

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



**FEMA**

# **Final Exercise Report Sequoyah Nuclear Power Plant**

**Licensee: Tennessee Valley Authority**

**Exercise Date: June 23, 2004**

**Report Date: September 21, 2004**



**FEMA**

September 21, 2004

Mr. William D. Travers  
Regional Administrator - RII  
Nuclear Regulatory Commission  
61 Forsyth Street, SW, Suite 23T85  
Atlanta, Georgia 30303

Dear Mr. Travers:

Enclosed is the final report for the June 23, 2004, Sequoyah Nuclear Power Plant exercise. The report addresses the evaluation of the offsite response plans and preparedness for the State of Tennessee and the affected local governments. The 10-mile Emergency Planning Zone (EPZ) includes Hamilton and Bradley Counties. The Federal Emergency Management Agency Region IV staff prepared the final exercise report. Copies of the report will be forwarded to the State of Tennessee and FEMA and NRC Headquarters by my staff.

The State of Tennessee and Bradley and Hamilton Counties activated their emergency response staffs. The emergency response organizations included elected officials, state and county employees and volunteers. Some of the exercise activities were conducted during the weeks of May 17 and May 24, 2004. These evaluated activities included protective actions for schools; evacuee monitoring, decontamination, registration and temporary care; and emergency worker monitoring and decontamination. A medical drill for an off-site patient was conducted on April 22, 2004.

The Tennessee Emergency Management Agency has instituted a "meet-me" conference call system between the State and the counties to improve their communication and coordination during events. This system was used extensively during the exercise and is a valuable addition.

All agreed upon exercise evaluation area criteria were demonstrated. No Deficiencies and only one Area Requiring Corrective Action (ARCA) were identified during the exercise. The ARCA concerned the failure to activate the sirens after making the second protective action decision. The appropriate EAS message was released. We will work with the State of Tennessee to monitor the correction of the ARCA.

Based on the results of the June 23, 2004, exercise and FEMA's review of Tennessee's 2002 and 2003 Annual Letter of Certification the offsite radiological emergency response plans and preparedness for the State of Tennessee and the affected local jurisdictions, site-specific to the Sequoyah Nuclear Power Plant, can be implemented and are 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 offsite radiological emergency response plans and preparedness for the State of Tennessee site-specific to the Sequoyah Nuclear Power Plant, granted on August 7, 1980, will remain in effect.

Should you have any questions, please contact Robert Perdue at 770/220-5464.

Sincerely,



Mary Lynne Miller  
Acting Regional Director

Enclosure

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## **I. EXECUTIVE SUMMARY**

On June 23, 2004, the Federal Emergency Management Agency (FEMA), Region IV, conducted a full participation plume exposure pathway exercise in the emergency planning zone (EPZ) around the Sequoyah Nuclear Power Plant. The purpose of the exercise was to assess the level of State and local preparedness in responding to a radiological emergency. This exercise was conducted in accordance with FEMA's policies and guidance concerning the exercise of State and local radiological emergency response plans (RERP) and procedures. This report contains the evaluation of the biennial exercise.

The most recent evaluated exercise was conducted on October 2, 2002. The qualifying emergency preparedness exercise was conducted in June 1980.

FEMA wishes to acknowledge the efforts of the many individuals, including volunteers, who participated in this exercise. The State of Tennessee and Bradley and Hamilton Counties, Risk Counties, participated in the exercise. Protecting the public health and safety is the full-time job of some of the exercise participants and an assigned responsibility for others. Others have willingly sought this responsibility by volunteering to provide vital emergency services to their communities. All exercise participants were cooperative and worked well fulfilling their duties as part of the team.

During the weeks of May 17 and May 24, 2004 FEMA evaluated out-of-sequence activities in Bradley and Hamilton Counties. The evaluated activities included: protective action for schools; reception and congregate care and emergency worker decontamination. A medical drill was conducted on April 22, 2004.

The meet-me conference system improved the communication and coordination between the Tennessee Emergency Management Agency (TEMA) and Bradley and Hamilton Counties.

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State and local organizations, except where noted, demonstrated knowledge of their emergency response plans and procedures and successfully implemented them. No Deficiencies and only one Area Requiring Corrective Action (ARCA) were identified. The ARCA concerned the failure to activate the Sequoyah siren system after the decision to evacuate the "Near Plant Area" and Quadrant B and to shelter-in-place Quadrant C.

## II. INTRODUCTION

On December 7, 1979, the President directed FEMA to assume the lead responsibility for offsite nuclear planning and response. FEMA's activities are conducted pursuant to Title 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 Title 44 CFR 350 establishes the policies and procedures for FEMA's initial and continued approval of State and local government's 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 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 FEMA (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 Commerce
  - Nuclear Regulatory Commission
  - Environmental Protection Agency
  - Department of Energy
  - Department of Health and Human Services
  - Department of Transportation
  - Department of Agriculture
  - Department of the Interior, and
  - Food and Drug Administration

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

Formal submission of the Multi-Jurisdictional Radiological Response Plan (MJRERP) for the Sequoyah Nuclear Power Plant to FEMA Region IV by the State of Tennessee was made in May of 1980. Formal approval of the MJRERP was granted on August 7, 1980, under 44 CFR 350.

A joint REP exercise was conducted on June 23, 2004, by FEMA Region IV to assess the capabilities of State and local emergency preparedness organizations in implementing their MJRERP and procedures to protect the public health and safety during a radiological emergency involving the Sequoyah Nuclear Power Plant. Out-of-sequence activities were evaluated during the weeks of May 17 and May 24, 2004. The activities included: protective action for schools, reception and congregate care, and emergency worker decontamination. A medical drill was conducted on April 22, 2004 and is included in this report. 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 in this report are based on the evaluations of the Federal Evaluator team, with final determinations made by the FEMA Region IV RAC Chairperson and Chief Evaluator 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 Interim Program Manual, August, 2002.

Section III, 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 evaluated and a tabular presentation of the time of actual occurrence of key exercise events and activities.

Section IV, entitled "Exercise Evaluation and Results" presents summary information on the demonstration of applicable exercise criterion at each jurisdiction or functional entity evaluated in a jurisdiction-based, issues-only format.

### **III. EXERCISE OVERVIEW**

Contained in this section are data and basic information relevant to the June 23, 2004 exercise to test the offsite emergency response capabilities in the area surrounding the Sequoyah Nuclear Power Plant.

#### **A. EPZ Description**

The Sequoyah Nuclear Power Plant, operated by the Tennessee Valley Authority (TVA), is located on the Tennessee River near the town of Soddy-Daisy in Hamilton County, Tennessee. Portions of Bradley and Hamilton Counties lie within the 10-mile EPZ. The major highways are Interstate 75 and Tennessee Highways 27 and 58. Land use is a mix of residential, business, and agricultural. The population of the 10-mile EPZ is approximately 89,000.

#### **B. Exercise Participants**

The following State agencies, organizations, and County governments participated in the Sequoyah Nuclear Power Plant exercise on June 23, 2004.

#### **STATE OF TENNESSEE**

Bureau of State Parks  
Department of Agriculture  
Department of Environment and Conservation  
Department of General Services  
Department of Human Services  
Department of Mental Health  
Department of Military  
Department of Safety  
Department of Solid Waste Management  
Department of Transportation  
Division of Forestry  
Division of Radiological Health  
Division of Water Pollution Control  
Public Service Commission  
Tennessee Bureau of Investigation  
Tennessee Emergency Management Agency  
Wildlife Resource Agency

#### **RISK JURISDICTIONS**

Bradley County  
Hamilton County

**PRIVATE/VOLUNTEER ORGANIZATIONS**

American Red Cross (ARC)  
AT&T  
Bell South

**C. Exercise Timeline**

Table 1, on the following page, presents the time at which key events and activities occurred during the Sequoyah Nuclear Power Plant exercise on June 23, 2004.

**Table 1. Exercise Timeline**

**DATE AND SITE:** June 23, 2004 - Sequoyah Nuclear Power Plant

Emergency Classification Level for Event	Time Declared Utility	Time That Notification Was Received or Action Was Taken						
		SEOC	FCC	RMCC	CECC	JIC	BRADLEY COUNTY	HAMILTON COUNTY
<b>Unusual Event</b>								
<b>Alert</b>	0928	0939		1001	0928		0952	0954
<b>Site Area Emergency</b>	1023	1032		1036	1023		1032	1037
<b>General Emergency</b>	1132	1140	1142	1142	1132	1136	1151	1148
<b>Simulated Rad. Release Started 1140</b>	1140	1136	1136	1142	1140	1136	1134	
<b>Simulated Rad. Release Terminated</b>								
<b>Facility Declared Operational</b>		1033	1035	1008	1017	1039	0900	0932
<b>Declaration of A local State of Emergency</b>							1100	
<b>Exercise Terminated</b>		1409	1410	1415	1410	1440	1411	1412
<b>Early Precautionary Actions:</b>								
School relocation		1004					1011	1000
River closing		1009					1010	1011
TARS activated for day cares							1011	1021
<b>1st Protective Action Decision</b>								
Activate public notification system		1015					1015	1015
<b>1st Siren Activation</b>		1030					1030	1030
<b>1st EAS Message</b>								
#4 – School relocation, notification for buses, stay-tuned message		1030					1030	1031
<b>2nd Protective Action Decision:</b>								
Evacuate near plant: A1, B1, C1, D1 and remainder of Quadrant B		1054					1054	1054
Shelter in place: Quadrant C								
<b>2nd Siren Activation</b>		**					**	**
<b>2nd EAS Message</b>								
#58		1100					1100	1101
<b>3rd Protective Action Decision:</b>								
Evacuate: Near Plant Area and Quadrants B and C		1159					1151	1151
Shelter in place: Quadrants A and D								
<b>3rd Siren Activation</b>		1210					1210	1210
<b>3rd EAS Message</b>								
#72		1210					1210	1211
<b>KI Administration Decision:</b>								
Field Teams take KI				1028				
Emergency workers take KI		1040						1051
Public in Quadrants B and C take KI		1141					1151	1151

\*\* SEOC Director stated to the counties that sirens would be activated at 1100, but the activation did not occur.

## IV. EXERCISE EVALUATION AND RESULTS

Contained in this section are the results and findings of the evaluation of all jurisdictions and functional entities that participated in the June 23, 2004 exercise to test the offsite emergency response capabilities of State and local governments in the 10-mile EPZ around the Sequoyah Nuclear Power Plant.

Each jurisdiction or functional entity was evaluated on the basis of its demonstration of criteria delineated in exercise criteria contained in the Interim REP Manual, dated August 2002. Detailed information on the exercise criteria 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 presents the status of all exercise criteria that were scheduled for demonstration during this exercise by all participating jurisdictions and functional entities. Exercise criteria are identified by number. The demonstration status of those criteria is indicated by the use of the following letters:

- M - Met (No Deficiency or ARCAs assessed and no unresolved Deficiency or ARCAs remain 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:** June 23, 2004 – Sequoyah Nuclear Power Plant

ELEMENT/Sub-Element	SEOC	DOSE ASSMT.	CECC	RMCC	FCC	JIC	FIELD TEAMS	BRADLEY COUNTY	HAMILTON COUNTY
<b>1. EMERGENCY OPERATIONS MANAGEMENT</b>									
1.a.1. Mobilization	M	M	M	M	M	M	M	M	M
1.b.1. Facilities									
1.c.1. Direction and Control	A	M	M	M	M	M		M	M
1.d.1. Communications Equipment	M		M		M	M	M	M	M
1.e.1. Equipment & Supplies to Support Operations	M	M	M	M	M	M	M	M	M
<b>2. PROTECTIVE ACTION DECISION MAKING</b>									
2.a.1. Emergency Worker Exposure Control	M	M						M	M
2.b.1. Rad Assessment & PARs & PADs Based on Available Info	M	M							
2.b.2. Rad Assessment and PARs and PADs for the General Public	M	M						M	M
2.c.1. Protective Action Decisions for Special Populations	M							M	M
2.d.1. Rad Assessment & Decision Making for Ingestion Exposure									
2.e.1. Rad Assessment & Decision Making for Relocation, Re-entry & Return									
<b>3. PROTECTIVE ACTION IMPLEMENTATION</b>									
3.a.1. Implementation of Emergency Worker Control		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	M
3.c.2. Implementation of PADs for Schools								M	M
3.d.1. Implementation of Traffic and Access Control								M	M
3.d.2. Impediments to Evacuation and Traffic and Access Control								M	M
3.e.1. Implementation of Ingestion Decisions Using Adequate Info									
3.e.2. Implementation of IP Decisions Showing Strategies and Instructional Materials									
3.f.1. Implementation of Relocation, Re-entry and Return Decisions									
<b>4. FIELD MEASUREMENT and ANALYSIS</b>									
4.a.1. Plume Phase Field Measurement & Analysis Equipment							M		
4.a.2. Plume Phase Field Measurement & Analysis Management				M			M		
4.a.3. Plume Phase Field Measurements & Analysis Procedures							M		
4.b.1. Post Plume Field Measurement & Analysis									
4.b.2. Laboratory Operations									
<b>5. EMERGENCY NOTIFICATION &amp; PUBLIC INFO</b>									
5.a.1. Activation of Prompt Alert and Notification	M							M	M
5.a.2. Activation of Prompt Alert and Notification 15-Minute (Fast Breaker)									
5.a.3. Activation of Prompt Alert and Notification Backup Alert and Notification								M	M
5.b.1. Emergency Info and Instructions for the Public and the Media	M					M		M	M
<b>6. SUPPORT OPERATIONS/FACILITIES</b>									
6.a.1. Monitoring and Decon of Evacuees and EWs and Registration of Evacuees									M
6.b.1. Monitoring and Decon of Emergency Worker Equipment									M
6.c.1. Temporary Care of Evacuees									M
6.d.1. Transport and Treatment of Contaminated Injured Individuals									M

**LEGEND:** M = Met      D = Deficiency      A = ARCA

## B. Status of Jurisdictions Evaluated

This subsection provides information on the evaluation of each participating jurisdiction functional entity, in a jurisdictional results based format. Presented below are the and definitions of terms used in this subsection relative to criterion demonstration status.

- **Met** - Listing of the demonstrated exercise criterion 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 criterion 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 ARCA 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 criterion, 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 may be discussed in this report.
- A **Deficiency** is defined in FEMA REP Interim Manual as "...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 FEMA REP Interim Manual 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.
- **Evaluation Area Criterion** - A number, letter and number corresponding to the criterion in the FEMA REP Interim Manual.
- **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 TENNESSEE

## 1.1 State Emergency Operations Center

State Emergency Operations Center (SEOC) personnel fully demonstrated the capability to conduct emergency operations. The SEOC received the emergency notification from the Tennessee Valley Authority (TVA), verified the information, and proceeded to quickly contact, alert, and mobilize personnel to coordinate and complete necessary actions in a timely manner. The SEOC Director periodically announced significant developments and kept the EOC staff informed of events to properly coordinate actions throughout the exercise. Their positive attitude was apparent as the staff worked as a well-trained team to provide effective direction and control. Particularly worthy of note was the continuous distribution of messages, press releases, weather reports and other information, as well as the display of the SEOC log to keep EOC personnel fully informed.

- a. **MET:** Criteria 1.a.1, 1.d.1, 1.e.1, 2.a.1, 2.b.1, 2.b.2, 2.c.1, 3.b.1, 3.c.1, 5.a.1 and 5.b.1
- b. **DEFICIENCY:** NONE
- c. **AREAS REQUIRING CORRECTIVE ACTION:** 1.c.1

**Issue No:** 58-04-1.c.1-A-01

**Condition:** At 1054 after the declaration of a Site Area Emergency (SAE) and after being informed that plant conditions were degrading, the SEOC Director in coordination with Hamilton and Bradley Counties reached a decision to evacuate the Near Plant Area and Quadrant B and shelter-in-place Quadrant C. The SEOC Director told the counties that sirens would be activated at 1100 and the appropriate EAS message (#58) would be broadcasted. The sirens were not activated. The EAS message was released.

**Possible Cause:** SEOC staff did not follow the MJREP. The decision to activate the sirens was not communicated to the Operations Officer charged with physically activating the siren system.

**Reference:** Evaluation Area 1.c.1; NUREG-0654 E.6; MJREP Annex B.I.B.1.c and H.V.B.2

**Effect:** Some members of the public may have missed the emergency instruction to evacuate or shelter-in-place because the sirens were not activated prior to the broadcast of the EAS message concerning the protective action decision (PAD).

**Recommendation:** Review and revise as necessary implementing procedures to ensure that an individual (position) is assigned the responsibility to communicate decisions to appropriate personnel for implementation.

**Schedule of Corrective Action:** The State will defer the corrective action to the TEMA training section (FNF) to change the program of instruction to reflect a checklist that will not only ensure siren activations followed by EAS messages to the public in a timely manner, but that the difference between "silent tests" and "simulated" siren soundings is only in the mechanics, and both will be treated with the same emphasis with respect to confirmation with the Risk Counties, and with immediate log entry. These steps are a matter of Standard Operating Procedure and need not be reflected in the MJRERPs for Watts bar and Sequoyah.

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

## **1.2 Dose Assessment**

The dose assessment staff, under the direction of the Division of Radiological Health (DRH) Radiation Control Officer, was highly competent and independently calculated dose assessments that closely agreed with those of TVA. The staff worked cooperatively and maintained communications with the Radiological Monitoring Control Center (RMCC). Field measurements from TVA and DRH field teams were appropriately applied to verify previously estimated release information. A visual presentation of the projected plume footprint was displayed to aid personnel in protective action decision making. Dose assessment efforts were well integrated into the overall DRH activities which were conducted in an exemplary manner.

- a. **MET: Criteria 1.a.1, 1.c.1, 1.e.1, 2.a.1, 2.b.1, 2.b.2 and 3.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**

## **1.3 Field Coordination Center**

The Field Coordination Center's (FCC) primary purpose was to coordinate State and Federal resources in support of local government and to serve as a backup to the SEOC. The FCC Director did an outstanding job in coordinating and performing his direction and control responsibilities. Emergency Services Coordinators (ESCs) established and maintained continuous contact with their counterparts in the SEOC and exchanged

operational information that resulted in a well-coordinated and planned response. Briefings were conducted, significant activity logs were maintained and maps were posted, which provided everyone within the FCC a full visual of the operational situation. The FCC staff is commended for their professional attitude and demonstrated ability to assume the lead response role from the State.

- a. MET: Criteria 1.a.1, 1.c.1, 1.d.1 and 1.e.1
- b. DEFICIENCY: NONE
- c. AREAS REQUIRING CORRECTIVE ACTION: NONE
- d. NOT DEMONSTRATED: NONE
- e. PRIOR ARCAs- RESOLVED: NONE
- f. PRIOR ARCAs – UNRESOLVED: NONE

#### **1.4 Radiological Monitoring Control Center**

The RMCC was co-located with the FCC. Upon activation, the RMCC successfully demonstrated the ability to direct radiological field monitoring teams (FMT), share field team data with the TVA field team coordinator, and promptly forward such data to the dose assessment team at the SEOC. All personnel were knowledgeable and professionally performed their duties.

- a. MET: Criteria 1.a.1, 1.c.1, 1.e.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

#### **1.5 Radiological Field Monitoring Teams**

Four Radiological Field Monitoring Teams (FMT) successfully demonstrated their capabilities during the exercise. Prior to deployment, team members conducted equipment inventories and instrument checks in accordance with their written procedures. After deployment, the FMTs used their equipment and procedures to effectively make appropriate radiation measurements and collect proper samples for analysis. Team members knew their exposure limits and turn-back values, and were properly equipped.

- a. **MET:** Criteria 1.a.1, 1.d.1, 1.e.1, 3.a.1, 3.b.1, 4.a.1, 4.a.2 and 4.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 Central Emergency Control Center**

The TVA's Central Emergency Control Center (CECC), located in the Corporate Offices, Chattanooga, Tennessee, is an excellent facility for effectively managing and conducting emergency operations. Communications, coordination and the flow of technical information between the utility operator and State officials, both at the CECC and the SEOC, were outstanding. State officials dispatched to the CECC were knowledgeable, well trained, and professionally and efficiently carried out their responsibilities.

- a. **MET:** Criteria 1.a.1, 1.c.1, 1.d.1 and 1.e.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 Joint Information Center**

The Joint Information Center (JIC), staffed with personnel from the State of Tennessee, Bradley and Hamilton Counties, and TVA, was declared operational at 1039. The TVA and State co-directors effectively managed the JIC. The excellent interaction and coordination between government and utility personnel was reflected in the execution of the JIC plans and procedures.

Two media briefings and one technical briefing were conducted, and State and county news releases were issued. The Public Inquiry/Rumor Control responded accurately and professionally to all calls from the public.

- a. MET: Criteria 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. RISK JURISDICTIONS

### 2.1 BRADLEY COUNTY

#### 2.1.1 Emergency Operations Center

The emergency operations center was well staffed and organized. The Bradley County Director of Emergency Management maintained direction and control throughout the exercise. Frequent briefings were held with round table input from all agencies represented. Communication between the State and counties was excellent throughout the exercise.

- a. MET: Criteria 1.a.1, 1.c.1, 1.d.1, 1.e.1, 2.a.1, 2.b.2, 2.c.1, 3.a.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

#### 2.1.2 Protective Actions for Schools

On May 18, 2004, Prospect Elementary School successfully demonstrated school relocation procedures through an interview at the Bradley County EOC. Participants in the interview included the Principal of Prospect Elementary School, the Director of Bradley County Emergency Management Agency and a TEMA Area Coordinator. The Principal was knowledgeable of the school relocation plan. Faculty and staff are trained annually on the plan and procedures. Schools are equipped with tone alert radios, buses

are equipped with two-way communications, and escorting law enforcement personnel have radio communications. Teachers and the school resource officer are assigned to ride buses to provide accountability of students.

- a. MET: Criterion 3.c.2
- b. DEFICIENCY: NONE
- c. AREAS REQUIRING CORRECTIVE ACTION: NONE
- b. NOT DEMONSTRATED: NONE
- c. PRIOR ARCAs – RESOLVED: NONE
- f. PRIOR ARCAs – UNRESOLVED: NONE

### **2.1.3 Traffic Control Points**

Two deputies from the Bradley County Sheriff's Department were interviewed regarding traffic control point (TCP) procedures at the County EOC. The deputies, when directed by their supervisor, would deploy to the assigned TCP with the appropriate dosimetry and equipment required for the establishment of a TCP. The deputies successfully demonstrated their knowledge of radiological exposure control, establishment of a TCP, and procedures to remove impediments to evacuation.

- a. MET: Criteria 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

## **2.2 HAMILTON COUNTY**

### **2.2.1 Emergency Operations Center**

The Hamilton County EOC is a spacious, technologically advanced operations center. The EOC staff was very proactive and used the new WebEOC program to keep all participants informed of their agencies' activities. The Emergency Management Director provided excellent direction and control throughout the exercise. Frequent briefings and feedback kept all agencies aware of the current plant status. The decision-making process

between the State and the County went smoothly. The County agencies' actions were timely and responsive.

- a. **MET: Criteria 1.a.1, 1.c.1, 1.d.1, 1.e.1, 2.a.1, 2.b.2, 2.c.1, 3.a.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**

### **2.2.2 Protective Actions for Schools**

Protective actions for schools was successfully demonstrated through an interview with school officials on May 24, 2004, at the Hamilton County Emergency Services Building. The following individuals participated: Assistant Superintendent, Hamilton County Schools; the Principals from Daisy, Harrison and McConnell Elementary Schools, Brown Middle School, Ooltewah High School and Sequoyah Technology Center; the Brown Middle School Resource Officer and the Hamilton County Emergency Services Director.

School staff receive in-service training on an annual basis. Each school has an emergency operations plan that addresses alert and notification procedures, and responsibilities and actions to take in the event sheltering or evacuation is directed. Teachers ride the buses to manage and keep track of the students. The County plans to have buses arrive at any of the schools within twenty minutes after the drivers are notified. The buses are equipped with two-way radios. Buses are escorted by the Hamilton County Sheriff's Department. The County provides relocation assistance, if needed, to twenty-six day care centers within the EPZ.

- a. **MET: Criterion 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**

### **2.2.3 Reception and Congregate Care**

Hamilton County successfully demonstrated reception and congregate care at Brainerd, Dalewood, and Chattanooga High Schools on May 19, 2004. The Hamilton County Health Department surveyed evacuees, sent contaminated evacuees on a designated path to the showers, and after decontamination they were re-monitored. The radiological monitors recorded the readings on a special form that evacuees carried to the American Red Cross (ARC) registration table in the adjacent congregate care center. The Chattanooga/Hamilton County Chapter of the ARC properly registered evacuees on ARC forms. The ARC provides feeding, mental health counseling, sleeping, and health services to evacuees. All staff were knowledgeable of their duties and effectively set up the evacuee monitoring and congregate care areas were effectively set-up.

- a. **MET: Criteria 1.e.1, 3.a.1, 3.b.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**

### **2.2.4 Traffic Control Points**

The Sheriff's Department successfully demonstrated its ability to establish and maintain TCPs. The Hamilton County Standard Operating Procedure (SOP) identifies the staffed and barricaded roadblocks. The ability to identify and remove impediments to evacuation was demonstrated during exercise play. The Sheriff's Department personnel demonstrated their knowledge of dosimetry and radiological exposure control.

- a. **MET: Criteria 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**

## 2.2.5 Emergency Worker Decontamination

The Hamilton County Emergency Management Agency, Tennessee Division of Forestry, the Red Bank Fire Department, the Red Bank Police Department, and the Hamilton County Health Department successfully demonstrated the emergency worker and equipment monitoring and decontamination station at the Red Bank High School on May 20, 2004. Personnel, including volunteers, were very knowledgeable in the set-up and operation of their equipment and facility. Appropriate dosimetry and monitoring equipment were issued and properly worn by the emergency workers. Monitoring, contamination control and decontamination procedures were appropriate. Individuals were knowledgeable of radiological exposure control.

- a. **MET: Criteria 1.e.1, 3.a.1, 3.b.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**

## 2.2.6 Medical Drill

On April 22, 2004, the Sequoyah Nuclear Power Plant medical drill was conducted at the Memorial Hospital. The medical drill scenario involved an individual, who had an accident while leaving a contaminated area. Hamilton County EMS personnel were dispatched to the accident scene and using appropriate contamination control techniques treated and prepared the patient for transport to the hospital. After arriving at the Memorial Hospital, the emergency staff successfully monitored and decontaminated the patient.

- a. **MET: Criteria 1.e.1, 3.a.1 and 6.d.1**
- b. **DEFICIENCY: NONE**
- c. **AREAS REQUIRING CORRECTIVE ACTION: NONE**
- d. **NOT DEMONSTRATED: NONE**
- e. **PRIOR ARCAs-RESOLVED: NONE**
- f. **PRIOR ARCA- UNRESOLVED: NONE**

### 3. SUMMARY OF AREAS REQUIRING CORRECTIVE ACTION

#### 3.1 2004 ARCAs

##### 3.1.1 58-04-1.c.1-A-01 State of Tennessee SEOC

**Condition:** At 1054 after the declaration of a Site Area Emergency (SAE) and after being informed that plant conditions were degrading, the SEOC Director in coordination with Hamilton and Bradley Counties reached a decision to evacuate the Near Plant Area and Quadrant B and shelter-in-place Quadrant C. The SEOC Director told the counties that sirens would be activated at 1100 and the appropriate EAS message (#58) would be broadcasted. The sirens were not activated. The EAS message was released.

**Possible Cause:** SEOC staff did not follow the MJREP. The decision to activate the sirens was not communicated to the Operations Officer charged with physically activating the siren system.

**Reference:** Evaluation Area 1.c.1; NUREG-0654 E.6; MJREP Annex B.I.B.1.c and H.V.B.2

**Effect:** Some members of the public may have missed the emergency instruction to evacuate or shelter-in-place because the sirens were not activated prior to the broadcast of the EAS message concerning the protective action decision (PAD).

**Recommendation:** Review and revise as necessary implementing procedures to ensure that an individual (position) is assigned the responsibility to communicate decisions to appropriate personnel for implementation.

**Schedule of Corrective Action:** The State will defer the corrective action to the TEMA training section (FNF) to change the program of instruction to reflect a checklist that will not only ensure siren activations

followed by EAS messages to the public in a timely manner, but that the difference between "silent tests" and "simulated" siren soundings is only in the mechanics, and both will be treated with the same emphasis with respect to confirmation with the Risk Counties, and with immediate log entry. These steps are a matter of Standard Operating Procedure and need not be reflected in the MJRERPs for Watts bar and Sequoyah.

## 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
CECC	Central Emergency Control Center
CFR	Code of Federal Regulations
DHS/FEMA	Department of Homeland Security/Federal Emergency Management Agency
DRH	Division of Radiological Health
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
ESC	Emergency Support Coordinator
FCC	Field Coordination Center
FMT	Field Monitoring Team
GE	General Emergency
ICF	ICF Consulting, Inc.
JIC	Joint Information Center
KI	Potassium Iodide
MJRERP	Multi-Jurisdictional Radiological Response Plan
NRC	Nuclear Regulatory Commission
NUREG-0654	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
RAC	Regional Assistance Committee
RACES	Radio Amateur Civil Emergency Service
RCO	Radiation Control Officer
REP	Radiological Emergency Preparedness
RERP	Radiological Emergency Response Plan
RMCC	Radiological Monitoring Control Center
SAE	Site Area Emergency
SEOC	State Emergency Operations Center
SOP	Standard Operating Procedures
SQN	Sequoyah Nuclear Power Plant
TCP	Traffic Control Point
TEMA	Tennessee Emergency Management Agency
TLD	Thermoluminescent Dosimeter
TVA	Tennessee Valley Authority

## APPENDIX 2

### EXERCISE EVALUATORS

The following is a list of the personnel who evaluated the Sequoyah Nuclear Power Plant exercise on June 23, 2004. The organization represented by each evaluator is indicated below.

- DHS-FEMA - Department of Homeland Security
- Federal Emergency Management Agency
- EPA - Environmental Protection Agency
- ICF - ICF Consulting Incorporated
- NRC - Nuclear Regulatory Commission

**Thomas E. Reynolds**

**Co-RAC Chairman**

<u>EVALUATION SITE</u>	<u>EVALUATOR</u>	<u>ORGANIZATION</u>
Chief Evaluator	Robert Perdue	DHS-FEMA
<b>STATE OF TENNESSEE</b>		
SEOC	Lawrence Robertson	DHS-FEMA
	Michael Dolder	DHS-FEMA
	Jim McClannahan	ICF
Central Emergency Control Center	Robert Trojanowski	NRC
Forward Coordinating Center	Stan Copeland	DHS-FEMA
RMCC	Keith Earnshaw	ICF
	Lloyd Gennerette	EPA
Dose Assessment	Charles Phillips	ICF
	Amy Moss	ICF
	Gary Parker	ICF
FMT #1	James Hickey	ICF
FMT #2	Carol Herzenberg	ICF
FMT #3	Marcy Campbell	ICF
FMT#4	Dave Stuenkel	ICF
Joint Information Center	Daniel Inman	ICF
	Frank Stead	ICF

**BRADLEY COUNTY**

Emergency Operations Center	Helen Wilgus Beth Massey Ernie Boaze	DHS-FEMA DHS-FEMA ICF
Traffic Control Points	Ernie Boaze	ICF

**HAMILTON COUNTY**

Emergency Operations Center	Tom Reynolds Candace Burrell	DHS-FEMA DHS-FEMA
Traffic Control Points	Candace Burrell	DHS-FEMA

**Out of Sequence Activities**

**Schools**

May 18	1300 – Prospect Elementary	Tom Reynolds	DHS-FEMA
May 24	Daisy Elementary	Robert Perdue	DHS-FEMA
	McConnell Elementary	Robert Perdue	DHS-FEMA
	Brown Middle	Charles Zeppenfeld	ICF
	Harrison Elementary	Beth Massey	DHS-FEMA
May 25	0930 – Ooltewah High	Robert Perdue	DHS-FEMA
	100 – Sequoyah Vocational	Charles Zeppenfeld	ICF
		Beth Massey	DHS-FEMA

**Emergency Worker Decontamination – May 20**

May 20 1000	Red Bank High School	Robert Perdue Tom Reynolds Beth Massey	DHS-FEMA DHS-FEMA DHS-FEMA
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**Shelters (Reception and Congregate Care)**

May 19	0900 – Brainerd High	Robert Perdue Tom Reynolds Beth Massey	DHS-FEMA DHS-FEMA DHS-FEMA
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1030 – Dalewood High

Robert Perdue  
Beth Massey

DHS-FEMA  
DHS-FEMA

1300 – Chattanooga High

Robert Perdue  
Beth Massey

DHS-FEMA  
DHS-FEMA

## APPENDIX 3

### EXERCISE CRITERIA AND EXTENT-OF-PLAY AGREEMENT

This appendix lists the exercise criteria scheduled for demonstration in the Sequoyah Nuclear Power Plant exercise on June 23, 2004 and the extent-of-play agreement approved by FEMA Region IV.

#### A. Exercise Criterion

Attached are the specific radiological emergency preparedness criteria scheduled for demonstration during this exercise.

#### B. Extent-of-Play Agreement

The Extent-of-Play Agreement on the following pages was submitted by Tennessee and was approved by FEMA Region IV.



FEMA

April 23, 2004

Mr. Gary Lima  
Emergency Management Planner  
Fixed Nuclear Facilities  
Tennessee Emergency Management Agency  
Military Department of Tennessee  
3041 Sideco Drive  
Nashville, Tennessee 37204-1502

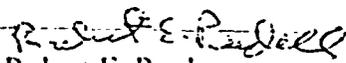
Dear Mr. Lima:

The Extent of Play agreement for the 2004 full participation Sequoyah Nuclear Power Plant exercise has been accepted with the following clarification:

Traffic Control Points in Bradley and Hamilton counties will be demonstrated during the exercise at a mutually agreed time between the emergency managers in the respective counties and the FEMA EOC evaluators.

Should you have questions, please contact me at 770-220-5464.

Sincerely,

  
Robert E. Perdue  
Technological Services Branch

cc: Tim Holden  
Tennessee Emergency Management Agency  
Military Department of Tennessee  
3041 Sideco Drive  
Nashville, Tennessee 37204-1502



THE STATE OF TENNESSEE  
TENNESSEE EMERGENCY MANAGEMENT AGENCY  
EMERGENCY OPERATIONS CENTER  
MILITARY DEPARTMENT OF TENNESSEE  
3041 SIDCO DRIVE, P.O. BOX 41502  
NASHVILLE, TENNESSEE 37204-1502  
(615) 741-0001

February 23, 2004

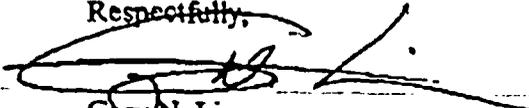
Mr. Robert E. Perdue  
Emergency Management Specialist  
Radiological Preparedness  
FEMA Region IV  
3003 Chamblee - Tucker Road  
Atlanta, 03341

Dear Dr. Perdue:

I forward to you the Extent-of-play (EOP) and matrix for approval for Sequoyah '04 (Graded Evaluation), scheduled for June 23, 2004. For any questions pertaining to the EOP and/or the Exercise Scenario, please feel free to contact me at 615 741-4503.

Thank you for your response to this request.

Respectfully,

  
Gary N. Lima  
EM Planner, FNF

Enclosure

**Table 2. Summary Results of Exercise Evaluation**

ELEMENT/Sub-Element	SEC	RMCC	ICC	JIC	LOF	FIELD TEAMS	BRADLEY COUNTY	HAMILTON COUNTY
<b>1. EMERGENCY OPERATIONS MANAGEMENT</b>								
1 a 1 Mobilization	X	X	X	X	X		X	X
1 b 1 Facilities	X	X	X	X	X		X	X
1 e 1 Direction and Control	X	X	X	X	X		X	X
1 d 1. Communications Equipment	X	X	X	X	X	X		X
1 e 1. Equipment & Supplies to Support Operations	X	X	X	X	X	X	X	X
<b>2. PROTECTIVE ACTION DECISION MAKING</b>								
2 a 1 Emergency Worker Exposure Control	X	X					X	X
2 b 1 Rad Assessment & PARs & PADs Based on Available Info	X	X						
2 b 2 Rad Assessment and PARs and PADs for the General Public	X	X						
2 e 1. Protective Action Decisions for Special Populations							X	X
2 d 1. Rad Assessment & Decision Making for Ingestion Exposure								
2 e 1 Rad Assessment & Decision Making for Relocation, Re-entry & Return								
<b>3. PROTECTIVE ACTION IMPLEMENTATION</b>								
3 a 1 Implementation of Emergency Worker Control	X	X			X	X	X	X
3 b 1 Implementation of KI Decisions	X					X	X	X
3 e 1. Implementation of PADs for Special Populations							X	X
3 e 2 Implementation of PADs for Schools							X	X
3 d 1. Implementation of Traffic and Access Control							X	X
3 d 2. Impediments to Evacuation and Traffic and Access Control							X	X
3 e 1. Implementation of Ingestion Decisions Using Adequate Info								
3 e 2. Implementation of IP Decisions Showing Strategies and Instructional Materials								
3 f 1 Implementation of Relocation, Re-entry, and Return Decisions								
<b>4. FIELD MEASUREMENT and ANALYSIS</b>								
4 a 1 Plume Phase Field Measurement & Analysis Equipment		X				X		
4 a 2. Plume Phase Field Measurement & Analysis Management		X				X		
4 a 3 Plume Phase Field Measurements & Analysis Procedures		X				X		
4 b 1 Post Plume Field Measurement & Analysis								
4 b 2. Laboratory Operations								
<b>5. EMERGENCY NOTIFICATION &amp; PUBLIC INFO</b>								
5 a 1 Activation of Prompt Alert and Notification	X						X	X
5 a 2. Activation of Prompt Alert and Notification (5-Minute Fast Breaker)								
5 a 3 Activation of Prompt Alert and Notification Backup Alert and Notification								
5 b 1 Emergency Info and Instructions for the Public and the Media	X			X	X		X	X
<b>6. SUPPORT OPERATIONS/FACILITIES</b>								
6 a 1 Monitoring and Decon of Evacuees and EWS and Registration of Evacuees							X	X
6 b 1. Monitoring and Decon of Emergency Worker Equipment								
6 c 1 Temporary Care of Evacuees								X
6 d 1 Transport and Treatment of Contaminated Injured Individuals	X							

**DATE AND SITE: June 23, 2004 – Sequoyah Nuclear Power Plant**  
**LEGEND: M = Met A = ARCA D = Deficiency X = Demonstration Required**



THE STATE OF TENNESSEE  
**TENNESSEE EMERGENCY MANAGEMENT AGENCY**  
EMERGENCY OPERATIONS CENTER  
MILITARY DEPARTMENT OF TENNESSEE  
3041 SIDCO DRIVE, P.O. BOX 41502  
NASHVILLE, TENNESSEE 37204-1502  
(615) 741-0001

## **2004 Sequoyah Nuclear Plant**

### **GRADED EVALUATION**

STATE OF TENNESSEE

**PLUME EXPOSURE PATHWAY ZONE**

**(10-MILE EPZ)**

### **GOALS, CRITERIA, AND EXTENT-OF-PLAY**

A full participation exercise will be conducted during the week of June 23, 2004 for the purpose of demonstrating an integrated radiological emergency response capability for the Sequoyah Nuclear Plant (SQN). The exercise will be a one-day event (approximately 8 hours), encompassing response capabilities and requirements of the State, local governments, and the Tennessee Valley Authority (TVA) in the 10-Mile Emergency Planning Zone (EPZ.)

The State of Tennessee and Tennessee Valley Authority have prepared goals addressing respective obligations. Both reflect the necessary interactions between the State and local governments as well as the utility as set forth in the Multi-Jurisdictional Radiological Emergency Response Plan (MJRERP) for the Sequoyah Nuclear Plant. The six (6) evaluation areas coupled with specific criteria to accomplish the following goals have been written in accordance with the Federal Emergency Management Agency (FEMA) Federal Register Notice, "Radiological Emergency Preparedness: Exercise Evaluation Methodology."

#### **STATE AND LOCAL GOVERNMENT EXERCISE GOALS:**

State and local government goals for this exercise are:

1. Test as well as evaluate the Sequoyah Nuclear Plant Multi-jurisdictional Radiological Emergency Response Plan concurrently with local government implementing procedures
2. Demonstrate and assess the continued viability of the integrated radiological emergency response effort through state and local government offsite personnel implementing response actions in accordance with established guidance
3. Ensure the safety of the general public through the issuance of protective action recommendations, as appropriate.

4. Ensure all agencies' capabilities and inadequacies are noted and corrected as well as pertinent recommendations for improvement implemented.
5. Out-of-sequence evaluated criteria can be re-demonstrated as an option.

## Evaluation Area 1 – Emergency Operations Management

### I.a. Mobilization

Criterion 1.a.1: Offsite Response Organizations (OROs) should 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; H.4.)

**EXTENT-OF-PLAY-** The State Emergency Operations Center (SEOC) will receive the emergency notification from the Tennessee Valley Authority (TVA), verify the notification, and contact, alert, and mobilize key personnel in a timely manner. Notification to adjacent states will also be demonstrated at the SEOC in accordance with the appropriate notification checklist as contained in the Sequoyah MJRERP. Facilities will be considered operational at START EX with assigned personnel to the SEOC, Field Coordination Center (FCC), Radiological Monitoring Control Center (RMCC) pre-positioned and in place no later than 9:00 AM Eastern/8:00 AM Central (to include field monitoring teams.) Risk County (Bradley and Hamilton) Emergency Operations Centers (EOCs) will be pre-positioned and in-place no later than 9:30 AM Eastern/8:30 AM Central time. The Risk County EMA Directors will discuss with evaluators agency capabilities/procedures to alert and mobilize staffs.

The Joint Information Center (JIC) personnel, State/local and TVA, will process through SECURITY SCREENING at 9:00 AM Eastern time, be pre-positioned and in place no later than 9:30 AM Eastern time and remain in place. The SEOC, FCC, RMCC, and Risk County EOC assigned personnel will remain on duty until  
END EX.

### I.b. Facilities

Criterion 1.b.1: Facilities are sufficient to support the emergency response (NUREG-0654, H.3.)

**EXTENT-OF-PLAY –** The SEOC, FCC, RMCC, JIC, and Risk County EOCs (Bradley and Hamilton) will be set up in accordance with established plans and procedures and remain fully operational during the course of the exercise.

### I.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; A.2.a, b.)

**EXTENT-OF-PLAY** - The SEOC Director will assume primary responsibility for direction and control; working in concert with the FCC, JIC, and Risk County EOC Directors.

**1.d. Communications Equipment**

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

**EXTENT-OF-PLAY** - The SEOC, FCC/RMCC, and Risk County EOCs will demonstrate primary and alternate communications systems at START EX. The communications network between the DRH field teams and RMCC and the RMCC and SEOC/CECC will be evaluated at the RMCC.

**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.7, 10; J.10a, b, e; J.11; K.3.a.)

**EXTENT-OF-PLAY** - The SEOC, FCC, RMCC, JIC, and Risk County EOCs (Bradley and Hamilton) will be set up in accordance with established plans and procedures.

**Evaluation Area 2 - Protective Action Decision Making**

**2.a. Emergency Worker Exposure Control**

Criterion 2.a.1: OROs use a decision making process, considering relevant factors and appropriate coordination, to ensure 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; J.10.e, f.)

**EXTENT-OF-PLAY** - Demonstration will be scenario driven and accomplished by Dose Assessment, the Chief Medical Officer and the Director of Emergency Operations in the SEOC. (See Criterion 2.b.2, STATE EXTENT OF PLAY)

**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 and 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 and Supplement 3.)

**EXTENT-OF-PLAY** – Demonstration will be scenario driven and accomplished by appropriate staff in the SEOC, RMCC, and CECC. Division of Radiological Health (DRH) personnel at the SEOC, in concert with TVA counterparts in the CECC, will perform dose assessment and independently validate dose projections. Radiological data for the field teams will be inserted by Controller injects and sent to the SEOC via the RMCC. Projections will be based on plant data provided by TVA and field radiation measurements.

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

**EXTENT-OF-PLAY** – Demonstration will be scenario driven and accomplished by appropriate staff in the SEOC. The Chief Medical Officer for the Tennessee Department of Health, after consultation with DRH, will make all decisions concerning the administration of KI to emergency workers, institutionalized persons, and the general public. When a decision is made, instructions will be relayed through the local EOCs and if the general population is included, distribution of KI to shelters will be simulated. Prior to implementation, decisions will be coordinated in a timely manner with the Risk County EOC Directors to ensure understanding/implementation.

2.c. Protection 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.d, e.)

**EXTENT-OF-PLAY** – Demonstration of this process by appropriate staff; i.e., DRH, EMS, TEMA, etc., in the State Emergency Operations Center will be scenario driven and based on projected exposure. Decisions will be coordinated through affected Risk County EOCs for understanding and implementation. Lists of the special needs as well as the resources necessary and available for evacuation are maintained by local EMA Directors and, when requested, will be provided to the evaluator for review. Organizational procedures for executing protective actions will be discussed with evaluators. Contact with the Public School System will be actual. (See Criterion 3.c.2/6.c.1)

2.d. Radiological Assessment and Decision-Making for the Ingestion Exposure Pathway:

Criterion 2.d.1: Radiological consequences for the ingestion pathway are assessed and appropriate protective action decisions are made based on the ORO planning criteria (NUREG-0654, I.8; J.11.)

**EXTENT-OF-PLAY** – Not applicable for this exercise.

2.e. Radiological Assessment and Decision-Making Concerning Relocation, Re-entry, and Return:

Criterion 2.e.1: Timely relocation, re-entry, and return decisions are made and coordinated as appropriate, based on assessments of the radiological conditions and criteria in the ORO's plan and/or procedures (NUREG-0654, A.1.b; I.10; M.1.)

**EXTENT-OF-PLAY – Not applicable for this exercise.**

**Evaluation Area 3 – Protective Action Implementation**

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.a, b.)

**EXTENT-OF-PLAY –** Emergency workers with assignments in the 10-mile EPZ and those involved in radiological monitoring and/or decontamination are issued Emergency Worker Dosimetry Kits. Two (2) emergency workers in each of the Risk County EOCs (Bradley and Hamilton) will be available to evaluators for interview as to knowledge of recording dosimetry readings and actions to be taken when certain planned thresholds are reached, especially if the established turn-back value (2.5 R [5 R TEDE]) is met or exceeded.

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 the general public) is maintained (NUREG-0654, E.7; J.10.e, f.)

**EXTENT-OF-PLAY –** Demonstration by appropriate staff in the State Emergency Operations Center will be: scenario driven and based on projected exposure. The Chief Medical Officer for the Tennessee Department of Health is located at the SEOC and, after consultation with DRH, will make all decisions concerning the administration of KI to emergency workers, institutionalized persons and the general public. When a decision is made, instructions will be relayed through the local EOCs and, if the general population is included, distribution of KI to shelters will be simulated. The Chief Medical Officer and other appropriate staff in the SEOC will be available for procedural discussions with evaluators.

3.c. Implementation of Protective Actions for Special Populations:

Criterion 3.c.1: Protective action decisions are implemented for special population groups within areas subject to protective actions (NUREG-0654, J.10.c, d, g.)

**EXTENT-OF-PLAY** – Demonstration of this process by appropriate staff in the SEOC and local EOCs will be scenario driven and based on projected contamination exposure levels. Decisions will be coordinated through affected local EOCs for understanding and implementation. (See Sub-paragraph 2.c.1) Implementation of protective actions and contact with the special populations/reception centers will be simulated however, procedural discussions between appropriate staff in the State/Risk County EOCs and the evaluators will be conducted, and actual contact made with at least one (1) government/private transportation asset.

Criterion 3.c.2: OROs/school officials implement protective actions for schools (NUREG-0654, J.10.c, d, g)

**EXTENT-OF-PLAY** – County school superintendents and transportation supervisors or designees will be available at respective EOCs for interviews by evaluators. For the purpose of ascertaining staff knowledge of relocation plans and procedures, an out-of-sequence interview with the following school principal/staff will be conducted, but contact by telephone with the school will occur during the Exercise :

ENDANGERED SCHOOL	LOCATION	DATE
Prospect Elementary School	Cleveland, TN	May 18, 2004 1:00 PM
Daisy Elementary School	Soddy-Daisy, Tennessee	May 24, 2004 10:00 AM
McConnell Elementary School	McConnell, Tennessee	May 24, 2004 11:30 AM
Brown Middle School	Chattanooga, Tennessee	May 24, 2004 1:30 PM
Harrison Elementary School	Harrison, Tennessee	May 24, 2004 2:45 PM
Ooltewah High School	Ooltewah, Tennessee	May 25, 2004 9:30 AM
Sequoyah Vocational School	Chattanooga, Tennessee	May 25, 2004 11:00 Am

NOTE: Evaluator escort to each school location will be provided by the Hamilton County EOC.

3.d. Implementation of Traffic and Access Control:

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)

**EXTENT-OF-PLAY** – Deployment of traffic and access control personnel will be simulated however, two (2) Emergency Workers tasked with performing such duties will be interviewed at each of the Risk County EOCs. This activity may be in sequence with the scenario; i.e., at the point when a roadblock or access point would be established, the EWs will be dispatched to the EOC rather than the location in the field. Interviews will cover such points as: responsibilities, personal dosimetry, turn-back values, and KI procedures. Specific interview times will be negotiated between the evaluator/s and Risk County Director.

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

**EXTENT-OF-PLAY** – Demonstration of impediments, if any, will be scenario driven. Regardless, appropriate staff personnel at the SEOC and Risk County EOCs will be available for discussions with the evaluators.

3.e. Implementation of Ingestion Pathway Decisions:

Criterion 3.e.1: The ORO demonstrates the availability and appropriate use of adequate information regarding water, food supplies, milk, and agricultural production within the ingestion exposure pathway emergency planning zone for implementation of protective actions (NUREG-0654, J.9, 11.)

**EXTENT-OF-PLAY** – Not applicable for this exercise.

Criterion 3.e.2: Appropriate measures, strategies, and pre-printed instructional material are developed for implementing protective action decisions for contaminated water, food products, milk, and agricultural production (NUREG-0654, E.5, 7, J.9, 11.)

**EXTENT-OF-PLAY** – Not applicable for this exercise.

3. f. Implementation of Relocation, Re-entry, and Return Decisions:

Criterion 3.f.1: Decisions regarding controlled re-entry of emergency workers and relocation and return of the public are coordinated with appropriate organizations and implemented (NUREG-0654, M.1, 3.)

**EXTENT-OF-PLAY** – Not applicable for this exercise.

## Evaluation Area 4 – Field Measurement and Analysis

### 4.a. Plume Phase Field Measurements and Analysis:

Criterion 4.a.1: The field teams are equipped to perform field measurements of direct radiation exposure (cloud and ground shine) and to sample airborne radioiodine and particulates (NUREG-0654, H.10; I.7, 8, 9.)

**EXTENT-OF-PLAY** – Field teams will utilize appropriate instrumentation and guidelines as established in DRII Standard Operating Procedures.

Criterion 4.a.2: Field teams are managed to obtain sufficient information to help characterize the release and to control radiation exposure (NUREG-0654, H.12; I.8, 11; J.10.a.)

**EXTENT-OF-PLAY** – (See Sub-paragraph 4.a.1.) All field teams will be under the direction of the RMCC.

Criterion 4.a.3: Ambient radiation measurements are made and recorded at appropriate locations, and radioiodine and particulate samples are collected. Teams must move to an appropriate low background location to determine whether any significant (as specified in the plan and/or procedures) amount of radioactivity has been collected on the sampling media (NUREG-0654, I.9.)

**EXTENT-OF-PLAY** – Four (4) field monitoring teams will be evaluated. Each field team will obtain at least one air sample with a minimum sample volume of 10 cubic feet. The particulate filter and absorber media cartridge will be bagged, labeled and transported to a collection point for simulated transport to a laboratory. Field monitoring data will be injected by controllers supporting the exercise, and be transmitted by the teams to the RMCC over the normal communications network (portable hand-held radios). Cellular telephones will be utilized for back-up communications.

**NOTE:** Radiological Monitoring Teams will be ready to link with the Evaluator(s) at 9:30 AM.

### 4.b. Post Plume Phase Field Measurements and Sampling:

Criterion 4.b.1: Field teams will demonstrate the capability to make appropriate measurements and to collect appropriate samples (e.g., food crops, milk, water, vegetation, and soil) to support adequate assessments and protective action decision-making (NUREG-0654, I.8; J.11.)

**EXTENT-OF-PLAY** – Not applicable for this exercise.

### 4.c. Laboratory Operations:

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

**EXTENT-OF-PLAY** – Evaluated during Watts Bar Exercise 2004 (Ingestion Pathway) - Not applicable for this exercise.

## Evaluation Area 5 – Emergency Notification and Public Information

### 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 initiation instructional message to the public must include as a minimum the elements required by current FEMA REP guidance. (10 CFR Part 50, Appendix E.IV.D and NUREG-0654, E.5.6,7):

**EXTENT-OF-PLAY** – The Emergency Alert System (EAS) will be activated simultaneously with the initial activation (SILENT TEST) of the Sequoyah (PNS) sirens with the broadcast of a test message (EAS Message #1). After the initial activation of the PNS sirens and broadcast of the special test message, subsequent PNS activations and contact with the LP-1 EAS control station will be simulated. Should there be a difference between the State and TVA System Status Monitors (SSMs) or if siren failure/s is/are indicated, backup route alerting for the affected coverage areas will be simulated. Risk County personnel will be available to discuss the routes and procedures that would be utilized in an actual emergency situation.

### AREAS REQUIRING CORRECTIVE ACTION

71-03-5.a.1-A-01 (State Emergency Operations Center) – The initial EAS message sent out to the public at 0931, did not contain one of the required elements as listed in the Alert and Notification Final Federal Register Notice, dated September 12, 2001. The EAS message sent out did not include a “reference to Radiological Emergency Preparedness specific information (e.g. brochures and information in telephone books) for use by the general public during an emergency.”

Criterion 5.a.2: Reserved at this time. (NUREG-0654)

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 public 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.)

**EXTENT-OF-PLAY** – Not applicable for this exercise.

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, 4.c.)

**EXTENT-OF-PLAY** – Emergency instructions/information will originate from the SEOC prior to JIC activation; after activation, information will be disseminated from the JIC ( Only) while emergency instructions will continue to be disseminated from the SEOC via the EAS (SEOC will be responsible for both information and instructions on ). Appropriate SEOC staff will be available to discuss with evaluators other means of rapid information dissemination; i.e., agricultural, etc.).

**Evaluation Area 6 – Support Operations/Facilities:**

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, 12; K.5.a.)

**EXTENT-OF-PLAY** – See Sub-paragraph 6.c.1, **EXTENT-OF-PLAY**

NOTE: There are no "Reception Centers" per se in the SQN MJRERP. Relocation Center/Congregate Care Center activities are combined and designated as "Mass Care Shelters."

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)

**EXTENT-OF-PLAY** – Monitoring and decontamination of emergency workers and equipment will be demonstrated, out-of-sequence, at the following location. The decontamination point will be staffed with trained personnel, and at least three (3) monitoring demonstrations will be accomplished. Hand held survey instruments will be used. A walk-through of decontamination procedures will be conducted for the evaluators with respect to personnel and equipment. School may be in session so demonstrations of monitoring and decontamination activities should be held to a minimum in order to lessen disruption of regular school activities. However, the staff will be available for interviews by evaluator/s.

FACILITY	LOCATON	DATE
Red Bank High School	Red Bank	May 20, 2004 10:00 AM

NOTE: The Tennessee Department of Forestry is lead agency and responsible to conduct the evaluators through the observation/walk-through process.

6.c. Temporary Care of Evacuees:

Criterion 6.c.1: Managers of congregate care facilities will demonstrate that the centers have resources to provide services and accommodations consistent with American Red Cross planning guidelines. Managers demonstrate the procedures through discussion 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.)

**EXTENT-OF-PLAY** - Congregate care will be demonstrated, out-of-sequence, at the following location. The shelter will be staffed with trained personnel, and at least six (6) monitoring demonstrations will be accomplished. Hand held survey instruments will be used. A walk-through of decontamination procedures will be conducted for the evaluators. School may be in session so demonstrations of monitoring, decontamination, and sheltering activities should be held to a minimum in order to lessen disruption of regular school activities. However, the staff will be available for interviews by evaluator/s. (See 6.a.1, NOTE)

SHELTER	LOCATON	DATE
Brainerd High School	Chattanooga, Tennessee	May 19, 2004 9:00 AM
Dalewood High School	Chattanooga, Tennessee	May 19, 2004 10:30 AM
Chattanooga High School	Chattanooga, Tennessee	May 19, 2004 1:00 PM

NOTE: If time, number of evacuees and resources allow, periodic monitoring of vehicles coming to the shelter will occur, however the first 24 hour priority is evacuee monitoring and sheltering. In anticipation of heavy traffic, evacuee vehicles are impounded and assumed contaminated till later monitoring can establish their actual status.

6.d. Transportation and Treatment of Contaminated Injured Individuals:

Criterion 6.d.1: The facility/ORO has the appropriate space, adequate resources, and trained personnel to provide transport, monitoring, decontamination, and medical services to contaminated injured individuals (NUREG-0654, F.2; H.10; K.5.a, b; L.1, 4.)

**EXTENT-OF-PLAY** – Demonstrated out-of-sequence during MS-1 Drills at the following locations:

FACILITY	LOCATION	DATE
Memorial Hospital	Chattanooga, Tennessee	April 22, 2004 9:00 AM
Parkridge Medical Center	Chattanooga, Tennessee	June 18, 2004 9:00 AM

**ACCRONYMS:**

ARCA	Areas Requiring Corrective Action
DRH	Division of Radiological Health
EMA	Emergency Management Agency
EMS	Emergency Medical Services
END EX	End Exercise
EOC	Emergency Operations Center
EOP	Extent of play
EPZ	Emergency Planning Zone
EW	Emergency Worker
FCC	Field Coordination Center
FRERP	Federal Radiological Emergency Response Plan
JIC	Joint Information Center
IPZ	Ingestion Pathway Zone
MJRRP	Multi-jurisdictional Radiological Emergency Response Plan
OES	Office of Emergency Services
ORO	Off-site Response Organization
PAG	Protective Action Guide
PAR	Protection Action Recommendation
PAD	Protective Action Decision
RMCC	Radiological Monitoring Control Center
SEOC	State-Emergency-Operations Center
START EX	Start Exercise

**DEFINITIONS:**

Baseline - The Federal Emergency Management Agency data base for support facilities in compliance with revised Evaluation Methodology.

Direct Reading Dosimetry - Dosimetry that allows individual(s) to read the administrative reporting limits (that are pre-established at a level low enough to consider subsequent calculation of Total Effective Dose Equivalent) and maximum exposure limits (for those emergency workers involved in life saving activities) contained in the ORO's plans and procedures.

Embargo Area – A designated area subject to legal prohibition on agricultural commerce.

Timely - Responsible ORO personnel/representatives demonstrate actions to disseminate the appropriate information/instructions with a sense of urgency and without undue delay.

*Out-of-Sequence*  
TIME-LINE AND EVENT MATRIX:

ENDANGERED SCHOOLS:

ENDANGERED SCHOOL	LOCATON	DATE
Prospect Elementary School	Cleveland, TN	May 18, 2004 1:00 PM
Daisy Elementary School	Soddy-Daisy, Tennessee	May 24, 2004 10:00 AM
McConnell Elementary School	McConnell, Tennessee	May 24, 2004 11:30 AM
Brown Middle School	Chattanooga, Tennessee	May 24, 2004 1:30 PM
Harrison Elementary School	Harrison, Tennessee	May 24, 2004 2:45 PM
Ooltewah High School	Ooltewah, Tennessee	May 25, 2004 9:30 AM
Squoyah Vocational School	Chattanooga, Tennessee	May 25, 2004 11:00 AM

NOTE: Evaluator escort to each school location will be provided by the Hamilton County EOC.

EMERGENCY WORKER and EQUIPMENT DECON:

FACILITY	LOCATON	DATE
Red Bank High School	Red Bank	May 20, 2004 10:00 AM

NOTE: The Tennessee Department of Forestry is lead agency and responsible to conduct the evaluators through the observation/walk-through process.

SHELTER EVALUATIONS:

SHELTER	LOCATON	DATE
Brainerd High School	Chattanooga, Tennessee	May 19, 2004 9:00 AM
Dalwood High School	Chattanooga, Tennessee	May 19, 2004 10:30 AM
Chattanooga High School	Chattanooga, Tennessee	May 19, 2004 1:00 PM

MEDICAL DRILLS:

FACILITY	LOCATION	DATE
Memorial Hospital	Chattanooga, Tennessee	April 22, 2004 9:00 AM
Parkridge Medical Center	Chattanooga, Tennessee	June 18, 2004 9:00 AM

**SEQUOYAH NUCLEAR PLANT**

**2004 REP EXERCISE**

**JUNE 23, 2004**

**OFFSITE RESPONSE NARRATIVE**

This will be a one-day exercise, beginning at about 0900 EDT and lasting approximately 7.0 hours. During the course of the exercise, the State and local governments will demonstrate their ability to protect the public within the 10-Mile EPZ from the affects of an accidental release of radioactive materials from the Sequoyah Nuclear Plant. The events described in the postulated accident as depicted in the plant (onsite) scenario will necessitate the activation of the Tennessee Multi-Jurisdictional Radiological Emergency Response Plan (MJRERP) for the facility. All demonstrations, interviews and other activities performed for evaluation will occur during the course of the exercise; however, due to time constraints and travel time to different locations, some activities will occur out-of-sequence with the scenario events. These stipulations, along with mutually agreed simulations, are included in the extent-of-play clauses as depicted in the offsite exercise objectives.

Due to the severity of the postulated accident that drives the activities in this scenario, the timeline indicated herein may vary from the actual initiation of events. This may occur due to the fact that the Site Emergency Director (SED) may declare an Emergency Classification Level (ECL) earlier or later than the time indicated.

**NOTE:** All times indicated herein are based on Eastern Daylight Time (EDT) and indicate the approximate start time of the activities so designated. Further, the activities described are ongoing and may take a shorter or longer length of time than that indicated.

**INITIAL CONDITIONS:**

**UNIT 1:**

Was at 100% power for the last 120 days. The core is at MOL. The Boron concentration is 961ppm at 9000 MWD/metric ton.

The 1A-A RHR Pump is O.O.S. for repairs and LCO 3.5.2 has been entered.

The 1-400 Monitor is O.O.S. for repairs.

**UNIT 2:**

As is.

**COMMON:**

A Contractor is repairing the service building roof.

**Background:**

At fifteen minutes T=00:15 [9:15 EDT] into the exercise, the contractor's hose to his propane heater for the asphalt leaks, ignites and consequently catches the truck on fire. Shortly the truck blows up spreading burning asphalt around the area and causing damage to the S/G steam and FW lines as well as the service building. Insulation has been blown off of sections of the steam and FW lines. Some of the burning asphalt is around the RWST, the Steam and FW lines, and some is on the roof of the service building where the contractor's people are trapped.

Plant Conditions @ T=00:20 [9:20 EDT]: **ALERT**

An ABI and Control Room Vent isolation occurs due to the smoke and heat from the fire. An **ALERT** should be declared based on EAL 4.1 (Fire in any of the areas listed in Table 4-1 (RWST) that is affecting safety related equipment required to establish or maintain safe shutdown) or 4.2 (Explosion in any of the areas listed in Table 4-1 (RWST) that is affecting safety related equipment required to establish or maintain safe shutdown).

STATE RESPONSE:

The State's response will begin when the Tennessee Valley Authority (TVA) Operations Duty Specialist (ODS) at TVA's Central Emergency Control Center (CECC) notifies the Tennessee Emergency Management Agency (TEMA) Operations Officer (TEMA-00) at the State Emergency Operations Center (SEOC) in Nashville that an **ALERT** has been declared at the plant. After verifying the call, the TEMA-00 will notify the On-Call SEOC Director (Designated TEMA official who will notify the TEMA Director), and, utilizing the notification list in the TEMA Operations SOPs will notify the risk counties (Bradley and Hamilton) and then notify the appropriate Emergency Service Coordinators (ESC) representing state agencies for this Emergency Classification Level (ECL.)

Upon receiving notification and arriving at the SEOC, the SEOC Director will instruct the TEMA-00 to notify selected ESCs representing various state agencies to report immediately to the SEOC. When sufficient personnel arrive, the Director will declare the SEOC operational and continue mobilization of State personnel.

LOCAL RESPONSE:

The Bradley and Hamilton County EM Directors, after being notified of the **ALERT** by the TEMA-00, will notify their respective County Executives and Mayors of the cities in the 10-Mile EPZ. The Directors will activate their local EOCs by notifying all EOC personnel to report immediately. All other governmental and private organizations with response roles will be placed on standby. County SOPs require that schools and day care centers in the 10-Mile EPZ are notified of the emergency situation and school bus drivers notified and instructed to report to their assigned schools to move the students should it become necessary. These notifications will be simulated.

The EM Directors of the host counties are notified and they simulate notification to the principals of the schools paired with endangered schools and those to be used as mass care shelters.

Plant Conditions @ T=1:10 [10:10 EDT]:

The FW flow indicator becomes erratic due to the fire flashing the water in the sensor lines to steam.

CONTINUING STATE RESPONSE:

As SEOC personnel arrive in response to the notification and summons, discussions are held regarding activation of the Prompt Notification System (PNS). If and when the decision is made to activate, this and all subsequent siren activation will be simulated. The EAS Local Control station, WSKZ in Chattanooga, will be notified to activate the EAS and instruct all stations in the area to monitor the network and standby for further information or instructions. Simultaneously with the first simulated activation of the sirens, the EAS Coordinator PIO will contact WSKZ and request that they record (the PIO will read EAS Message #1 [System Test Tape] over the ringdown line) and actually broadcast the message. The SEOC Director will fully activate the SEOC, especially the PIO staff, and depending on circumstances, may begin notification and mobilization of the Field Coordination Center (FCC), Radiological Monitoring Control Center (RMCC) including field monitoring teams, and if media interest and public concern is such that activation of the Joint Information Center (JIC) is advisable, he may coordinate with TVA in the activation of that facility.

#### CONTINUING LOCAL RESPONSE:

Activation of facilities and mobilization of personnel continues at the local level. Communication is maintained and updates are provided on a continuing basis. The CECC continually updates the SEOC on plant conditions and this information is relayed to the local EOCs.

#### Plant Conditions @ T=1:15 [10:15 EDT]: SITE AREA EMERGENCY

The heated S/G #1 Steam line breaks when water is sprayed on it during fire fighting efforts. Shrapnel from the steam line strikes the RWST. The RWST has been punctured about half way up and is leaking. When the MSIV for S/G #1 begins to close, it sticks about 50% open. When the Reactor attempts to Scram an ATWS occurs. Some fuel clad damage occurs due to stresses during the ATWS. Additionally, the steam driven AFW pump fails to pump. An SAE is declared based on EAL 2.3 (Reactor power >5% and not decreasing after valid auto and manual trip signals.)

#### STATE RESPONSE:

Upon notification of the SITE AREA EMERGENCY declaration, the SEOC Director will order the full activation of the SEOC, FCC, RMCC, and JIC. The TEMA OO, using the notification list for this ECL will notify all persons, agencies, departments and organizations, including the risk counties (Bradley and Hamilton) and Host counties (Meigs, Rhea, and Sequatchie), that have a role in the response. Those persons assigned to the SEOC and other State field EOCs will report immediately to their assigned posts. In cases where an agency has numerous personnel involved in the response, contact will be made with a designated individual who will initiate a pyramiding system of phone calls to notify all persons in their respective organizations. This contact person will place them on standby or instruct them to report to their assigned duty station.

#### LOCAL RESPONSE:

Upon receiving notification of the SITE AREA EMERGENCY from the SEOC, the Risk County EOCs (Bradley and Hamilton) are fully activated by the local Directors. All schools and day care centers located within the 10-Mile EPZ are notified by tone-alert radios and/or public telephone (simulated) to immediately relocate the student bodies to designated paired schools. The Principals of these paired schools would be advised to make preparations for the arrival of the relocated students. The Host County EM Directors are also notified to place all mass care shelter personnel on standby.

#### CONTINUING STATE AND LOCAL RESPONSE:

Constant communication is maintained between the SEOC and the CECC. As situational reports, plant conditions and other pertinent information is received from the Site Emergency Director (SED) at the plant by the CECC, the information is provided immediately to the SEOC Director. TVA makes protective action recommendations for the public if in the opinion of the CECC staff they are justified. However, if no recommendation is forthcoming from TVA and, if after a critical study of plant conditions and other factors that could contribute to public endangerment, a unilateral decision may be made jointly by the SEOC staff either to order "sheltering-in-place" for residents of the "Near Plant Area" or request that the Governor declare a "State-of-Emergency" and order a precautionary evacuation of this area which is comprised of sectors A-1, B-1, C-1, and D-1.

If a decision is made to order protective actions, the SEOC Director will coordinate with the Risk County EM Directors in the activation (simulated) of the PNS. The EASC PIO at the SEOC will be instructed to contact the EAS control station and transmit the appropriate message(s) for broadcast over the network.

Simultaneously with activation of the PNS, the Tennessee Wildlife Resources Agency, the U. S. Coast Guard, and volunteer agencies will dispatch personnel in boats equipped with

loudspeakers to warn commercial and civilian river traffic, fishermen, and those persons in parks and recreation areas along the river who may not be familiar with the purpose of the sirens. The U.S. Corps of Engineers will be requested to close the locks at Chickamauga and Watts Bar Dams; the Federal Aviation Administration will be requested to restrict air traffic over the area; and the Norfolk and Western Railroad will be instructed to stop all traffic approaching the area.

Communication is maintained between the SEOC and the CECC and between the SEOC and local EOCs. The CECC provides continuous updates to the SEOC and current information is provided to the local EOCs; periodic briefings are conducted in the EOCs to keep personnel apprised of the situation and give an opportunity for each department head to review the actions taken and determine if they are sufficient or if mobilization of emergency personnel should be accelerated to cope with the worsening situation.

Mobilization of State personnel continues with Emergency Service Coordinators (ESC) and Public Information Officers (PIO) reporting to their assigned locations; state liaison personnel report to the local EOCs and the CECC; other State personnel who may become involved in field activities are instructed to report to their assignment or remain on standby. When the JIC becomes operational, press conferences and news releases will be used as a means to keep the media and the general public informed of conditions at the plant and to provide other information concerning the safety of the citizens of the area.

Mobilization also continues at the local level with department heads positioning staff and equipment as required. The Sheriffs notify and coordinate all necessary support personnel and resources (municipal police, THP, fire departments, rescue squads, etc.). If an evacuation has been ordered, the Sheriffs will dispatch personnel to strategic points on controlled evacuation routes for traffic control, and additional personnel will be dispatched to establish security around the affected area. The EOC staff will notify the ARC and local health department monitoring and decontamination personnel to make preparations and be ready to open shelters on a moment's notice. Monitoring and decontamination personnel assigned to emergency worker/vehicle decon points will be notified in a like manner.

Plant Conditions @ T=01:20 [10:20 EDT]

The fires are extinguished.

Plant Conditions @ T=02:25 [11:25 EDT] **GENERAL EMERGENCY**

At about two hours twenty five minutes (T=02:25) into the exercise, a S/G tube rupture occurs on S/G # 1. This results in a release of radioactivity at the ground level due to the broken steam line. A **GE** should be declared based on EAL-7-1 (EAB dose resulting from an actual or imminent release of gaseous radioactivity > 1 Rem TEDE or > 5 Rem thyroid CDE for the actual or projected release).

**STATE RESPONSE:**

When the SEOC is notified by the CECC of the **GENERAL EMERGENCY** declaration, the loss of containment integrity and release to the atmosphere, the information is immediately passed to the Bradley and Hamilton County EOCs. In all likelihood, the deteriorating conditions at the plant will trigger a discussion about additional protective actions for the public. If no recommendation is received from TVA, the State may either shelter or evacuate other areas that are deemed by DRH to be endangered.

When the SEOC is notified of the worsening situation and the continuing release, the staff immediately notifies the county EOCs. If evacuation of the "Near Plant Area" has not previously occurred, TVA will most likely make that recommendation at this time and further recommend that residents in downwind sectors be sheltered in place. If after consultation with TVA's Dose Assessment Team, DRH feels that the recommended protective actions are sufficient, DRH will so advise the SEOC Director and the protective actions will be initiated. However, after considering the worsening plant conditions and a radiological release in progress, the State may;

exercise its option of taking more stringent action by evacuating the downwind sectors rather than sheltering the population. DRH field monitoring teams will be dispatched from the RMCC to selected points and will report monitoring results back to the RMCC every fifteen minutes. The DRH and TVA dose assessment teams continually analyze the data to determine if additional protective actions are required.

The Tennessee Department of Agriculture continues to monitor the situation and issues appropriate instruction to the agricultural community.

Mobilization of State personnel and resources continue, with responders activated and positioned at the FCC, county EOCs, and field locations. The SEOC coordinates and provides additional personnel and equipment when requested by the counties, and if necessary, requests assistance from the Federal government through the Federal Emergency Management Agency.

While attempts are being made to stop the release and repair the malfunctioning equipment, communications between the CECC and SEOC, and the SEOC and local EOCs is maintained with information and updates being shared among all responsible authorities. All data is studied carefully and if additional protective actions are required, they will be initiated. The State Medical Officer confers with DRH and if radioiodine concentrations are a hazard, will issue instructions for emergency workers to begin taking KI and would consider a similar order for portions of the general population. The EAS Coordinator at the SEOC will relay all emergency instructions and information for the public to the EAS. The JIC will be notified of all messages and instructions being broadcast by the EAS and will keep the media and the general public informed by way of briefings and press conferences.

#### LOCAL RESPONSE:

After being notified of the GENERAL EMERGENCY and precautionary protective action recommendations from the SEOC, if any, the local EOC Directors would proceed with implementing the evacuation or sheltering plans for the affected area. The Sheriff dispatches personnel to man critical roadblocks, assists in an orderly evacuation along controlled routes, and provides security for the evacuated or sheltered areas. If additional personnel are required, the Sheriff will coordinate the request from other state and local organizations. The Bradley and Hamilton County Radiological Officers begin the distribution of monitoring kits to appropriate shelters, manned roadblocks, and Shelter Information Points. The county road departments and TDOT; set up road barricades at predetermined locations around the affected area. The ARC, assisted by DHS personnel opens and mans shelters as needed. All other personnel are notified of the GENERAL EMERGENCY and remain on standby.

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The Bradley and Hamilton County EOCs continue mobilization and implementation of the evacuation plans for the affected sectors. Essential personnel are notified to report to their assigned positions, while reserve personnel remain on standby. If additional personnel are required, the Sheriffs will request assistance from the State and will coordinate the assignment of the personnel provided where they can be utilized to the greatest advantage.

Security is established around evacuated areas by the establishment of roadblocks and barricades; Shelter Information Points are set up at pre-determined locations; and Traffic Assist Teams are dispatched to patrol controlled evacuation routes.

When the local EOC Directors are notified that emergency workers have been directed to take KI, they will ensure that this information is passed on to the personnel in the field. EOC officials continue to monitor the situation and study the availability of the local manpower and resources. If it is determined that additional personnel is required, a request for assistance will be made to the SEOC.

If additional evacuation or sheltering orders are issued, the sheriffs will re-evaluate the previously established roadblocks and security measures. If necessary, they will be moved to new locations and additional blocks set up to encompass the enlarged area. ARC and DHS personnel will open additional shelters as required.

**EXERCISE TERMINATION:**

The exercise will terminate when all onsite and offsite objectives have been demonstrated.

## **APPENDIX 4**

### **EXERCISE SCENARIO**

This appendix contains a summary of the simulated sequence of events used as the basis for invoking emergency response actions by OROs in the Sequoyah Nuclear Power Plant exercise on June 23, 2004.

This exercise scenario was submitted by the State of Tennessee and approved by FEMA Region IV.

SEQUOYAH NUCLEAR PLANT (SQN) 2004 NRC/FEMA GRADED EXERCISE  
SCENARIO NARRATIVE  
CONFIDENTIAL  
Rev. Date: 4/19/04

INITIAL CONDITIONS:

UNIT-1:

- 100% power for the last 120 days. The core is at MOL. The Boron concentration is 961 ppm. 9000 MWD/metric ton.
- 1A-A RHR Pump is O.O.S. for repairs. LCO 3.5.2 has been entered.
- 1-400 Monitor is O.O.S for repairs.

UNIT-2:

- As is.

COMMON:

- A contractor is repairing the service building roof.

EVENTS: Note: Times are in scenario elapsed time (hr: min). While the Scenario has certain EALs listed which the SED is expected to make declaration of the emergency classifications (ALERT, SAE, GE), it is possible that the SED may declare an emergency classification based on judgment or some other set of EALs which the Scenario did not expect. If any of these situations arise the Controllers must be ready to evaluate the accuracy and timeliness of any unexpected emergency declarations.

At fifteen minutes (T=00:15) into the exercise, the contractor's hose to his Propane heater for the asphalt leaks, ignites and consequently catches the truck on fire. Shortly the truck blows up spreading burning asphalt around the area and causing damage to the S/G steam and FW lines as well as the service building. Insulation has been blown off of sections of the steam and FW lines. Some of the burning asphalt is around the RWST, the Steam and FW lines, and some is on the roof of the service building where the contractor's people are trapped. Within a few minutes, an ABI and Control Room Vent isolation should occur due to the smoke and heat from the fire. An ALERT should be declared based on EAL 4.1(Fire in any of the areas listed in Table 4-1(RWST) that is affecting safety related equipment required to establish or maintain safe shutdown) or 4.2(Explosion in any of the areas listed in Table 4-1(RWST) that is affecting safety related equipment required to establish or maintain safe shutdown).

At about one hour ten minutes (T=01:10) into the exercise, the FW flow indicator becomes erratic due to the fire flashing the water in the sensor lines to steam.

At about one hour fifteen minutes (T=01:15) into the exercise, the heated S/G #1 Steam line breaks when water is sprayed on it during fire fighting efforts. Shrapnel from the steam line strikes the RWST. The RWST has been punctured about half way up and is leaking. When the MSIV for S/G #1 begins to close, it sticks about 50% open. When the Reactor attempts to Scram an ATWS occurs. Some fuel clad damage occurs due to stresses during the ATWS. Additionally, the steam driven AFW pump fails to pump. A SAE should be declared based on EAL 2.3 (Reactor power >5% and not decreasing after valid auto and manual trip signals).

At about one hour twenty minutes (T=01:20) into the exercise, the fires are extinguished.

At about two hours twenty five minutes (T=02:25) into the exercise, a S/G tube rupture occurs on S/G # 1. This results in a release of radioactivity at the ground level due to the broken steam line. The field survey at EAB sample point 0-4 should report > 1Rem/hr gamma. A GE should be declared based on EAL 7.1(EAB dose resulting from an actual or imminent release of gaseous radioactivity > 1 Rem TEDE or > 5 Rem thyroid CDE for the actual or projected release).

The exercise will terminate at about six hours (T=06:00) into the exercise or when off site environmental monitoring objectives have been demonstrated.

SEQUOYAH NUCLEAR PLANT (SQN) 2004 NRC/FEMA GRADED EXERCISE  
SCENARIO NARRATIVE  
CONFIDENTIAL  
Rev. Date: 4/19/04

The importance of scenario events:

1A-A RHR Pump is O.O.S. for repairs.	Provides an additional OSC task. Also as the Scenario progresses allows an opportunity for the TSC/OSC to prioritize tasks.
1-400 Monitor is O.O.S for repairs.	Provides an additional OSC task. Complicates Dose assessment. Also as the Scenario progresses allows an opportunity for the TSC/OSC to prioritize tasks.
A contractor is repairing the service building roof.	Fire and Explosion from equipment becomes the initiating event for the ALERT declaration and also produces a needed fire brigade response.
S/G #1 Steam line breaks.	Combined with the MSIV failure to close and a later S/G tube rupture provides a release pathway for radioactivity for the exercise.
An ATWS occurs.	Provides reason for fuel clad failures.
MSIV for S/G #1 sticks about 50% open.	Provides an additional OSC task. Also as the Scenario progresses allows an opportunity for the TSC/OSC to prioritize tasks. Combined with the S/G #1 Steam line break and a later S/G tube rupture provides a release pathway for radioactivity for the exercise.
Steam driven AFW pump fails to pump.	Provides an additional OSC task.
A S/G tube rupture occurs on S/G # 1.	Combined with the S/G #1 Steam line break and MSIV for S/G #1 sticking about 50% open provides a release pathway for radioactivity for the exercise.

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SQN  
EMERGENCY PREPAREDNESS  
2004  
GRADED EXERCISE

Administratively Confidential

SCENARIO TIMELINE  
REV. DATE 04-19-04

09:00(EDT)

00:00 00:30 01:00 01:30 02:00 02:30 03:00 03:30 04:00 04:30 05:00 05:30 06:00 06:30

ALERT(EAL 4.1 or 4.2) SAE(EAL 2.3) GE(EAL 7.1)

