

JUL 23 1984

Docket No. 50-271

Vermont Yankee Nuclear Power Corporation  
ATTN: Mr. Warren P. Murphy  
Vice President and Manager of Operations  
RD 5, Box 169  
Ferry Road  
Brattleboro, Vermont 05301

Gentlemen:

Attached is a copy of the final assessment report from FEMA I for the joint State and local radiological emergency response exercise for the Vermont Yankee Nuclear Power Plant conducted on September 21, 1983. In connection with resolution of the deficiencies, you should keep abreast of the activities taken by both State and local authorities and provide assistance to them on an as needed basis.

If you have any questions concerning this matter, please contact Mr. Hilbert W. Crocker (215) 337-5208 of my staff.

Sincerely,

Original Signed By:

Thomas T. Martin, Director  
Division of Engineering and  
Technical Programs

Attachment:  
As stated

cc w/attachment:

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Mr. W. F. Conway, President and Chief Executive Officer  
Mr. J. P. Pelletier, Plant Manager  
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Mr. Warren P. Murphy

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FINAL EXERCISE ASSESSMENT

JOINT STATE AND LOCAL RADIOLOGICAL EMERGENCY RESPONSE EXERCISE  
FOR THE VERMONT YANKEE NUCLEAR POWER PLANT

VERNON, VERMONT

SEPTEMBER 21, 1983

FEDERAL EMERGENCY MANAGEMENT AGENCY

REGION I

John W. McCormack Post Office and Courthouse  
Boston, Massachusetts 02109

~~8406250248~~

## VERMONT YANKEE NUCLEAR POWER PLANT

LICENSEE: Yankee Atomic Electric Company

LOCATION: Vernon, Vermont

DATE OF REPORT: May 11, 1984

DATE OF EXERCISE: September 21, 1983

### PARTICIPANTS:

State of Vermont  
Brattleboro, Vt.  
Dummerston, Vt.  
Guilford, Vt.  
Vernon, Vt.  
Bellows Falls, Vt.\*

State of New Hampshire  
Chesterfield, N.H.  
Hinsdale, N.H.  
Richmond, N.H.  
Swanzey, N.H.  
Winchester, N.H.  
Keene, N.H.\*

State of Massachusetts  
Bernardston, Mass.  
Gill, Mass.  
Greenfield, Mass.  
Leyden, Mass.  
Northfield, Mass.  
Warwick, Mass.

### NONPARTICIPANTS:

The towns of West Halifax, Vermont, and Colrain, Massachusetts, which are located in the 10-mile emergency planning zones (EPZs) of both the Vermont Yankee and Yankee Atomic power plants, were tested in the April 6, 1983, exercise of the Yankee Atomic plant in Rowe, Massachusetts. The states that are included in the 50-mile ingestion EPZ were also not tested in this exercise, but will be at a future date.

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\*Relocation Center Community.



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## ABBREVIATIONS

ARES	Amateur Radio Emergency Services
CAP	Civil Air Patrol
CDNAVS	Civil Defense National Voice System
DOC	U.S. Department of Commerce
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EBS	Emergency Broadcast System
EOC	Emergency Operations Center
EOF	Emergency Operations Facility
EPA	U.S. Environmental Protection Agency
EPZ	Emergency Planning Zone
FEMA	Federal Emergency Management Agency
HHS	U.S. Department of Health and Human Services
IFO	Incident Field Office
IRAP	Interagency Radiological Assistance Plan
KI	Potassium iodide
MCDA	Massachusetts Civil Defense Agency
MDPH	Massachusetts Department of Public Health
NAWAS	National Warning System
NRC	U.S. Nuclear Regulatory Commission
PAG	Protective Action Guide
RAC	Regional Assistance Committee
RACES	Radio Amateur Civil Emergency Service
RADEF	Radiological Defense
RERP	Radiological Emergency Response Plan
TLD	Thermoluminescent dosimeter
USDA	U.S. Department of Agriculture



## SUMMARY

On September 21, 1983, the Federal Emergency Management Agency (FEMA) conducted an exercise of the plans and preparedness for off-site radiological emergency response for the Vermont Yankee Nuclear Power Plant located in Vernon, Vermont. Following the exercise, a preliminary evaluation was made by a 38-member federal observer team, and briefings for exercise participants and the general public were held on September 22, 1983, at the Quality Inn, Brattleboro, Vermont. This document provides overviews, deficiencies, areas for improvement and recommendations for each of the jurisdictions and field activities tested in the exercise.

Each deficiency and a corresponding recommendation for corrective action is described by jurisdiction in Sec. 2 of this report. Areas for improvement, which are not considered deficiencies, are also similarly described in Sec. 2. Section 3 provides a summary listing of (1) deficiencies that would lead to a negative finding, and (2) other deficiencies, including those meriting priority attention. This summary is in a tabular format and includes space for the states and local jurisdictions to respond to the deficiencies.

### Vermont

The new State Emergency Operations Center (EOC) has improved the emergency response capability of Vermont. The space and layout was generally efficiently organized and all appropriate maps and status boards were used. Activation and staffing was good; fan-out equipment was not fully operational but most essential staff members arrived promptly. The first-shift staff was highly competent. The primary communications link between the state and Brattleboro, Dummerston, and Guilford did not function effectively; equipment problems were encountered, reception was poor or nonexistent, confusing information was received, and updates were not sufficiently frequent. The backup systems did work well. Internal message flow at the State EOC was generally efficient, although verbal communications should be replaced with written messages. Also, messages originating from the Emergency Operations Facility (EOF) were not logged and consistently distributed to appropriate staff members. The Incident Field Office (IFO) move was well timed and well coordinated, and the Health Commission appropriately authorized the use of potassium iodide (KI) for emergency workers. Emergency Broadcast System (EBS) messages were disseminated with excellent coordination by the three states. Six EBS messages were issued (simulated) from the Vermont State EOC; however, the Vermont State EOC and local EOCs should improve their timing and coordination of EBS messages with siren sounding. There was no indication that the State EOC had contacted the Brattleboro EOC before releasing the information over the EBS.

The Brattleboro IFO operations were transferred efficiently to the Alternate IFO in Rockingham. However, supervision and assignment of the field monitoring teams were not resumed at the Alternate IFO after the move. Staff mobilization was prompt and management at both locations was efficient. Facilities of both IFOs were adequate;

however, some problems with the intercom system and message logging within the Brattleboro IFO were identified, and the Alternate IFO needs a status board. Field monitoring team deployment and communications, despite some minor problems with static, were generally handled well. Procedures for access control and traffic control were demonstrated and the Brattleboro IFO was well equipped for radiological exposure control. Reentry activities should be demonstrated in a future exercise.

Vermont field monitoring teams knew how to operate the equipment available to them for the exercise. Communications were generally good except for minor transmission problems, although the single communications network available could be overloaded at critical times. Knowledge of dosimetry was good, but permanent record dosimeters were not available. Direction and control of field monitoring teams might be accomplished better from the EOF. The IFO's role in radiological health, beyond distributing equipment and deploying teams, should be more clearly defined.

The Bellows Falls Union High School served as the relocation center. Staffing from the state, Windham County, Bellows Falls, the American Red Cross and volunteers all contributed to a successful demonstration. Some clarification is needed on the responsibility for monitoring evacuees and whether the number of emergency workers doing monitoring are sufficient to handle a large number of evacuees. Clarification is also needed on the role of the State Civil Defense at relocation centers. The relocation center could shelter 800 evacuees and had adequate accommodations; however, meaningful tasks must be developed to exercise the participants involved at the relocation center.

Four local EOCs were involved in the exercise. All of the EOCs had good facilities and amenities; however, noise was a problem at one and emergency classifications were not posted at another. Alerting and notification, emergency operations management, and implementation of evacuation and access control were performed well at all EOCs. Problems with the primary radio-telephone communications system were evident at three EOCs, but the system worked very well at Vernon. Public alerting should be improved by synchronizing EBS messages with siren sounding, reviewing procedures for EBS use, and reducing concern regarding the adequacy of siren coverage. Overall, more training and equipment for radiological exposure control are needed at some of the EOCs. Vernon EOC staff members demonstrated their field monitoring capability and a good knowledge of radiological exposure control. Limited reentry activity was evident at the local EOCs; exercise controllers did not induce enough activity.

### New Hampshire

The layout and space allotted for New Hampshire State EOC operations would probably not be adequate to support a full-scale state response to an accident. All appropriate maps were either posted or available. The status board was kept updated and the emergency classification level was posted. Alerting and mobilization of staff worked well considering the classification upgrade from Alert to General Emergency. Operations management was effective. The Civil Defense Director was in charge, held frequent briefings, and involved all appropriate staff in decision making. The Governor's

representative displayed good knowledge of radiological emergency response planning. Communications, both internal and external (with the Keene IFO and local EOCs), need major improvements.

Additional staffing at the State EOC is needed to assist the Operations Officer; internal messages were not relayed on standardized, hard-copy forms and thus transmission errors resulted; and the newly installed Civil Defense radio network was nonfunctional. The backup telephone was also overloaded at key times in the exercise. The ham operator provided the only effective means of communications. Nevertheless, messages to the IFO and subsequently to the local EOCs were initially delayed. Interstate coordination was effectively demonstrated through use of the Nuclear Alert System. This coordination was particularly evident in the drafting of EBS messages. However, coordination of EBS messages with public alerting needs improvement.

Protective actions -- staffing access control points, warning transients, closing state facilities in the 10-mile emergency planning zone (EPZ), and coordinating evacuation -- were effectively implemented. Accident assessment capabilities have improved since the last exercise, but, because of the fast-breaking nature of a scenario and the accident assessment staff's need for additional experience, insufficient information was available to the State EOC from the EOF. This condition was exacerbated by the lack of consistency in message forms used by the EOF and the State EOC and ineffective logging and distribution within the EOC. Also, procedures need to be reviewed on the use of support resources for ingestion pathway sampling. All appropriate state agencies participated in an excellent tabletop discussion on recovery and reentry. The scenario provided adequate play; deficiencies that had been identified earlier were corrected and new problems were identified because the scenario provided a full test of essential emergency response capabilities.

At the Keene IFO, activation and staffing were slow. State field monitoring teams were promptly dispatched upon their arrival at the IFO. Limited staffing created operations management problems. The state Civil Defense Representative could not perform all of the many activities that were expected. Also, as indicated above in the discussion of the State EOC, communications between the IFO and the State EOC were ineffective and the Civil Defense radio, which was to be used for communications between the IFO and the field monitoring teams, did not work. The exercise players are to be commended for establishing backup communications. Nevertheless, information flow was slow and hindered effective response capability.

The New Hampshire field monitoring teams did not have adequate monitoring equipment or an effective communication system. Although observers did not spot the necessary low-level GM counter, state officials assured FEMA in a subsequent meeting of April 5, 1984 that this equipment was available and with the teams. The exception was that the Silver Zeolite cartridges were not used because of the tendency of the cartridges to lose their effectiveness when exposed over periods of time to air. To improve communications the hand-held portable radios need to be upgraded for effective communication with the IFO. Direction and control of the field monitoring teams might be better accomplished from the EOF. The IFO's role in radiological health, beyond distributing equipment and deploying teams, should be more clearly defined.

Generally, facilities and amenities at the five New Hampshire local EOCs were adequate. Status boards and appropriate maps were available at most EOCs. Additional telephones were needed at two EOCs. Staff members were alerted and mobilized promptly at most locations, and participation at most EOCs was very good. Key staff, supporting personnel, and other participants were generally knowledgeable and dedicated. As indicated in the previous discussions of the State EOC and IFO, the new Civil Defense radio was not adequate as a primary communications link to the local EOCs. The backup Southwest Mutual Aid radio worked, but, because this system operates on only one frequency, messages were sometimes delayed. Also, most local EOCs received either conflicting or insufficient information on the status of the emergency. The public was notified with sirens, tone alert radios, and mobile alerting, all coordinated with EBS messages. At two EOCs, additional vehicles with public address systems for mobile alerting may be needed. Tone alert radios did not work at all locations. At another EOC, attempts to contact the media center were futile. Radiological exposure control was generally adequate. Survey meters, permanent-record dosimeters, and direct-read dosimeters were available.

### Massachusetts

In accordance with the agreed exercise objectives, the State EOC had limited involvement in this exercise. Representatives from key state agencies responded promptly. The EOC was effectively managed. Intrastate coordination of EBS messages was good. Some confusion arose about the Vermont evacuation to the Greenfield Community College. Communications equipment and its use by the State and Area IV EOCs were good, but some local EOCs had trouble communicating with the Area IV EOC.

The Area IV EOC was activated promptly and effectively managed. Communications problems were evident with the Tri-State Mutual Fire Aid radio and the new Civil Defense radio telephone connecting Area IV with the local EOCs. These problems were identified at Bernardston, Gill, Greenfield, Leyden, Northfield, and Warwick. The Area IV EOC coordinated movement of evacuees from Vermont to the Greenfield Community College.

For the most part, facilities, activation, staffing, emergency operations management, and radiological exposure control were good at all six Massachusetts local EOCs. Additional training in dosimetry was needed at one EOC and more personnel are needed for exposure control activities at another. Communications problems, usually in the form of malfunctions of the new Civil Defense radio telephone, existed at all the EOCs. Implementing protective actions was discussed at most EOCs, and participants at all EOCs indicated that the exercise did not provide adequate testing.

### Utility and State Coordination

The EOF was promptly staffed by representatives from Vermont and New Hampshire. New Hampshire does not have an independent radio link between the EOF and the State EOC and relies solely on land-line telephones for communication. Massachusetts representatives were stationed in Greenfield and coordinated response

from this location. Space allocation and briefing procedures at the EOF were improved over previous exercises. The roles and responsibilities of utility and state personnel need to be clarified to avoid delays in decision making.

The media center in Dalem's Chalet generally had adequate facilities to support the media. An actual power outage demonstrated the need for backup power at this location. Communications with the utility were cut off and equipment provided for the media did not work. Primary communication links to the State EOCs and EOF were demonstrated. Formal media briefings were held hourly and press releases were reviewed before being released. The effectiveness of the rumor control number was not effectively demonstrated. It is our understanding that the utility company has removed the toll-free rumor control telephone. In the event of an accident the plant will release a corporate telephone number and take collect calls.

## 1 INTRODUCTION

### 1.1 EXERCISE BACKGROUND

On December 7, 1979, the President directed the Federal Emergency Management Agency (FEMA) to assume lead responsibility for all off-site nuclear planning and response. FEMA's basic responsibilities in Fixed Nuclear Facility Radiological Emergency Planning include:

- Taking the lead in off-site emergency planning and in the review and evaluation of state and local government emergency plans for adequacy.
- Determining whether the plans can be implemented on the basis of observation and evaluation of exercises conducted by emergency response jurisdictions.
- Coordinating the activities of volunteer organizations and other involved federal agencies such as:
  - Nuclear Regulatory Commission (NRC)
  - Environmental Protection Agency (EPA)
  - U.S. Department of Energy (DOE)
  - U.S. Department of Health and Human Services (HHS)
  - U.S. Department of Transportation (DOT)
  - U.S. Department of Agriculture (USDA)
  - U.S. Department of Commerce (DOC)

Representatives of most of these agencies serve as members of the Regional Assistance Committee (RAC), which is chaired by FEMA.

Emergency plans for the Vermont Yankee Nuclear Power Plant in Vernon, Vermont, were formally submitted to the RAC by the States of Vermont, Massachusetts, and New Hampshire and involved local jurisdictions. The submission of the plans was followed closely by the exercising (in 1982), critiquing, and evaluation of the plans. A public meeting was held to acquaint the public with contents of the plans, answer questions about them, and receive suggestions on the plans.

The second radiological emergency exercise was conducted on September 21, 1983, between 8 a.m. and 5 p.m., to reassess the adequacy of the state and local emergency preparedness organizations and their capability to protect the public in a radiological emergency involving the Vermont Yankee Nuclear Power Plant. Figure 1 shows the communities within and surrounding the Vermont Yankee 10-mile plume emergency planning zone (EPZ).

An observer team consisting of FEMA personnel, RAC members, and support personnel from federal and state agencies evaluated the September 21 exercise. A total of 38 observers were assigned to evaluate state, local, and field activities. Observers

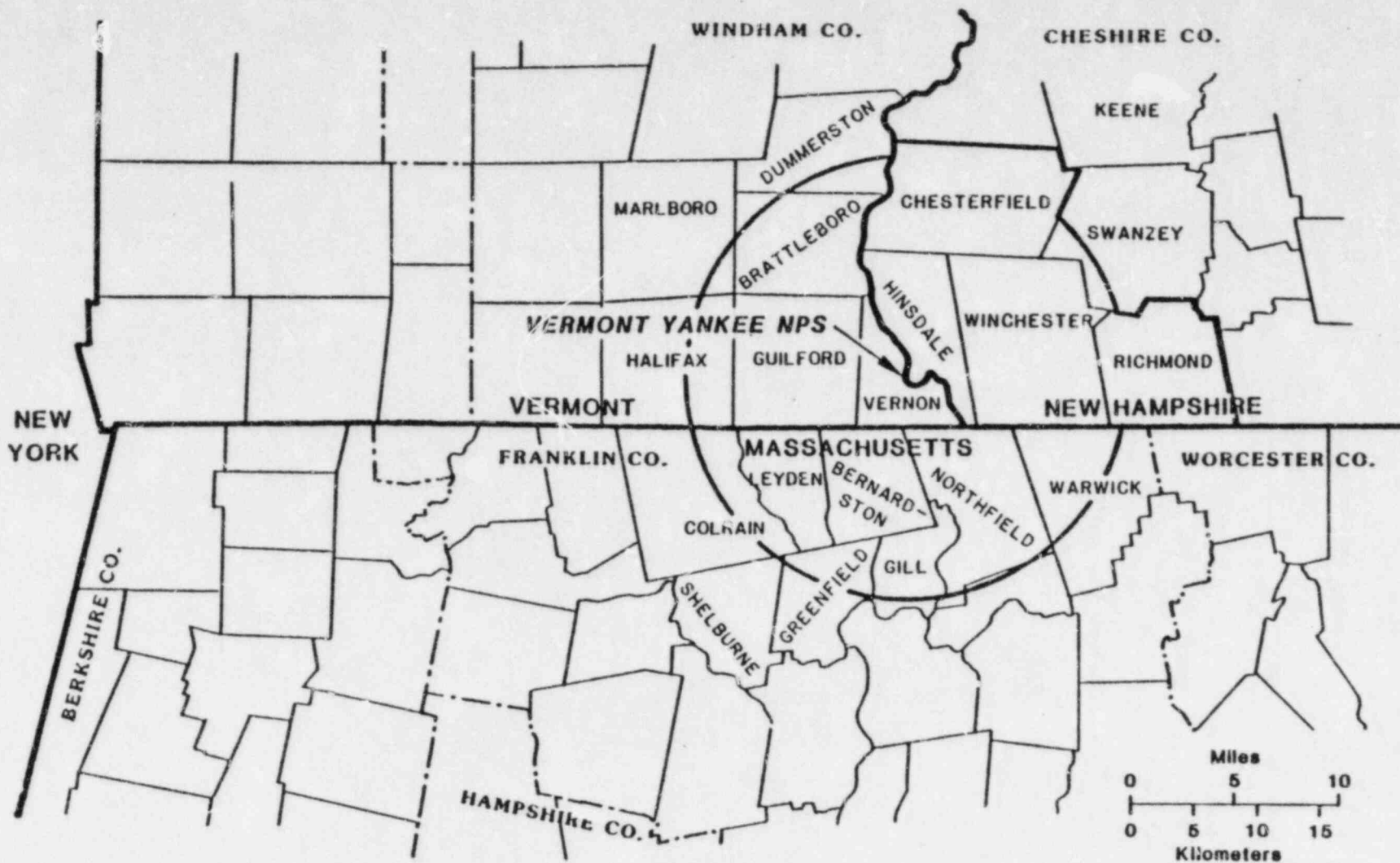


Fig. 1 Plume EPZ of the Vermont Yankee Nuclear Power Plant

were trained in radiological emergency planning concepts and given evaluation kits containing information on the exercise objectives, exercise scenario, and other pertinent data. Team leaders coordinated evaluation team operations and consolidated findings.

The exercise observations were recorded on a new questionnaire that permitted more-objective and more-detailed recording of observations and assured more uniformity among observation points. The report format reflects the use of this new form.

After the exercise, the federal observers met to review their observations. The intent of this meeting was to present site-specific observations and develop the preliminary findings that are detailed in this final exercise report. A public critique of the exercise for the exercise participants and general public was held at 1 p.m. on Thursday, September 22, 1983, at the Quality Inn in Brattleboro, Vermont.

The findings presented in this report were reviewed by the RAC Chairman of FEMA Region I. FEMA suggests that state and local jurisdictions take remedial actions in response to each of the deficiencies indicated in this report and that the states submit a schedule for addressing the identified deficiencies. The Regional Director of FEMA is responsible for certifying to the FEMA Associate Director of State and Local Programs and Support, Washington, D.C., that any deficiencies observed during the exercise have been corrected and that such corrections have been incorporated into state and local plans, as appropriate.

## 1.2 FEDERAL OBSERVERS

Thirty-eight federal observers were located at off-site emergency response functions. These individuals, their agencies, and their exercise location(s) are given below.

<u>Observer</u>	<u>Agency</u>	<u>Location</u>
Edward Thomas, RAC <sup>a</sup> Chairman	FEMA	General Observation
Larry Robertson, Team Leader	FEMA	Vermont State EOC <sup>b</sup>
Elliott Levine	FEMA <sup>c</sup>	Vermont State EOC
Andrew Hull	BNL <sup>d</sup>	Vermont State EOC
Bruce Swiren, Team Leader	FEMA	New Hampshire State EOC
Fred Oleson, RAC Member	FEMA	New Hampshire State EOC
Gary Kaszynski	FEMA <sup>c</sup>	New Hampshire State EOC
Sharon Stoffel, Team Leader	FEMA	Massachusetts State EOC
Paul Lutz, RAC Member	USCG <sup>e</sup>	Massachusetts State EOC
Kenneth Horak, Team Leader	FEMA	Dalem's Chalet Media Center
Neil Gaeta, RAC Member, Team Leader	FDA <sup>f</sup>	Emergency Operations Facility
Edward Wojnas, RAC Member	NRC <sup>g</sup>	New Hampshire Field Monitoring
James Opelka	FEMA <sup>c</sup>	Vermont Field Monitoring
Richard Holtzman	FEMA <sup>c</sup>	Vermont Field Monitoring
Warren Church	FDA	New Hampshire Field Monitoring
Byron Keene, RAC Member	EPA <sup>h</sup>	Emergency Operations Facility
Donald Connors, Team Leader	FEMA <sup>i</sup>	Keene State College, New Hampshire, Relocation Center



James Levenson	FEMA <sup>c</sup>	Relocation Center, Bellows Falls, Vermont
Robert Archila, Team Leader	FEMA	Incident Field Office, Brattleboro, Vermont; Alternate Incident Field Office, Rockingham, Vermont
John Stepp, RAC Member, Team Leader	HHS <sup>j</sup>	Incident Field Office, Keene, New Hampshire
K.C. Chun	FEMA <sup>c</sup>	Incident Field Office, Keene, New Hampshire
Kenneth Bertram	FEMA <sup>c</sup>	Area IV EOC, Belchertown, Massachusetts
Carol Roselli	FEMA	Area IV EOC, Belchertown, Massachusetts
Al Lookabaugh, Team Leader	FEMA	EOC, Brattleboro, Vermont
Sue Ann Curtis	FEMA <sup>c</sup>	EOC, Dummerston, Vermont
Doris Garvey	FEMA <sup>c</sup>	EOC, Guilford, Vermont
Leslie Poch	FEMA <sup>c</sup>	EOC, Vernon, Vermont
Dorothy Nevitt, RAC Member, Team Leader	DOA <sup>k</sup>	EOC, Chesterfield, New Hampshire
Donald Fingleton	FEMA <sup>c</sup>	EOC, Hinsdale, New Hampshire
Donald Hulet	FEMA <sup>c</sup>	EOC, Richmond, New Hampshire
Duane Knudson	FEMA <sup>c</sup>	EOC, Swanzey, New Hampshire
Rebecca Thomson	FEMA	EOC, Winchester, New Hampshire
Michael Sinclair, Team Leader	FEMA	EOC, Northfield, Massachusetts
George Hatch	FEMA	EOC, Bernardston, Massachusetts
Susan Barisas	FEMA <sup>c</sup>	EOC, Gill, Massachusetts
Robert Leisius	FEMA <sup>c</sup>	EOC, Greenfield, Massachusetts
Donna Kenski	FEMA <sup>c</sup>	EOC, Leyden, Massachusetts
David South	FEMA <sup>c</sup>	EOC, Warwick, Massachusetts

<sup>a</sup>RAC = Regional Assistance Committee

<sup>b</sup>EOC = Emergency Operations Center

<sup>c</sup>Contract Employee from Argonne National Laboratory, U.S. Department of Energy

<sup>d</sup>BNL = Brookhaven National Laboratory, U.S. Department of Energy

<sup>e</sup>USCG = U.S. Coast Guard, U.S. Department of Transportation

<sup>f</sup>FDA = U.S. Food and Drug Administration

<sup>g</sup>NRC = Nuclear Regulatory Commission

<sup>h</sup>EPA = U.S. Environmental Protection Agency

<sup>i</sup>American Red Cross Representative

<sup>j</sup>HHS = U.S. Department of Health and Human Services

<sup>k</sup>DOA = U.S. Department of Agriculture

### 1.3 EXERCISE OBJECTIVES

The exercise objectives of the states and local communities were to demonstrate that their emergency response plans, operations, and capability for mobilizing and coordinating needed resources are adequate to cope with an emergency at the Vermont Yankee Nuclear Power Plant.

### 1.3.1 Vermont Objectives

Specific objectives of the State of Vermont were to:

1. Demonstrate evacuation of the Vernon School to the Bellows Falls relocation center.
2. Demonstrate dosimeter reading of evacuees at decontamination point and simulate decontamination if needed.
3. Demonstrate reentry procedures and lab testing of collected samples.
4. Demonstrate Emergency Broadcast System (EBS) messages to the public and demonstrate interstate coordination.
5. Demonstrate the receipt and verification of notification from the plant by the State Police, followed by notification to state and local EOCs.
6. Demonstrate communications with local communities and primary state agencies.
7. Demonstrate the mobilization of emergency personnel at State EOC, IFO, local EOCs, and the EOF operations. Provide 24-hour round-the-clock coverage of these operations at local level.
8. Demonstrate the proper activation of public alerting and notification systems.
9. Demonstrate that emergency response agencies understand the emergency action levels and their consequent off-site responses.
10. Demonstrate the ability of the leadership of each EOC and the EOF to maintain clear and concise direction and control of all emergency response functions under their jurisdiction.
11. Demonstrate actual command and control functions to direct an actual or simulated access control.
12. Demonstrate the ability of emergency workers to adequately perform their duties despite low dose limits allowed before they must discontinue working and demonstrate the decision chain for permitting workers to receive exposure levels in excess of State Protective Action Guidelines (PAGs).
13. Demonstrate the coordination of the EOF personnel with off-site authorities on protective action recommendation, accident assessment, and public information.

14. Demonstrate interstate coordination between Vermont, Massachusetts, and New Hampshire where and when necessary to avoid confusion and potential harm to the public.
15. Demonstrate public information via media liaison(s).
16. Demonstrate the coordination with and support of federal agencies through FEMA and provide them with available resources to support them.

### 1.3.2 New Hampshire Objectives

Specific objectives of the State of New Hampshire were to:

1. Test established procedures for notifying and mobilizing the New Hampshire Emergency Response Organizations and to test the public alerting and notification capability.
2. Test and evaluate a new Civil Defense communications system. This system links the five New Hampshire towns in the emergency planning zone, the host community, the State EOC, the State Incident Field Office (IFO), and the Department of Public Health Services radiological monitoring teams. The existing communication system between Vermont Yankee Nuclear Power Plant, the States of New Hampshire, Massachusetts, and Vermont emergency response agencies will also be exercised.
3. Test the ability of the individuals in the principal state and local emergency response organizations to implement and coordinate the functions for which they are responsible.
4. Test the ability of the state to coordinate with the other states in the release and dissemination of information to the media.
5. Test the state's ability to collect and evaluate radiological data, to assess data supplied by the utility, to estimate the consequences of this information and to recommend the necessary protective actions to protect the public health and safety of New Hampshire citizens.
6. Initiate protective response actions for New Hampshire communities in the plume exposure Emergency Planning Zone using data based upon accident assessments.
7. Test the ability of the state to mobilize such support activities as the reception center, medical facilities and transportation services.

### 1.3.3 Massachusetts Objectives

Specific objectives of the State of Massachusetts were to:

1. Provide evidence of annual dissemination of information to the public.
2. Demonstrate coordination with reception, and host areas (includes such activities as use of maps, evacuee estimates, traffic flow information updates, logistics support at centers, and feedback from volunteer and governmental agencies).
3. Demonstrate that emergency response agencies understand the emergency action levels and their consequent off-site responses.
4. Demonstrate the receipt and verification of notification from the plant by the State Police and State Police notification to primary state agencies.
5. Demonstrate interstate coordination between New Hampshire, Vermont, and Massachusetts.
6. Demonstrate communications with local communities and primary state agencies.
7. Demonstrate the mobilization of emergency personnel at Area IV EOC and local EOCs to include the demonstration of a 24-hour manning capability. The State EOC will be manned with minimum personnel.
8. Demonstrate communications via radio/telephone (i.e., primary and backup systems).
9. Demonstrate the activation of the public alerting and notification systems to alert the EPZ public and provide them with prompt instructions.
10. Demonstrate the ability of the leadership of each EOC and the EOF to maintain clear and concise direction and control of all emergency response functions under their jurisdiction.
11. Demonstrate actual command and control functions to direct simulated access and traffic control.
12. Demonstrate public information via media liaison.
13. Demonstrate the coordination with and support of federal agencies through FEMA.

14. Demonstrate the coordination of the EOF personnel with off-site authorities on protective action recommendations, accident assessment, and public information.

Specific objectives of Massachusetts in the area of accident assessment were to:

15. Demonstrate Massachusetts Department of Public Health (MDPH) receipt of notification from the State Police.
16. Demonstrate mobilization and deployment of MDPH personnel to Massachusetts Civil Defense Agency (MCDA) and EOF.
17. Demonstrate establishment of effective interface with MCDA and the Vermont Nuclear Power Plant.
18. Demonstrate limited field operating procedures and communications.
19. Demonstrate EOF assessment actions and development of protection action recommendations.
20. Demonstrate MDPH EOF - Media Center interface.

Specific objectives of Massachusetts local EOCs were to:

21. Demonstrate exposure control for emergency personnel by proper use of equipment/instruments and record keeping.
22. Demonstrate that local emergency response managers possess and utilize capability to assure that their activities are coordinated internally and with all adjacent and overlapping jurisdictions.
23. Demonstrate the effectiveness of EOC operations, including a capability to maintain effective communications with emergency forces and state agencies.

#### 1.4 EXERCISE SCENARIO

Before the exercise started, the plant was assumed to be at 100% power on close cycle. The High Pressure Coolant Injection System was to be out of service for maintenance and the check-outs of the backup emergency core cooling system completed.

The events at Vermont Yankee Nuclear Power Plant were to begin at about 5:30 a.m. with the detection of an earthquake on site. An Unusual Event was to be declared and the Shift Supervisor was to notify the State Police of Vermont, New Hampshire, and Massachusetts at 5:35 a.m. Between 5:40 and 5:50 a.m., the State Health Department representatives were to be notified. At about 6 a.m., the shift supervisor

and the state health representatives were to determine the impact of the earthquake on plant operations\* and whether an escalation in emergency status was likely. Between 7 a.m. and 7:30 a.m., the EOF Coordinator (who was to report to the site at about 6:30 a.m.) was to update the state authorities of plant conditions and advise that the Unusual Event would be maintained until the complete plant was inspected. Between 7:45 and 7:55 a.m., the EOF coordinator was to advise off-site authorities that an Unusual Event status had to be redeclared because of an "indication of Loss of Coolant Accident (LOCA) evidenced by high containment sump flow indicating unidentified leakage greater than 5 gpm." This redeclaration was to be followed by discussion concerning escalation to an Alert because the leakage may have been related to the earthquake.

An Alert was to be declared at approximately 8:10 a.m. due to "coolant leakage within the primary containment greater than 50 gpm as indicated by continuous sump pumping" and the States of Vermont, New Hampshire, and Massachusetts were to be notified of the escalation.

The Media Center was to be activated between 8:40 a.m. and 9:10 a.m. A news release was to be drafted at the EOF and then, after discussion and coordination with state representatives, released to the public. At 9:55 a.m. a second, more-severe earthquake was to be sensed at the plant, massive failure of the control rod drive system was to be detected, and, at 10 a.m., a General Emergency was to be declared. The State EOCs were to be advised of this escalation by the Nuclear Alert System. A major release was to be in progress by 10:15 a.m., ground contamination levels were to be recorded within the site, and by 10:40 a.m. off-site monitoring teams were to report a whole-body dose rate of 10 R/hr at a site 1 mile downwind of the plant. Between 10:40 a.m. and 11:10 a.m., off-site monitoring teams were to report a whole-body dose rate of 4.8 R/hr at a site 2 miles downwind, with no iodine component measured. At the same time, transferring the Media Center to an alternate location was to be discussed and it was to be indicated that the wind would shift within a half-hour. At 12:15 p.m., additional press releases were to be forwarded to the Media Center for release to the public (the Media Center was not to be moved to an alternate location).

An agreement was to be reached to deescalate the Site Area Emergency at 12:50 p.m. because of a reduction in off-site dose conditions. At 2:00 p.m., it was to be explained that time had been condensed and that 1 week had passed. Consequently, exercise controllers located at each State EOC were to provide the players with information on what events had occurred during the week. The exercise was to resume with discussions about further deescalation and reentry of evacuated residents.

The exercise was to terminate at approximately 3:30 p.m. Table 1 provides a sequence of selected events for the exercise.

Overall, the affected state and local governments were presented with a very challenging and fast-moving scenario.

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\*For the exercise, it was assumed that no off-site effects of the earthquake would be evident; the earthquake would affect only plant operations.

Event	LOCATIONS									
	VT		NH		MA		CT		RI	
	VT State	VT Field	NH State	NH Field	MA State	MA Field	CT State	CT Field	RI State	RI Field
General Alarm	0513	0513	0513	0513	0513	0513	0513	0513	0513	0513
Alert	0818	0818	0818	0818	0818	0818	0818	0818	0818	0818
ROC Activated	0700 0743	1120	0843	0843	0843	0843	0843	0843	0843	0843
ROC Operational	0730 0753	1130	0815	0815	0815	0815	0815	0815	0815	0815
General Emergency	1000 1003		1007	1010	1004	1005	1005	1005	1005	1010
Field Team Dispatched										
Access Control	1805		1830	1831						
Shelter Message	1913									
Evacuation										
Tram, Bladwin	1820									
Stratfield Hillfield	1827 1930									
State Park	1140									
Siren Sounded	1820		1843	1853	1822	1848	1848	1848	1848	1843
Yam Alert Sirens	1820		1815	1820	1842	1848	1848	1847	1843	1843
ROC Message	0 1834		4120	1823	1844	1845	1845	1845	1845	1845
Mobile Sirens			1111	1822						
Bombproof Bldg	1:00 1:45 1:53		1:00	1:10 1:30	1:35	1:35	1:35	1:35	1:35	1:35
Bombproof to Alert				1:30						
Evacuation Terminated	1832 1808		1:00 1:05	1:00 1:05	1:00	1:00	1:00	1:00	1:00	1:00

\*Five ROC messages at 0843, 0848, 0730, 1005, 1013, 1120.

†Constitution, Mandate.

Table 1 Sequence of Selected Events

## 1.5 EVALUATION CRITERIA

The exercise evaluations presented in Section 2 are based on applicable planning standards and evaluation criteria set forth in Section II of NUREG-0654-FEMA-1, Rev. 1 (Nov. 1980). After the overview narrative for each jurisdiction or activity, deficiencies and areas for improvement are presented with accompanying recommendations. Deficiencies fall into two categories. The first category consists of those deficiencies that caused a finding that off-site emergency preparedness was not adequate to provide reasonable assurance that appropriate 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. These are deficiencies that lead to a negative finding. A negative finding must be based on at least one deficiency of this type.

The second category includes deficiencies in areas where demonstrated performance during the exercise was considered faulty, corrective actions are considered necessary, but other factors indicate that reasonable assurance could be given that in the event of a radiological emergency, appropriate measures can and will be taken to protect the health and safety of the public. Those deficiencies identified by an asterisk (\*) in this category are considered to be deficiencies meriting priority attention.

Areas for improvement are also listed as appropriate for each jurisdiction or activity. These items are not deficiencies, merely suggestions for improved performance.



## 2 EXERCISE EVALUATIONS

### 2.1 VERMONT STATE OPERATIONS

The State of Vermont activated and tested the new State EOC in Waterbury, Vermont, the Brattleboro Incident Field Office (IFO) and Rockingham Alternate IFO; three radiological monitoring teams; the Bellows Falls Relocation Center; and four local EOCs. The Media Center located at Dalem's Chalet in Brattleboro, Vermont, was also activated and the overview is included in Section 2.4.2.

#### 2.1.1 Vermont State EOC

##### Overview

The Vermont State EOC was recently moved from Montpelier to its present location in Waterbury. This exercise of Vermont's Radiological Emergency Response Plan (RERP) was the first to test this new facility. The facility is well-designed and provides ample working space and furnishings for staff members. The emergency staff are situated in separate department offices that provide for efficient operations. A large room was used for periodic briefings of key emergency staff members. The dose assessment staff and the radiological health staff offices are physically separated from each other by about 50 feet. Any exchange of information between these two groups required personnel to leave their work stations. Two backup diesel generators serve the building that houses the EOC.

Appropriate maps and status boards were available and utilized. Posted maps included the plume EPZ (by sectors), and maps of access control points and relocation centers were located in the State Police offices. Emergency action levels were posted and a situation status board was updated frequently to provide a chronological record of key events. The map showing the number of permanent residents (by sector) was available in the EOC manager's RERP notebook, although the map had some numerical discrepancies.

The EOC was activated after the State Police received a call indicating that an Unusual Event was declared at the plant at 5:33 a.m. A call-out was then initiated to the EOC manager and the Director of Occupational and Radiological Health. Most staff members were at the EOC by 7 a.m., before the Site Area Emergency, because the Civil Preparedness staff normally starts work at that time. The automatic dialers used to execute the call-out procedures were not operating at the time of the exercise. The EOC was fully operational by about 7:45 a.m.

Staffing at the EOC included representatives from the following: the governor's Office, Civil Defense, Public Service Department, Health Department, State Police, Fish and Game Department, Transportation Department, American Red Cross, Amateur Radio Emergency Services (ARES), National Guard, and Civil Air Patrol. The Department of Environmental Conservation was called at 10:30 a.m., about 30 minutes after the General

Emergency was declared; however, the director was not reached until 10:52 a.m. when called at home. Additional requests for emergency assistance were made to both FEMA and the Interagency Radiological Assistance Plan (IRAP). Second-shift staffing was demonstrated by presenting a roster of personnel assignments and in some cases by double staffing.

The first-shift staff competently performed its assignments. Staff members' familiarity with their assignments was apparent during periodic briefings, when events surrounding the plant conditions and its impact were discussed.

All communications systems worked well and were used effectively. Brattleboro, Dummerston, and Guilford could not be reached effectively by radio telephone. The WESCOM system was used for calling and holding conferences with Massachusetts, New Hampshire, the utility, and the EOF. Other available communication systems included commercial telephone, National Warning System (NAWAS), State Police, and Highway Radio. Additional communication support was available from Amateur Radio Emergency Services and the Civil Air Patrol (CAP). Civil Defense National Voice System (CDNAVS), which will permit the state to call FEMA directly, is due to be installed in October. During the exercise the telephone was used to request FEMA assistance. The EOC communicated with the field monitoring teams through the Brattleboro IFO. Internal EOC communications and message logging procedures were generally efficient. However, three different lines of communication connected the EOF with the EOC. Three staff members (one member each from Civil Defense, Radiological Health, and Public Service) were transmitting plant information directly to their superiors at the EOC. Information from these unofficial channels of communication was passed along verbally to the EOC director and was not always written down and distributed to the appropriate staff. This practice could lead to inaccurate message documentation and incomplete distribution of messages.

Emergency operations were effectively managed by the Commissioner of Public Safety. Appropriate staff members were consulted and were involved in decision making, including the EOC manager and representatives from Health, Radiation Safety, and Public Service. Because the EOC staff is dispersed in separate offices, the briefings and the chronological status board helped keep members informed of events and responses. The flow of information leading to protective action recommendations was good. Overall, the dose assessment and the protective action recommendations were made competently and quickly.

Dose projections were calculated quickly with a programmable calculator and data from the plant on meteorological conditions (wind speed, direction, stability class) and plant condition (projected release strength). Projected dose rates agreed with those of the utility. However, the utility's projected data were used to determine where to deploy the state monitoring teams. To minimize radiation exposure to the teams, they were ordered to locate the plume and remain at its edge rather than traverse it. However, the RAC believes that the low allowable dose limits preclude the identification of the plume boundary and field verification of dose projections. Other protective actions were ordered for emergency workers. At about 10 a.m., the EOC received word that measurable levels of iodine were found on site. Although iodine was not detected in the off-site plume, the State Commissioner of Health authorized the use of potassium

iodide (KI) for emergency workers in the field. Another action to protect emergency workers was the transferring of IFO operations from Brattleboro to Rockingham. The move was timed and coordinated effectively with the flow of events.

Off-site protective action considerations began with the escalation from Site Area Emergency to a General Emergency at 10 a.m. The loss of coolant at the plant resulted in a utility recommendation to evacuate the nearby towns of Vernon, Vermont, and Hinsdale, New Hampshire. After discussion of the need for and requirements of evacuation with the Department of Health and Radiological Health, the recommendation was accepted. Once this decision was reached, the state notified the Governor, alerted the Department of Transportation to the impending evacuation and the need for access control with the states of Massachusetts and New Hampshire, and coordinated the sounding of sirens, tone alert radios, and EBS messages. In anticipation of further plume transport and existing plant conditions, a second evacuation order was recommended for Brattleboro, Vermont, and Guilford, New Hampshire. Subsequent activities followed the same sequence as the previous evacuation order. However, the state did not contact Brattleboro before releasing the evacuation information over EBS.

Six emergency broadcast messages were issued (simulated) during the exercise. Live emergency broadcast tests were successfully performed twice. Simulated messages described events, plant status, evacuation orders, routes to take, and what to take along. These messages were effective and, in the case of the first evacuation order, coordinated with the sounding of sirens and tone alert radios. The sirens and tone alert radios were to sound at 10:20 a.m. and the EBS message was to play at 10:22 a.m. However, the EOC did not verify that the sirens had sounded before the EBS message. Additionally, EBS messages were not monitored to determine if any other instructions were being given locally.

Access around the plant area was controlled by establishing 17 roadblocks. The Department of Transportation helped the State Police establish the barricades.

The press was briefed on several occasions but the briefings were not observed during the exercise. Briefings, which were given by the Governor's representative, were held in a separate conference room in the EOC building. Maps indicating the emergency classification, plume sectors, and plant layout were available. Prior to briefings the Public Information Officer (PIO) contacted the official Media Center at Dalem's Chalet to determine the latest plant status and other pertinent information that could be disseminated to the public via the press.

The scenario did not provide for a demonstration of reentry capabilities.

#### Deficiency and Recommendation

1. Description: The Brattleboro EOC did not receive notice from the State EOC to evacuate in a timely manner. Thus, Brattleboro's protective response activities could not be implemented because the Brattleboro EOC was notified of the evacuation over EBS at the same time the public was (NUREG-0654, II, J.9).

Recommendation: Advise the EOCs of all affected towns of protective actions recommended for their town before such information is broadcast over the EBS so that emergency response actions can be initiated by the local EOCs before the public receives this information.

2. Description: Even though the emergency workers adequately performed their duties prescribed in the Vermont State plan, the low dose limits preclude the identification of the plume boundary and field verification of dose projections. Furthermore, the RAC believes that the low allowable dose limits renders the Vermont field monitoring teams incapable of providing accurate field verification. Thus, Vermont would be dependent on utility field monitoring data and would not be able to verify the dose projections independently (NUREG-0654, II, I.9, I.11).

Recommendation: It is suggested that Vermont make better arrangements to locate and track the airborne radioactive plume. This may include changing state guidelines and field procedures to allow for the entry of field monitoring teams into areas suspected to be in the plume. This could be done without exceeding EPA exposure limits and would allow the state to obtain radioiodine measurements.

#### Areas for Improvement and Recommendations

1. Description: The automatic dialers were not yet operating at the EOC's new location (NUREG-0654, II, E.2).  
Recommendation: The automatic dialers should be made operational to expedite the alerting of the staff.
2. Description: The EOC staff representative from the Department of Environmental Conservation was not reached until 52 minutes after the General Emergency declaration (NUREG-0654, II, E.2).  
Recommendation: Review procedures for alerting staff during later stages of an emergency to ensure that the staff members or their designated backups are contacted promptly.
3. Description: Information from the EOF was received by three state agencies (Radiological Health, Public Service, and Civil Defense) represented at the State EOC. Not all information from these sources was logged and distributed to appropriate staff.  
Recommendation: Devise a procedure to ensure that information originating at the EOF is logged and distributed to appropriate EOC staff.
4. Description: The current EOC layout separates the Department of Health and Radiological Health from the individuals who are

computing doses. The dose assessment team was not consulted on protective action decisions because the team members were physically removed from the decision makers. Consequently the decisions on recommending protective actions were made with limited input.

Recommendation: If possible, provide a means for more effective consultation between the groups developing dose information and those responsible for protective actions. These means may include moving the two groups to adjacent offices in the EOC, or providing an intercom between the two offices.

5. Description: After the evacuation order for the towns of Vernon and Hinsdale received concurrence, an order to sound sirens at 10:20 a.m. and issue an EBS message at 10:22 a.m. was given. However, the state did not verify that sirens actually sounded before the EBS message was broadcast (NUREG-0654, II, E.6).

Recommendation: Institute a procedure to verify that sirens are sounded before the EBS message is broadcast.

6. Description: The state had insufficient opportunity to exercise reentry procedures (NUREG-0654, II, M and N).

Recommendation: Future exercises and drills should demonstrate state reentry procedures and capabilities.

### 2.1.2 Incident Field Offices (IFOs)

#### Overview

Emergency response capabilities were demonstrated at both the IFO in Brattleboro and the Alternate IFO in Rockingham.

The Alert message was received at 8:36 a.m. from the State EOC. Procedures for mobilizing the IFO staffs were then promptly implemented by the State Police, who used a call fan-out system. The IFOs were also directly informed about the status of the plant by the State EOC. All essential staffing was completed within 45 minutes of receipt of the Alert. Other supporting staff arrived later. The alternate IFO demonstrated the ability to change shifts by presenting a staff roster.

The Directors of both IFOs were clearly in charge and efficiently managed operations. Plans and checklists were used and adequate security was provided. Messages were logged and distributed as needed. However, many of the log entries at the Alternate IFO show only the originators and addresses; the content of messages was not included in the log entries.

Both IFOs were well located, arranged, and staffed. The Alternate IFO has a backup location about 20 miles north of the plant with good facilities and equipment for sustaining IFO operations. Backup power for communications was available at both

IFOs. The IFO displays were adequate but relocation centers were not posted at either IFO. The Alternate IFO had no status board and emergency classification levels were not posted. Both facilities can support extended operations, one by using lodging available nearby. Although enough telephones are available, the Civil Defense and Department of Public Health (DPH) staffs at the IFO, who are located on the second floor and in the basement, respectively, experienced some problems with the intercom system they used to communicate with each other.

With the exception of telephones, which were sometimes overloaded, external communications were reliable and efficiently handled. The two-way radios and scanners were especially effective. Mobile radios were used to communicate with staff members while they were en route to the Alternate IFO.

The IFOs have no responsibility for dose assessment but are involved with field monitoring. Until the IFO was evacuated, field teams were directed to various locations. Field readings were reported regularly at 15- to 20-minute intervals. Activities of DPH at the IFO were not fully resumed at the Alternate IFO as planned; instead, the State EOC took over direction of the field monitoring teams and reentry operations. Before the move, the IFO DPH personnel proficiently handled the field monitoring teams and reported field data to the State EOC. There were only occasional minor difficulties with clear transmissions of data from the field teams.

Although the IFOs have no responsibility for public alerting and instruction, they have vehicles, personnel, and equipment available for supplementing these activities (which are performed by the towns under the direction of the state). An EBS station located next to the IFO, WTSA, had good provisions for security and was equipped with a scanner so that conversations between field monitoring teams and DPH staff members could be monitored.

The IFO demonstrated procedures for implementing and coordinating access control, traffic control and transportation. Transportation for people who have impaired mobility was arranged with the Department of Transportation. The Department of Transportation and the Civil Defense Agency carried out parallel activities in these areas and reported to the DPH at the State EOC and also advised the IFO director.

The IFO was well equipped for radiological exposure control -- it had ion chamber survey instruments and an adequate supply of 0-200 mR, 0-20 R, and 0-200 R personal dosimeters on hand. Various kinds of environmental sampling equipment and protective clothing were also available.

There was no media activity at the Brattleboro IFO, but it was evident that reporters could be adequately accommodated.

Demonstration of reentry procedures was poor. Although the scenario provided for demonstration of reentry procedures, the IFO staffs apparently did not feel that this was to be a part of the exercise. There apparently was no impetus from the state to demonstrate reentry.

The scenario was adequate for testing the more important elements of the plan, but it appears that not enough exercise controls were used to elicit any meaningful response by the IFOs in reentry operations.

#### Deficiency and Recommendation

1. Description: Internal communications equipment (intercom) at the Brattleboro IFO was not reliable and hampered accurate information transfer between the Civil Defense and Department of Public Health staffs (NUREG-0654, II, F.1.d).  
Recommendation: Identify the communications equipment problem and remedy it.

#### Areas for Improvement and Recommendations

1. Description: The text of messages was not included in the log entries, thus limiting awareness of the changing emergency response condition.  
Recommendation: Have communicators note, at least in abbreviated form, the message text in the log entries. This referencing of messages will make changes in emergency status clearly evident.
2. Description: While the IFO operations in Brattleboro were transferred to the Alternate IFO in Rockingham, the DPH staff at the State EOC assumed direction of the Vermont field monitoring teams. It appeared that supervision and assignment of the field monitoring teams were not resumed at the Alternate IFO after the move.  
Recommendation: The responsibility for supervising and assigning field monitoring during and after transfer of operations from the IFO to the Alternate IFO should be clearly defined in the standard operating procedures and the state plan. Consideration should be given to direction of the field monitoring teams from the EOF.
3. Description: Reentry demonstration at the IFO was, at best, weak.  
Recommendation: Since reentry demonstration is always scheduled at the end of a tiring day when participants, especially volunteers, are ready to go home, consideration should be given to handling this important phase by a carefully prepared drill or a series of tabletop exercises.
4. Description: The Alternate IFO at Rockingham was activated, but it lacked a status board and emergency classification levels were not posted.  
Recommendation: Install a suitable status board and a display showing the emergency classification.

### 2.1.3 Vermont Field Monitoring

#### Overview

Three radiological monitoring teams, consisting of two members per team, were deployed from the Brattleboro IFO in Vermont. Mobilization procedures were not demonstrated; team members were prepositioned for this exercise. An adequate mobilization system that includes the use of radio pagers, call lists, and procedures to replace unreachable members was described in detail.

Adequate monitoring equipment was available for each team. It included G-M counters (one end window), ionization chambers (0-300 mR/hr and 0-300 R/hr), and filter media and thermoluminescent dosimeter (TLD) replacements for the fixed-station air monitoring system. Teams were also equipped with environment sampling equipment. At least one team did not have portable air sampling equipment.

The field monitoring team demonstrated a good knowledge of the equipment that was available to them for the exercise. When an actual demonstration or simulation was not completed, team members explained the appropriate procedures to show their capabilities.

Radio communications were clear and understandable to the IFO and the State EOC in Waterbury after the IFO was relocated, although some dead spots and weak areas did exist. Because only one network is used for all radio transmissions, communications could be crowded at critical times. According to exercise participants, the Vermont State Police radio could be made available as backup in a real radiological emergency.

Although dosimetry was generally adequate, all team members in one of the monitoring teams did not have permanent-record devices. Potassium iodide was available but not required or demonstrated. All team members knew how to use their dosimeters.

The scenario was good and allowed the teams to demonstrate their abilities. Capability for environmental sampling during the recovery-reentry stage was not demonstrated.

#### Deficiencies and Recommendations

- \*1. Description: All members of one of the field monitoring teams did not have permanent-record dosimeters (NUREG-0654, II, K.3.a).  
Recommendation: Provide sufficient permanent-record dosimeters (TLDs or film badges) for all field monitoring team members.
2. Description: Not all teams were equipped with portable air monitoring and sampling devices (NUREG-0654, II, H.7, I.8).



Recommendation: According to the Vermont State Plan, each monitoring team kit should contain air monitoring and sampling devices.

Area for Improvement and Recommendation

1. Description: Although participants said the State Police radio network could be used for backup communications, its use was not demonstrated during the exercise (NUREG-0654, II, F.1.d).  
Recommendation: Demonstrate the use and procedures for the State Police radio network, or make available more than one frequency on the Civil Defense system.

#### 2.1.4 Bellows Falls Relocation Center

##### Overview

The reception center at the Bellows Falls Union High School was activated within 40 minutes of the initial telephone notification. Activation included the establishment of registration, social welfare, psychological, kitchen, nursing, and security functions. All stations were clearly identified with signs. Red Cross radio communications were established before the center was activated. Initially three organizations staffed the center, including the American Red Cross with volunteers, the Bellows Falls Police Department, and Vermont Civil Defense. The Red Cross unit was well managed and trained in their responsibilities.

Within another hour, representatives arrived from the Vermont Department of Public Health, the Vermont Agency of Human Services, and the Windham County Sheriff's Department. The Sheriff's Department officers assumed security and traffic control functions. Volunteer nurses from a local hospital and the Bellows Falls Police Department demonstrated shift changes. The Red Cross unit represented a "first response" function and in a protracted emergency would be replaced by National Red Cross staff.

Fifteen evacuees arrived at the reception center by bus. There was some confusion about the location of the drop-off point and the radiological monitoring station. A need for plan clarification was evident regarding the responsibility for monitoring evacuees and the role of Vermont Civil Defense at the relocation center. Two Vermont Department of Public Health monitoring teams demonstrated the monitoring function and processed approximately 40 persons per hour. If contaminated individuals had been encountered, continued monitoring at this rate would have not been possible. Additional monitoring equipment was stored at the school, but the staff had difficulty in locating and gaining access to the equipment. Contaminated individuals were to be decontaminated in the school's shower facilities. In compliance with exercise objectives, decontamination was not demonstrated. Decontamination supplies were present; the staff did not indicate whether additional supplies could be made available in an actual emergency.

Standard Red Cross procedures for registering evacuees were used (i.e., Red Cross Form 5972). No one was admitted into the reception center without having cleared the monitoring, decontamination (if necessary), and registration stations.

The relocation center was located well beyond the plume EPZ. The center could accommodate 800 evacuees and feed approximately 300 per sitting. If the number of evacuees was expected to exceed shelter capacity, the shelter manager would contact the Red Cross state office for alternative relocation instructions. Sanitary facilities, drinking water, storage lockers, and vehicle parking were all adequate. The shelter had no sleeping accommodations but these could be acquired within a few hours. The shelter was equipped with wheelchair ramps.

Telephone communications were available to each state or local emergency facility. Indirect amateur radio and citizen band (CB) links were provided and used by a Red Cross volunteer. All messages were logged. A facility-based ambulance was not available at the reception center, and no one was aware of an ambulance radio frequency. First-aid equipment at the shelter was minimal. Staff members could use police and CB communications to radio for an ambulance if one were required.

Shelter personnel were notified of the number of expected evacuees just prior to their arrival. Food supplies that were immediately available included coffee, tea, and sweet rolls. More food could be obtained from local vendors by using existing Red Cross purchase orders. Kitchen facilities were available at the center. No procedures were developed to inform evacuees of events in the affected area.

The scenario adequately tested alerting, notification, and activation procedures. However, the expertise of volunteers at the nursing, social welfare, and psychiatric stations was completely unused. These participants should be provided with meaningful, professional tasks. Future exercises should also realistically test radiological monitoring, decontaminating, and sheltering of evacuees.

#### Deficiencies and Recommendations

None.

#### Areas for Improvement and Recommendations

1. Description: The role of Civil Defense at the relocation center was not defined. It was also not clear which agency was responsible for monitoring evacuees (NUREG-0654, II, A.2.a, J.12).  
Recommendation: In the state plan and standard operating procedures, define the role of the Civil Defense at relocation centers and identify which agency should monitor evacuees.
2. Description: An ambulance was not stationed at the facility, and no one present was aware of an ambulance radio frequency (NUREG-0654, II, F.2., L.4).  
Recommendation: Establish a primary communication link with local ambulance services. Police and CB radios can continue to provide a backup capability.
3. Description: Volunteer registered nurses said first-aid equipment was inadequate (NUREG-0654, II, L.1).  
Recommendation: In consultation with medical and emergency response experts, equip the relocation center with appropriate first-aid equipment.

4. Description: There was no procedure to inform evacuees about events in the affected area (NUREG-0654, II, G.4.a,c).

Recommendation: Include an official spokesperson on the shelter staff to brief evacuees, respond to rumors, and answer questions.

## 2.1.5 Local EOCs

### 2.1.5.1 Brattleboro

#### Overview

The Brattleboro EOC is located in the municipal building and has sufficient space, furniture, lighting, and telephones. Noise is also adequately controlled. Backup power is available but was not demonstrated. A status board showing current plant conditions was posted. All necessary maps were posted except for one showing evacuation routes; however, this map will be made available and posted in the future.

The EOC was activated promptly and according to plan procedures. The call to activate the EOC was received at the fire station from the State Police at 8:35 a.m. Staff notification procedures were initiated using a written call list and the EOC was fully staffed by 9:00 a.m.

Emergency operations management was well handled. The town manager held periodic briefings and consulted with the staff frequently before making decisions. A message log was kept and message handling procedures operated efficiently. The staff had written procedures and checklists for reference. Access to the EOC was controlled.

Communications were generally effective. The radio telephone linking all local EOCs and the State EOC was not operating so the backup system was used. Schools could be contacted by telephone, and hospitals and ambulances could be contacted by radio. There was a direct link to the EBS station from which the EOC could broadcast a message over the EBS directly.

Updated radiological information provided by the state was not regularly transmitted to the EOC. According to the EOC Director, the state has agreed to provide for updated information to the EOC every 30 minutes. The EOC Director felt that, because so little information was given during the early stages of the exercise, the staff was uncertain about why the state ordered an evacuation.

The public was alerted by sounding the sirens, dispatching route alerting teams, and contacting schools, nursing homes, and hospitals. The state order to evacuate was not received at the Brattleboro EOC in a timely manner. Thus, Brattleboro could not set up evacuation functions such as traffic and access control, which have to be established before the public receives the evacuation message over the EBS. After some discussion and inquiries to the State EOC, the sirens were sounded at 11:15 a.m., and the EOC Director subsequently transmitted an evacuation message over the EBS at 11:20 a.m. The simulated evacuation called for by the scenario was carried out well. Traffic control points were staffed quickly and were adequate to cover the entire town. A list of mobility-impaired individuals is available at the EOC so that appropriate arrangements can be made for their evacuation, if necessary. The Brattleboro plan has also been updated to include additional vehicles that can be used to assist in an evacuation.

Radiological exposure control procedures were demonstrated. The EOC had sufficient quantities of high-, low-, and mid-range dosimeters for all EOC staff and emergency workers. Record keeping cards were maintained for all workers. No permanent record dosimeters were available at the EOC. Potassium iodide was also available but the state did not authorize its use. Members of the staff were generally knowledgeable of decontamination procedures. However, the staff felt that refresher courses in radiological exposure control would be beneficial.

Due to the time compression of the scenario and the quick termination of the exercise, recovery and reentry activity was not required of the EOC. However, the Director and staff discussed potential problems faced upon reentry and possible solutions.

The scenario seemed well designed and sufficiently tested emergency response capabilities including reentry. However, the reentry phase was not properly conducted by the exercise controllers.

#### Deficiencies and Recommendations

1. Description: The primary communication system did not function properly (NUREG-0654, II, F.1.b, F.1.d).  
Recommendation: Identify the communications equipment problem and remedy it.
2. Description: Brattleboro did not receive prompt notification from the state to evacuate (NUREG-0654, II, J.9).  
Recommendation: The state needs to review its procedures on notifying local EOCs to initiate all protective actions so that local EOCs can begin emergency response actions before the public receives protective action recommendations over the EBS.
3. Description: Permanent-record dosimeters were not available (NUREG-0654, II, K.3.a).  
Recommendation: Provide a sufficient number of permanent-record dosimeters.

#### Areas for Improvement and Recommendation

1. Description: The State EOC did not give regular updates of radiological information to the Brattleboro EOC. Consequently the Brattleboro EOC staff was unsure of the reason for an evacuation (NUREG-0654, II, F.1.b).  
Recommendation: The state should provide local EOCs with regular updates on the incident, and especially on radiological information.

2. Description: The exercise controllers did not properly conduct the reentry phase (NUREG-0654, II, M.3).  
Recommendation: Give controllers better training in conducting a reentry phase of an exercise.
  
3. Description: A map showing evacuation routes was neither posted nor available (NUREG-0654, II, J. 10.a).  
Recommendation: Post a map in the EOC showing evacuation routes.

### 2.1.5.2 Dummerston

#### Overview

The Dummerston EOC is located on the second floor of the municipal center, which is geographically situated on the border of the 10-mile EPZ. At present an alternate EOC site has not been identified. Furniture, lighting, the organization of the available space, ventilation, and security were adequate. Additional work areas, typewriters, copy machines, and telephones were present in the offices downstairs and would be available during an emergency situation. Maps showing the plume EPZ, evacuation routes, and population distribution; a status board; a 24-hr staff roster; and list of major phone numbers were posted. While these facilities are adequate for short-term use, sustained operation could be limited by a lack of bunks, cooking areas, and showers. Also, the building lacks an alternate power source.

The EOC was activated after the notification of the Alert was transmitted and verified over the Civil Defense radio telephone system. Staffing was completed in 20 minutes; staff members were notified by telephone or contacted in person if they were already present in the municipal building. The staff included representatives from the following municipal services: police, fire, health, highway, civil defense, communications, public information, and supply.

The overall management of the Dummerston EOC was very good. The Emergency Director managed the staff efficiently. These staff members performed their assignments promptly and according to the local plan, which they frequently checked for reference. Message logs were also maintained.

The overall organization of the EOC communication system was adequate. The main system is the radio telephone; commercial telephones are used as a backup. Supplemental information was obtained from the fire and weather monitoring systems. The EOC office has no public radio for receiving EBS messages. Several problems occurred within the various communication systems. First, the radio telephone was not adequately transmitted for most of the morning. Second, information transmitted over the fire monitoring system was contradictory; inconsistent terms were used to describe events, mixing the descriptions of a Site Area and General Emergency classifications. Third, notification of EBS messages was not received in the EOC office.

The EOC had minimal involvement with the public alerting system and cannot be completely evaluated since evacuation did not take place. For the most part, public alerting by siren was initiated and actiated outside this community by the Tri-State Mutual Fire Aid Network. The EOC alerting system included vehicles with public address systems, police and fire car message carriers, and public messages transmitted by the EBS.

This EOC does not have a program to fulfill radiological exposure control functions. The state has agreed to provide staff and equipment to the Dummerston area on an "as needed" basis. Reentry procedures were not demonstrated.



Some deficiencies reported after the 1982 exercise have been corrected including deficiencies noted in the facility and displays. However, the exercise still did not adequately test the emergency capabilities of the EOC, particularly the plans and capabilities for responding to a radiological emergency and associated evacuation procedures. However, the staff used some of the long periods of inactivity to practice plotting the plume and discuss how they could improve the EOC facility.

#### Deficiencies and Recommendations

1. Description: The communication network available to the EOC was not effective. Reception was poor, confusing information was received, and situation updates were too infrequent (NUREG-0654, II, F.1.d).  
Recommendation: Comprehensively test and debug the entire communication system and develop comprehensive procedures for using the system.
2. Description: A program for controlling radiological exposure is not established and dosimeters are not available (NUREG-0654, II, K.3.a, O.1).  
Recommendation: Provide sufficient dosimeters and establish a radiological exposure control training program.

#### Areas for Improvement and Recommendations

1. Description: No provision for long-term EOC operations is available. An alternative backup power source for communications equipment is not available.  
Recommendation: Provide for bunks and meals at the EOC or arrange for this service at a nearby house or business. Provide an alternate power source to support EOC communications operations.
2. Description: The EOC had no radio for monitoring EBS messages.  
Recommendation: Install a functioning radio in the EOC.
3. Description: The reentry phase was not properly conducted by the exercise controllers (NUREG-0654, II, M.3).  
Recommendation: More exercise control is needed in the reentry phase.

### 2.1.5.3 Guilford

#### Overview

The Guilford EOC is located in the station house of the town's volunteer fire company. The EOC had adequate space, lighting, and furniture to support operations. Bathroom and kitchen facilities were also available and sufficient space exists for bunks to be brought in, if needed. Backup power supply is limited to possible use of the firetruck; this method was not demonstrated. A status board was posted and kept up to date. Maps of the EPZ and the town (houses, location of handicapped residents, roads, etc.) were on display. A list of individuals needing assistance in evacuation was available. Evacuation routes and access control points were added to the town map as the scenario unfolded. Maps of relocation centers were not posted or available although their location was known to the EOC staff. Emergency classification levels were not posted.

The primary communication system was a newly installed radio telephone. The reception of messages was very poor, with considerable static and interruptions in transmission, and the Guilford EOC was unable to send messages on the new equipment. The staff was aware of the malfunction and had requested repairs prior to the exercise. A repairman had unsuccessfully worked on the system the day before the exercise. Alternative communications were limited to one commercial telephone, the Tri-State Fire Aid telephone, and the fire radio. The latter has limited range and messages must be relayed from other stations.

Activation and staffing of the EOC were timely. The EOC was activated by 6:30 a.m. following the declaration of an Unusual Event, although the town plan did not require this action until after an Alert (8:27 a.m.). The commercial phone was used to notify the staff, with pagers also available for notifying 10 members of the staff who were also volunteer firemen. An additional 15 volunteer firemen would have been called in an actual emergency. Twenty-four-hour staffing was demonstrated by presenting a roster. Staff mobilization procedures were already well established for activating the volunteer fire company. A minimum of 7 staff members were present at the EOC at all times.

The head of Guilford's Civil Defense was in charge of the EOC, and was effectively supported by the fire chief and one of the town's three selectmen. The designated health officer and media representative were not present. Access to the EOC was controlled by a sign-in/out log. The staff worked together smoothly and effectively. Messages were logged in, and although copies were not circulated, all participants were kept informed. Written procedures had been prepared for each emergency classification and were followed. A copy of the town plan was available and referred to during the exercise.

Guilford relies on tone alert radios for public alerting. A tone alert and receipt of the evacuation message were received on the EOC's radio following the declaration of General Emergency. The fire siren was sounded following the evacuation announcement, but the staff felt that it was not effective since it could not be heard throughout the

town. The EOC staff contacted the elementary school by commercial telephone, although the school has a tone alert radio and its own emergency plan. The EOC staff did not prepare an EBS message and did not monitor the EBS, although a radio was available. The staff was confused about where responsibility for issuing EBS messages rests; the town plan is ambiguous.

The staff practiced determining protective actions. On the basis of information from the state on real or scenario wind direction, the staff judged that only the northeast sector of the town should be evacuated. This decision was not communicated (either real or simulated) to the public. Two staff members were dispatched (simulated) to access control points for the section of town selected for evacuation. The EOC was in the plume pathway and the possibility of evacuating to the designated alternate location (the Town Hall) was discussed. It was decided that, because the townspeople would expect emergency headquarters to be at the fire station, the EOC would not be relocated.

Direct-reading dosimeters (low-range), survey meters, and record cards were available at the EOC. Dosimeters and record cards were issued to the emergency workers sent to access control points. Dosimeters were not issued to EOC personnel even though the EOC was likely in the path of the plume. Permanent-record devices were not available and reentry procedures were not carried out.

#### Deficiencies and Recommendations

1. Description: The primary communications system did not function properly and only one commercial telephone was available for backup communications (NUREG-0654, II, F.1.d).  
Recommendation: Identify the communications problem and remedy it. Provide additional commercial telephones for backup communication.
2. Description: The responsibility for public alerting via EBS messages is not clearly defined in the town plan (NUREG-0654, II, E.5).  
Recommendation: Clarify the plan and train the EOC staff in their responsibility for public alerting via EBS messages.
3. Description: The EOC staff was not properly trained in the use of dosimetry equipment and lacked knowledge of maximum doses. Also, permanent-record dosimeters were not available (NUREG-0654, II, K.3.a, K.3.b).  
Recommendation: Train the EOC staff in use of dosimetry equipment and in understanding maximum allowable doses. Also, provide sufficient permanent record dosimeters.

Areas for Improvement and Recommendations

1. Description: The school plan was not included in the town plan nor available at the EOC, and the staff was not aware of its contents.  
Recommendation: Provide copies of the school plan to EOC staff members so that they can determine what role the EOC could (or should) play in the school evacuation.
  
2. Description: The reentry phase was not properly conducted by the exercise controllers (NUREG-0654, II, M.3).  
Recommendations: More exercise control is needed in the reentry phase.

#### 2.1.5.4 Vernon

##### Overview

The Vernon EOC is located in the basement of the firehouse and consisted of a communications room and an operations room. The EOC can provide good protection to the occupants because it has concrete block walls and is windowless. A kitchen and sleeping quarters are available to support extended operations. Backup power for the entire firehouse is available and was demonstrated. There was a slight problem with noise in the communications room since all radios were located along one wall. The director recognized the problem and plans to provide for more separation of the radios in the future. All necessary maps were posted and used effectively. A status board showing current plant conditions was posted and a message log was kept.

The EOC was activated promptly and according to plan procedures. The Alert was received at 8:26 a.m. by the Civil Defense Director via telephone from the State EOC and also over the fire radio pager. The Director initiated staff notification procedures using a written call list and the EOC was fully staffed by 8:50 a.m. Twenty-four hour staffing capability was demonstrated by presentation of a roster of second-shift personnel; some positions were also double staffed.

Emergency operations management was well handled. The Civil Defense Director was an effective leader who consulted the staff frequently before making decisions. Because the EOC was small, it was not necessary to distribute copies of messages; communications could be overheard by everyone in the EOC. However, because fire department personnel were located upstairs, the staff felt that an intercom system would help to distribute messages to the firemen more effectively. Security was minimal at this EOC; a police officer was occasionally posted at the door as necessary.

Communications were especially effective. The new radio telephone worked well. All local EOCs and the State EOC are tied in and conferencing is available on this line. Redundant communications to both the state and other local EOCs were demonstrated. There was also a direct telephone link to the EBS station from which the EOC could broadcast a message over the EBS directly. The EOC drafted a test message and transmitted it to the EBS station. The PIO at the EOC was quite knowledgeable about procedures to access the EBS and drafted an effective message. The EOC had radio contact with all schools and highway maintenance vehicles.

Public alerting was accomplished quickly. The three sirens covering the town were sounded at the appropriate time as directed by the state. In two sections of the town where it is difficult to hear the sirens, the Director simulated sending out two route alerting teams to cover the area. He estimated it would take about 15 minutes to cover each area.

The simulated evacuation called for by the scenario was carried out well. Traffic control points were staffed quickly and were adequate to cover the entire town. The EOC had radio contact with all highway maintenance vehicles so that if they were needed they could respond quickly. Evacuation capability was demonstrated by

evacuating several residents of a nursing home and, on the basis of reports to the EOC, was carried out with no problems.

Three people in the nursing home and one resident in a private home were identified as needing help during an evacuation, but EOC staff did not foresee any problems in getting assistance to move these people if necessary.

Although field monitoring is not a function of the local EOCs, the Vernon EOC demonstrated field monitoring capability by sending out two two-person teams. Because Vernon is close to the plant, these teams can probably provide good information during the early stages of an accident before state field monitoring teams can be mobilized. The EOC staff has a RADEF officer and several volunteer firemen who have received training in field monitoring activities.

Radiological exposure control procedures were demonstrated. The EOC had sufficient quantities of high-, low-, and mid-range dosimeters for all EOC staff and emergency workers and maintained record keeping cards for the workers. A number of staff members, especially the volunteer firemen, had been trained to use dosimeters. However, no permanent-record dosimeters were available at the EOC. Potassium iodide was available but the state did not authorize its use.

Knowledge of decontamination procedures needs improvement. The RADEF officer has some training in decontamination procedures, but, since he may be out with the field monitoring teams, other staff members should be trained.

The scenario seemed well developed and produced a sufficient test of emergency response capabilities. However, due to the time compression of the scenario, reentry was not played.

#### Deficiency and Recommendation

1. Description: Permanent-record dosimeters were not available (NUREG-0654, II, K.3.a).  
Recommendation: Provide sufficient permanent-record dosimeters.

#### Areas for Improvement and Recommendations

1. Description: Incoming staff were not immediately informed of the current situation and development of the incident.  
Recommendation: Install a large message board for chronologically recording events.
2. Description: Security was inadequate to restrict access only to authorized personnel.  
Recommendation: Strengthen security procedures, possibly by initiating a sign-in procedure to control access to the EOC.

3. Description: In the event of the RADEF officer's absence, other staff members should be trained in decontamination procedures (NUREG-0654, II, O.1).  
Recommendation: Provide appropriate training for additional staff personnel.
  
4. Description: The reentry phase was not properly conducted by the exercise controllers (NUREG-0654, II, M.3).  
Recommendation: Controllers need to be better trained in conducting reentry phases of exercises.

## 2.2 NEW HAMPSHIRE STATE OPERATIONS

The State of New Hampshire activated and tested the State EOC in Concord, the Incident Field Office in Keene, two field monitoring teams, the relocation center at the Keene State College, and five local EOCs. The overviews for these local EOCs are included in Section 2.2.4.

### 2.2.1 New Hampshire State EOC

#### Overview

The New Hampshire State EOC is located in the State Civil Defense Headquarters at 1 Airport Road on the State Military Reservation in Concord. The EOC consisted of an operations room, a communications area, an accident assessment room, and a meeting room for the Governor and the emergency response staff. The layout and amount of space allotted for emergency response activities would probably be inadequate to support a full-scale state response to an accident. All appropriate maps were either posted or available, the status board was kept updated, and the emergency classification level was posted. Backup power was not available, but this problem will probably be remedied when a new EOC is built.

The system for alerting and activating the EOC staff worked well. At 5:40 a.m., the New Hampshire State Police notified the Civil Defense duty officer at his home of the Unusual Event status. The duty officer reported to the office and subsequently contacted the Civil Defense Director and Governor's office. At the Alert, the EOC was partially activated in accordance with the state plan. Normally, at the Site Area Emergency stage, all state agencies would be directed to report to the EOC. During this exercise, activation did not occur at the Site Area Emergency classification because the classification went from an Alert to the General Emergency. Activation took around 40 minutes total, although most staff showed up sooner than that. By 10:40 a.m., the EOC was fully staffed and operational.

Emergency operations management worked well. The Director exercised firm control of the staff activities and other state agency EOC representatives. Adherence to the procedures in the plan was stressed. The Governor's representative performed well; frequent briefings were held in the Governor's office at the EOC to discuss status of actions and strategy. The Governor's representative displayed good knowledge of the requirements of off-site emergency planning.

The operations officer was very busy answering the phone and keeping track of the message flow; thus coordination of staff response actions by this individual was not effective. Internal message handling was not optimal. Messages were not relayed at all times on standard hard-copy forms. The lack of forms resulted in unnecessary recopying of messages by communication operators, either from oral communications or from unorganized notes.



Communications between the State EOC and the local communities via the Keene IFO were not effective, apparently because equipment failed in the newly installed Civil Defense radio network. The Centrex telephone system, which was a backup for communicating with the IFO and verifying that local EOCs received messages, was overloaded at key times in the exercise. Thus, the backup ham radio operators were essential for communications. Even though the communications officer at the State EOC should be commended for successfully establishing a communication link with the IFO, messages to the IFO and subsequently to the local EOCs were initially delayed.

The Nuclear Alert System was an effective communication link between the three states and the utility, particularly in the drafting of EBS messages. It also provided backup communications from the IFO to the State EOC, although the exercise participants said this use was not in accordance with the New Hampshire State Plan.

Public alerting decision making was executed well. Upon receiving notification of a General Emergency and recommendations for evacuation, the State EOC staff coordinated the timing of public alerting with Vermont and Massachusetts. At 10:45 a.m., a test signal was broadcast over EBS simulating public instructions, and sirens were sounded (from the Southwest Mutual Fire Aid facility) for public alerting. There was some difficulty contacting the five local EOCs of the public alerting and notification timing sequence due to the poor operation of the Civil Defense radio network. Contact was made via commercial telephone and ham radio a few minutes late.

Other protective actions ordered by the Governor's representative included closing all state facilities in the 10-mile EPZ. State EOC staff members from the various state agencies simulated calling state facilities under their respective agency's jurisdiction to inform them to close. Also, the State Fish and Game Commission simulated sending a National Guard helicopter with a loudspeaker over the Pisgah State Park to alert hikers and campers of the incident and tell them to evacuate. The State Police from Troop C simulated staffing all access control points on principal highways. Control of secondary roads in the area required assistance from the National Guard.

The Pupil Transportation representative at the EOC contacted the two schools in the evacuated towns of Hinsdale and Chesterfield and arranged for the students' bus transportation to the reception center in Keene. Bus capacity was adequate, since the bus company also serves schools outside the EPZ. In the other three towns where sheltering was recommended, the instructions to the affected schools were also promptly relayed.

Considerable progress in accident assessment had been made by the Department of Public Health (DPH) by organizing instruction manuals, standard operating procedures, maps, forms, programmed computers, logs, message control, and shift changes. Had the scenario been more conventional (i.e., not escalated directly from the Alert to General Emergency), the positive impacts of these preparations may have been more fully demonstrated. The chief players and the State Health Commissioner were well trained in accident assessment and did, in fact, properly recommend the required protective actions required for the affected towns in the EPZ. However, the inexperience and late arrival of the representative at the EOC, resulted in insufficient information related to source

term, and iodines and particulates concentrations off-site. Thus, because of this lack of information at the State EOC, protective actions were based on "worst case" estimates. State DPH monitoring teams were pulled back to the IFO because of the expected "worst case" high levels of dose, and were unable to define the plume.

The process of augmenting existing staff with additional EOC staff, field monitors, decontamination consultants, etc. was excellent. Inexperience as to what was pertinent to the assessment process was evident and admitted by the hot-line communicator at the DPH/EOF phone.

The internal communications system at the EOF has been improved but was not familiar to the New Hampshire EOC accident assessment players. Had this new system of internal communications been used by the New Hampshire DPH representatives at the EOF and the DPH (telephone) communication specialist at the State EOC, more accurate and timely reports would have been available. A standard form for logging essential plant information was available at the EOF but copies were not available at the State EOC DPH accident assessment room. Also, the State Commissioner of Health and the radiation control staff were not fully aware of the methods of obtaining, logging, and internally distributing essential plant information.

The DPH status board in the accident assessment room should indicate the location and status of utility monitoring teams as well as those dispatched by the IFO. The maps used by DPH and others did not indicate direction in degrees (at least for every 10°) as well as by compass rose.

Based on discussions with State EOC officials, additional supplies of dosimeters (self-reading and permanent-record) and KI are needed for emergency workers and local citizens who may have to reenter evacuated areas.

State laboratories' capacity for analyzing and processing samples of, for example, food, water, crops, and milk would have been inadequate if extensive contamination had been encountered in the plume. Although the New England Radiological Health Compact had been invoked on the assumption that such contamination had occurred, the request for assistance was for additional laboratory and monitoring personnel, not for additional equipment. Exercise participants said mobile labs from Yankee Atomic, DOE/EPA, Portsmouth Navy Yard, and Brookhaven National Laboratory could have been made available. It was not clear how and where these resources would have been integrated into the total response.

There was an excellent tabletop discussion on recovery and reentry actions and strategy following the "stop play" stage in the exercise. The states conferred with each other and agreed to relax protective actions around 7 p.m. that evening. At issue were the subjects of security, food, animal feed, and water supply monitoring, and the degree of activation at the state and local level to support a prolonged response at the Alert classification. The roles of other agencies such as the State Agriculture Department, State Police, National Guard, State Highway Department, etc. were discussed with the Governor. It would have been useful to have "special problems" inserted into this exercise phase to stimulate activity by these state agencies. Also, no one at the State EOC actually informed the local governments of their decision to allow reentry at 7 p.m.

that evening. Therefore, the local EOCs were still playing the exercise in an evacuation stage, while the state was playing in the reentry and recovery stage.

The scenario provided the New Hampshire local EOCs and responsible state agencies an opportunity to display their ability to implement their plans. Earlier deficiencies that had been recognized were corrected and new problems were identified because the scenario provided a full test of essential emergency response capabilities.

#### Deficiencies and Recommendations

- \*1. Description: The space and layout of the State EOC was not well suited for efficient operations. Also, backup power was not available to sustain communications in the event of a power outage (NUREG-0654, II, H.3).  
Recommendation: Continue efforts to improve EOC in terms of space and layout. This will probably necessitate establishing a new State EOC.
- \*2. Description: Communications over the Civil Defense radio network did not function between the State EOC, the IFO, and the local EOCs. The backup centrex telephone system was overloaded at key times and did not provide backup capability (NUREG-0654, II, F.1.d).  
Recommendation: The cause of the primary and backup communication system failure must be identified and remedied. Schedule drills to test the adequacy of these systems.
- \*3. Description: Internal message flow between the operations room and the communications center was ineffective because messages were not relayed on standardized, hard-copy forms and the operations room was poorly laid out. Also, the operations officer could not simultaneously answer phones and coordinate internal message flow (NUREG-0654, II, A.2.a, F.1.d).  
Recommendation: Transfer of internal messages should not be done orally or from unorganized notes; use hard-copy message forms to eliminate recopying of messages by receivers. Give more assistance to the operations officer to ensure that internal communications are efficient and accurate. Improve room layout to make it more conducive to internal communications.
- \*4. Description: Information from the EOF received at the EOC DPH assessment room was not written down on forms that were used at both locations. A standard form was available at the EOF but not at the EOC, so accurate and timely reports were not available. Technical updates from the EOF were not periodically (at least every 30 minutes) received at the State EOC (NUREG-0654, II, F, F.1.d).

Recommendation: The standard form used at the EOF should also be used at the State EOC. Technical information from the EOF should be updated every 30 minutes or sooner if conditions change.

5. Description: The state DPH representative did not arrive at the EOF promptly, thus resulting in insufficient information flow to the State EOC for making protective action decisions based on accident assessment (NUREG-0654, II, H.4).

Recommendation: Consider providing continual contact between the EOF and the State EOC while the state representative is in transit to the EOF. Also, additional training is needed for the individual assigned to be the state representative at the EOF.

6. Description: A request for assistance in analyzing and processing ingestion pathway samples did not accurately specify the type of assistance required. It was also not clear as to how the available resources (laboratory and monitoring personnel) would be integrated in the total response effort (NUREG-0654, II, A.2.a, A.3).

Recommendation: Review the state's requirements for ingestion pathway monitoring and clearly indicate the relationships and responsibilities between the state and the available resources.

#### Areas for Improvement and Recommendations

1. Description: A status board in the Governor's briefing room would be useful. The status board in the DPH accident assessment room did not indicate the location and status of the utility teams and the state monitoring teams dispatched from the IFO. The maps used by DPH did not indicate direction by degrees and compass rose (NUREG-0654, II, J.10.a).

Recommendation: It is suggested that a status board be maintained in the Governor's briefing room. Include the location and status of field monitoring teams on the DPH status board, and include direction by degrees and by compass rose on plume exposure pathway maps.

2. Description: Although the State EOC staff held an excellent tabletop discussion on recovery and reentry, the local EOCs were not aware of the deescalation of the emergency and that recovery and reentry was taking place; the local governments were still in the evacuation stage.

Recommendation: Assure that communications are maintained throughout the exercise.

## 2.2.2 Keene IFO

### Overview

The Incident Field Office (IFO) in Keene, N.H., has ample space, furniture and lighting. An adequate status board and necessary maps were also available, but the staff was slow to use them. The staffing process at the IFO was confused and slow. Field monitoring teams were activated before the Alert notification, and several players arrived at the IFO site almost one hour before the state Civil Defense representative in charge of the IFO arrived. During the early stage of staffing, there was no security and no one was in charge. Staffing was completed at about noon, 2 hours after the arrival of the state Civil Defense representative. Many support agencies were represented at the IFO. The IFO staff members from DPH were, in general, familiar with their duties. Monitoring team members were contacted via commercial telephone. No backup communication system was available. Upon their arrival at the IFO, radiological field monitoring teams were promptly dispatched to designated monitoring sites upon receiving instructions from the State EOC. They were not briefed on plant and meteorological conditions or exposure control procedures before they left the IFO. The state Civil Defense representative in charge of the IFO was also working as a communicator, and, therefore was too busy to direct other support staff. There was no periodic briefing to update participants with the status of emergency situations. In general, the IFO lacked overall management.

The Civil Defense radio between the IFO and radiological monitoring teams did not function most of the time. Also, no communications were received from the State EOC over the Civil Defense radio system and the backup telephones were overloaded at key times. Failure to establish a link or excessive static noise levels caused the difficulties. No backup communication system was available to the field monitoring teams except for the commercial telephones they could find while in the field. Eventually, field monitoring teams managed to report radiological dose rate data to the IFO either through local EOCs using the portable Civil Defense radio or by commercial telephone. At times, telephone communication at the IFO was interrupted by excessive noise from adjacent telephone or radio conversations.

Messages from the State EOC over commercial telephone concerning the plant status, emergency classifications, and protective actions taken were clearly posted on the status board, although posting of the messages was delayed in the beginning. However, radiological field monitoring data were not plotted on maps nor disseminated among key players at the IFO.

There was some confusion about the threshold level of exposure for KI use. However, instructions to take KI were issued to field teams at the direction of the State EOC. The instruction was issued as a precautionary measure before any detection of radioactive iodide in the field.

Activation of a decontamination facility was simulated, and the exercise at the IFO was cut short without simulation of recovery and reentry procedures.

### Deficiencies and Recommendations

- \*1. Description: The new Civil Defense communication system did not function properly between the IFO and field monitoring teams. Also there was no backup radio system; commercial telephones were used if they were available (NUREG-0654, II, F.1.d).  
Recommendation: Problems with the Civil Defense communication system should be identified and remedied. An appropriate backup communication system also needs to be identified and tested.
  
2. Description: Due to the lack of enough staff the state Civil Defense representative in charge was too busy working as a telephone communicator causing him to neglect his management duties (NUREG-0654, II, A.2.a)  
Recommendation: Assign an additional person to work as a telephone communicator so the state Civil Defense representative can provide overall management at the IFO.
  
3. Description: Message logging at the IFO was informal (essential elements of communication were not recorded); important messages (plant status, meteorological conditions, field monitoring data, etc.) were not disseminated among key players, and no periodic briefings were held to update the staff on the status of the emergency (NUREG-0654, II, A.2.a, F.1.d).  
Recommendation: Develop and use standardized forms for message logging. Such forms should provide spaces for all essential elements of communication. Develop and implement procedures for providing important messages to key players and other staff members in the form of hard copy or periodic oral briefing, and post messages on the status board.

### Areas for Improvement and Recommendations

1. Description: Security at the IFO was nonexistent during the early stage of staffing.  
Recommendation: Develop procedures to provide security from the time of IFO activation and register all participants prior to admittance to IFO.
  
2. Description: Maps were available but not used to display field monitoring data and the locations of the radioactive plume and field monitoring teams.  
Recommendation: Develop procedures to use maps for promptly displaying radiological information and monitoring team locations.

3. Description: Field teams were not briefed on exposure control procedures or plant and meteorological conditions before deployment.

Recommendation: Brief field teams on plant and meteorological conditions and exposure control procedures prior to deployment.

### 2.2.3 New Hampshire Field Monitoring

#### Overview

The demonstration of radiological field team mobilization was adequate. Teams were dispatched prematurely to the IFO in order to complete demonstrations of team capabilities. Commercial telephone notification is used by the state to mobilize teams in an emergency at the Vermont Yankee nuclear station. Radio pagers are not used for notification. Teams were not briefed prior to being dispatched to their respective duties.

The monitoring teams, in general, had adequate monitoring equipment. A low range G-M counter would have been useful to the teams because of its long battery life and durability. As expected prior to the exercise, teams were not equipped with silver zeolite or silica gel filter cartridges for radioactive iodine sampling; however, charcoal cartridges were used adequately.

The field monitoring teams demonstrated an adequate knowledge of their equipment and used standard operating procedures to set up appropriate equipment. Plume monitoring procedures were not demonstrated nor were environmental sampling techniques. The teams encountered problems finding monitoring locations identified by the IFO. Also, because no plume monitoring was performed, direction and control of the field teams did not demonstrate the more aggressive method necessary for definitively tracking the plume. Little information was received by the teams from the IFO on plant status.

Hand-held portable radios used by the radiological field monitoring teams were ineffective. Many messages were completely misunderstood. Battery life of portable radios was also a limiting factor for good communication. The teams nevertheless communicated data to the IFO and local EOCs over commercial telephone.

The field monitoring teams were equipped with adequate dosimeters including permanent-record devices (TLDs or film badges). However, team members were never requested by the IFO to read dosimeters or report readings. Teams were advised to contact the IFO for guidance on maximum allowable doses or overdoses. Potassium iodide was administered (simulated) to team members.

The scenario was adequate in most respects. Recovery/reentry environmental sampling was not demonstrated, personnel and equipment were not monitored, and protective measures were not taken for decontamination of vehicles or equipment.

#### Deficiencies and Recommendations

- \*1. Description: Communications used by the monitoring teams did not function properly (NUREG-0654, II, F.1.d).  
Recommendation: Identify communications equipment problem and remedy it. Possibly equip field monitoring teams with vehicles that have mobile radios.



- \*2. Description: Monitoring teams are not equipped with a low level G-M counter. Equipment provided to teams has short battery life and is not adequate for extended field use (NUREG-0654, II, I.8).  
Recommendation: Provide field monitoring teams with a portable G-M counter with extended-life batteries, such as the CDV-700.
3. Description: Dosimeters were not distributed and IFO personnel were not familiar with radiological exposure control measures (NUREG-0654, II, K.3.a, K.3.b).  
Recommendation: Give IFO and field team personnel more training in the use of dosimeters and in all other aspects of radiological exposure control.

#### Areas for Improvement and Recommendations

1. Description: Teams had trouble finding locations to be monitored and sampled. Very little information was received from the IFO on plant status.  
Recommendation: Provide more training for both the monitoring teams and the communicator at the IFO.
2. Description: Direction and control of the monitoring teams were not optimal. The effectiveness of the monitoring teams was limited by the number of fixed monitoring points and plume monitoring was not performed.  
Recommendation: Consider moving the direction and control of field monitoring teams to the EOF. Define more clearly the IFO's role in radiological health beyond use as a distribution point for equipment and for deployment of teams. Establish additional monitoring points or give field teams the flexibility to select other monitoring points and perform plume monitoring at the monitoring points in a future exercise.

## 2.2.4 Keene State College Relocation Center

### Overview

The relocation center at Keene State College was activated promptly. The reception center staff were initially notified by telephone. College staff members set up the center. Representatives from the New Hampshire Welfare Office performed reception functions, while the American Red Cross provided radio communications and a liaison to the congregate care center. Large, informative signs were posted at appropriate stations. No medical or first-aid team was present, although a station was provided. The shelter manager, communications volunteer, and emergency volunteers knew their respective roles and had taken shelter courses.

A 24-hour staffing and maintenance capability was not demonstrated. Participants discussed their need for a list of backup staff. Red Cross shelter registration forms used to register evacuees at the reception center were inappropriate. Also, the capabilities to monitor and shelter evacuees were not demonstrated. Participants said the monitoring station would be located at the highway exit. Contaminated persons would be directed to the high school for decontamination. It was not clear how people who were monitored and cleared would be transported from the monitoring station to the relocation center. A capability for traffic direction and control was not observed.

Keene State College is an appropriate choice for a relocation center. It is at least 5 miles beyond the plume EPZ and can shelter 700 evacuees. Adequate communications, kitchen, drinking water, sleeping, and parking facilities were present. Working relations between the College, Welfare, and Red Cross personnel were excellent.

### Areas for Improvement and Recommendations

1. Description: Emergency medical staff, traffic control, and a public information officer were lacking (NUREG-0654, II, A.2.a).  
Recommendation: Make arrangements with Keene College health division, campus security, and other appropriate groups to provide the necessary emergency personnel.
2. Description: A capability to staff and maintain the reception center for a protracted period was not evident (NUREG-0654, II, A.4).  
Recommendation: Develop a list of trained, standby personnel indicating availability. Develop procedures for contacting backup personnel.
3. Description: Red Cross registration forms used to register evacuees at the reception center were inappropriate (NUREG-0654, II, J.12).

Recommendation: Increase training and familiarization of participants with the appropriate forms and procedures to improve registration procedures.

## 2.2.5 New Hampshire Local EOCs

### 2.2.5.1 Chesterfield

#### Overview

The Chesterfield EOC has been relocated since the last exercise. It has bathroom and kitchen facilities and adequate space, lighting, furniture, telephones, and backup power. Sleeping facilities are not available, but bunks could be brought in if needed. Large EPZ maps with plume sectors, evacuation routes, relocation centers, and access control points were posted. Furthermore, an ingestion pathway EPZ map showing locations of crops, livestock, dairy producers, and open water supplies was posted. This is an important innovation and helped in the determination of protective actions and notification. A map showing population by evacuation area was not available. A status board was prominently displayed and kept current on significant events and emergency classification levels.

Activation and staffing of the EOC was accomplished efficiently. At 5:55 a.m. key EOC staff were notified by Southwest Mutual Fire Aid via radio pagers of the Unusual Event and they arrived at the EOC by 6:10 a.m. The EOC was immediately activated and operational. The remaining EOC staff were notified by radio pager or telephone and requested either to report to the EOC or remain on standby for a second shift. The EOC was staffed with selectmen, town administrative staff, the police and fire chiefs, and other volunteers. Twenty-four-hour operation of the EOC is possible with replacement staff drawn from a list of volunteers.

Emergency operations were adequately managed by the Civil Defense Director. The Director held briefings and discussed proposed actions with the staff. Written procedures and checklists were used by all key staff members and helped in carrying out necessary actions. Messages were logged and relayed to the EOC staff. Security was weak although probably sufficient for a small-town EOC. Upon arriving at the EOC, people were required to identify themselves and state the nature of their business. However, no log was kept, nor were people stopped before entering the EOC.

Communications using the new Civil Defense radio, delivered the day before the exercise, were ineffective. There was static and messages were often broken and could not be copied. The Director felt that communications would have been better over the Southwest Mutual Fire Aid telephone. The communication officer did a good job under adverse conditions.

The public was alerted with tone alert radios, EBS messages, telephone calls, and route alerting. The Director instructed the Fire Chief to mobilize the firefighters for route alerting after the evacuation notice was given. The school was notified of the situation and buses were put on standby before the evacuation order.

Access to the area was controlled by simulated road blocks. The Department of Public Works would keep roads clear during bad weather and in event of stalled or

wrecked cars. Evacuation of Chesterfield was simulated and was well directed by the Civil Defense Director, who was organized, evaluated problems, and arrived at appropriate solutions. A written list with the location of mobility-impaired individuals was available but it did not include any notation on the special needs of these individuals. Messages about protective actions for livestock, not drinking from open water supplies, or where school children could be picked up were not issued.

Radiological exposure control procedures were adequately demonstrated. The RADEF Officer was very knowledgeable about radiological instrumentation and problems associated with exposure to and contamination by radioactive materials. Verbal and written instructions on dosimetry were given to emergency workers when they were issued dosimeters. Appropriate records also were maintained. In addition to permanent-record dosimeters, survey meters and low- (0-200 mR), mid- (0-20 R), and high-range (0-200 R) dosimeters were available.

Media relations were not handled at this EOC. Any media requests would be referred to the state media center.

Recovery and reentry procedures were not demonstrated at Chesterfield. At 1:45 p.m. the town was evacuated. All the EOC staff except the Director and one selectman were allowed to leave. The Director and selectman went to the Keene reception center for a briefing on reentry. However, shortly after they arrived in Keene they were called to a real emergency in Chesterfield, so recovery and reentry were not played.

The scenario provided sufficient activity for the Chesterfield EOC. Because they had to evacuate, most EOC staff members were busy throughout the exercise.

#### Deficiency and Recommendation

- \*1. Description: The primary communication system did not function properly (NUREG-0654, II, F.1.d).  
Recommendation: Identify the communications equipment problem and remedy it.

#### Areas for Improvement and Recommendations

1. Description: Although a list of the names and locations of mobility-impaired individuals was available, it did not identify their special needs (NUREG-0654, II, J.10.d).  
Recommendation: Along with the list of the names and locations of mobility-impaired individuals, include a statement of their special needs.
2. Description: Maps showing population distribution by evacuation area were not available (NUREG-0654, II, J.10.b).  
Recommendation: Provide maps showing population by evacuation area.

### 2.2.5.2 Hinsdale

#### Overview

The Hinsdale EOC is located in the fire station. It has bathroom and kitchen facilities and adequate space, lighting, furniture, and backup power. Sleeping facilities are not available, but volunteers live close enough so that extensive overnight facilities are not necessary. Furthermore, space is adequate for bunks to be brought in if needed. An EPZ map with plume sectors, evacuation routes, relocation centers, and access control points was posted. Also displayed was an ingestion pathway EPZ map showing locations of crops, livestock, dairy producers, and open water supplies. A map showing population by evacuation area was not available. A status board was prominently displayed and kept current on significant events and emergency classification levels. Only one telephone line was available at the EOC and this was shared with the fire station. This severely limited the EOC's ability to communicate.

The EOC was activated and staffed efficiently. The Fire Chief was notified via the Southwest Mutual Fire Aid radio system of the Unusual Event at 5:57 a.m. and activated at the EOC by 6:10 a.m. When appropriate, the remaining EOC staff were summoned to the EOC. The EOC was staffed with selectmen, volunteer firemen, the Chief of Police, and other volunteers. Twenty-four-hour operation of the EOC is possible with replacement staff drawn from a list of volunteers. Since most staff live relatively close to the EOC, there would be no problem activating the EOC under any weather condition.

Emergency operations were well managed by the Civil Defense Director, who was also the RADEF Officer. The Director was clearly in charge of the operation and effectively delegated responsibility to others when appropriate. All staff members were knowledgeable of their specific duties and those of others. Furthermore, each department head had a procedures checklist that could be used by someone less familiar with that particular position. Message handling was efficient. Messages were checked, logged, and relayed to the EOC staff. Access to the EOC was controlled and each person was logged in when they arrived at the EOC.

Communications capability at the EOC was poor. The new Civil Defense radio was almost useless. Messages were unclear and could not be copied. Although the Southwest Mutual Fire Aid radio did work, there is only one frequency available to transmit all messages. This caused delays in the transmission of messages as well as some confusion. Because the EOC only had one telephone, all outgoing calls were made across the street at the First Selectman's office. Furthermore, the EOC telephone went dead early in the exercise. Because of the topography, most of the available wireless communication systems did not work. Neither the Police Chief nor the Fire Chief could communicate directly with their field people. Radio pagers also were ineffective. They could receive the tone alert but not voice messages. This caused problems in the alerting and notification of EOC staff members, who had to be contacted by telephone. An amateur radio operator was sent to the EOC to assist with communication, but his hand-held radio did not work well within the EOC. The Director has requested \$500 to build a radio-repeater to improve communications as well as more hand-held radios and radio

paggers. Very little information was transmitted to the EOC even though it was in the plume and had to evacuate.

Public alerting was accomplished by sirens, tone alert radios, EBS messages, and route alerting. However, local officials expressed concern that these systems were not adequate to notify all citizens efficiently. According to exercise participants, the two Hinsdale sirens are only useful for a small group of people and not all citizens have tone alert radios. Only two vehicles are equipped with public address systems: a fire truck and the Fire Chief's personal auto. Therefore, most of the 3700 residents would have to be notified by door-to-door and route alerting which could take a significant amount of time.

Traffic control points were effectively set up; keeping evacuation routes open during most conditions would not be a problem. Because there were not sufficient police to block all roads and provide security for evacuated areas, the local EOC would request assistance from the state. A written list of the location and needs of mobility-impaired individuals and others with special needs was available. Furthermore, arrangements were made to evacuate schools and a home for senior citizens.

Radiological exposure control procedures were adequately demonstrated. In addition to permanent-record dosimeters, low- (0-200 mR), mid- (0-20 R), and high-range (0-200 R) dosimeters, and survey meters were available. Direct-reading dosimeters were zeroed and distributed along with permanent record dosimeters to emergency workers going into the field. Instruction sheets and log sheets were issued with the dosimeters. The RADEF Officer also made outdoor background measurements periodically. The RADEF Officer as well as seven other volunteers were trained and knowledgeable in radiological exposure control and decontamination procedures.

Media relations would be handled by the PIO; no media people appeared at the Hinsdale EOC.

The Director discussed recovery and reentry procedures and was aware of many problems associated with these activities. Hinsdale would expect substantial direction and assistance from the state during recovery. Although the scenario did provide substantial activity for Hinsdale, recovery and reentry procedures were not demonstrated. The exercise was concluded before the EOC was notified they could reenter. Because Hinsdale was evacuated, recovery and reentry should not have been phased out.

#### Deficiencies and Recommendations

- \*1. Description: Communications between the Hinsdale EOC and all other emergency response organizations and emergency workers in the field did not function properly. The new Civil Defense radio was ineffective (messages were broken and could not be copied); the backup telephone went dead and could not be used most of the day; the Southwest Mutual Fire Aid radio has only one frequency and could not handle the large message load; and the

portable amateur radio, dispatched by the state, was ineffective because reception was poor inside the EOC (NUREG-0654, F.1.b, F.1.d).

Recommendation: Identify the primary and backup communications problems and remedy them. Perhaps the communications officer could build a radio-repeater that would improve the EOC communications capability if funds were made available. This should be discussed with the state Civil Defense officials.

- \*2. Description: According to exercise participants, the ability to alert and notify emergency response personnel is severely restricted because radio-pagers do not work well in this area. Most personnel had to be notified by telephone, which became a problem when some staff members could not be located (NUREG-0654, II, E.2, F.1.e, H.4).

Recommendation: Improve personnel alerting. Alleviate the problems with the radio pagers. More radio pagers may be needed for this location.

#### Areas for Improvement and Recommendations

1. Description: There was a lack of follow-up messages about the class of emergency, type of actual or projected releases, quantity of release, chemical and physical form, meteorological conditions, projected dose rates, estimates of surface radioactivity, utility response actions, recommended response actions, or prognosis (NUREG-0654, II, E.6).

Recommendation: Transmit more-frequent follow-up messages to the local EOCs.

2. Description: Maps showing population by evacuation area around the nuclear facility were not available (NUREG-0654, II, J.10.b).

Recommendation: Provide maps showing population by evacuation area around the nuclear facility.



### 2.2.5.3 Richmond

#### Overview

The Richmond EOC is located in the Richmond fire station, where space for EOC operations is limited. Because the weather was good on the day of the exercise, participants moved freely in and out of the EOC through the open door. During inclement weather this would not be possible and overcrowding would be a problem. There are no arrangements for extended operation of the EOC. All necessary visual aids, such as sector maps of evacuation routes and reception or care centers, status boards, and emergency classification levels were posted and clearly visible.

The EOC is normally activated at the Site Area Emergency classification. During this exercise, classification went from the Alert to the General Emergency, skipping the Site Area Emergency. However, key personnel, the selectman, and the Fire Chief were notified at the Alert stage by personal radio pagers. They have the option to partially activate the EOC then and chose to do so. The General Emergency was not officially recognized at this EOC until 10:30 a.m. Earlier communications were not understood or wrongly interpreted.

EOC staff members were notified by radio pagers and commercial telephone. However, the supply of radio pagers is inadequate for a timely activation of the EOC. Current personnel rosters are referred to during this notification. The Richmond EOC completed its limited staffing at approximately 11 a.m. Most EOC staff are volunteers and many did not participate because of their jobs.

Generally, the staff that participated was capable of performing its assigned tasks. Each organizational head demonstrated adequate knowledge of duties and carried them out. A briefing was held at the recovery stage of the exercise to resolve staffing for the next shift if it became necessary.

Emergency operations management was effectively carried out by the selectman and the Civil Defense Director. Coordination of activities could be improved if more briefings were held. Emergency plans were referred to during the exercise. However, information and procedures in the plans were difficult for the C.D. Director to find.

Communications at the EOC were a problem throughout the exercise. The new Civil Defense radio was barely adequate. Messages that were received were broken and hard to understand, and information about the plant status or weather was infrequent or nonexistent. Information received from the Southwest Mutual Fire Aid telephone did not agree with messages from other sources and therefore confused participants. The EOC has only one commercial telephone and two sets of hand-held radios. Communications with emergency workers and notification teams was inadequate.

Contact with the media center was attempted many times using a telephone number as stated in the emergency plan. Not only was the number incorrect but many attempts to obtain the correct number from various sources failed. Finally, telephone contact was made with the media center and a recorded message was received.

The Richmond EOC participated on a limited basis in the alerting and instructional messages to the populace in the risk area. Verification of the General Emergency classification and sheltering was accomplished via commercial telephone with the Concord EOC. Tone alert radios were used for initial notification. Citizens were instructed to tune to the local EBS station for further instruction regarding the emergency. The Richmond EOC activated its door-to-door notification teams, who then drove through the affected areas notifying the population. Commercial telephone notification is also employed at this EOC; over 140 telephone calls were made by emergency personnel using call sector lists.

Radiological exposure control was not completely demonstrated at the Richmond EOC. Dosimeters, including TLDs, were provided but their use was not fully understood by all participants. The dosimeters were adequate in number and range (0-200 mR, and 0-20 R). There were no discussions on the use of KI, decontamination, or maximum dose for emergency workers.

The scenario overall was adequate. It required the EOC staff to make some decisions, but their involvement was limited. Resources and personnel were not required to demonstrate any significant actions. There were extended periods when these volunteer responders had very little to keep them interested in the exercise. There were no free play activities.

#### Deficiencies and Recommendations

- \*1. Description: The new Civil Defense radio and the Southwest Mutual Fire Aid radio did not function properly. Messages received over the radio were broken and in some cases impossible to understand. Information received over the Fire Aid telephone differed from that from other sources. The EOC has insufficient equipment to communicate with emergency workers (NUREG-0654, II, F.1.b, F.1.d).

Recommendation: Identify the communications equipment problem and remedy it. Information received over the Fire Aid telephone should not be used if it differs from that from other sources. Install mobile radios in emergency vehicles.

2. Description: The EOC staff is notified by commercial telephone and radio pagers. Only one telephone and four radio pagers are available for this purpose (NUREG-0654, II, E.1, E.2, F.1.e).

Recommendation: Provide the EOC with additional telephones and radio pagers for initial notification.

#### Areas for Improvement and Recommendations

1. Description: EOC staff was limited because most EOC staff are volunteers and need to take time off work to participate in the exercise (NUREG-0654, II, A.2.a).

Recommendation: A program needs to be developed to encourage local participation.

2. Description: Information needed from the emergency plans was difficult to find and in some cases incorrect (NUREG-0654, II, P.4).

Recommendation: Develop procedure check lists that specify actions to be taken, and update telephone numbers in the plans.

3. Description: There was a lack of follow-up messages about the class of emergency, type of actual or projected releases, quantity of release, chemical and physical form, meteorological conditions, projected dose rates, estimates of surface radioactivity, utility response actions, recommended response actions, and prognosis (NUREG-0654, II, E.6).

Recommendation: Transmit more-frequent follow-up messages to the Richmond EOC.

4. Description: The Richmond EOC has limited space and probably would not be able to support continuous operations for a protracted period of time (NUREG-0654, II, A.4 and H.3).

Recommendations: Consider moving the EOC to a larger facility.

5. Description: The EOC was unable to contact the media center. The EOC called the media center number stated in the plan many times, but the number was incorrect and many attempts to obtain the correct number from various sources failed (NUREG-0654, II, G.4.b).

Recommendation: Arrange for a timely exchange of information from the media center and correct the media center phone number in the plan.

6. Description: Even though this was not a specific exercise objective, the EOC participants were not fully familiar in the use or the handling of dosimetry (NUREG-0654, II, K.3.a, K.3.b).

Recommendation: Provide further training for emergency workers in the use of dosimetry.

#### 2.2.5.4 Swanzey

##### Overview

The Swanzey EOC is located with the Swanzey Center fire station in the lower portion of the town hall. The facility is equipped with a kitchen and had adequate space and furniture to support the Swanzey operations. The EOC had no backup power supply and only one telephone.

Because the EOC is in the same building as the Police Department, Fire Department, and Selectmen's offices, activation of the EOC was an easy task. Initial steps to activate the EOC were taken at 8:30 a.m. when news was received of the Alert status. Between 8:30 a.m. and about 10 a.m. all EOC staff arrived. Organizations represented at the EOC included Civil Defense, Fire Department, Police Department, rescue squad, and Selectmen. Continuous operation of the EOC would be possible with replacements drawn from a list of volunteers. The staff displayed an adequate knowledge of their duties.

The Civil Defense Director was clearly in charge of the EOC operations and consulted staff members as necessary. Because of the small size of the Swanzey EOC, formal briefings were not necessary. Staff members were kept abreast of the situation through use of the status board and informal discussions.

Maps showing the plume EPZ, evacuation routes, relocation centers, access control points, population distribution, and emergency classification levels were either posted or available in the EOC. The status board was maintained near the Civil Defense radio in the fire station garage. This required an additional information flow from the garage into the EOC.

Primary means of communications was the Civil Defense radio, which was only marginally operational. However, critical information was received at the Swanzey EOC because the EOC was able to communicate with its support (field) staff and with other EOCs.

The public was alerted by sirens at 10:40 a.m. Schools in Swanzey, although outside the affected area, were informed of the exercise status and the dispatching of vehicles to cover route notification was discussed before 11 a.m.

Radiological exposure control for emergency workers entailed distribution of pocket dosimeters (0-200 mR and 0-20 R) to the assistant Fire Chief for distribution to emergency workers. Record keeping was not observed.

The EOC staff promptly took action to control access to the EPZ area after notification of General Emergency. The staff discussed the evacuation of mobility-impaired persons in the EPZ area. Written documentation listing all persons and organizations requiring direct notification and special attention during an evacuation was not observed. Although the exercise did not require the simulation of public evacuation or recovery and reentry, such procedures were discussed by the staff.

The scenario adequately tested the plans and capabilities for response to a radiological emergency.

#### Deficiency and Recommendation

- \*1. Description: The new Civil Defense radio did not function properly. Also, the EOC had only one telephone line (NUREG-0654, II, F.1.d).

Recommendation: Identify the communications problem and remedy it. Also, install more telephones at the EOC.

#### Areas for Improvement and Recommendations

1. Description: The EOC has no backup power supply for communications equipment.

Recommendation: Install an emergency generator capable of supporting EOC communications equipment (NUREG-0654, II, F.1.d).

2. Description: Although dosimeters were issued to the staff member responsible for distributing them to field personnel, it was not clear that there was an adequate level of training to ensure their proper use (NUREG-0654, II, K.3.b).

Recommendation: Continue to train staff responsible for tracking doses received by field personnel to ensure their safety.

#### 2.2.5.5 Winchester

##### Overview

The Winchester EOC is located in the fire station, which includes an ambulance service, the local police, and Civil Defense headquarters. Sufficient space, lighting, and equipment were available for operations. A status board was available and kept updated; all appropriate maps were available and posted. For extended operations, other nearby facilities would be used.

The Southwest Mutual Fire Aid dispatch center in the Keene IFO provided initial notification to Winchester officials. Following this initial notification by telephone, activation was rapid and staffing was completed within ten minutes. The initial notification link is continuously monitored by Winchester officials. Key organizations were present, adequate training and knowledge were evident, and 24-hr staffing was demonstrated by a shift change.

The EOC was effectively managed by the Civil Defense Director and the Police Chief, who both exhibited thorough knowledge of the procedures and implementation requirements. Briefings were held, appropriate staff members were involved in decision making, plans and procedures were available, and internal messages distribution was efficient.

The newly installed Civil Defense radio did not function effectively as the primary communication link with the Keene IFO and the State EOC. The system was nonfunctional for most of the day and no one knew how to use it. Backup was provided through the Southwest Mutual Fire Aid telephone but delays were encountered in receipt and transmission of messages.

The public was alerted by sirens and tone alert radios, vehicles with public address systems (simulated), and calls placed to the elementary school. Some time delays were encountered between the Winchester EOC and Southwest Mutual Fire Aid in Keene regarding communication of the General Emergency declaration. Also, the tone alert radio in the elementary school did not work and the EOC staff said that not enough vehicles are available with public address systems to notify the populace of Winchester in a timely manner.

Evacuation was not ordered for Winchester; however, the EOC staff said resources are available to deal with impediments to evacuation and to accommodate all traffic and access control responsibilities. Lists of mobility-impaired individuals are available. Plans for evacuating schools are established and procedures are in place for obtaining school buses and drivers.

The Winchester EOC personnel were well informed about dosimetry and decontamination equipment and procedures. Dosimeters were distributed and records of exposure were kept.

The EOC was not equipped or expected to interact with the media. The Chairman of the Board of Selectman and Civil Defense Director would, if needed, prepare and deliver a statement to the media following consultation with the State EOC.

Recovery and reentry were not demonstrated in Winchester. The scenario did not provide a high level of activity for Winchester. Deficiencies identified previously had been corrected.

#### Deficiencies and Recommendations

- \*1. Description: The Civil Defense radio did not function properly. No one at the EOC knew how to operate the system. (NUREG-0654, II, F.1.d, N.2.a).  
Recommendation: Identify the cause of the communication system failure and remedy it. Conduct drills in the use of the system.

#### Area for Improvement and Recommendation

1. Description: It was reported that tone alert radios did not function at some locations and the exercise participants also indicated that suitable equipment for public notification is not available (NUREG-0654, II, E.6, J.9).  
Recommendation: Investigate these allegations to identify the reported cause of the tone alert radio malfunction and correct it if necessary; the Winchester EOC officials should work with the state and utility to ensure that a capability exists for notifying the public in a timely manner.

## 2.3 MASSACHUSETTS STATE OPERATIONS

The locations and activities tested in the State of Massachusetts included the State EOC in Framingham, the Area IV Civil Defense Headquarters in Belchertown, and six local EOCs. The town of Colrain was not required to participate in this exercise because it was involved in the Yankee Rowe exercise on April 6, 1983. However, the State reported that Colrain officials did take this opportunity, on their own, to test their plans and improve their emergency response skills. Field monitoring activities were also not tested.

### 2.3.1 Massachusetts State EOC

#### Overview

The State EOC is located in the permanent Civil Defense Headquarters and has excellent space, furnishings, and equipment. Displays were good. A status board and maps showing the plume EPZ, evacuation routes, access control points, and relocation centers were clearly visible. Although meteorological data were prominently displayed, more attention should be given to the wind direction overlay in future exercises. As meteorological conditions were updated, no one changed the wind overlay on the EPZ map.

The Massachusetts Civil Defense Agency (MCDA), Public Health, State Police, American Red Cross, National Guard, and Department of Public Works were represented at the EOC. The key positions were staffed by 9:30 a.m. Due to the limited involvement of the state (as per exercise objectives), this was adequate. Also, because the exercise took place on a normal work day, emergency staff activation was not truly demonstrated.

The EOC was effectively managed throughout the exercise. The MCDA Director frequently discussed plant and meteorological conditions with civil defense and public health officials and periodically informed the Governor of the exercise status. Hard-copy message drafting and handling was excellent. EBS messages were well coordinated among the states' agencies. The activation of tone alert radios and exercise deescalation were coordinated well. Evacuation of Vermont citizens to the town of Greenfield caught officials at the State EOC by surprise. Nevertheless, the Area IV EOC coordinated the evacuation to and access control at the reception center at Greenfield Community College.

Communications equipment and demonstration of its use was excellent. Equipment included microwave teletype to the Area IV EOC, commercial telephone, National Warning System (NAWAS), dedicated land lines, State Police teletypes, and the Massachusetts Department of Public Works (MDPW) and State Police radio networks. The three states could hold conferences over the Nuclear Alert System.

Although protective action recommendations decisions were made elsewhere, the extremely high dose projections received discussion among the EOC staff commensurate with the need. The State EOC staff did verify the 50-R whole-body dose projection (400



R in 8 hours) as well as the Massachusetts Department of Public Health recommendation derived at the EOF of no protective action for Massachusetts' communities.

Interstate coordination of public instructions was good. The three states agreed about EBS message text and time for announcement in order to coordinate the sirens. The text was read by the State EOC to primary EBS stations. The state had an excellent idea for future canned EBS text which could eliminate public confusion. Massachusetts text can include a sentence (after instructing Massachusetts citizens) which would advise Vermont and New Hampshire to tune to their EBS stations (and read the call numbers) to receive instructions from their respective state officials. The EBS was not utilized after the 10:45 broadcast. However, periodic EBS broadcasts were simulated. Media press releases were provided at the media center.

### 2.3.2 Area IV EOC

#### Overview

The Area IV EOC was activated promptly upon receipt of the Alert and was fully operational within one hour. However, the exercise occurred during the normal working hours of the facility and its staff, so it did not test activation during off-hours, although the EOC Director has a radio pager providing continuous notification capability. The EOC had round-the-clock operations as evidenced by presentation of a second-shift roster.

The Area IV MCDA Headquarters could accommodate extended operations. Security was excellent with controlled access through a locked door opened only upon presentation of appropriate identification.

The Area IV MCDA Director was clearly in charge and the operations officer provided direct supervision and frequent briefings to the staff. Operations were enhanced by the use of checklists and the availability of all appropriate plans and visual aids (status board, maps, etc.).

Personnel worked hard and generally effectively at their primary function of verifying and relaying messages to local EOCs. However, they did not know that the Tri-State Mutual Fire Aid radio had suffered an equipment failure after the Alert status had been communicated and had not provided primary subsequent emergency status changes according to Massachusetts plans. In addition, the newly installed microwave radio connecting the Area IV EOC with local EOCs was plagued by much interference. As a result, communications to local EOCs concerning changes in emergency status were made by telephone and were up to 25 minutes late. In a few cases, there was a lack of outbound message logging, although forms were available. Also, the available forms did not have a column for time sent, and thus partially defeated their purpose.

Area IV responsibilities for evacuation of Vermont residents to the Greenfield Community College and access control of the evacuated area were executed promptly by the state police officer, who rapidly notified available officers to set up simulated patrols and roadblocks at appropriate points. The Department of Public Works representative ordered appropriate sign posting. Although no one in Area IV had to evacuate, there is an established system for assisting mobility-impaired individuals. Also, there are contracts with bus companies that provide arrangements for evacuating school children. The EOC staff indicated that in a real emergency, potential traffic jams at school would be avoided by either evacuating children in school buses before parents could arrive at school or by closing school even before evacuation is ordered and sending children home under snow closing plans.

Although this EOC did not become involved in any radiological exposure control activities because it was not in the EPZ, the radiological officer demonstrated thorough knowledge of the use of dosimetry, required record keeping, and exposure limits. There were ample direct-read dosimeters with high-, medium- and low-range reading capabilities available, and EOC staff indicated that permanent-record devices were nearby at a Department of Public Health facility.

There was a place for media activities in an outer lobby outside the EOC operations area. Media representatives would only be allowed to enter the EOC if they were escorted. No media representatives arrived at this EOC.

During the simulated ensuing week generated by the artificial time advance assumed in the exercise, Area IV staff said they assumed the State of Vermont would coordinate directly with Massachusetts MCDA Headquarters in Framingham, the Greenfield Reception Center, Massachusetts State and local police regarding the takeover by Vermont or the National Guard of roadblocks, reentry control, and instructions for returning evacuees.

The Area IV EOC did not become involved with public alerting and instruction (other than indirectly through message relays to local EOCs) or ingestion pathway protective actions during this exercise.

The scenario adequately tested this EOC's function as a relay point between the MCDA Headquarters in Framingham and local EOCs, although it did not test relaying of protective action messages to Massachusetts local EOCs. It did test Area IV evacuation support activities for Vermont citizens moving into Massachusetts.

#### Deficiency and Recommendation

- \*1. Description: The newly installed MCDA microwave radio system did not function properly. The Tri-State Mutual Fire Aid equipment also failed. Telephone calls were made to verify receipt of all emergency classification messages after the Alert status message, but busy signals were often encountered and primary notification became delayed. These problems were identified at Bernardston, Gill, Greenfield, Leyden, Northfield, and Warwick (NUREG-0654, II, F.1.d, E.2).  
Recommendation: Repair the MCDA microwave radio system and insure that Area IV knows continuously whether the local EOCs are receiving primary notification of emergency status changes from the Tri-State Mutual Fire Aid according to Massachusetts plans. Set up a contingency plan assigning one individual to each local EOC to provide primary notification and verification of emergency status changes.

#### Area for Improvement and Recommendation

- 1. Description: In a few cases, logs were not kept of outgoing messages to local EOCs, and log forms did not have a column for time sent (NUREG-0654, II, E.6).  
Recommendation: Redesign outbound message log forms and require all appropriate communications personnel to use the forms.

### 2.3.3 Massachusetts Local EOCs

#### 2.3.3.1 Bernardston

##### Overview

Activation of the Bernardston EOC was fairly prompt but was slowed by the need to telephone staff members who did not have paging devices. Proper alert message verification and call list procedures were followed. Round-the-clock staffing capability was demonstrated with a shift change and adequate training and knowledge was displayed by both shifts.

The EOC Director effectively managed operations despite extreme space limitations and high noise levels due to radio distortions. He conducted periodic briefings, involved appropriate staff in decision making, and maintained good control of operations. Operational plans and checklists were available for reference, and message handling was efficient. However, the facility can only accommodate a few people in an emergency and needs more telephones. A status board was available and used effectively, and appropriate maps were available although some (population, access control, and relocation centers) were not posted.

Communications personnel operated effectively, but there were early breakdowns in the Tri-State Mutual Fire Aid and new MCDA radio systems, which resulted in delays in the receipt of key messages (e.g., the General Emergency message was not received until 10:21 a.m. although Area IV began relaying it at 10 a.m.). After the breakdowns, messages were received through Radio Amateur Civil Emergency Service (RACES) communications and over the telephone, and these systems involved notification of towns sequentially instead of simultaneously.

Activation of traffic control points was promptly ordered, and supported by a request for assistance and equipment from the state. The EOC staff was aware of the location of mobility-impaired individuals and had made arrangements for their evacuation as well as school children. However, no real or simulated evacuation of this town was required during the exercise. Public alerting and instruction were also not required during the exercise.

The town has a health plan with the Board of Health in charge of decontamination, but no ingestion pathway protective actions were required during the exercise.

Radiological exposure control equipment and training were sufficient, with proper instructions issued along with dosimeters. Potassium iodide was not available for use at this EOC, but there was an awareness of decontamination procedures.

Discussions were held about making necessary arrangements to secure evacuated areas, procedures for allowing reentry to evacuated areas for essential services, relaxation of protective actions on the basis of data indicating safe levels of radioactivity, and the need for effective communications during recovery and reentry. The EOC Director felt that Bernardston could effectively deal with these requirements

but would rely on the state to handle the safety, health, protection and financial compensation aspects of recovery and reentry.

The local police and fire departments did not feel that enough activity was required of them by the scenario, and there was dissatisfaction with the lack of a full test of EOC staff capabilities.

#### Areas for Improvement and Recommendations

1. Description: The EOC has space limitations and an insufficient number of telephones (NUREG-0654, II, H.3).  
Recommendation: A larger facility with more telephones would improve response capability.
2. Description: The EOC staff capabilities were not fully tested because there was no test of public alerting and instruction, evacuation, and recovery and reentry (NUREG-0654, II, N).  
Recommendation: Despite the fact that Vermont and New Hampshire are the main players in this exercise, Massachusetts local EOCs should be provided with more activities in future scenarios to more fully test their capabilities and make their participation worthwhile.
3. Description: Activation of the EOC was slightly delayed by the unavailability of paging devices for some key EOC staff members (NUREG-0654, II, F.1.e).  
Recommendation: Procure pagers for key staff members.

### 2.3.3.2 Gill

#### Overview

The Gill EOC was activated and staffed promptly and efficiently. Firefighters were contacted by pagers and other EOC staff were notified by telephone. Participation in the exercise was excellent. Eighteen individuals reported to the EOC and the majority remained at the EOC for the duration of the exercise. The organizations represented at the EOC included the Fire Department, Police Department, Highway Patrol, Board of Selectmen, and Mount Herman School. Although a formal shift change was not demonstrated, adequate backup personnel are available. All firefighters have been trained to operate the communication systems, and training sessions on dosimeters and decontamination procedures are held several times a year.

The EOC was effectively managed throughout the exercise. Access to the EOC was controlled and all participants were required to sign in and out on a log sheet. The communications officer maintained excellent message logs for all incoming and outgoing calls. However, due to the limited activity in this EOC, the staff did not have the opportunity to fully demonstrate coordination and decision making.

The EOC facilities are adequate to support emergency operations. There are plans to move all communications equipment to a separate room with more space and less noise interference. Although backup power is not available for the entire facility, a backup generator is available to run the communications systems. Maps showing the plume EPZ and evacuation routes were posted, but there was no status board.

The communications officer did an excellent job of operating all communications systems; however, some problems exist with the communications systems themselves. Initial notification of the Unusual Event came over the Tri-State Mutual Fire Aid network, although most EOC personnel had heard about it several hours earlier over their radio scanners. Notification of the Alert came over the Tri-State radio system. Messages were received over the Civil Defense radio system for about an hour, but all subsequent messages from the Area IV EOC were received by telephone due to a "breaking-up" problem over the radio system. Use of the telephone as the primary means of communications caused delays in receiving and verifying messages. It took 4 minutes to verify the Alert message because the Boston State Police number was busy. When the Boston State Police were called to verify the General Emergency message, they said that they had not received the notification as yet. The call was then verified by telephoning the Area IV EOC.

Public alerting was not demonstrated in Gill. In an emergency, tone alert radios would be the primary means of notification. Two mobile public address systems could also be used if needed.

Although evacuation was not ordered for this area, the Fire Chief indicated that there were sufficient personnel and vehicles to monitor evacuation routes and access control points, and if additional assistance was needed, it could be requested through the Tri-State system or from Area IV. The EOC has a list of people who might require

assistance in an evacuation, and in a real emergency, firemen would be sent to these locations. School children would be evacuated by bus, but contacting the bus companies is not the responsibility of the EOC. Although contracts are in place with the various bus companies, EOC staff expressed concern that the same bus company may serve several different community schools, and if more than one town was evacuated, an adequate number of buses might not be available.

The demonstrated activities for radiological exposure control were effective. Dosimeters (0-200 R) were issued to all personnel. Readings were taken every half hour and recorded. Personnel were sent to take readings, approximately every half hour, outside of the EOC and at three locations in the town. Permanent-record devices were not available. Personnel were aware of monitoring and decontamination procedures.

The exercise did not provide enough activity to fully test the capabilities of the Gill EOC. The exercise did provide a good test of the communication systems and alerting and mobilizing the EOC. However, because the plume did not pass in the direction of Gill, evacuation, recovery, reentry, and general decision making and coordination were not tested.

#### Deficiency and Recommendation

1. Description: Permanent-record devices were not available (NUREG-0654, II, K.3.a).  
Recommendation: Provide sufficient permanent-record dosimeters.

#### Areas for Improvement and Recommendations

1. Description: Radio communications between Area IV and the EOC broke down early in the exercise. The telephone was used to relay subsequent messages; however, these messages were received 5-10 minutes after the amateur radio operator received them.  
Recommendation: The Area IV EOC should provide more complete information to local EOCs on plant status, meteorological conditions, and state decisions.
2. Description: The exercise did not provide the town with enough activity to adequately demonstrate off-site preparedness and response.  
Recommendation: Future exercise should provide more activity for the Massachusetts local EOCs.

### 2.3.3.3 Greenfield

#### Overview

The Greenfield EOC is located partially below ground in the basement of the Greenfield fire station. The Greenfield fire station is also the dispatch center for the Tri-State Mutual Aid system. The entire building could operate on a standby generator for approximately 30 days on 500 gallons of stored fuel. Though not observed, the alternate EOC is the Greenfield police department. The facilities at the EOC were very good. There were sufficient space, furniture, and supplies. Maps showing the plume EPZ, evacuation routes, relocation centers, access control points, and population distribution were posted. Emergency classification levels were also posted.

According to the dispatcher at the fire station, the notification of an Unusual Event was heard over the NAWAS network at approximately 6 a.m. The fire department then called the Civil Defense Director later, who in turn called the Assistant Civil Defense Director because he was not able to attend the exercise due to work obligations. The Assistant Director arrived at the EOC and was activating it when the Alert notification was received at 8:10 a.m.

The Assistant Director was in complete charge of the EOC operations and performed effectively in this capacity. Participation by support staff was not evident; the Assistant Director handled all emergency response activities. Messages were logged and efficiently handled and access to the EOC was controlled.

The communications capabilities at the EOC were generally good. Although a new Civil Defense radio did not function properly in the morning, backup systems included ham operators, telephone communications with Area IV headquarters, and a 6-meter Tri-State radio hookup. These systems kept the ECC staff well informed of exercise events. Other communications available included 8 commercial telephone lines, a police station teletype, and a local 2-meter radio with 4 portables for communication with local emergency response staff.

Dosimeters were available in sufficient number at the EOC and permanent-record devices were observed. A charger and counter were demonstrated and the means to keep exposure records was evident. A RADEF officer arrived at 11:05 a.m., checked the dosimeters that were issued, checked other radiation equipment in storage, and left about 90 minutes later.

Public alerting and notification were not observed at this EOC. However, the Assistant Director stated that he had personally issued (200) tone alert radios with necessary instructions to homes within his responsibility in the EPZ. There were no written data on mobility-impaired people and provisions for their assistance at the EOC.

After adequate media briefings at the EOC, reporters from two newspapers were given the state news media telephone number at Dalem's Chalet.



Area for Improvement and Recommendation

1. Description: Participation by support staff was not evident; the Assistant Director of Civil Defense who was in charge of the EOC has other responsibilities and may not be able to accomplish required activities in an actual emergency.  
Recommendation: Additional trained personnel are needed to assist in responding to a radiological emergency.

#### 2.3.3.4 Leyden

##### Overview

The Leyden EOC was located in the basement of the town hall. It was furnished with sufficient tables and chairs and the lighting was good. The space was small but adequate; other rooms are available if needed. The building has a kitchen and toilet facilities. If 24-hr operations were required, EOC staff members would go home to sleep because they all live close by. No emergency power is available.

Activation and staffing of the EOC were prompt. The assistant fire chief was notified of the Alert status via the Tri-State Mutual Aid fire phone at 8:45 a.m. and the EOC was fully staffed within 30 minutes. Round-the-clock staffing capability was demonstrated with a roster; some members changed shifts and these personnel were briefed.

The Chairman of the Board of Selectmen managed the EOC and released most of the staff to their regular jobs after they left word where they could be reached. All staff members had a copy of the town plan, which included checklists for their various duties, and the Chairman consulted the plan frequently. He also kept a log of incoming messages. No security measures were demonstrated because all the EOC staff members knew each other.

A status board and map of the plume EPZ were displayed but the status board was not updated. Evacuation routes, relocation centers, access control points, and population were not displayed on maps but the EOC manager knew what these were.

The initial Alert notification was received over the fire phone, which is the primary system of notification and is backed up by the Area IV Civil Defense radio. However, there is no fire phone in the EOC and the fire phone system broke down shortly after the initial notification. Further communications were received over the Civil Defense radio but the reception was often unclear and full of static. At 10 a.m., Area IV Civil Defense Headquarters switched to a different frequency that could not be received on the EOC radio. Soon after the frequency switch, a ham radio operator arrived and monitored the new frequency on his own equipment. The messages of General Emergency and Site Area Emergency status were received over the commercial telephone. Due to the breakdowns in the fire phone system and radio communications, the Leyden EOC missed several messages.

Dose assessment, protective action recommendations, and public alerting and instruction were not demonstrated. Although no media representatives visited the Leyden EOC, the EOC manager knew that they should be referred to the media center at Dalem's Chalet.

Although no evacuation measures were required of Leyden in this exercise, according to exercise participants the town had sufficient equipment and personnel to evacuate. The EOC Manager knew where equipment was, how to mobilize traffic controllers, and where to station controllers. The town had one mobility-impaired person

who would require transportation. The EOC Manager knew where that person lived, although the address was not written down. Evacuation of schools is handled separately by the school superintendent.

The Leyden EOC was equipped with sufficient 0-200 mR dosimeters, a charger, record cards, and two Geiger counters. However, no one, including the Civil Defense Director, knew (1) how to read or charge dosimeters, (2) what PAGs were, (3) what KI was or what it was for, or (4) when or how to decontaminate. Direct-read dosimeters were available but not distributed to the EOC staff; permanent-record dosimeters were not available. The Civil Defense Director and the EOC Manager expected the Area IV Civil Defense Headquarters to send someone out to manage radiological exposure control in a real emergency.

Recovery and reentry procedures were not part of the scenario and were not demonstrated.

The scenario did not provide enough activity for the participants, especially since some of them took time off from regular jobs to participate in the exercise.

#### Deficiency and Recommendation

1. Description: Direct-read dosimeters were not distributed and EOC personnel were not familiar with radiological exposure control measures. Permanent-record dosimeters were not available (NUREG-0654, II, K.3.a, K.3.b).  
Recommendation: EOC personnel need more training in the use of dosimeters and in all other aspects of radiological exposure control. Provide sufficient permanent-record dosimeters.

#### Areas for Improvement and Recommendations

1. Description: Several messages were not received because the fire phone and backup radio communications systems broke down (NUREG-0654, II, F.1.b)  
Recommendation: All communications systems should be checked and the necessary equipment (e.g., repeaters) obtained so that clear communications can be maintained at all times.
2. Description: No emergency power is available at the Leyden town hall.  
Recommendation: A backup emergency power system for ensuring continuous communications should be installed at the Leyden town hall.
3. Description: Maps at the EOC did not display evacuation routes, relocation centers, access control points, population, or

radiological monitoring points. The status board was displayed but not updated.

Recommendation: Evacuation routes, relocation centers, access control points, radiological monitoring points, and population should all be added to existing maps displayed at the EOC. The EOC staff should be trained to update the status board regularly.

### 2.3.3.5 Northfield

#### Overview

A permanent EOC is being built in the basement of the town hall. For the exercise, plans were to use the town clerk's office across the hall from the police dispatcher's room. However, a state auditor arrived at 8 a.m. and demanded access to files in the clerk's office, so the EOC was moved to a vacant 2nd floor office. Communications between the Civil Defense Director and the police dispatcher were by telephone intercom. The temporary EOC was adequate for the level of participation, but would have been inadequate under actual emergency conditions.

The Civil Defense Director activated the EOC and notified other responders by telephone. The only officials participating at the EOC were the Civil Defense Director, a police dispatcher, and an official representing the Northfield-Mt. Herman school. A fire department dispatcher manned radio communications from the fire station about one-eighth of a mile away. The Chairman of the Board of Selectmen, designated as the authority in charge under the town plan, did not participate in the exercise. A representative of the Amateur Radio Operators operated from his car parked behind the town hall.

The Civil Defense Director managed the EOC effectively and received good cooperation and coordination from the police and fire dispatchers. He demonstrated the preparedness of the town to carry out the plan, although no actual staffing was provided outside of the dispatchers. Message logs were accurate and entries were discussed. Some of the terms used to describe plant facilities were unfamiliar to EOC personnel. Also, meteorological data were not standardized to ensure faster and more accurate plotting.

Radio communications with Massachusetts Civil Defense Area IV were poor. For a period of almost 4 hours no messages were received by Civil Defense radio. The amateur radio operator relayed messages to the EOC, usually about 5-10 minutes before the messages were received by telephone from Area IV. From 8:30 a.m. to 2:45 p.m. the EOC received only four notifications regarding meteorological and functional conditions at the plant. The information received was sketchy. The town was not given any advance indication of evacuation orders that might affect access control procedures in the town. The state activated EBS during the exercise; however, the town was never notified of this action.

Although the public was not alerted in this area, the Northfield schools (private) requested permission to test the on-campus siren after the General Emergency was declared. The Civil Defense Director agreed to allow the test and ordered the siren activated 5 minutes later. Telephone calls were made to all schools, advising them of the test status, and police patrols were advised by radio of the status. Although evacuation of the town was not ordered for this exercise, in an emergency requiring evacuation students would be evacuated by bus. The town and school plans indicate that it is the responsibility of the contracted bus company to notify the bus drivers. The town and schools should seek assurances that the contractors have procedures in place for contacting and assembling the necessary drivers.

Radiological exposure control was good. Sufficient direct-read dosimeters, chargers and record-keeping cards were available. No permanent-record devices were available.

No recovery and reentry activities were demonstrated. Although the town was the major evacuation route for Vernon and Hinsdale, the EOC was shut down at 2:45 p.m. when Area IV advised that it could reduce to a "skeleton staff."

With the exception of communications, the exercise did not offer an opportunity for participation by the Northfield EOC.

#### Areas for Improvement and Recommendations

1. Description: Radio communications between Area IV and the EOC broke down early in the exercise. The telephone was used to relay subsequent messages; however, these messages were received 5-10 minutes after the amateur radio operator received them. Also, the information that was received from Area IV was extremely limited.  
Recommendation: A communication drill should be held to make sure the new Civil Defense radio system is operating properly. Area IV EOC should provide more complete information to local EOCs on plant status, meteorological conditions, and state decisions that affect the town.
2. Description: It is not clear if adequate procedures are in place for notifying and assembling bus drivers to evacuate school children.  
Recommendation: The town and school should seek assurances from the contracted bus company that adequate procedures are in place for contacting and assembling bus drivers.
3. Description: The scenario did not offer the opportunity for full participation by the Massachusetts local EOCs. The Massachusetts towns in Vermont Yankee's EPZ remain untested.  
Recommendation: Future scenarios should provide more activity for the Massachusetts local EOCs.

### 2.3.3.6 Warwick

#### Overview

The Warwick EOC is located on the second floor of the town's volunteer fire station. The EOC is sufficiently equipped; there are bathroom facilities; a backup power supply; and adequate space, lighting, and furniture to support the radiological emergency response activities.

A newly acquired EPZ map was posted. It identified plume sectors and population by evacuation area. A separate map of Warwick and the surrounding areas displaying the evacuation routes, access control points, and relocation centers was not posted. A map in the evacuation plan manual does present all of this information, except for the radiological monitoring points. Emergency classification levels were posted and the status board was clearly visible and updated.

The EOC was activated after the Notification of an Unusual Event (8:25 a.m.) was transmitted via the Tri-State Mutual Aid dispatch. Subsequently, an Alert was issued at 8:43 a.m. The messages were verified with the State Police; some difficulty was encountered in reaching the State Police to verify the messages. Activation and staffing of the EOC were timely and effectively demonstrated. The Civil Defense Director - who is also the Fire Chief, Health Officer, Communications Operator, and Radiological Defense Officer - together with a volunteer and a Selectman, participated throughout the exercise. The Civil Defense Director/Communications Officer, using a call list, notified all other EOC staff, town officials, and potentially affected organizations (e.g., a grade school next to the EOC) of the Alert and put them on standby. Periodic updates were communicated to these individuals throughout the exercise. Staffing was never complete at any time because the supporting staff is a volunteer group that did not participate because they could not leave their jobs. It was indicated that better participation would have been attained if the exercise was staged on a weekend.

Four methods of alerting the staff could be used if required; radio/ scanner, pager, telephone, or messenger. The only potential staffing problem that was observed dealt with the inability to readily contact the volunteer police officers. If there was no answer on the blue phones (direct lines) located in their homes, only a series of phone calls could have activated the volunteer police department. A phone list containing alternative or work phone numbers was unavailable.

Although the scenario did not test the capability for 24-hr emergency operations, it was apparent through discussions that the local EOC could be suitably staffed under such conditions. Shift change procedures were discussed and the participating staff exhibited sufficient knowledge to implement the procedures. However, only the Civil Defense Director is presently capable of performing the communication activities, together with the execution of the Civil Defense/EOC procedures plan. A further complication is that the Director is also the fire chief; a situation could arise where fire protection responsibilities may deter one fire chief from effectively executing his duties as the Civil Defense Director.

The Civil Defense Director effectively managed all aspects of the EOC operation. Full support of the town officials was evident. The Director made decisions in a timely manner, had copies of the plan available for reference, kept all nonparticipants informed of the emergency actions taken, and displayed a thorough knowledge of responsibilities and duties. Warwick was not directly affected by the plume so the activities required at the EOC were minimal.

The staff's capabilities and knowledge of the communications systems at the EOC were effectively demonstrated. The director contacted all surrounding EOCs to establish communications with them. Because of problems with the newly installed Civil Defense radio network, most messages were transmitted by telephone. When the radio was in operation, interference and repeater problems made some messages inaudible. The Warwick EOC was informed of the activities occurring at the plant approximately 30 minutes before being notified officially by the State of Massachusetts. Status reports were transmitted over radio frequencies from Vermont and New Hampshire. Thus, local residents and EOCs with receivers for those frequencies were aware of the emergency status before it was officially announced by the state.

It was not possible to determine whether the capability to alert the 32 families in the EPZ was acceptable. The tone alert radio receivers are the primary notification system, with a backup of personal visits. Phone calls were made to selected households to determine if the tone alert had been sounded. The Civil Defense Director also demonstrated the procedures to be executed if personal notification of the households was required. Each year a two-page introduction sheet is prepared and circulated in the *Warwick Monthly* newsletter. It indicates the warning stages, procedures to follow, evacuation route, and phone numbers to contact.

Supplies of direct-read dosimeters were adequate, but permanent-record dosimeters were not available. Adequate knowledge of exposure control was exhibited, but obtaining sufficient personnel could be a problem in a protracted emergency.

Media relations were not observed. There is no space designated for the press in the Warwick EOC because of its size. A local newspaper did phone the EOC for information about the exercise. They were referred to the Media Center after some general, positive comments were relayed by the Director.

The scenario tested some areas where earlier deficiencies were cited. In each of these areas (i.e., maps and protective action implementation procedures), improvements were evident.

#### Deficiencies and Recommendations

1. Description: The Civil Defense radio did not function properly (NUREG-0654, II, F.1.d)  
Recommendation: Identify the communications problem and remedy it.



2. Description: Permanent-record dosimeters were not available at the EOC (NUREG-0654, II, K.3.a).  
Recommendation: Provide sufficient permanent-record dosimeters.

Area for Improvement and Recommendation

1. Description: The Civil Defense Director acts as the manager of the EOC and the communications dispatcher.  
Recommendation: Additional personnel are needed to accomplish emergency response activities.

## 2.4 UTILITY AND STATE COORDINATION

### 2.4.1 Emergency Operating Facility

#### Overview

Staffing of the Emergency Operating Facility (EOF) was accomplished promptly by participants from the states of Vermont and New Hampshire. Massachusetts chose to preposition its staff in Greenfield because their travel time would have been excessive if they were sent out after actual notification. During the notification procedure, the Vermont Yankee Nuclear Station notifies the State Police in the three affected states, and the police fan out notification activation to emergency staff involved.

The EOF has been rearranged to give state representatives a room that is completely satisfactory for desks, communications, status boards, and maps. Ample space is also provided in the same room for briefings. The area that is in use now is an improvement over that used in previous exercises.

The methods used by the utility in briefing the respective state representatives have also changed from previous exercises. The Site Recovery Manager or his assistant informed the three state representatives during frequent appearances (every 5 to 15 min) to the states' work area, rather than having the state representatives crowd into briefings for the entire EOF staff, an improvement over previous exercises.

Communications between each of the State EOF representatives and their respective EOCs (in the case of Vermont, the IFO, both original and relocated) were excellent. New Hampshire does not have an independent radio link and must rely on land-line communications.

The states' staff at the EOF evaluated the data from Vermont Yankee Nuclear Station and the Vermont Yankee recommendations on protective actions. The staff then passed on their recommendations to their respective State EOCs, where official recommendations to the Governors (or Governors' representatives) were developed. Only the intermediate step in reaching protective action decisions was observed at the EOF. The above does not apply to Massachusetts since the final recommendation is made by the NIAT officials in charge at the EOF. The only possible Massachusetts action in this exercise would have been to shelter or evacuate the affected area in the 10-mile EPZ. The NIAT official in charge determined that no action was necessary, and Massachusetts made no protective action recommendations.

The scenario provided an excellent exercise for the states of Vermont and New Hampshire. It did not exercise the dose assessment capabilities of Massachusetts (to do so would have required some unrealistic meteorology conditions) but Massachusetts capabilities have been adequate in two previous exercises for the Pilgrim and Yankee Rowe plants. Yankee Atomic developed the scenario to meet specific criteria set forth by the involved three states. Therefore, it appears to be adequate to the extent that it was written to meet the states' requirements.

The scenario was developed in two major parts: first, the escalation to the General Emergency classification, and second, the deescalation from the Alert classification after one week. At that time there continued to be a need for future, controlled venting of the containment vessel.

The Plant Recovery Manager requested state approval for the deescalation. Before he could finish his explanation, the Nuclear Engineer from the State of Vermont Public Service Commission proceeded to present a series of conditions for controlled releases. The New Hampshire staff was consulted by the Vermont staff and agreed on the details of the release (apparently Massachusetts was never consulted on the issue). As the duties of the Nuclear Engineer do not include making judgments or decisions in Public Health matters, his role should have ended there. However, he did become involved in those matters. This involvement caused some delay before it became clear that the plant manager did not wish to make an immediate release, but was instead recommending a delay to allow for radioactive decay.

#### Deficiency and Recommendation

- \*1. Description: Confusion between participants and unnecessary time delays were caused when the Vermont Public Service Nuclear Engineer became involved in matters which are the domain of the Vermont Department of Public Health (NUREG-0654, II, A.2.a).

Recommendation: Clarify roles and responsibilities of key individuals involved in emergency response.

#### Area for Improvement and Recommendation

1. Description: New Hampshire does not have an independent radio link between the EOF and their State EOC and must rely solely on land-line telephone communications.

Recommendation: New Hampshire may wish to consider installation of a radio link between the EOF and State EOC.

## 2.4.2 Media Center, Dalem's Chalet

### Overview

The media center for the Vermont Yankee Nuclear Power Plant is located at Dalem's Chalet in Brattleboro, Vermont. In general, the facilities were good. There was sufficient space to accommodate a large media turnout. Separate rooms were provided for each Public Information Officer (PIO) and were equipped with typewriters and other supplies. Backup power was not available. This was dramatically demonstrated during the exercise when all power was lost. Consequently the computer hookup to the utility was down; electric typewriters and copiers could not function; display projectors could not be used; and television lights were inoperable.

Activation and staffing of the media center were good. Organizations represented included the utility, Vermont Governor's Office of Public Safety, Massachusetts Civil Defense, and New Hampshire Civil Defense. Representatives of these organizations can be notified at any time via radio pagers, and 24-hour staffing capability is possible. All the PIOs, in general, displayed adequate knowledge of emergency public information activities. The utility representatives were particularly good. They were able to answer even the most detailed questions asked by some very informed and aggressive reporters. The Vermont public safety representative was not as well prepared. He was unable to answer a question on evacuation procedures for Vermont towns and admitted that he was not very familiar with Vermont Civil Defense plans.

Primary communication links to State EOCs and the EOF were demonstrated. Although not demonstrated, secondary communication links are available. The Vermont Civil Defense PIO, however, would have to rely on the use of the utility radio as a backup, which could cause problems.

Overall, the informational functions performed at the media center were thorough. PIOs always conferred before issuing press releases and briefing the media. Seven formal media briefings were held at almost hourly intervals. Generally, the briefings were thorough, accurate, and clear. However, typewritten news releases were unformatted on plain paper and did not specify the issuer or date.

The effectiveness of the rumor control system was not demonstrated during this exercise. There was no evidence of it being used, but each of the PIOs described a respective rumor control system during a post exercise debriefing. The New Hampshire PIO complained that they were to have been given an "800" rumor control number for the exercise, but it was not functional, and the New Hampshire staff had to dial long distance to Vermont to track down rumors if they developed.

In general, the scenario generated meaningful sustained activity at the media center. The number of briefings and news releases are indicative of the fast-paced activities that occurred until late in the afternoon. The problem with the scenario was the credibility of the earthquakes as the cause of the simulated accident. Various media representatives questioned the Utility PIO on this issue since Vermont Yankee had provided assurances over the years that the plant was essentially earthquake proof.

### Deficiency and Recommendation

1. Description: No backup power was available at the media center; during a power outage, communications with the utility became inoperable, and lighting and media equipment could not be used (NUREG-0654, II, G.3.a).  
Recommendation: A backup source of electrical power should be provided for the media center.

### Areas for Improvement and Recommendations

1. Description: The Vermont PIO was not familiar with Vermont Civil Defense plans, specifically, evacuation procedures for Vermont towns (NUREG-0654, II, G.4.a).  
Recommendation: Vermont should provide a PIO that is completely familiar with Vermont Civil Defense plans as they relate to nuclear facility emergencies.
2. Description: Typewritten news releases were unformatted and issued on plain paper; the issuer and date were not specified.  
Recommendation: News releases should follow the standard format and specify who issued the release and at what time.
3. Description: The effectiveness of the rumor control systems was not demonstrated and the New Hampshire toll-free rumor-control number was not functional (NUREG-0654, II, G.3.c).  
Recommendation: Demonstrate rumor control functions in the next exercise.

### 3 SUMMARY LISTING OF DEFICIENCIES

Section 2 of this report lists deficiencies with recommendations noted by the federal evaluators of this exercise. These evaluations are based on the applicable planning standards and evaluation criteria set forth in Section II of NUREG-0654-FEMA-1, Rev. 1 (November, 1980), exercise objectives, and the evaluation criteria provided in Sec. 1.5 of this report.

The Regional Director of FEMA is responsible for certifying to the FEMA Associate Director, State and Local Programs and Support, Washington, D.C., that any deficiencies noted in the exercise have been corrected and that such corrections have been incorporated into the plan.

FEMA requests that the states and local jurisdictions submit the measures they have taken or intend to take to correct deficiencies. FEMA recommends that a detailed plan, including projected and actual dates of completion for implementing corrective actions, be provided if corrective actions cannot be instituted immediately.

Deficiencies fall into two categories:

- A. Deficiencies that cause a finding that off-site emergency preparedness was not adequate to provide assurance that appropriate resources can and will be taken to protect the health and safety of the public.
- B. Deficiencies identified where demonstrated (and observed) performance during the exercise was considered faulty, corrective actions are considered necessary, but other factors indicate that reasonable assurance could be given that, in the event of a real radiological emergency, appropriate measures can be taken to protect the health and safety of the public.

No deficiencies in category A were identified in this exercise. Deficiencies identified in category B are summarized in Table 2.

Deficiencies and RAC Recommendation for Corrective Action	NUREG-0654 Element	State (S) and Local (L) Proposed Corrective Actions	Proposed Completion Date	FEMA Evaluation of State and Local Response	Actual Completion Date
<u>Vermont State EOC</u>					
<p>1. <u>Description:</u> The Brattleboro EOC did not receive notice from the State EOC to evacuate in a timely manner. Thus, Brattleboro's protective response activities could not be implemented because the Brattleboro EOC was notified of the evacuation over EBS at the same time the public was.</p> <p><u>Recommendation:</u> Advise the EOCs of all affected towns of protective actions recommended for their town before such information is broadcast over the EBS so that emergency response actions can be initiated by the local EOCs before the public receives this information.</p>	J.9				
<p>2. <u>Description:</u> Even though the emergency workers adequately performed their duties as prescribed in the Vermont State plan, the low dose limits preclude the identification of the plume boundary and field verification of dose projections. Furthermore, the RAC believes that the low allowable dose limits renders the Vermont field monitoring teams incapable of providing accurate field verification. Thus, Vermont would be dependent on utility field monitoring data and would not be able to verify the dose projections independently.</p> <p><u>Recommendation:</u> It is suggested that Vermont make better arrangements to locate and track the airborne radioactive plume. This may include changing state guidelines and field procedures to allow for</p>	I.9, I.11				

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Deficiencies and RAC Recommendation for Corrective Action	NUREG-0654 Element	State (S) and Local (L) Proposed Corrective Actions	Proposed Completion Date	FEMA Evaluation of State and Local Response	Actual Completion Date
<u>Vermont State EOC (Cont'd)</u>					
the entry of field monitoring teams into areas suspected to be in the plume. This could be done without exceeding EPA exposure limits and would allow the state to obtain radiiodine measurements.					
<u>Incident Field Offices (IFOs)</u>					
<p>1. <u>Description:</u> Internal communications equipment (intercom) at the Brattleboro IFO was not reliable and hampered accurate information transfer between the Civil Defense and Department of Public Health staffs.</p> <p><u>Recommendation:</u> Identify the communications equipment problem and remedy it.</p>	F.1.d				
<u>Vermont Field Monitoring</u>					
<p>*1. <u>Description:</u> All members of one of the field monitoring teams did not have permanent-record dosimeters.</p> <p><u>Recommendation:</u> Provide sufficient permanent-record dosimeters (TLDS or film badges) for all field monitoring team members.</p>	K.3.a				
<p>2. <u>Description:</u> Not all teams were equipped with portable air monitoring and sampling devices.</p> <p><u>Recommendation:</u> According to the Vermont State Plan, each monitoring team kit should contain air monitoring and sampling devices.</p>	H.7, I.8				



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<u>Brattleboro</u>					
1. <u>Description:</u> The primary communication system did not function properly. <u>Recommendation:</u> Identify the communications equipment problem and remedy it.	F.1.b, F.1.d				
2. <u>Description:</u> Brattleboro did not receive prompt notification from the state to evacuate. <u>Recommendation:</u> The state needs to review its procedures on notifying local EOCs to initiate all protective actions so that local EOCs can begin emergency response actions before the public receives protective action recommendations over the EBS.	J.9				
3. <u>Description:</u> Permanent-record dosimeters were not available. <u>Recommendation:</u> Provide sufficient permanent-record dosimeters.	K.3.a				
<u>Dummerston</u>					
1. <u>Description:</u> The communication network available to the EOC was not effective. Reception was poor, confusing information was received, and situation updates were too infrequent. <u>Recommendation:</u> Comprehensively test and debug the entire communication system and develop comprehensive procedures for using the system.	F.1.d				

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<u>Dummerston (Cont'd)</u>					
<p>2. <u>Description:</u> A program for controlling radiological exposure is not established and dosimeters are not available.</p> <p><u>Recommendation:</u> Provide sufficient dosimeters and establish a radiological exposure control training program.</p>	K.3.a, 0.1				
<u>Gulford</u>					
<p>1. <u>Description:</u> The primary communications system did not function properly and only one commercial telephone was available for backup communications.</p> <p><u>Recommendation:</u> Identify the communications problem and remedy it. Provide additional commercial telephones for backup communication.</p>	F.1.d				
<p>2. <u>Description:</u> The responsibility for public alerting via EBS messages is not clearly defined in the town plan.</p> <p><u>Recommendation:</u> Clarify the plan and train the EOC staff in their responsibility for public alerting via EBS messages.</p>	E.5				
<p>3. <u>Description:</u> The EOC staff was not properly trained in the use of dosimetry equipment and lacked knowledge of maximum doses. Also, permanent-record dosimeters were not available.</p>	K.3.a, K.3.b				

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<u>Guilford (Cont'd)</u>					
<u>Recommendation:</u> Train the EOC staff in use of dosimetry equipment and in understanding maximum allowable doses. Also, provide sufficient permanent record dosimeters.					
<u>Vernon</u>					
1. <u>Description:</u> Permanent-record dosimeters were not available. <u>Recommendation:</u> Provide sufficient permanent-record dosimeters.	K.3.a				
<u>New Hampshire State EOC</u>					
*1. <u>Description:</u> The space and layout of the state EOC was not well suited for efficient operations. Also, backup power was not available to sustain communications in the event of a power outage. <u>Recommendation:</u> Continue efforts to improve EOC in terms of space and layout. This will probably necessitate establishing a new State EOC.	H.3				
*2. <u>Description:</u> Communications over the Civil Defense radio network did not function between the State EOC, the IFO, and the local EOCs. The backup centrex telephone system was overloaded at key times and did not provide backup capability. <u>Recommendation:</u> The cause of the primary and backup communication system failure must be identified and remedied. Schedule drills to test the adequacy of these systems.	F.1.d				

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<u>New Hampshire State EOC (Cont'd)</u>					
<p>*3. <u>Description:</u> Internal message flow between the operations room and the communications center was ineffective because messages were not relayed on standardized, hard-copy forms and the operations room was poorly laid out. Also, the operations officer could not simultaneously answer phones and coordinate internal message flow.</p> <p><u>Recommendation:</u> Transfer of internal messages should not be done orally or from unorganized notes; use hard-copy message forms to eliminate recopying of messages by receivers. Give more assistance to the operations officer to ensure that internal communications are efficient and accurate. Improve room layout to make it more conducive to internal communications.</p>	A.2.a, F.1.d				
<p>*4. <u>Description:</u> Information from the EOF received at the EOC DPH assessment room was not written down on forms that were used at both locations. A standard form was available at the EOF but not at the EOC, so accurate and timely reports were not available. Technical updates from the EOF were not periodically (at least every 30 minutes) received at the State EOC.</p> <p><u>Recommendation:</u> The standard form used at the EOF should also be used at the State EOC. Technical information from the EOF should be updated every 30 minutes or sooner if conditions change.</p>	F, F.1.d				

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<u>New Hampshire State EOC (Cont'd)</u>					
<p>5. <u>Description:</u> The state DPH representative did not arrive at the EOF promptly, thus resulting in insufficient information flow to the State EOC for making protective action decisions based on accident assessment.</p> <p><u>Recommendation:</u> Consider providing continual contact between the EOF and the State EOC while the state representative is in transit to the EOF. Also, additional training is needed for the individual assigned to be the state representative at the EOF.</p>	H.4				
<p>6. <u>Description:</u> A request for assistance in analyzing and processing ingestion pathway samples did not accurately specify the type of assistance required. It was also not clear as to how the available resources (laboratory and monitoring personnel) would be integrated in the total response effort.</p> <p><u>Recommendation:</u> Review the state's requirements for ingestion pathway monitoring and clearly indicate the relationships and responsibilities between the state and the available resources.</p>	A.2.a, A.3				CO CO
<u>Keene IFO</u>					
<p>*1. <u>Description:</u> The new Civil Defense communication system did not function properly between the IFO and field monitoring teams. Also there was no backup radio system; commercial telephones were used if they were available.</p>	F.1.d				

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<u>Keene IFO (Cont'd)</u>					
<u>Recommendation:</u> Problems with the Civil Defense communication system should be identified and remedied. An appropriate backup communication system also needs to be identified and tested.					
2. <u>Description:</u> Due to lack of enough staff the state Civil Defense representative in charge was too busy working as a telephone communicator causing him to neglect his management duties.	A.2.a				
<u>Recommendation:</u> Assign an additional person to work as a telephone communicator so the state Civil Defense representative can provide overall management at the IFO.					
3. <u>Description:</u> Message logging at the IFO was informal (essential elements of communication were not recorded); important messages (plant status, meteorological conditions, field monitoring data, etc.) were not disseminated among key players, and no periodic briefings were held to update the staff on the status of the emergency.	A.2.a, F.1.d				
<u>Recommendation:</u> Develop and use standardized forms for message logging. Such forms should provide spaces for all essential elements of communication. Develop and implement procedures for providing important messages to key players and other staff members in the form of hard copy or periodic oral briefing and post messages on the status board.					

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<u>New Hampshire Field Monitoring</u>					
<p>*1. <u>Description:</u> Communications used by the monitoring teams did not function properly.  <u>Recommendation:</u> Identify communications equipment problem and remedy it. Possibly equip field monitoring teams with vehicles that have mobile radios.</p>	F.1.d				
<p>*2. <u>Description:</u> Monitoring teams are not equipped with a low level G-M counter. Equipment provided to teams has short battery life and is not adequate for extended field use.  <u>Recommendation:</u> Provide field monitoring teams with a portable G-M counter with extended-life batteries, such as the CDV-700.</p>	I.8				
<p>3. <u>Description:</u> Dosimeters were not distributed and IFO personnel were not familiar with radiological exposure control measures.  <u>Recommendation:</u> Give IFO and field team personnel more training in the use of dosimeters and in all other aspects of radiological exposure control.</p>	K.3.a, K.3.b				
<u>Chesterfield</u>					
<p>*1. <u>Description:</u> The primary communication system did not function properly.  <u>Recommendation:</u> Identify the communications equipment problem and remedy it.</p>	F.1.d				

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<u>Hinsdale</u>					
<p>*1. <u>Description:</u> Communications between the Hinsdale EOC and all other emergency response organizations and emergency workers in the field did not function properly. The new Civil Defense radio was ineffective (messages were broken and could not be copied); the backup telephone went dead and could not be used most of the day; the Southwest Mutual Fire Aid radio has only one frequency and could not handle the large message load; and the portable amateur radio, dispatched by the state, was ineffective because reception was poor inside the EOC.</p>	<p>F.1.b, F.1.d</p>				
<p><u>Recommendation:</u> Identify the primary and backup communications problems and remedy them. Perhaps the communications officer could build a radio-repeater that would improve the EOC communications capability if funds were made available. This should be discussed with the state Civil Defense officials.</p>					
<p>*2. <u>Description:</u> According to exercise participants, the ability to alert and notify emergency response personnel is severely restricted because radio-pagers do not work well in this area. Most personnel had to be notified by telephone, which became a problem when some staff members could not be located.</p>	<p>E.2, F.1.e, 4.4</p>				
<p><u>Recommendation:</u> Improve personnel alerting. Alleviate the problems with the radio pagers. More radio pagers are needed for this location.</p>					



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<u>Richmond</u>					
<p>*1. <u>Description:</u> The new Civil Defense radio and the Southwest Mutual Fire Aid radio did not function properly. Messages received over the radio were broken and in some cases impossible to understand. Information received over the Fire Aid telephone differed from that from other sources. The EOC has insufficient equipment to communicate with emergency workers.</p> <p><u>Recommendation:</u> Identify the communications equipment problem and remedy it. Information received over the Fire Aid telephone should not be used if it differs from that from other sources. Install mobile radios in emergency vehicles.</p>	F.1.b, F.1.d				
<p>2. <u>Description:</u> EOC staff is notified by commercial telephone and radio pagers. Only one telephone and four radio pagers are available for this purpose.</p> <p><u>Recommendation:</u> Provide the EOC with additional telephones and radio pagers for initial notification.</p>	E.1, E.2, F.1.e				
<u>Swansey</u>					
<p>*1. <u>Description:</u> The new Civil Defense radio did not function properly. Also, the EOC had only one telephone line.</p> <p><u>Recommendation:</u> Identify the communication problem and remedy it. Also, install more telephones at the EOC.</p>	F.1.d				

Deficiencies and RAC Recommendation for Corrective Action	NUREG-0654 Element	State (S) and Local (L) Proposed Corrective Actions	Proposed Completion Date	FEMA Evaluation of State and Local Response	Actual Completion Date
<u>Winchester</u>					
<p>*1. <u>Description:</u> The Civil Defense radio did not function properly. No one at the EOC knew how to operate the system.</p> <p><u>Recommendation:</u> Identify the cause of the communication system failure and remedy it. Conduct drills in the use of the system.</p>	F.1.d, N.2.a				
<u>Area IV EOC</u>					
<p>*1. <u>Description:</u> The newly installed MCDA microwave radio system did not function properly. The Tri-State Mutual Fire Aid equipment also failed. Telephone calls were made to verify receipt of all emergency classification messages after the Alert status message, but busy signals were often encountered and primary notification became delayed. These problems were identified at Bernardston, Gill, Greenfield, Leyden, Northfield, and Warwick.</p> <p><u>Recommendation:</u> Repair the MCDA microwave radio system and insure that Area IV knows continuously whether the local EOCs are receiving primary notification of emergency status changes from the Tri-State Mutual Fire Aid according to Massachusetts plans. Set up a contingency plan assigning one individual to each local EOC to provide primary notification and verification of emergency status changes.</p>	F.1.d, E.2				

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<u>Gill</u>					
1. <u>Description:</u> Permanent-record devices were not available (NUREG-0654, II, K.3.a). <u>Recommendation:</u> Provide sufficient permanent-record dosimeters.	K.3.a				
<u>Leyden</u>					
1. <u>Description:</u> Direct-read dosimeters were not distributed and EOC personnel were not familiar with radiological exposure control measures. Permanent-record dosimeters were not available. <u>Recommendation:</u> EOC personnel need more training in the use of dosimeters and in all other aspects of radiological exposure control. Provide sufficient permanent-record dosimeters.	K.3.a, K.3.b				
<u>Warwick</u>					
1. <u>Description:</u> The Civil Defense radio did not function properly. <u>Recommendation:</u> Identify the communications problem and remedy it.	F.1.d				
2. <u>Description:</u> Permanent-record dosimeters were not available at the EOC. <u>Recommendation:</u> Provide sufficient permanent-record dosimeters.	K.3.a				

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<u>Emergency Operating Facility (EOF)</u>					
<p>*1. <u>Description:</u> Confusion between participants and unnecessary time delays were caused when the Vermont Public Service Nuclear Engineer became involved in matters which are the domain of the Vermont Department of Public Health.</p> <p><u>Recommendation:</u> Clarify roles and responsibilities of key individuals involved in emergency response.</p>	A.2.a				
<u>Media Center, Dale's Chalet</u>					
<p>1. <u>Description:</u> No backup power was available at the media center; during a power outage, communications with the utility became inoperable, and lighting and media equipment could not be used.</p> <p><u>Recommendation:</u> A backup source of electrical power should be provided for the media center.</p>	G.3.a				