCY
EXTENT-OF-PLAY
OUT OF SEQUENCE AND SIMULATIONS

- OBJECTIVES 6,8 Will have 2 Field Teams demonstrate iodine particulate sampling at the Morgan County Health Department at 8:30 am prior to being dispatched to the field Note #2
- OBJECTIVE 7 Scenario dependant.
- OBJECTIVE 9 Scenario dependant.
- OBJECTIVE 14 Scenario dependent. KI will not be issued, procedures will be discussed.
- OBJECTIVE 20, 21 MS-1 Drill will be demonstrated on October 4,2001 at Decatur General in Decatur. Note#4
- OBJECTIVE 24 Laboratory will not be demonstrated during exercise.

#2 Field teams will demonstrate taking iodine particulate samples in the Morgan County Health Dept. Parking Lot at 08:30 prior to being dispatched to the field.

#4 Decatur General and Decatur EMS will demonstrate a MS-1 exercise on Thursday, October 4, 2001

AEMA
EXTENT-OF-PLAY
OUT OF SEQUENCE AND SIMULATIONS

- OBJECTIVE 1 Mobilization of Emergency Personnel.
Scenario dependant, EOC personnel will be pre-staged.

- OBJECTIVE 2 Facilities, equipment etc.
Scenario dependant.

- OBJECTIVE 3 Direction and Control
Scenario dependant. Note#5.

- OBJECTIVE 4 Communications
Scenario dependant.

- OBJECTIVE 10 Alert and Notification
Scenario dependant

- OBJECTIVE 11 Public Instructions
Scenario dependant

- OBJECTIVE 12 Emergency Information- Media
Scenario dependant-JIC

- OBJECTIVE 13 Emergency Information- Public
Scenario dependant-JIC

#5 The FEOC operations , in the Morgan County EOC, are an information coordination process, there are no Direction and Control aspects.

APPENDIX 4

EXERCISE SCENARIO

This appendix contains a summary of the simulated sequence of events (Exercise Scenario) which was used as the basis for invoking emergency response actions by OROs in the Browns Ferry Nuclear Power Plant exercise on June 6, 2001.

This exercise scenario was submitted by the State of Alabama, Alabama Radiation Control Agency and TVA, and approved by FEMA Region IV.

(Included in Final Report only)

BFN 2001 NRC/FEMA GRADED EXERCISE NARRATIVE SUMMARY
CONFIDENTIAL
Rev. date: 3/15/01

INITIAL CONDITIONS:

Unit 1 1B CRD pump is O.O.S. for repairs.
Unit 2 at 100% power.
Unit 3 at 100% power.

Unknown to the participants: A leak of sodium hypochlorite in the Calgon Building has been draining to the forebay via the yard drains for some time.

EVENTS: Note times are in elapsed scenario time.

At the start of the exercise (T=00:00) a Condenser tube leak of 750 gallons per minute begins on Unit 2. Over several minutes Condensate Demin influent/effluent and RWCU Demin influent/effluent conductivity alarms occur in the Control room. Chemistry will be requested to obtain liquid samples of the Condensate System and Reactor Coolant.

At seven minutes (T=00:07) into the exercise the Unit 2 Turbine bearing lube oil cooler temperature controller fails. The lube oil temperature begins to rise. As the oil temperature increases, bearing vibration begins to occur.

At twelve minutes (T=00:12) into the exercise vibration alarms (7 mils) occur on the Unit 2 Turbine. (This response is verified using the new digital EHC system to be installed during U2C11 refueling outage.)

At about fifteen minutes (T=00:15) into the exercise the Unit 2 Reactor is scrammed. The Turbine is manually tripped. When the Turbine is tripped, several low pressure blades penetrate the turbine casing, damage additional condenser tubes, puncture the condenser below the water boxes. Additionally, some pieces exit through the Turbine Building roof and penetrate the sheet metal sides and roof of the refuel floor and create a large hole in the side of the Reactor Building. HPCI will not be able to start due to a failure of its 120 volt system. Also if the RWCU inboard valve, 2-FCV-69-1, starts to close or when operations attempts to place RHR in Torus cooling the 480 volt reactor MOV board 2A fails. This prevents valves powered off of this board from functioning. Some of these valves are those needed for Suppression Pool Cooling as well as 2-FCV-69-1. The Reactor building negative pressure cannot be maintained on Unit 1,2,3 even if the SBGTS initiates due to a loss of Secondary Containment Integrity.

At approximately thirty five minutes (T=00:35) into the exercise an ALERT should be declared based on EAL 6.3A (Turbine failure resulting in visible damage or penetration of any of the following structures from missiles: Reactor Building, Diesel Generator Building, Intake Structures, Control Bay).

Some water will be flooding into the Turbine building from the holes in the Condenser if the Condenser Cooling Water (CCW) has not been isolated from the Condenser.

During the exercise a medical emergency will occur. The injured person, if checked by Radcon, will be found to be radioactively contaminated. The time of this event will be determined during the exercise by the lead controllers and exercise coordinator.

At two hours fifteen minutes (T=02:15) into the exercise a leak develops in the RWCU heat exchanger room which will soon exceed 220°F in the RWCU isolation valve area (Maximum Safe Operating Temperature).

At about two hours thirty minutes (T=02:30) into the exercise a SAE should be declared based on EAL 3.1S (An unisolable Primary System leak is discharging into secondary containment and any area temperature exceeds the Maximum Safe Operating Temperature limit listed in Table 3.1)

At two hours thirty five minutes (T=02:35) into the exercise Operations should Emergency Depressurize based on having more than one area exceeding Maximum Safe Operating Temperatures in the RWCU HX room and an unisolable Primary System leak is discharging into secondary containment.

At three hours (T=03:00) into the exercise some fuel clad failures begin to occur over the next 1.5 hours due to chemicals from the river water which has attacked the fuel clad.

BFN 2001 NRC/FEMA GRADED EXERCISE NARRATIVE SUMMARY

CONFIDENTIAL

Rev. date: 3/15/01

At four hours fifteen minutes (T=04:15) into the exercise 2-RE-90-272A or 273A exceed the values in table 3.1-G/3.2-G. These values indicates failed fuel of $\geq 300 \mu\text{C/gm DEI}$ where the RCS is not leaking into the Drywell.

At four hours thirty minutes (T=04:30) into the exercise a GE should be declared based on EAL 3.1G (An unisolable Primary System leak is discharging into secondary containment and any area temperature exceeds the Maximum Safe Operating area Temperature limit listed in Table 3.1 and any indication of potential or significant fuel failure exists. Refer to Table 3.1-G/3.2-G).

The exercise terminates when the leaking RWCU has been isolated and the radioactive release to the environment has been reduced or terminated.

BFN 2001 NRC/FEMA GRADED EXERCISE NARRATIVE SUMMARY

CONFIDENTIAL

Rev. date: 3/15/01

EXPLANATION OF EVENTS:

Unit 1 1B CRD pump is O.O.S. for repairs.

Limits the addition of extra water while at high pressure to the Unit 2 RCS.

Sodium hypochlorite leak at Calgon Building

Allows chlorine containing compounds to be introduced into the Condenser.

Condenser tube leak

Allows the introduction of certain chemicals from the river to the U-2 RCS which over a short time lead to fuel clad failures.

Unit 2 Turbine bearing lube oil cooler failure

Provides reason for increasing Turbine bearing vibration that leads to Turbine failure.

Turbine failure and associated damage

Provides reason for the ALERT

HPCI does not start

Combined with 1B CRD pump is O.O.S, limits the addition of water while Unit 2 RCS is at high pressure.

480 volt Rx. MOV Board 2A fails

Prevents some valves needed for containment cooling from being remotely operated. Also prevents 2-FCV-69-1 from being closed which allows for an unisolable leak later.

A leak develops in the RWCU heat exchanger room

This leak provides the cause of the SAE and a release path outside of containment.

Medical emergency

Is required by our six-year exercise plan and also adds a distracting event for the TSC and OSC to address.

Fuel clad failures

Allows increased release rates for the offsite plume requirements and results in $\geq 300 \mu\text{C/gm}$ DEI RCS activity which results in the GE declaration.

APPENDIX 5
LETTER OF CREDIT



Federal Emergency Management Agency

Region IV
3003 Chamblee-Tucker Rd
Atlanta, GA 30341

June 16, 2000

Mr. Lee Helms, Assistant Acting Director
Alabama Emergency Management Agency
Post Office Drawer 2160
Clanton, Alabama 35046-2160

Dear Mr. Helms:

This is in response to Mr. Sam Guerrero's request for approval verification of your March 26, 1999, letter requesting credit for Radiological Emergency Preparedness (REP) objectives 30, 32, and 33. This request was based on severe winter weather, Tornado Warnings and Flash Flooding, which occurred December 23-25, 1998 and January 22-23, 1999, in northwest Alabama.

Your request for credit has been granted to the State of Alabama EOC, and the counties of Morgan, Lawrence, Madison, Lauderdale, and Limestone for Objectives 30, 32, and 33 for the May 26, 1999 Ingestion Exercise.

Should you or your REP staff have questions, please contact me at 770/220-5470.

Sincerely,

A handwritten signature in black ink, appearing to read "Donald L. Cornell", is written over the typed name.

Donald L. Cornell, EMPS
Training, Exercise and
Evaluation Branch

cc: Samuel Guerrero, AEMA
RD
RF

PT-TE/DLCornell/alcredit/bg/6/16/00/x5470



Federal Emergency Management Agency
Washington, D.C. 20472

APR 15 1999

MEMORANDUM FOR: Larry Robertson
Regional Assistance Committee Chairperson
FEMA Region IV

FROM: *Vanessa E. Quinn*
Vanessa E. Quinn, Acting Chief
Radiological Emergency Preparedness Branch

SUBJECT: State of Alabama Emergency Management Agency Letter
of Request for Offsite Exercise Credits for Objectives 30,
32, and 33 for the Browns Ferry Nuclear Power Station

This responds to a memorandum dated April 12, 1999 from Donald L. Cornell of your staff, which transmits a letter and documentation dated March 26, 1999, from Lee Helms, Acting Assistant Director for the State of Alabama Emergency Management Agency requesting credit for Radiological Emergency Preparedness (REP) exercise credit for: Objective 30, Continuous, 24-Hour Staffing; Objective 32, Unannounced Exercise or Drill; Objective 33, Off-Hours Exercise or Drill. This request is based on severe winter weather, Tornado Warnings and Flash Flooding which occurred December 23-25, 1998 and January 22-23, 1999 in north west Alabama.

Based upon our review of the documentation provided by State of Alabama Emergency Management Agency and the recommendation of FEMA Region IV, credit is granted to State of Alabama EOC, and the counties of Morgan, Lawrence, Madison, Lauderdale, and Limestone for Objectives 30, 32, and 33 for the May 26, 1999 Ingestion Exercise.

If you have any questions regarding this matter, please contact me at 202-646-3664.