

official

NOV 03 1986

Georgia Power Company
ATTN: ✓ Mr. J. H. Miller, Jr.
President
P. O. Box 4545
Atlanta, GA 30302

Gentlemen:

SUBJECT: FEMA RADIOLOGICAL EMERGENCY EXERCISE REPORT - VOGTLE ELECTRIC
GENERATING PLANT EMERGENCY EXERCISE OF APRIL 30 - MAY 1, 1986

Enclosed is a copy of the Federal Emergency Management Agency's Report for the Vogtle Electric Generating Plant Emergency Exercise of April 30 - May 1, 1986. As described in the enclosure, FEMA did not identify any deficiencies or areas requiring corrective actions; however, several items have been recommended for improvement.

We encourage you to assist the appropriate organizations in resolving the items identified by FEMA. Resolution of these items should be completed prior to the next full scale emergency preparedness exercise.

We also encourage you to work closely with the State and counties in the development of a scenario for the next full scale exercise that will effectively test the areas in which the improvement items were disclosed.

Your cooperation in this matter is appreciated.

Sincerely,

Virgil L. Brownlee, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Enclosure:
FEMA Exercise Report

cc w/encl: (See page 2)

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PDR ADCK 05000424
F PDR

FE 35 *11*

cc w/encl:

- ✓ J. P. O'Reilly, Senior Vice President
Nuclear Operations
- ✓ R. E. Conway, Senior Vice President &
Project Director
- ✓ D. O. Foster, Vice President, Project
Support
- ✓ P. D. Rice, Vice President, Project
Engineering
- ✓ R. H. Pinson, Vice President, Project
Construction
- ✓ J. T. Beckham, Vice President &
General Manager - Operations
- ✓ R. A. Thomas, Vice President,
Licensing
- ✓ D. S. Read, General Manager,
Quality Assurance
- ✓ C. W. Hayes, Vogtle Quality
Assurance Manager
- ✓ W. C. Ramsey, Manager -
Readiness Review
- ✓ G. B. Bockhold, General Manager,
Nuclear Operations
- ✓ L. Gucwa, Manager, Nuclear Safety
and Licensing
- ✓ M. H. Googe, Project
Construction Manager
- ✓ E. D. Groover, Quality
Assurance Site Manager -
Construction
- ✓ J. A. Bailey, Project Licensing
Manager
- ✓ G. F. Trowbridge, Esq., Shaw,
Pittman, Potts and Trowbridge
- ✓ B. W. Churchill, Esq., Shaw,
Pittman, Potts and Trowbridge
- ✓ E. L. Blake, Jr., Esq., Shaw,
Pittman, Potts and Trowbridge
- ✓ J. E. Joiner, Troutman, Sanders,
Lockerman and Ashmore
- ✓ J. G. Ledbetter, Commissioner,
Department of Human Resources
- ✓ C. H. Badger, Office of Planning
and Budget
- ✓ D. Kirkland, III, Counsel,
Office of the Consumer's Utility
Council
- ✓ D. Feig, Georgians Against
Nuclear Energy

cc w/encl: (Continued on page 3)

cc w/encl: Continued

- ✓ M. B. Margulies, Esq., Chairman,
Atomic Safety and Licensing Board
Panel
- ✓ Dr. O. H. Paris, Administrative Judge
Atomic Safety and Licensing Board
Panel
- ✓ G. A. Linenberger, Jr., Administrative Judge
Atomic Safety and Licensing Board
Panel
- ✓ B. P. Garde, Citizens Clinic, Director
Government Accountability Project

bcc w/encl:

- ✓ E. Reis, GSO
- ✓ W. M. Hill, IE
- ✓ M. Miller, NRR
- ✓ W. Brach, GSO
- ✓ M. Sinkule, RII
- ✓ E. Christnot, RII
- ✓ NRC Resident Inspector
Document Control Desk
State of Georgia

RII

RII

RII

RII

ATabaka

ATDecker

DCollins

MSinkule

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RADIOLOGICAL EMERGENCY PREPAREDNESS EXERCISE REPORT

Nuclear Power Plant: Vogtle Electric Generating Plant
Applicant: Georgia Power Company

Location of Plant: State of Georgia
Waynesboro
Burke County

Date of Report: September 19, 1986

Date of Exercise: April 30-May 1, 1986

Participants:
State of Georgia
Burke County, Georgia
State of South Carolina
Aiken County, South Carolina
Allendale County, South Carolina
Barnwell County, South Carolina
U.S. Department of Energy Savannah River Operations Office

FEDERAL EMERGENCY MANAGEMENT AGENCY

Region IV
1371 Peachtree St., NE
Atlanta, Georgia 30309

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CONTENTS

ABBREVIATIONS AND ACRONYMS	iv
EXERCISE SUMMARY	v
1 INTRODUCTION	1
1.1 Exercise Background	1
1.2 Exercise Evaluators	1
1.3 Evaluation Criteria	2
1.4 Exercise Objectives	2
1.5 Exercise Scenario	9
2 EXERCISE EVALUATION	12
2.1 Georgia State Operations	12
2.1.1 Forward Emergency Operations Center	12
2.1.2 Radiological Monitoring Teams	14
2.2 Georgia County Operations	16
2.2.1 Burke County Emergency Operations Center	16
2.2.1.1 Reception Center and Shelter	18
2.2.1.2 Decontamination Station	20
2.2.1.3 Traffic and Access Control	20
2.3 South Carolina State Operations	21
2.3.1 Forward Emergency Operations Center	21
2.3.2 State Emergency Operations Center	24
2.4 South Carolina County Operations	25
2.4.1 Aiken County	25
2.4.2 Allendale County	27
2.4.3 Barnwell County	29
2.5 Joint Operations	31
2.5.1 Emergency Operations Facility	31
2.5.2 Media Center	32

ABBREVIATIONS AND ACRONYMS

ADL	Administrative Decision Line
DHEC	Department of Health and Environmental Control
DNR	Division of Natural Resources
DOT	Department of Transportation
DRD	Direct Reading Dosimeter
EBS	Emergency Broadcast System
EMA	Emergency Management Agency
EMS	Emergency Medical Service
EMT	Emergency Management Technicians
ENC	Emergency News Center
ENN	Emergency Notification Network
EOC	Emergency Operations Center
EOF	Emergency Operations Facility
EPA	Environmental Protection Agency
EPD	Emergency Preparedness Division
EPZ	Emergency Planning Zone
FEOC	Forward Emergency Operations Center
GEMA	Georgia Emergency Management Agency
GPC	Georgia Power Company
KI	Potassium Iodide
NUREG-0654	Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, NUREG-0654, FEMA-REP-1, Rev. 1, (1980).
PAG	Protective Action Guides
PIO	Public Information Officer
PNS	Public Notification System
RAC	Regional Assistance Committee
RADEF	Radiological Defense
RERP	Radiological Emergency Response Plan
SEOC	State Emergency Operations Center
SLED	State Law Enforcement Division
SOP	Standard Operating Procedure
TCP	Traffic Control Point
TLD	Thermoluminescent Dosimeter
VEGP	Vogtle Electric Generating Plant

EXERCISE SUMMARY

GEORGIA STATE OPERATIONS

Forward Emergency Operations Center

All State agency representatives at the State Forward Emergency Operations Center in Waynesboro, Georgia, participated in the Plant Vogtle Radiological Emergency Preparedness (REP) exercise and demonstrated an adequate level of readiness for dealing with a radiological emergency. The FEOC was staffed by major departments according to the plan. Direction of operations was well managed by the Governor's Representative, and his staff was effectively involved in the decision-making process. Physical aspects of the EOC were adequate to support continuous operations.

Message boards, maps and other displays were posted and effectively used to facilitate the State's response function. However, the noise level in the room made it difficult to hear on the telephone and to monitor the information coming from the Emergency Notification Network. All communications systems operated effectively during the exercise. The communications network was supported by the State Mobile Command Vehicle which was stationed outside the FEOC.

Protective action decisions were correctly made by the Governor's Representative and his staff, in consultation with the Utility, Burke County and the State of South Carolina.

Radiological Monitoring Teams

Dose Assessment, Protective Action Recommendations, and Radiological Exposure Control were all performed by the joint Georgia State and Burke County (Georgia) field teams in a satisfactory manner. Professionalism was repeatedly demonstrated by State and county radiological health personnel during the exercise. Particularly outstanding was the thorough and comprehensive basis upon which protective action decisions were reached and implemented.

GEORGIA COUNTY OPERATIONS

Burke County Emergency Operations Center

The Burke county EOC is an excellent facility. All of the necessary information was clearly displayed. The co-location of the Burke county EOC and the State FEOC made communication and consultation straightforward.

Upon notification, the EOC was staffed in a timely manner. The call initiating staffing was received at 8:05 and the appropriate staff were present by 8:35. The EOC

was staffed by representatives of all organizations identified in the plan. The staff present at the EOC demonstrated adequate training and knowledge of their duties and responsibilities. The EOC was run effectively by the Emergency Management Coordinator and his Operations Officers. Briefings were held to keep the staff involved and informed of the situation. The briefings were particularly effective since the Operations Officer gave the present status, outlined action necessary for each organization, and asked to be kept appraised of progress and problems.

Messages were handled and logged efficiently. Hard copies were distributed as necessary.

Reception Center and Shelter

Mock evacuees were efficiently registered, monitored, decontaminated when appropriate, and processed into the shelter. The shelter was located at Waynesboro High School. An overflow facility at Waynesboro Elementary school was used as well. The overflow facility had the drawback of not having showers.

The participation by volunteer and appropriate government organizations was excellent. Leadership at both facilities was outstanding. Participating staff were well trained and the demonstration at the facility was well planned and executed. Monitoring equipment and procedures were adequate, as were decontamination equipment and procedures.

Traffic control at the facility was not done well and is indicated as an area for improvement.

Decontamination Station

The decontamination station was well organized. The various vehicle decontamination points were sufficiently separated, allowing good traffic flow. Ten vehicles were actually processed.

Personnel were well trained, and the equipment was appropriate for the tasks. Delays at several points were experienced initially, but personnel were shifted to speed the processing. A hidden source was detected in the wheel well of one vehicle.

The station manager is to be congratulated on the effective utilization of the temporary vehicle decontamination location.

Traffic Access and Control

Traffic access and control activities were conducted in a timely and professional manner by the Burke county Sheriff's Department, State Highway Patrol, and State DOT personnel.

The assigned personnel have received training in personal dosimetry and were adequately supplied with dosimetry equipment.

The large number of traffic control points (TCPs) required a large staff. Permanent evacuation route signs installed at strategic points could facilitate evacuation and possibly reduce the number of people needed for TCP duties. The four boat launch sites identified on the Savannah River should have information/warning signs posted to alert boaters of Plant Vogtle emergency warning procedures.

SOUTH CAROLINA STATE OPERATIONS

Forward Emergency Operations Center

The South Carolina FEOC was promptly activated and assumed control of State functions at 11:00 am. The FEOC was completely staffed and all participants performed their respective duties competently. Overall, the staffing capability demonstrated at the FEOC was outstanding. The emergency response activities undertaken at the FEOC were well managed and coordinated. Periodic briefings, enhanced by contributions from the operational staff, were excellent.

The physical facilities at the FEOC were excellent and capable of supporting extended operations. All necessary status boards, maps, and graphic aids were posted, used, and kept current. Communications capabilities were also excellent and, except for the ADL system, all primary and secondary systems were demonstrated to be operational. These systems were backed up with the telephone and radio communications housed in EPD's mobile van.

The FEOC played an important role in public alerting and notification during the interim period prior to the establishment of the ENC. Emergency messages were promptly drafted and relayed to the South Carolina EBS stations. The state PIO did an excellent job in handling media inquiries during this interim period.

The scenario provided South Carolina little opportunity to exercise its capability in recovery/reentry or ingestion pathway activities. However, the state did stay abreast of the situation in Georgia by monitoring communications, involving DHEC in consultation, and staff discussions. All exercise objectives for the State of South Carolina were demonstrated.

State Emergency Operations Center

The South Carolina staff did an excellent job of performing dose assessment and protective actions. Both back-up staff and equipment were available for performing calculations and communicating results. Close contact was maintained with Georgia personnel. The physical arrangement at both the FEOC and the SEOC ensured good coordination among counties and agencies, as well as with the utility and with the Savannah River Plant. Written procedures were available and EPA dose guidelines were

used. Minor lapses in posting of information occurred, but these were of little significance due to redundancy of information sources, including briefings and written messages.

SOUTH CAROLINA COUNTY OPERATIONS

Aiken County EOC

Initial Notification of the Alert was received at the warning point located in the Aiken County Law Enforcement Center. Activation of the EOC Staff was fully demonstrated with complete staffing. The emergency coordinator was effectively in charge of the operation of the EOC. The coordinator and his staff displayed an outstanding knowledge of their duties and responsibilities. As a result of the skills demonstrated in this exercise, it was readily apparent that the staff was dedicated and had many hours of training.

The facilities of the EOC were adequate. There was ample space and furniture, and telephones were supplied for all organizations. Internal messages were promptly handled and logged. Ample graphic information, including a status board, and wall maps locating the EPZ, traffic control points and reception center were displayed, consulted, and promptly updated. The decision-making process demonstrated at the EOC was exceptional, with frequent discussions between staff members. Overall, the complete operations and management of the EOC indicated a high level of professionalism, training and dedication.

Although not required by the exercise objectives, it was observed that there were no permanent record dosimeters for distribution to emergency workers.

Allendale County EOC

In general, the performance of the Allendale County EOC was excellent. Activation and staffing of the EOC went very well. The performance of the director of Emergency Preparedness, in particular, was very good. He demonstrated knowledge of his emergency management responsibilities, periodically briefing EOC staff, and designating responsibility to appropriate staff.

The communications systems were very good, with ample redundancy. There were primary and back-up systems to the State, other local EOCs, and the EOF.

Although not required by the exercise objectives, it was observed that there were no permanent record dosimeters for distribution to emergency workers, and the EOC personnel did not demonstrate adequate knowledge in the use of dosimetry equipment.

Barnwell County EOC

The Barnwell county EOC, located in the detention center compound, is an adequate facility which has enough equipment and space for extended operation. Security can be easily maintained. The communications systems were also adequate.

The staff at the EOC were generally very knowledgeable and well trained. The communications officer, RADEF officer, and Department of Social Services personnel performed exceptionally well. Although it was not required by the scenario, the Shelter Services Chief conceived and coordinated an actual shelter operation at the Barnwell High School. This activity involved the efforts of eight agencies. The only exception to the generally high level of performance was in the area of public information which requires additional attention.

Although not required by the exercise objectives, it was observed that there were no permanent record dosimeters or record keeping cards for distribution to emergency workers.

JOINT STATE OPERATIONS

Emergency Operations Facility

The EOF facility was manned in part by representatives from GEMA(GA), DHEC(SC), and Burke County, Georgia. These three representatives were positioned in the center of the EOF, near the Emergency Director. The two State representatives participated in management meetings. Each received the same distribution of status sheets as other groups, and were assigned a multi-line telephone. The Burke county representative had access to a radio on the county frequency. A five-frequency South Carolina radio was available, but not in use.

A Field Monitor Controller (DNR-GA) operated from the dose assessment area. Positioning of field monitoring teams was coordinated with Georgia Power's Field Monitoring Team Coordinator. Telephone communication from the dose assessment area to the EOC was available.

Media Center

There were no serious problems observed at the Emergency News Center (ENC). The staff seemed to have been well briefed on all routine procedures except the actual inter-agency/inter-facility handling of proposed and final versions of news releases. That system requires attention to reduce production time and to insure that coordination is effective. The ENC facility is well equipped with communications, visual aids, and accommodations for the media.

1 INTRODUCTION

1.1 EXERCISE BACKGROUND

A team of personnel from FEMA Region IV, the RAC, FEMA's contractors, and federal and state agencies evaluated the April 30 and May 1, 1986 exercise. FEMA, Region IV assigned 19 federal representatives to evaluate the activities in the states of Georgia and South Carolina and affected local jurisdictions. Team leaders coordinated team operations.

Following the exercise, these federal evaluators met to compile their evaluations. Team leaders consolidated the evaluations of individual team members and furnished them to the RAC chairman. A public critique of the exercise for exercise participants and the general public was held by the RAC Chairman at 11:00 a.m. on Friday, May 2, 1986 at the Emergency News Center, Burke County Office Park, Waynesboro, Georgia.

The findings presented in this exercise report are based on the observations of federal evaluators, and have been reviewed by FEMA Region IV.

1.2 EXERCISE EVALUATORS

Nineteen federal evaluators observed offsite emergency response functions. These individuals, their affiliations, and their exercise assignments are given below.

<u>Observer</u>	<u>Agency^a</u>	<u>Assignment</u>
V. Baker	FEMA	Burke County (Ga) Reception Center and Shelter
B. Eichorst	HHS/FDA	Burke County (Ga) Decontamination Station
J. Glover	FEMA	Media Center
M. Goodkind	ANL	South Carolina FEOC (Graniteville)
		South Carolina SEOC (Columbia)
A. Hall	DOT	Burke County (Ga) Traffic/Access Control
J. Heard	FEMA	Georgia FEOC (Waynesboro)
R. Izzo	ANL	Aiken County (SC) EOC
J. Keller	INEL	Field Radiological Monitoring Team
P. Kier	ANL	Barnwell County (SC) EOC
D. Knudson	ANL	Burke County (Ga) EOC
J. Levenson	ANL	South Carolina FEOC (Graniteville)
		South Carolina SEOC (Columbia)
C. Malina	USDA	Georgia FEOC (Waynesboro)
R. Marston	NRC	Emergency Operations Center
J. Opelka	ANL	Field Radiological Monitoring Team
R. Payne	EPA	Georgia FEOC (Waynesboro)
D. Poyer	ANL	Allendale County (SC) EOC
B. Salmonson	INEL	Field Radiological Monitoring Team

<u>Observer</u>	<u>Agency^a</u>	<u>Assignment</u>
C. Stovall	FEMA	Exercise Oversight
G. Woodard	FEMA	Chief of Evaluators

^a ANL	= Argonne National Laboratory
DOT	= U.S. Department of Transportation
EPA	= U.S. Environmental Protection Agency
FEMA	= Federal Emergency Management Agency
HHS/FDA	= U.S. Department of Health and Human Services, Food and Drug Administration
INEL	= Idaho National Engineering Laboratory
NRC	= U.S. Nuclear Regulatory Commission
USDA	= U.S. Department of Agriculture

1.3 EVALUATION CRITERIA

The VEGP exercise evaluations that follow in Section 2 of this report are based on applicable planning standards and evaluation criteria set forth in Sec. II of NUREG 0654-FEMA-1, Revision 1 (November, 1980). Region IV evaluated the exercise utilizing the modular format. Federal evaluators were instructed to mark those sections of the report "not applicable" which did not correspond to the objectives for the exercise.

Following the narrative for each jurisdiction or offsite response activity, Deficiencies, Areas Requiring Corrective Action, and Areas Recommended for Improvement are presented with accompanying recommendations. Any identified Deficiencies would cause a finding that the off-site preparedness is not adequate to provide reasonable assurance that appropriate protective measures can and will be taken to protect the health and safety of the public living in the vicinity of the site in the event of a radiological emergency. At least one Deficiency in this category would necessitate a negative finding. No deficiencies and no areas requiring corrective actions were identified during this exercise.

Areas Requiring Corrective Actions include those activities where demonstrated performance during the exercise was evaluated and considered faulty; corrective actions are necessary, but other factors indicate that reasonable assurance could be given that in the event of a radiological emergency, appropriate measures can be taken to protect the health and safety of the public.

Areas Recommended for Improvement are listed as appropriate for each jurisdiction or offsite activity.

1.4 EXERCISE OBJECTIVES

Georgia Power Company, the State of Georgia, Burke County, and the State of South Carolina, Aiken, Allendale and Barnwell Counties, planned a coordinated exercise of their respective emergency plans for both the onsite and offsite support agencies on

April 30 and May 1, 1986. The exercise involved activation and participation of the staff and response facilities of VEGP as well as emergency organizations and emergency facilities of the states of Georgia and South Carolina and the affected county jurisdictions.

Federal agencies were to be notified during the exercise according to existing emergency response procedures. Federal agencies with radiological emergency preparedness responsibility did not actively participate in the play of this exercise. Federal representatives, however, did act as exercise evaluators.

Exercise objectives included full participation from the States of Georgia and Burke County. The State of South Carolina objectives indicated partial activation, but Allendale, Aiken, and Barnwell Counties' objectives were for full participation. State activities included the activation of radiological field monitoring teams, participation at the media center with communication and information exchange with the county and Georgia Power organizations. The Georgia State FEOC in Waynesboro and the South Carolina State FEOC in Graniteville were activated to support VEGP and county play.

In the following table, the exercise objectives submitted by the states of Georgia and South Carolina are listed.

The State of Georgia in communication to FEMA Region IV dated February 10, 1986, identified the following formal exercise objectives to be accomplished at the April 30, and May 1, 1986, emergency response exercise for the VEGP.

A. State of Georgia Emergency Response Organization

Exercise Objectives

1. Demonstrate the ability to activate, staff, and operate the state EOC (Atlanta) and the State Forward EOC (at the Burke County EOC Building, on the corner of Georgia Highway 24 and Perimeter Road in Waynesboro).
2. Demonstrate the ability to initiate and support 24-hour operation of the State EOC and State Forward EOC.
3. Demonstrate the ability to make decisions and to coordinate emergency activities with Burke County, South Carolina, DOE-SR and VEGP.
4. Demonstrate the adequacy of facilities and displays to support emergency operations.
5. Demonstrate the ability to communicate with members of the state of Georgia Emergency Response Organization, the Burke county EOC, VEGP and field personnel.

6. Demonstrate the ability to alert public within the effective plume exposure pathway EPZ, and to disseminate an initial instructional message within 15 minutes after the decision is made to do so. (In coordination with South Carolina and jointly with Burke County.)
7. Demonstrate the adequacy of notification procedures for alerting the public within 45 minutes for the portion of the EPZ with only transient population (hunters and fishers) mostly along the Savannah River. (In coordination/jointly with South Carolina, DOE-SR and Burke County.)
8. Demonstrate the ability to mobilize and deploy joint radiological monitoring team members in conjunction with the county, in a timely fashion.
9. Demonstrate the use of appropriate equipment for determining ambient radiation levels.
10. Demonstrate the use of appropriate equipment for measurement of airborne radioiodine concentrations as low as 10^{-7} Ci/cc in the presence of noble gases.
11. Demonstrate the use of appropriate equipment and procedures for laboratory measurement and analyses of cesium, and radio-iodine deposits in food and environmental samples.
12. Demonstrate the use of appropriate equipment for collection, transport and analysis of samples of soil, vegetation, water, and milk.
13. Demonstrate the ability to project dosage to the general public via plume exposure, based on Protective Action Guides (PAGs), available shelter, evacuation time estimates, and all appropriate factors.
14. Demonstrate the ability to project dosage to the public via ingestion pathway exposure, based on field data, and to determine the appropriate protective measures, based on PAGs and other relevant factors.
15. Demonstrate the ability of state radiological assessment personnel to monitor environmental conditions and provide information to the appropriate decision-makers.
16. Demonstrate the ability to implement protective actions for ingestion pathway hazards.

17. Demonstrate the ability to formulate and distribute appropriate instructions to the public in a timely fashion.
18. Demonstrate the ability to control access to an evacuated area.
19. Demonstrate the ability to identify the need for, request and obtain Federal assistance. (To be simulated)
20. Demonstrate the ability to distribute personnel dosimetry and continuously monitor and control emergency worker exposure.
21. Demonstrate the ability to decide, based on predetermined criteria, whether to issue KI to emergency workers.
22. Demonstrate the ability to supply and administer KI, if appropriate. (Administration of KI will be simulated.)
23. Demonstrate the ability to coordinate timely and accurate media releases with the county, VEGP, and other organizations.
24. Demonstrate the ability to provide advance coordination of information released.
25. Demonstrate the ability to coordinate rumor control in conjunction with the county and VEGP.
26. Demonstrate the ability to estimate total population exposure.
27. Demonstrate the decision-making process to determine the appropriate measure for controlled recovery and reentry.

B. Burke County (Georgia) Emergency Response Organization

Exercise Objectives

1. Demonstrate the ability to promptly notify and mobilize the Burke County Emergency Response Organization.
2. Demonstrate the ability to initiate and support 24-hour operation of the Burke County EOC.
3. Demonstrate the ability to make decisions and to coordinate emergency activities with the state and VEGP.
4. Demonstrate the adequacy of facilities and displays to support emergency operations.

5. Demonstrate the ability to communicate with members of the Burke County Emergency Response Organizations, the state, other local organizations, and VEGP.
6. Demonstrate the ability to request outside support when local capabilities are exceeded.
7. Demonstrate the ability to mobilize joint radiological monitoring team members in conjunction with the state.
8. Demonstrate the use of appropriate equipment for determining ambient radiation levels.
9. Demonstrate the ability to alert public within the effective plume exposure pathway EPZ, and to disseminate an initial instructional message within 15 minutes after the decision is made to do so. (Jointly with the state of Georgia.)
10. Demonstrate the adequacy of notification procedures for alerting the public within 45 minutes for the portion of the EPZ with only transient population (hunters and fishers) mostly along the Savannah River. (Jointly with the state of Georgia.)
11. Demonstrate the ability to formulate and distribute appropriate instructions to the public in a timely fashion.
12. Demonstrate the ability to organize and manage the resources necessary to support an orderly evacuation of the affected subzones within the plume exposure pathway EPZ.
13. Demonstrate the ability to control access to an evacuated area.
14. Demonstrate the ability to distribute personnel dosimetry and continuously monitor and control emergency worker exposure.
15. Demonstrate the ability to coordinate timely and accurate media releases with the state, VEGP, and other organizations.
16. Demonstrate the ability to provide advance coordination of information released in conjunction with the state and VEGP.
17. Demonstrate the ability to coordinate rumor control in conjunction with the state and VEGP.
18. Demonstrate adequacy of ambulance and hospital facilities, in coordination with VEGP, for handling a contaminated and injured individual.

19. Demonstrate the ability to register and conduct radiological monitoring of evacuees at the host county reception center.
20. Demonstrate adequate equipment and procedure for the decontamination of emergency workers, equipment and vehicles.

The State of South Carolina identified in a letter to FEMA Region IV on February 14, 1986, the following State and local support activities to be demonstrated during the April 30 and May 1, 1986 exercise of the VEGP.

C. State of South Carolina (Off-Site Plume Exposure Pathway Objectives, 0-10 Miles)

Exercise Objectives

1. Demonstrate ability to mobilize staff and activate facilities promptly.
2. Demonstrate ability to make decisions and to coordinate emergency activities.
3. Demonstrate adequacy of facilities and displays to support emergency operations.
4. Demonstrate ability to communicate with all appropriate locations, organizations, and field personnel.
5. Demonstrate ability to alert the public within the 10-mile EPZ, and disseminate an initial instructional message, within 15 minutes.
6. Demonstrate ability to formulate and distribute appropriate instructions to the public, in a timely fashion.
7. Demonstrate ability to brief the media in a clear, accurate and timely manner.
8. Demonstrate ability to provide advance coordination of information released.
9. Demonstrate ability to establish and operate rumor control in a coordinated fashion.

D. Aiken, Allendale, and Barnwell (South Carolina) Counties (Off-Site Plume Exposure Pathway Objectives, 0-10 Miles)

Exercise Objectives

1. Demonstrate ability to mobilize staff and activate facilities promptly.
2. Demonstrate ability to make decisions and to coordinate emergency activities.
3. Demonstrate adequacy of facilities and displays to support emergency operations.
4. Demonstrate ability to communicate with all appropriate locations, organizations, and field personnel.
5. Demonstrate the ability to alert the public within the 10-mile EPZ, and to disseminate an initial instructional message within 15 minutes to residents and 45 minutes to transients.
6. Demonstrate ability to formulate and distribute appropriate instructions to the public, in a timely fashion.
7. Demonstrate ability to brief the media in a clear, accurate and timely manner.
8. Demonstrate ability to provide advance coordination of information released.
9. Demonstrate ability to establish and operate rumor control in a coordinated fashion.

E. South Carolina State and County (Ingestion Pathway, 0-50 Miles)

South Carolina Emergency Preparedness Division and the county EOCs involved will maintain communications during this portion of the exercise. EPD operations will be from the SEOC in Columbia.

South Carolina will also furnish representations from Radiological Health, EPD Operations, and Public Information to Vogtle Media Center and/or Georgia FEOC.

1.5 EXERCISE SCENARIO

It is 0700 EST on 30 April 1986. Unit 1 had been operating at an average of 80 percent capacity since ending a refueling outage in mid-November. Since March 15, Unit 1 had been operating at 100 percent power. All safety equipment was operable except RHR pump 1A. The motor was being replaced because the RHR pump has been out of service since 0720 EST on April 29. In addition, condensate pump No. 3 was out of service due to very high bearing temperatures during operation. Unit 2 was under construction.

At 0710 EST, sparks from welding started a fire in the Turbine Building that took more than ten minutes to extinguish after alarm was received. A NOTIFICATION OF UNUSUAL EVENT was declared.

At 0800 EST, a large increase in required reactor coolant water make-up rate (approximately 100 gpm) occurred. This was accompanied by increases in containment atmosphere pressure, temperature, radioactivity, and humidity levels. An ALERT was declared since the reactor coolant leakage was greater than 50 gpm.

Detectors alarmed indicating a fire in the area of emergency Diesel Generator 1A at 0930 EST. When the fire brigade responded, they determined that off-site assistance was required. The fire was extinguished with fire-fighting assistance but there was significant damage and the diesel generator was put out of service.

At 0955 EST, a missing maintenance worker was found. He had been working on the motor for RHR Pump 1A when a rigging failure allowed the motor to strike him in the chest. He fell, striking the pump casing. His injuries included cracked ribs, fractured right arm, and a shallow 6-in. cut on his right thigh. He was highly contaminated in the area of the cut, with lower levels of contamination in other areas.

Radioactive material was released from the plant vent via the containment vent duct indicating that the containment isolation valves were leaking, at 1100 EST. A SITE AREA EMERGENCY was declared because two barriers to fission product release had been breached or challenged.

At 1115 EST, the positive displacement charging pump tripped due to a faulty direct-acting solid-state trip unit. This activated the 480V switchgear 1 NB 21 trouble, the charging line high/low flow, and the reactor coolant pump seal water injection low flow annunciators. A maintenance team was dispatched to investigate and repair. A centrifugal charging pump was started. It tripped out after operating a few seconds. The second centrifugal charging pump was started and it provided the required charging flow. Radioactive releases increased to a rate of 0.01 Curie/sec by 1200 EST.

When the turbine shaft coasted to a stop at approximately 1215 EST, the turning gear did not start due to a fault in the slow-speed switch. As a result, the zero RPM annunciator in the Control Room did not reset as expected. Maintenance personnel were dispatched from the OSC to investigate.

At 1345 EST, a major loss of coolant accident (LOCA) occurred. Pressurizer pressure and level dropped rapidly causing a safety injection signal. Containment

pressure increased causing an increase in radioactive release rate. However, safety injection and containment spray did not occur because the common suction line from the Refueling Water Storage Tank (RWST) was plugged by previously undetected debris and could not be opened. At that time, the remaining operable centrifugal charging pump tripped out.

By 1400 EST, containment radiation levels and radioactive releases were increasing rapidly indicating that severe damage was occurring to the uncovered reactor core. GENERAL EMERGENCY was declared because all three barriers to fission product release had been breached. Efforts to provide alternate sources of water to feed the RHR and Safety Injection Pump were unsuccessful.

The vent coolers in the containment were removing decay heat from the containment atmosphere and the leak rate flow from the containment began decreasing with containment pressure. However, containment radiation levels peaked at 1445 EST at a value exceeding one-half million R/hr and radioactive releases corresponded to approximately one rem/hr at a distance of two miles from the reactor.

At 1600 EST, work continued on efforts to remove the blockage and open the line to the RWST. Repair teams reported that it would take about an hour to get flow to the pumps. Containment pressure was still decreasing due to cooling provided by the containment fan coolers.

At 1700 EST, injection waters from the RWST became available. Safety injection promptly covered the reactor core with cooling water and the containment spray system dropped the containment pressure below atmospheric pressure. Radioactive releases were terminated.

At 1730 EST, a Nuclear Service Cooling Water (NSCW) Train B pump tripped as a result of a coupling failure. This resulted in an activation of the NSCW Train B Low Header Pressure Annunciator in the Control Room.

At 1900 EST, the plume exposure pathway portion of the exercise was terminated.

The ingestion pathway portion of the exercise was continued from 0800 EST to 1200 EST on 1 May 1986.

GENERAL SEQUENCE OF OFFSITE SCENARIO EVENTS

Date, Approximate Time (EST)	Emergency Levels
April 30,	<p>0724 ALLENDALE ACTIVATED AN UNUSUAL EVENT</p> <p>0730 NOTIFICATION OF UNUSUAL EVENT (Fire in Turbine Building lasting more than 10 minutes)</p> <p>0805 BURKE</p> <p>0806 BARNWELL SC</p> <p>0820 AIKEN</p> <p>0815 ALERT (Reactor coolant leakage was greater than 50 gpm)</p> <p>0930 Fire in the Diesel Generator 1A Building (Offsite fire-fighting assistance requested)</p> <p>0945+ Medical Emergency at RHR Pump 1A Area (Offsite hospital provided medical assistance)</p> <p>1115 SITE AREA EMERGENCY Declared (Two barriers to fission products release were breached)</p> <p>1415 GENERAL EMERGENCY Declared (Three barriers to fission product release were breached.)</p> <p>1445 Radioactive release was equivalent to approximately 1 R/hr. at 2 mi from VEGP</p> <p>1700 Radioactive release was terminated</p> <p>1900 PLUME EXPOSURE PATHWAY EXERCISE WAS TERMINATED</p>
May 1	<p>0800 START OF INGESTION PATHWAY EXERCISE (Dispatched field teams to collect and analyze samples, make assessment, recommend and implement protective measures)</p> <p>1200 TERMINATION OF EXERCISE</p>

Meteorology at 0700, April 30:

Wind speed 4 mph at 10 meter level

Wind direction is from 097 degrees

Stability class is C

2 EXERCISE EVALUATION

2.1 GEORGIA STATE OPERATIONS

2.1.1 Forward Emergency Operations Center

The Forward Emergency Operations Center (FEOC) was activated by simulated aircraft transport of State staff from the State EOC in Atlanta. However, the Georgia SEOC in Atlanta did not participate in this exercise. Establishment of the FEOC was accomplished in a timely manner with the facility being fully operational by 10:20 am. The FEOC was fully staffed by all organizations required by the Georgia Plan. In addition, the staff was supported by liaisons from the Nuclear Regulatory Commission and the South Carolina Emergency Preparedness Department and the Department of Health and Environmental Control (DHEC). All staff members displayed a clear understanding of the plan and procedures throughout the entire exercise. Capability to staff the FEOC for 24-hour operation was demonstrated by presentation of an updated roster of alternative personnel.

The Executive Director of the Georgia Emergency Management Agency (GEMA), the Governor's representative, provided outstanding management of the FEOC. He continuously demonstrated the ability to make appropriate decisions and to coordinate emergency activities with Burke County, the Vogtle Electric Generating Plant (VEGP), and South Carolina. The staff of the FEOC was kept informed of actions taken, the status of activities, and of problems requiring response actions. State agency representatives were actively involved in making decisions, and response organizations gave status reports. Messages were processed and distributed efficiently. Access to the FEOC was adequately controlled by the state police.

The FEOC, located in one room of the Burke County EOC, has adequate facilities for conducting continuous emergency response activities. All necessary maps and other displays were posted, and the status board was kept current. However, the room was noisy, making it difficult to monitor incoming information on the Emergency Notification Network (ENN) and to converse on the telephone.

All communications systems operated effectively during the exercise; the ENN and the commercial telephones were in constant use. Additionally, the telefax system efficiently transmitted hard-copy messages between the FEOC and the media center. The State Mobile Command Vehicle, stationed outside the FEOC, provided further support.

The radiological health staff, including representatives from Georgia and South Carolina, performed dose assessment satisfactorily. The entire operation was well organized with each individual efficiently performing his assigned task and demonstrating detailed knowledge of health physics principles.

Protective action decisions to evacuate were made by the Governor's representative and his staff in consultation with the utility, Burke County, and South Carolina.

These decisions were justified by the technical data upon which they were based. The ability to alert the public within the affected plume exposure pathway EPZ and to disseminate an initial instructional message within 15 minutes of the decision to do so was adequately demonstrated. Tone alert radios and EBS, including television station Channel 6 in Augusta, carried emergency messages for the affected public.

The ability to control radiological exposure of field workers was well demonstrated. The distribution of dosimeters and control of exposure records was outstanding. KI was available in each packet issued to field workers and could have been taken if the situation so demanded.

During the second day of the exercise, FEOC staff were involved with policy and procedures concerning the ingestion pathway and reentry and recovery operations. Results of radiological monitoring conducted during the night indicated that it was safe to reenter parts of the evacuated area. Ingestion pathway actions discussed and taken were: sampling of soil, grass, milk, and water; placing cattle on stored feed; and requiring a special permit from the Georgia Department of Agriculture before agricultural products from Burke County could be sold or shipped. The relaxation of protective actions was based on monitoring data indicating safe levels of radioactivity. Reentry and recovery decisions were communicated promptly to all response organizations. There was, however, a breakdown of coordination between the controllers having radiological field data and the EPD director at the FEOC during the reentry and recovery phase of the exercise. Field data that should have been available to the EPD director at the FEOC at 8:00 am was not available until 11:15 am, which added to the difficulty of implementing reentry and recovery.

All exercise objectives that were the responsibility of the FEOC were demonstrated.

DEFICIENCIES

None.

AREAS REQUIRING CORRECTIVE ACTION

None.

AREAS RECOMMENDED FOR IMPROVEMENT

1. **Description:** High noise levels in the FEOC impaired normal telephone conversation and effective monitoring of the ENN.

Recommendation: It is recommended that the room directly across from the FEOC be used to house the person monitoring the ENN and Radiological Health personnel.

2.1.2 Radiological Monitoring Teams

Three field teams were deployed during the plume phase of the exercise. The teams were dispatched from the Burke County EOC. Each of the field teams consisted of two persons, one from the State and one from Burke County. Mobilization of the teams, as it would be accomplished in a real emergency, was not observed. Under conditions likely to be experienced in a real emergency, the state field team members would be called by the DNR duty officer using a telephone roster. The county team members are on 24-hour call as county EMTs. The state team members were prepositioned at a nearby city, while the county team members were at their normal County duty station. The county team members arrived at 8:45 am and the state team members at 10:00 am. By about 12:20 pm, all three teams were deployed to the field.

Back-up field teams were not available for 24-hour staffing. On the second day of the exercise, field teams were again prepositioned at the Burke County EOC and deployed from the EOC.

The field team kits were packed and ready for inventory and quick deployment to the field. Equipment checklists were available and utilized. The county team members checked the kits against the equipment list in the plan before the state personnel arrived.

As appropriate, the field team members were given a thorough briefing on plant conditions, current meteorology, exposure control procedures, and equipment check procedures before they were deployed. The field team coordinator assigned specific responsibilities to the team members.

All three field teams were well equipped to monitor the plume. The teams had low- and high-range detectors to measure the direct radiation, an air pump, appropriate cartridges, and a sensitive pancake probe to take and measure air samples. The teams performed an operation check on their equipment before being dispatched. All the equipment had calibration stickers indicating recent calibration. The vehicles of the teams varied in all-terrain capability, but at least one was a 4-wheel drive vehicle, thus assuring the capability to drive to difficult to reach monitoring locations.

The field teams followed written procedures (SOP 6.0.3.6) and were able to detect and report simulated direct radiation levels above 2 mR/hr, as called for in the procedures. At least one team identified the centerline of the plume by traversing it. However, none of the teams performed open window readings in addition to the closed window readings stipulated in the SOP. Both open and closed window readings should be made at each location to assure that the air sample measurements are actually taken in the presence of the plume and not in an area outside of the plume where plume shine causes non-zero closed window readings.

All three teams followed proper procedures for taking air samples and measuring them. These procedures included going to an area of background radiation to perform counting and timely transportation of the air samples via a courier team (4th vehicle) back to the radiological laboratory at the Burke County EOC.

The three teams evaluated were well equipped to perform ingestion pathway sampling. They were equipped with scoops and plastic containers for sample collection, and identification labels. A sufficient supply of equipment was not included in the kits, but was available at the Burke County EOC. One ingestion pathway team had a micro-R meter instead of a CDV-700 (SOP 6.0.3.7 should be revised to indicate this equipment change.) Proper procedures were used in the collection of ingestion pathway samples. One team took great care to keep the vehicle and the working areas clean, and to isolate clean and contaminated work areas. Cross-contamination of samples would have been negligible. One of the field teams did not isolate its samples as far away from the unprotected driver as possible. However, this was not a problem given the low levels of radiation recorded for the simulated samples.

All the team members were familiar with the area being monitored and detailed maps were available to assist in finding monitoring locations or accomplishing roving monitoring assignments.

The field teams maintained communications with the field team coordinator throughout the plume and ingestion pathway portions of the exercise by radio. During the initial phase of team deployment, the field team coordinator was in the Burke County EOC. Later this function was transferred to the EOF, as specified in the plan. No dead spots were observed in communications to either location during the exercise. A repeater system was used for the communication of the field teams and the field team coordinator. The teams had two back-up radio systems in the vehicle in case the primary radio system failed. Excellent radio protocol was maintained throughout the exercise.

The field team members for both plume and ingestion pathway activities had adequate personnel dosimetry which was issued at the point of deployment, the Burke County EOC. Two direct reading dosimeters, 0-200mR and 0-5R were issued to each radiological monitoring team member. In addition, a TLD and simulated KI was issued. The dosimetry issued to the teams is different from that specified in the plan. The plan should be reviewed and revised to reflect the proper and appropriate dosimetry currently in use and observed and evaluated at this exercise. Forms for logging the dosimeter readings were available and used. The teams read their dosimeters at appropriate intervals and communicated their readings to the field team coordinator. The teams were aware of the location of the decontamination station and would have reported there at the close of their tour of duty. However, the facility was closed before the teams finished their field assignments. The teams were aware of their administrative dose limits.

DEFICIENCIES

None.

AREAS REQUIRING CORRECTIVE ACTION

None.

AREAS RECOMMENDED FOR IMPROVEMENT

1. **Description:** Field teams were prepositioned at the Burke County EOC. Back-up field teams were not available for 24-hour staffing.

Recommendation: County and state members of the field teams should demonstrate activation and mobilization in a future exercise. A 24-hour staffing capability should be demonstrated.

2. **Description:** One ingestion pathway team had a micro-R meter instead of a CDV-700.

Recommendation: SOP 6.0.3.7 should be revised to indicate this equipment change. Equipment possessed by the teams in their kits should agree with the equipment check list.

3. **Description:** The dosimetry issued to the teams is different than that specified in the plan.

Recommendation: The plan should be revised to reflect the proper and appropriate dosimetry which was worn by the team members during the exercise.

4. **Description:** None of the teams performed open window readings, only closed window readings as stipulated in the SOP 6.0.3.6.

Recommendation: SOP 6.0.3.6 should be revised to call for both open and closed window readings. Such readings should be taken to assure that the air sample measurements are actually in the plume and not in an area outside of the plume where plume shine causes non-zero closed window readings.

2.2 GEORGIA COUNTY OPERATIONS

2.2.1 Burke County Emergency Operations Center

The Burke County EOC is an excellent facility. All of the necessary information was clearly displayed. The co-location of the Burke County EOC and the State FEOC made communication and consultation straightforward.

Upon notification, the EOC was staffed in a timely manner. The call initiating staffing was received at 8:05 and the appropriate staff were present by 8:35. The EOC was staffed by representatives of all affected organizations as called for in the plan. The staff present at the EOC demonstrated adequate training and knowledge of their duties and responsibilities.

The EOC was run effectively by the Emergency Management Coordinator and his Operations Officers. Briefings were held to keep the staff involved and informed of the exercise situation. The briefings were particularly effective since the operations officer gave present status, outlined action necessary for each organization, and asked to be kept apprised of progress and problems.

Hard copies of messages were handled and distributed efficiently. A message log was kept.

The communications systems at the EOC included the ENN and commercial telephone. Communications to local EOCs, the media center, schools, and the hospital was by telephone. Communications with field workers (e.g., TCP personnel and radiological monitoring teams) was by radio.

Field monitoring teams consisted of one member from the county and one member from the state. The county people with basic radiological training are familiar with the county geography while the state people have more in-depth radiological monitoring knowledge. This combination of skills provides complementary knowledge and increased the effectiveness of both teams.

The PNS and EBS were actuated effectively. The EBS messages were broadcast within five minutes of the siren notification.

Activation of traffic control measures was prompt and staffing was well controlled from the EOC. Traffic control status was illustrated on a map. Three traffic control points were identified.

The county had access to an adequate number of vehicles and personnel to execute evacuation of the affected areas and maintain control. The State was available to provide additional assistance.

Although evacuation of school children from Girard Elementary School was simulated, the school will not be in operation when the VEGP comes on line.

Information regarding mobility-impaired and special needs residents was available. The information is continually being collected and will be current when VEGP reaches operational status.

Personal dosimetry was controlled at the EOC. Forms were maintained for each person issued dosimetry.

Recovery and reentry were carefully controlled based on dose information generated by the FEOC (State). Measures to control agricultural commodities were implemented until it became clear that the products were not contaminated.

DEFICIENCIES

None.

AREAS REQUIRING CORRECTIVE ACTIONS

None.

AREAS RECOMMENDED FOR IMPROVEMENT

None.

2.2.1.1 Reception Center and Shelter

The Reception Center and primary shelter was the Waynesboro High School. Evacuees were registered, monitored, and decontaminated as appropriate prior to proceeding to the shelter. When the shelter capacity was reached, the "overflow" evacuees were registered and transferred to the secondary shelter at the Waynesboro Elementary School.

The facilities were very well staffed with approximately 30 persons from 11 agencies. The presence of four of these agencies was pursuant to mutual aid agreements. Staff activation commenced with the Board of Education representative at the County EOC contacting school principals who acted as shelter managers. Other EOC staff contacted their specific representatives. It took approximately one hour to fully activate the facilities. The EOC was notified that the Reception Center was open before all personnel were in place and ready to receive evacuees.

Leadership at both facilities was outstanding with good participation by school personnel. Personnel appeared to have a good understanding of their responsibilities and to have undergone appropriate training in such areas as shelter management, disaster health nursing, and radiological monitoring. It was evident that there had been much planning and preparation for emergency situations.

Monitoring equipment was available and operable. Emergency workers demonstrated appropriate exposure control and monitoring techniques. Several of the mock evacuees had small, hidden radioactive sources. These sources were detected by the monitors and those evacuees were processed through decontamination.

Appropriate decontamination equipment was available (soaps, towels, plastic-lined garbage cans, hospital gowns, etc.). Proper procedures for decontamination were demonstrated and appropriate records kept.

Both facilities were large and adequately equipped as shelters. However, Waynesboro Elementary would not be suitable for use as a reception center because of the absence of showers. Although monitoring could be done there, contaminated evacuees would still have to be transported back to Waynesboro High School for decontamination.

There should be signs on the access roads to direct evacuees to the Reception Center and to specific areas such as parking or reception. There was no evidence of traffic control or of security.

Overall, the exercise objectives were demonstrated.

DEFICIENCIES

None.

AREAS REQUIRING CORRECTIVE ACTION

None.

AREAS RECOMMENDED FOR IMPROVEMENT

1. **Description:** Signs should be prominently displayed that direct evacuees to the Reception Center and to specific areas such as parking and reception.

Recommendation: More signs and directional arrows would be helpful in directing the flow of evacuees. Also, evacuees assigned to an alternate shelter who are proceeding in private vehicles should be given strip maps.

2. **Description:** The Reception Center notified the EOC that it was open before all personnel were in place.

Recommendation: All personnel should be in place and ready to receive evacuees prior to notifying the EOC that the Reception Center is open.

3. **Description:** Traffic control and security were not evident during this exercise.

Recommendation: Traffic control and security should be provided.

4. **Description:** Red Cross personnel did not arrive, although both shelter managers requested and expected Red Cross support.

Recommendation: Red Cross personnel should participate at the shelter in the next exercise.

5. **Description:** It appears unrealistic to expect normal school activities to proceed while large numbers of evacuees are being registered and/or sheltered.

Recommendation: The County Plan should specify at what point schools would be dismissed.

2.2.1.2 Decontamination Station

The Burke County Decontamination Station was located at the Recreation Complex, a temporary site. The decontamination area was well organized to minimize any possible spread of contamination. Personnel were well trained and demonstrated proper procedures at all sites. Long lines of vehicles were anticipated at several points and personnel were shifted quickly to normalize the flow. Approximately 10 vehicles were actually processed.

All exercise objectives were demonstrated.

DEFICIENCIES

None

AREAS REQUIRING CORRECTIVE ACTIONS

None

AREAS RECOMMENDED FOR IMPROVEMENT

None

2.2.1.3 Traffic and Access Control

Ten traffic/access control points (TCPs) were observed. Eight of these were staffed with Burke County deputy sheriffs, one was staffed by Georgia Department of Transportation (DOT) representatives, and one was staffed with DOT personnel and a State Patrol officer.

Staffing of the TCPs was timely and consistent with the scenario. Evacuation of non-essential VEGP personnel was ordered about 9:20 a.m. and TCPs adjacent to the plant were established. Additional TCPs were activated as evacuation of the surrounding population was ordered.

TCP emergency workers demonstrated adequate knowledge of evacuation routes, shelter locations, and decontamination procedures. Procedures for clearing traffic were not demonstrated but emergency workers were aware of the procedures for obtaining wreckers or tow trucks.

The public would not be aware of evacuation routes because information/warning signs have not yet been installed at public boat ramps. Permanent evacuation route signs have not been installed at strategic locations in the VEGP area.

All of the emergency workers were supplied with personal dosimeters (0-200 mR and 0-5 R direct reading dosimeters and a permanent record dosimeter). They were

issued simulated KI. Actual KI would be available and would be administered upon instruction from the EOC.

Exercise objectives relevant to traffic and access control were demonstrated.

DEFICIENCIES

None

AREAS REQUIRING CORRECTIVE ACTION

None

AREAS RECOMMENDED FOR IMPROVEMENT

1. **Description:** Signs indicating evacuation routes and/or information warnings were not present at strategic locations in the VEGP area or at the public boat ramps.

Recommendation: Permanent evacuation route signs should be installed at strategic locations in the VEGP area and information/warning signs would be helpful at the public boat ramps.

2.3 SOUTH CAROLINA STATE OPERATIONS

2.3.1 Forward Emergency Operations Center

The South Carolina Forward Emergency Operations Center (FEOC) was promptly activated and assumed operational control of State functions at 1100 hours. The utility notified the South Carolina State Emergency Operations Center (SEOC) warning point at the Notification of Unusual Event using the Emergency Notification Network (ENN). The ENN is monitored continuously 24-hours per day. Staff were notified and mobilized according to planned procedures. A representative from the Department of Health and Environmental Control (DHEC) was dispatched to the Emergency Operations Facility (EOF) to act as liaison to the FEOC. Public Information Officers (PIOs) were dispatched to the Emergency News Center (ENC), and a State liaison officer was sent to the Burke County (GA) EOC. Operations and agency staff arrived at the FEOC (Graniteville National Guard Armory) and immediately began setting up. All essential staff were present by 1045 hours. The FEOC was completely staffed according to the plan. All participants were knowledgeable of their responsibilities and performed their respective duties competently. Overall, the activation and staffing capability demonstrated at the FEOC was outstanding.

The emergency response activities undertaken at the FEOC were very well managed. Actions were coordinated between the operational staff through strong leadership. Briefings were presented with each significant change in plant status. These briefings were occasionally enhanced with contributions from the various agency representatives. The decision-making process involved appropriate representatives of the operations staff. Several copies of the plan were available for reference and each agency had access to written procedures. Exercise messages were logged, reproduced, and distributed effectively. Logs of telephone communications were also maintained. Access to the FEOC was strictly controlled and enforced by the State Law Enforcement Division (SLED) through a sign-in and badging process.

The physical facilities at the FEOC were excellent and capable of supporting extended, large-scale response activities. No crowding or congestion was observed. The operations staff, DHEC, Governor's representatives, PIOs, and support agencies each had separate rooms. Workspace, furniture, telephones, and lighting were all adequate and ample. A status board was kept up-to-date in each of the major operations areas. The emergency classification level was clearly posted. All necessary maps, charts, and other visual aids were posted, kept current, and used.

Communication capabilities were excellent and, in most cases, the primary and backup systems were demonstrated to be operable. The only exception was the Administrative Decision Line (ADL). Although the ADL failed to operate correctly, back-up capabilities functioned well. The failure of the ADL did not seriously affect overall operations. However, a communication problem with the FEOC was observed at the Barnwell County EOC. Verification of protective action messages reportedly sometimes took up to 40 minutes. This delayed Barnwell County's action on these messages until verification was received from the State. In addition to the fixed communications installed at the FEOC, EPD's mobile communications van provided redundant telephone and/or radio communications to nearly all fixed systems. Multiple hard-copy devices were available, including one to the ENC. Each device was demonstrated to be reliable and reasonably fast.

Radiological assessment was demonstrated although the exercise objectives only called for coordination activities for South Carolina. The radiological assessment function was performed by DHEC personnel. The radiological assessment area was spacious and located in a room separate from, but adjacent to the main operations area. The room appeared adequate to support the full level of activity that would be required during an actual event. However, the dose table in the operations room lacked unit designations. It is suggested that the table be upgraded to include appropriate units. The 1-hour and 12-hour dose values were posted without units, but dose information was effectively communicated both verbally and on message forms. Communication between DHEC personnel was facilitated by hand-held radios when members of the team were elsewhere in the facility. Representatives of the radiological assessment team participated in the regularly-scheduled FEOC briefings. A portable computer was used for dose calculations when emission rates were provided by the utility. Operation of the dose projection model was demonstrated and the team discussed the results and compared them to the utility's calculations. Back-up procedures for hand calculation were also available. Protective action guidelines (PAGs) as prescribed by EPA were readily available.

Protective action activities were limited due to the small area included in the plume Emergency Planning Zone (EPZ) in South Carolina, an area of low population density in the EPZ. Aside from the Savannah River Plant, the other sectors in South Carolina include a controlled private hunting area (G-10) and a plantation (H-10). The county and DHEC representatives were well acquainted with these areas and estimated evacuation times. Time tables were also available and used in these discussions. When the decision was made to evacuate following complete review by DHEC and the Governor's representative, the county representatives called their respective county EOCs which were to simulate the evacuation of the zones. There were no sirens or tone alert radios in the affected zones, but tone-alert radios are planned for the few residents in the area. Route alerting for the hunting area was considered.

The FEOC played an active role in public alerting during the interim period before the establishment of the ENC. With the declaration of the **Site Area Emergency**, the FEOC, in coordination with Georgia, activated the tone-alert (NOAA) radio system and provided the initial instructional message at 1100 hours. Follow-up messages specific to the situation were promptly drafted and relayed to the Emergency Broadcast System (EBS) stations at Aiken at 1120 and Orangeburg at 1126. The prescribed messages were thought to be too lengthy. Hence, follow-up messages were drafted at the FEOC. When the ENC was established, the responsibility for preparing and coordinating public instructions shifted to the ENC.

Media briefings were generally to be provided at the ENC. However, PIOs at the FEOC did provide some informational briefings over the telephone and conducted at least one interview with actual press representatives. The PIO did an excellent job with the press and avoided technical jargon.

All exercise objectives for the state of South Carolina were demonstrated.

DEFICIENCIES

None.

AREAS REQUIRING CORRECTIVE ACTION

None.

AREAS RECOMMENDED FOR IMPROVEMENT

1. **Description:** The Administrative Decision Line (ADL) failed to operate during the exercise. This line represents the only conferencing capability between the FEOC with the Georgia FEOC and the EOF.

Recommendation: The reliability of the ADL should be improved. (Discussion with State staff during the exit critique indicated the problem had been identified and corrected on May 1, 1986).

2. **Description:** The FEOC PIO staff felt the prescribed public instructions were too lengthy and they preferred to draft their own during the exercise.

Recommendation: Although the messages drafted during the exercise were prepared promptly and correctly, it would be desirable to update the prescribed messages in the plan to be more specific to the situation and briefer.

3. **Description:** Dose values were posted without units on the status boards.

Recommendation: Specify the correct units on the dose table.

4. **Description:** Verification of protective action messages by the South Carolina FEOC to the Barnwell County EOC sometimes took up to 40 minutes, thereby delaying the county's actions.

Recommendation: Procedures for timely verification of messages by the FEOC should be reviewed and improvements implemented.

5. **Description:** There were no sirens or tone alert radios in the lightly populated EPZ.

Recommendation: Install tone alert radios for residents in the EPZ.

2.3.2 State Emergency Operations Center

The South Carolina Emergency Operations Center (SEOC) was minimally involved in the plume pathway portion of the exercise as most of the state's response was conducted from the FEOC. However, the SEOC was partially activated for the ingestion pathway exercise and reentry and recovery activities demonstrated on the second day of the exercise.

The SEOC is located on the lower level of the State Office Building in Columbia. The facility is permanently established and is used for all emergency situations. Communication capabilities were excellent and were demonstrated to be operable to all emergency operating locations during the exercise. In addition to telephones, radio communications to the counties were available. The SEOC also has an operational television capability for live broadcasts in coordination with EBS messages. Partitions were available to reduce noise levels and headsets can be used with telephones. Although only a small portion of the facility was used during the exercise, it was apparent that the space and capabilities to support a full response were present.

The scenario provided little opportunity to exercise ingestion pathway or recovery/reentry capabilities at the SEOC. However, during the overnight recess, DHEC

simulated field collection and laboratory analyses of milk, vegetation, and soil samples. No radiation was detected in any of the samples and the protective actions placing livestock on stored feed and thorough washing of crop materials were lifted for the South Carolina counties. For the most part, exercise activities were linked to monitoring Georgia's offsite activities. Representatives from DHEC maintained contact with Georgia and the Savannah River Plant and provided briefings to the SEOC staff. The DHEC representative also responded to numerous questions simulating press inquiries.

The scenario did not allow for a strong recovery/reentry demonstration at the SEOC. Recovery and reentry operations affected only twelve families. Relaxation of the evacuation orders and reentry were based on the simulated field monitoring data that indicated normal background radiation. The decision to allow reentry was promptly communicated to all response organizations after the data had been evaluated.

Agricultural extension agents from Clemson University were present to coordinate activities with the county extension agents, had the need arisen. Detailed information for dairy farmers, and telephone numbers, crop acreage, food processing plants, etc., were available for each South Carolina county.

DEFICIENCIES

None

AREAS REQUIRING CORRECTIVE ACTION

None

AREAS RECOMMENDED FOR IMPROVEMENT

None

2.4 SOUTH CAROLINA COUNTY OPERATIONS

2.4.1 Aiken County

An Alert notice was received at the Warning Point which is located in the Aiken County Law Enforcement Center at 0820. The Emergency Coordinator can be reached 24 hours a day via a pager system. There were two other back-up staff also equipped with pagers who could activate the EOC. The EOC Coordinator notified the staff by telephone using a written call sheet. Staffing was complete at 0930 and included representation from Fire, Rescue, Medical Services, Emergency Welfare, Purchasing, Transportation, County elected officials, Public Works, Radiological Defense, Law Enforcement, Salvation Army, School Systems and American Red Cross. The staff displayed an excellent knowledge of their duties and responsibilities. Twenty-four hour staffing was demonstrated early in the exercise by double staffing.

The Emergency Coordinator was effectively in charge of the County's emergency operations as designated in the plan. He frequently briefed his staff on the changing situation, consulted with them and directed them to various actions. The EOC was notified of Site Area Emergency at 1057 and General Emergency at 1345. The order to evacuate came at 1417, shortly after the order to take shelter at 1412. Internal communications were managed well, with messages promptly logged. EOC security was tight with law enforcement officers carefully controlling access.

The facility was adequate for the job. There was ample space in the EOC. Furniture and telephones were supplied for each representative from the various organizations. Ample tabular and graphic displays were available. The status board was promptly updated on significant events. Maps showing the Plume EPZ, evacuation routes, traffic control points, and reception centers were all available.

The County was well prepared with communications capabilities. The ENN telephone system was the primary communications system linking the utility, State, warning points, and Counties. Police/fire radio provided the back-up communication capability.

The area of Aiken County that was to be evacuated is an uninhabited game preserve with controlled seasonal access. All people who access the preserve are registered at arrival. A call was placed to the preserve from the Sheriff at the EOC ordering evacuation of the area. Additional law enforcement officers were dispatched to the area to assist.

Traffic control points were manned by Aiken County Law Enforcement Officers. Two locations were demonstrated during the exercise.

Emergency workers (ambulance and monitoring teams) were equipped with mid- and high-range dosimetry. TLDs were not available for this exercise, but they were ordered and expected to be delivered within 45-60 days. Law Enforcement Officers manning the traffic control points were not issued dosimetry; however, the control points were not within the 10 mile EPZ. KI was not available. However, the use of dosimetry to monitor emergency worker exposure, and the availability of KI were not exercise objectives for Aiken County.

The scenario was adequate to exercise the County's resources.

DEFICIENCIES

None.

AREAS REQUIRING CORRECTIVE ACTIONS

None.

AREAS RECOMMENDED FOR IMPROVEMENT

1. **Description:** Three of the exercise objectives (#7, #8, #9) for Aiken County were not demonstrated. These objectives were to demonstrate the ability to (1) brief the media, (2) provide advance coordination of information released, and (3) establish and operate rumor control.

Recommendation: Exercise objectives #7, #8, and #9 should be demonstrated by Aiken County in a future exercise.

2. **Description:** TLDs were not available for the exercise. The TLDs were ordered, however they were not received in time for the exercise.

Recommendation: Demonstrate presence of TLDs at the next exercise.

3. **Description:** Ambulance and monitoring teams were equipped with mid- and high-range dosimetry; however, Law Enforcement Officers assigned to Traffic Control were not issued any type of dosimetry.

Recommendation: All emergency workers should be issued dosimetry to prevent unnecessary exposure.

2.4.2 Allendale County

The activation and staffing of the Allendale EOC was prompt. Activation was initiated at 0724 upon Notification of an Unusual Event. The activation message was verified by a series of numbers and a codeword. The County dispatcher contacted the Director of Emergency Preparedness who notified staff and then activated the EOC. The EOC was fully staffed at 0806. A 24-hour County notification system was in place through the police dispatcher's office.

EOC management was excellent. The Director of Emergency Preparedness was effectively in charge. He demonstrated a thorough knowledge of his emergency management responsibility, periodically briefed EOC staff, and designated responsibility to the appropriate staff. Message handling was good. Messages primarily flowed between the communications officer and the Director of Emergency Preparedness.

The facility was adequate. The EOC was located in the County Tax Assessors Office. It was somewhat small, however, EOC personnel did not seem uncomfortable. The Status board and EPZ maps were clearly posted. Evacuation routes, relocation centers, and access control points were shown.

Communications were generally good, with the exception of a problem that developed with the Emergency Notification Network. There was a good deal of

redundancy. There were specific telephone lines to the State EOC, other local EOCs and the EOF. Back-up systems included the State radio, FAX machine, and sheriff's radios. The Emergency Notification Network (ENN) was demonstrated. During the declaration of a General Emergency, there was some confusion between the EOCs and the EOF. There was also static and radio interference over the ENN. As a result, it took approximately 30 minutes to transmit the message.

There were no permanent record dosimeters. The Radiological officer when issuing dosimeters, failed to zero them. Also, there was a failure to initially place batteries in the dosimeter chargers. However, the use of dosimetry to monitor emergency worker exposure was not an objective of this exercise.

DEFICIENCIES

None

AREAS REQUIRING CORRECTIVE ACTIONS

None.

AREAS RECOMMENDED FOR IMPROVEMENT

1. **Description:** During the exercise, there were communications problems experienced with the ENN radio. There was static and interference at times and there was some problem receiving the General Emergency message.

Recommendation: Eliminate the source of static on the ENN radio and demonstrate an adequate back-up.

2. **Description:** Exercise objectives #7, #8, #9 for Allendale County were not demonstrated. These objectives were to demonstrate the ability to (1) brief the media, (2) provide advance coordination of information released and (3) establish and operate rumor control.

Recommendation: Exercise objectives #7, #8, and #9 should be demonstrated by Allendale County in a future exercise.

3. **Description:** Exercise objectives #5 and #6 for Allendale County were not demonstrated. These objectives were to demonstrate the ability to (1) alert the public within the 10-mile EPZ and disseminate an initial instructional message, and (2) formulate and distribute timely instructions to the public.

Recommendation: Exercise objectives #5 and #6 should be demonstrated by Allendale County in a future exercise.

4. **Description:** TLDs were not available for emergency workers in the Allendale county EOC.

Recommendation: Demonstrate presence of TLDs at the next exercise.

2.4.3 Barnwell County

The Barnwell County EOC was activated by the receipt of the Alert notification from the Vogtle Electric Generating Plant (VEGP) at 8:06 a.m. A call list was used to notify the EOC staff. Representatives from 18 county agencies or functions participated in the exercise; the only agency not represented was the county council. Because Barnwell County has few employees, there was considerable reliance on volunteers for second-shift personnel, and on support from other counties.

The EOC was managed by the Barnwell County Disaster Preparedness Coordinator (DPC) with much assistance from the State Controller, an experienced Emergency Preparedness Coordinator from another county. This arrangement resulted in excellent management of the EOC and gave the DPC invaluable experience. However, it diminished the opportunities for the DPC to fully demonstrate his knowledge and capabilities. There were timely briefings of the staff, status boards were kept current, and message logs were kept.

The EOC, located in a separate building in the County detention compound, has adequate facilities for conducting continuous emergency response activities. All necessary maps and other displays were posted.

The EOC had adequate communication equipment that operated effectively during the exercise. There was a dedicated telephone line and a bridge line to VEGP, and radio and telephone communication with the State and county EOC's. Each agency desk had its own telephone. Emergency Medical Services (EMS) radio provided communication capabilities with support hospitals, ambulances, and radiological monitoring teams. Warning messages and news releases were received on the telefax; however, several news releases were received an hour after formulation and contained obsolete information. The Communications Officer performed his responsibilities with accuracy and professionalism.

Emergency status and protective action messages relevant to Barnwell County were received at the following times: Site Area Emergency at 10:45; Governor's Emergency at 11:01; General Emergency at 13:45; take shelter at 13:45; evacuate at 14:35; and shelter horses at the Creek Plantation at 14:40. Except for the last message from the State, all of these messages originated at VEGP and were verified with the State by the Emergency Preparedness Division liaison at the EOC. Action on the protective action messages was delayed until verification from the State was received, which sometimes took up to 40 minutes (see section 2.3.1).

The EOC staff was anxious to demonstrate their capability to conduct a shelter operation. In response to a controller message, the County actually set up a shelter operation at the Barnwell high School that was not required by the scenario. This operation was conceived and coordinated by the Shelter Services Chief and involved the School Superintendent, Social Services, Rescue, Radiological Defense, Welfare Services, Transportation Services, and the Red Cross. The situation in the message was expanded to involve as many county agencies as possible.

Barnwell County has an adequate supply of direct reading dosimeters and chargers. There were fifty 0-20R dosimeters, fifty 0-200R dosimeters, and 6 chargers at the EOC; 24 dosimeters, chargers, and geiger counters at the Sheriff's office; and 24 dosimeters in a tactical vehicle. However, in contradiction to the County Plan, TLD permanent record dosimeters and record-keeping cards had not been distributed in the County. During the exercise, dosimeters in the EOC were properly charged under the direction of the Radiological Defense (RADEF) Officer. He explained that emergency workers in the plume EPZ were instructed to read their dosimeters every 15-30 minutes and to report to him for instructions if the hairline had moved. The RADEF Officer was extremely well trained.

Barnwell County has few media relation responsibilities and has not set aside space for media briefings. The Public Information Officer appeared to lack confidence in his ability to explain the significance of the emergency classification levels and the content of news releases. He received assistance from the State Controller.

DEFICIENCIES

None.

AREAS REQUIRING CORRECTIVE ACTION

None.

AREAS RECOMMENDED FOR IMPROVEMENT

1. **Description:** Exercise objective #5 for Barnwell County was not demonstrated. This objective was to demonstrate the ability to alert the public within the 10-mile EPZ and disseminate an initial instructional message.

Recommendation: Exercise objective #5 should be demonstrated by Barnwell County in a future exercise.

2. **Description:** Exercise objectives #8 and #9 for Barnwell County were not demonstrated. These objectives were to demonstrate the ability to (1) provide advance coordination of information released, and (2) establish and operate rumor control.

Recommendation: Exercise objectives #8 and #9 should be demonstrated by Barnwell County in a future exercise.

3. **Description:** The EOC coordinator required assistance (and training) from the State Controller.

Recommendation: In subsequent exercises, the Disaster Preparedness Coordinator should be given greater opportunity to demonstrate his capabilities through less involvement of the State Controller in the management of the EOC.

4. **Description:** The Public Information Officer lacked confidence in his knowledge of PAGs.

Recommendation: The PIO should be given further training.

5. **Description:** TLDs were not available for the exercise.

Recommendation: Demonstrate presence of TLDs at the next exercise.

2.5 JOINT OPERATIONS

2.5.1 Emergency Operations Facility

Representatives from the states of Georgia and South Carolina, and from Burke County (Georgia) were mobilized at the EOF. The Burke County EMA representative arrived at 0900, the Georgia GEMA representative arrived at 1008, and the South Carolina DMEC representative arrived at 1120. A field monitoring team coordinator from the Georgia DNR and a radio operator arrived at the EOF at 1305. Each of the representatives briefed themselves on the current plant status upon their arrival. According to the exercise participants, there is a system in place for alerting and activating staff members at any hour of any day. This system consists of contact by telephone and portable paging devices for both state and county staff. The EOF was fully staffed during the exercise. Staff members displayed adequate training and knowledge.

Facilities at the EOF were satisfactory. Adequate space was provided for both state and county personnel, who were situated in the center of the EOF. Status boards and displays were clearly visible to state and county representatives from this position.

Coordination of activities and information flow were satisfactory at the EOF. The two state representatives attended periodic emergency management meetings, and each agency was provided with updated status sheets during the exercise.

The field monitoring team controller from the Georgia DNR and the radio operator conducted their activities from the dose assessment area of the EOF. The

positioning of the three field monitoring teams and the gathering of field data were coordinated with the Georgia Power Company's field monitoring team coordinator.

Communications capabilities at the EOF were adequate. The primary communication system used for communicating with the state and local EOCs was multi-line telephones. The Burke County representative also had access to a radio on the county frequency as a secondary communication link. A five-frequency radio for communications with South Carolina was also available, but was not used. Communication between the field monitoring teams and the field monitoring team controller in the EOF was by radio. The field monitoring team controller also had access to a telephone for communications with the State EOC.

The scenario adequately involved the state and local EOF representatives in the exercise activities and adequately tested their emergency response capabilities.

All exercise objectives were met at the EOF.

DEFICIENCIES

None

AREAS REQUIRING CORRECTIVE ACTIONS

None

AREAS RECOMMENDED FOR IMPROVEMENT

None

2.5.2 Media Center

The facilities and operations observed at the Emergency News Center (ENC) were generally good. The ENC was fully staffed; however, mobilization procedures were not demonstrated. Public Information Officers (PIOs) representing the states of Georgia and South Carolina, Burke County (Georgia), GPN, and the Nuclear Regulatory Commission were present at the ENC during the exercise. The PIOs displayed adequate training and knowledge and performed all required tasks well.

The ENC facility was excellent, with only minor improvements recommended. Sufficient space and equipment were available for both PIOs and media representatives. Up to 125 reporters could be accommodated at briefings, and there were additional private areas where PIOs could confer and where media representatives could conduct interviews. Maps and displays at the ENC were generally adequate, but could be improved by the addition of maps of the Savannah River Plant area and a chart for tracking activities such as sheltering, evacuation, and opening of reception centers.

Communications capabilities at the ENC were generally adequate, with the exception that additional telephones for incoming media calls are needed. Communications systems between the ENC and State and local EOCs and the EOF consisted of dedicated and commercial telephone lines.

The informational functions of the ENC were generally good. Media kits were available, sufficient briefings were held, PIOs exchanged information to keep each other up-to-date, and the staff appeared to be well trained in all routine procedures except handling of draft and final news releases. Hard copy news releases were not always available in a timely manner due to some coordination problems in the procedures for handling, numbering, and distributing news releases.

An adequate rumor control system was demonstrated at the ENC. Rumor control phones were staffed by county and GPC personnel. The rumor control telephone number was provided in press briefings, news releases, and EBS messages. Up to five telephone calls could be handled simultaneously. However, it was observed that the staff members on the telephones were not kept up-to-date on events and were, therefore, not always well prepared to answer questions. Procedures for keeping these rumor control staff members better informed should be strengthened.

DEFICIENCIES

None

AREA REQUIRING CORRECTIVE ACTION

None

AREAS RECOMMENDED FOR IMPROVEMENT

1. Description: Maps of the Savannah River Plant area, and a chart for tracking activities such as sheltering, evacuation, and opening of reception centers were not present at the Emergency News Center.

Recommendation: Providing the indicated maps and displays at the ENC would enhance the media briefings.

2. Description: Additional telephones for incoming media calls are needed at the Emergency News Center.

Recommendation: Providing additional telephone lines for incoming media calls to the ENC would expedite information flow to the media.

3. **Description:** The staff members on the ENC rumor control telephones were not kept up-to-date on events and were, therefore, not always well prepared to answer questions.

Recommendation: Procedures for keeping rumor control staff members better informed should be strengthened.

4. **Description:** Although the ENC was fully staffed, mobilization procedures were not demonstrated.

Recommendation: Staff mobilization procedures for the ENC should be demonstrated in a future exercise.

5. **Description:** Hard copy news releases were not always available in a timely manner at the ENC due to some coordination problems in the procedures for handling, numbering, and distributing news releases.

Recommendation: The procedures for handling, reviewing, and distributing proposed and final hard copy news releases should be reviewed for adequacy. The staff should be provided with additional training to ensure proper coordination.