

FEB 03 1987.

Docket No. 50-254
Docket No. 50-265

Commonwealth Edison Company
ATTN: Mr. Cordell Reed
Vice President
Post Office Box 767
Chicago, IL 60690

Gentlemen:

We have received the enclosed Federal Emergency Management Agency (FEMA) letter dated December 17, 1986, containing the offsite emergency preparedness findings for the State of Iowa and Clinton and Scott Counties in Iowa for the Quad Cities Nuclear Power Station exercise conducted on August 26, 1986. Based on the performance of the offsite agencies during the exercise, FEMA identified no deficiencies requiring corrective action. However, 13 weaknesses were observed that will require corrective actions by the State of Iowa and Clinton and Scott Counties in Iowa.

We fully recognize that any remedial actions to be implemented may involve other parties and political institutions which are not under your direct control. Nonetheless, we would expect the subject of offsite preparedness for the area around the Quad Cities Nuclear Power Station to be addressed by you as well as others.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosure will be placed in the NRC's Public Document Room.

Sincerely,

W. D. Shafer, Chief
Emergency Preparedness and
Radiological Protection Branch

Enclosure: As stated

See Attached Distribution

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yes

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Commonwealth Edison Company

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FEB 03 1987.

Distribution

cc w/enclosure:

D. L. Farrar, Director
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R. L. Bax, Plant Manager
DCS/RSB (RIDS)

Licensing Fee Management Branch

Resident Inspector, RIII

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General's Office, Environmental
Control Division

cc w/o enclosure:

D. Matthews, EPB, OIE



EXERCISE EVALIATION OF THE IMPLEMENTATION OF STATE
AND LOCAL RADIOLOGICAL EMERGENCY RESPONSE PLANS

CONDUCTED AUGUST 26, 1986

for the

QUAD CITIES NUCLEAR POWER STATION

Near Cordova, Rock Island County, Illinois
Commonwealth Edison, Licensee

PARTICIPANTS:

State of Iowa
Clinton County
Scott County

November 12, 1986

prepared by
Federal Emergency Management Agency
Region VII
911 Walnut Street
Kansas City, Missouri 64106

Jerome D. Overstreet, Regional Director

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4/11

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

- * Taking the lead in off-site emergency planning and in the review and evaluation of radiological emergency response plans developed by State and local governments.
- * Determining whether such plans can be implemented on the basis of observation and evaluation of exercises of the plans conducted by State and local governments.
- * Coordinating the activities of the following Federal agencies with responsibilities in the radiological emergency planning process:
 - U.S. Department of Commerce (DOC)
 - U.S. Nuclear Regulatory Commission (NRC)
 - U.S. Environmental Protection Agency (EPA)
 - U.S. Department of Energy (DOE)
 - U.S. Department of Health and Human Services (HHS)
 - U.S. Food and Drug Administration (FDA)
 - U.S. Public Health Service (PHS)
 - U.S. Department of Transportation (DOT)
 - U.S. Department of Agriculture (USDA)
 - U.S. Department of the Interior (DOI)

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

Formal submission of the radiological emergency response plans for the Quad Cities Nuclear Power Station (QCNPS) to the RAC by the State of Iowa and affected local jurisdictions was followed by a critique and evaluation of these plans.

The joint radiological emergency preparedness exercise was conducted for the QCNPS on August 26, 1986, between the hours of 0535 and 1430 to assess the capability of State and county emergency preparedness organizations to: 1) implement their radiological emergency preparedness plans and procedures; and 2) protect the public during a radiological emergency at the Commonwealth Edison Quad Cities Nuclear Power Station. The plans evaluated included the "Iowa Radiological Emergency Response Plans", and the Emergency Response Plans for Clinton and Scott Counties. This was the sixth exercise held for the Quad Cities Nuclear Power Station. It was classified as Full Scale with the State of Iowa and the counties of Clinton

and Scott participating. The State of Illinois, including Rock Island and Whiteside Counties also participated. However, this report will address the State of Iowa only.

1.2 EXERCISE EVALUATORS

Eleven Federal agency personnel and seven FEMA contract staff evaluated the off-site emergency response functions. These individuals and their exercise assignments are given below:

<u>OBSERVER</u>	<u>AGENCY</u>	<u>ASSIGNMENTS</u>
Bob Bissell	FEMA	Overview
Bill Brinck	EPA	Field Team Coordination
Marlee Carroll	FEMA	EOF
John Coleman	FEMA	Regional Office Coordination
Dee Demmitt	ANL	Scott Co. EOC
Bill Gasper	ANL	Ambulance Drill
Joseph Hayes	FEMA	Clinton Co. EOC
Caroline Herzenberg	ANL	State EOC
Roxanne Izzo	ANL	Reception/Decon Center
Steve Kouba	DOE	Field Monitoring Team
Rich Leonard	FEMA	Overview
Jim Levenson	ANL	Clinton Co. EOC
Mark Lickers	DOT/USCG	Forward Command Post
Brad Salmonson	INEL	Reception/Decon. Centers/ Field Monitoring Team
Dick Sumpter	FEMA	Scott Co. EOC
John Tatar	ANL	Clinton Co. Reception Center
Alyce Williams	FEMA	JPIC
Dianne Wilson	FEMA	State EOC

1.3 EVALUATION CRITERIA

The evaluation criteria for this exercise were:

1. 44 Code of Federal Regulations (CFR), Part 350.9.
2. NUREG-0654/FEMA-REP-1, Rev. 1 (All applicable requirements).
 - 2.a. The thirty-five standardized objectives developed as a summary of observable elements contained in NUREG-0654. These objectives will be referenced throughout the report.
3. Iowa Radiological Emergency Response Plan, Section B, Nuclear Power Plant Accident/Incident (all current revisions through March, 1986).
4. Quad Cities - Site Specific Nuclear Power Plant Emergency Response Plans for Clinton and Scott Counties (all current revisions through March, 1986).

1.4 EXERCISE OBJECTIVES

Exercise objectives included full-scale participation from the State of Iowa and Clinton and Scott Counties. State activities included the activation of the Forward Command Post, Radiological Field Monitoring Teams, and participation at the Joint Public Information Center. The Iowa State Emergency Operations Center in Des Moines was activated to support the utility and local counties. Both Scott and Clinton County Emergency Operation Centers were fully activated. The alert and notification system, consisting of sirens and activation of the Emergency Broadcast System (EBS), was simulated during this exercise. The utility activated the Emergency Operations Facility, Radiological Field Monitoring Teams and the Joint Public Information Center.

The Exercise was intended to demonstrate many, but not necessarily all, of the Quad Cities Nuclear Power Station capabilities to respond to a wide range of emergency conditions. The scenario was designed to activate the State and local radiological emergency response plans for the Quad Cities Nuclear Power Station and Commonwealth Edison's radiological emergency response plan through their various levels. The exercise demonstrated a number of primary emergency preparedness functions. At no time was the exercise permitted to interfere with the safe operations of the plant, and the plant management, at its discretion, could have suspended the exercise for any period of time necessary to ensure this goal.

Free play was encouraged and the exercise controllers interfered only if operator or player action prematurely terminated the exercise or deviated excessively from the drill schedule.

On June 13, 1986, the State of Iowa submitted formal objectives for State and local jurisdictions for this exercise. The format of this submission utilizes the thirty-five standardized objectives referred to under 1.3. (2.a.) above. They will be referred to by number throughout this evaluation report and are as follows:

Iowa State Emergency Operations Center

OBJECTIVE NUMBER

- 1 Demonstrate ability to mobilize staff and activate facilities promptly.
- 2 Demonstrate ability to fully staff facilities and maintain staffing around the clock.
- 3 Demonstrate ability to make decisions and to coordinate emergency activities.
- 4 Demonstrate adequacy of facilities and displays to support emergency operations.

- 5 Demonstrate ability to communicate with all appropriate locations, organizations, and field personnel.
- 10 Demonstrate ability to project dosage to the public via plume exposure, based on plant and field data, and to determine appropriate protective measures, based on PAG's, available shelter, evacuation time estimates, and all other appropriate factors.
- 13 Demonstrate ability to alert the public within the 10-mile EPZ and disseminate an initial instructional message within 15 minutes.
- 14 Demonstrate ability to formulate and distribute appropriate instructions to the public, in a timely fashion.
- 15 Demonstrate the organizational ability and resources necessary to manage an orderly evacuation of all or part of the plume EPZ.
- 17 Demonstrate the organizational ability and resources necessary to control access to an evacuated area.
- 21 Demonstrate the ability to make the decision, based on predetermined criteria, whether to issue KI to emergency workers and/or the general population.
- 22 Demonstrate the ability to supply and administer KI, once the decision has been made to do so.
- 25 Demonstrate ability to provide advance coordination of information released.

Emergency Operations Facility

OBJECTIVE NUMBER

- 1 Demonstrate ability to mobilize staff and activate facilities promptly.
- 2 Demonstrate ability to fully staff facilities and maintain staffing around the clock.
- 4 Demonstrate adequacy of facilities and displays to support emergency operations.
- 10 Demonstrate ability to project dosage to the public via plume exposure, based on plant and field data, and to determine appropriate protective measures, based on PAG's, available shelter, evacuation time estimates, and all other appropriate factors.

Joint Public Information Center

OBJECTIVE
NUMBER

- 1 Demonstrate ability to mobilize staff and activate facilities promptly.
- 2 Demonstrate ability to fully staff facilities and maintain staffing around the clock.
- 4 Demonstrate adequacy of facilities and displays to support emergency operations.
- 5 Demonstrate ability to communicate with all appropriate locations and organizations.
- 24 Demonstrate ability to brief the media in a clear, accurate and timely manner.
- 25 Demonstrate ability to provide advance coordination of information released.

State Forward Command Post

OBJECTIVE
NUMBER

- 1 Demonstrate ability to mobilize staff and activate facilities promptly.
- 2 Demonstrate ability to fully staff facilities and maintain staffing around the clock.
- 3 Demonstrate ability to make decisions and to coordinate emergency activities.
- 4 Demonstrate adequacy of facilities and displays to support emergency operations.
- 5 Demonstrate ability to communicate with all appropriate locations and organizations.

Dose Assessment and Field Team Coordination

OBJECTIVE
NUMBER

- 3 Demonstrate ability to make decisions and to coordinate emergency activities.
- 4 Demonstrate adequacy of facilities and displays to support emergency operations.

- 5 Demonstrate ability to communicate with all appropriate locations and organizations.
- 10 Demonstrate ability to project dosage to the public via plume exposure, based on plant and field data, and to determine appropriate protective measures, based on PAG's, available shelter, evacuation time estimates, and all other appropriate factors.

Radiological Field Monitoring Teams

OBJECTIVE
NUMBER

- 5 Demonstrate ability to communicate with all appropriate locations, organizations, and field personnel.
- 6 Demonstrate ability to mobilize and deploy field monitoring teams in a timely fashion.
- 7 Demonstrate appropriate equipment and procedures for determining ambient radiation levels.
- 8 Demonstrate appropriate equipment and procedures for measurement of airborne radioiodine concentrations as low as 10^{-7} uCi/CC in the presence of noble gases.
- 20 Demonstrate ability to continuously monitor and control emergency worker exposure.

Medical Emergency

OBJECTIVE
NUMBER

- 20 Demonstrate ability to continuously monitor and control emergency worker exposure control. (Illini Hospital-Based Ambulance Service.)
- 30 Demonstrate adequacy of ambulance facilities and procedures for handling contaminated individuals. (St. Luke's Hospital-Based Ambulance Service.)

Clinton County Emergency Operations Center

OBJECTIVE
NUMBER

- 1 Demonstrate ability to mobilize staff and activate facilities promptly.
- 2 Demonstrate ability to fully staff facilities and maintain staffing around the clock.

- 3 Demonstrate ability to make decisions and to coordinate emergency activities.
- 4 Demonstrate adequacy of facilities and displays to support emergency operations.
- 5 Demonstrate ability to communicate with all appropriate locations, organizations, and field personnel.
- 13 Demonstrate ability to alert the public within the 10-mile EPZ, and disseminate an initial instructional message, within 15 minutes.
- 14 Demonstrate ability to formulate and distribute appropriate instructions to the public in a timely fashion.
- 15 Demonstrate the organizational ability and resources necessary to manage an orderly evacuation of all or part of the plume EPZ.
- 17 Demonstrate the organizational ability and resources necessary to control access to an evacuated area.
- 20 Demonstrate ability to continuously monitor and control emergency worker exposure.
- 22 Demonstrate ability to supply and administer KI, once the decision has been made to do so.

Clinton County Relocation/Reception - Dewitt Central High School and Goose Lake High School

OBJECTIVE
NUMBER

- 1 Demonstrate ability to mobilize staff and activate facilities promptly.
- 2 Demonstrate ability to fully staff facilities and maintain staffing around the clock.
- 27 Demonstrate adequacy of procedures for registration, radiological monitoring and decontamination of evacuees and vehicles.
- 26 Demonstrate adequacy of facilities for reception of evacuees.

Scott County Emergency Operations Center

OBJECTIVE
NUMBER

- 1 Demonstrate ability to mobilize staff and activate facilities promptly.

- 2 Demonstrate ability to fully staff facilities and maintain staffing around the clock.
- 3 Demonstrate ability to make decisions and to coordinate emergency activities.
- 4 Demonstrate adequacy of facilities and displays to support emergency operations.
- 5 Demonstrate ability to communicate with all appropriate locations, organizations, and field personnel.
- 13 Demonstrate ability to alert the public within the 10-mile EPZ, and disseminate an initial instructional message, within 15 minutes.
- 14 Demonstrate ability to formulate and distribute appropriate instructions to the public in a timely fashion.
- 15 Demonstrate the organizational ability and resources necessary to manage an orderly evacuation of all or part of the plume EPZ.
- 17 Demonstrate the organizational ability and resources necessary to control access to an evacuated area.
- 35 Demonstrate ability to determine and implement appropriate measures for controlled recovery and reentry.

Scott County Relocation/Reception Center

OBJECTIVE
NUMBER

- 1 Demonstrate ability to mobilize staff and activate facilities promptly.
- 2 Demonstrate ability to fully staff facilities and maintain staffing around the clock.
- 27 Demonstrate adequacy of procedures for registration, radiological monitoring and decontamination of evacuees and vehicles.

1.5 EXERCISE SCENARIO

The scenario for the exercise consisted of a sequence of events resulting in a release of radioactivity of sufficient magnitude to warrant the declaration of a General Emergency. This release of radioactivity, or plume, traveled in a western direction from the plant into the State of Iowa. Protective Action Recommendations resulted in the evacuation and/or sheltering of residents within Clinton and Scott Counties, Iowa. Ingestion pathway protective action recommendations was implemented in downwind sectors out to ten miles in both Clinton and Scott Counties.

The following narrative summary is an excerpt from the scenario submitted to this office by Commonwealth Edison on July 11, 1986.

Unit one is operating normally at full power (824 MWe, 2509 MWth) and has been at high power since starting up from a weekend maintenance outage in May. The $\frac{1}{2}$ diesel is out of service, three days into a seven day Limiting Condition of Operation (LCO) before unit shutdown will be required. Mechanical Maintenance reports that the $\frac{1}{2}$ diesel should be returned to service in two to three days.

Unit Two is operating normally at high power (770 MWe, 2360 MWth) and is controlling load automatically. The unit has been on line all summer without outage. The unit is in an LCO for the $\frac{1}{2}$ diesel out of service. Unit two is out of service for trip throttle valve repairs. Unit two has been operating with a significant condenser tube leak for the last two weeks. Due to load demand, the unit has been kept on line requiring one or two condensate filter demineralizers to be backwashed, precoated and returned to service per shift. A Unit Two shutdown to repair the leaking condenser tubes is scheduled to commence on the upcoming weekend.

For the last week there has been an Offgas System leak in the turbine building. Personnel exiting through the trackway portals are found to have contaminated clothing after being in the Turbine Building for any extended period of time.

A large amount of condensate filter demineralizer resin was recently delivered to the station. One order of resin is contaminated with a powdered chemical cleaning agent known as Baxite 86. The contaminated resin will be used to precoat three demineralizers (1C, 2A, and 2E) and will cause chemical contamination of the reactor feedwater when the demineralizers are placed in service. The Baxite 86 will cause degradation of elastomer seals and a crud release in the reactor, which eventually leads to a release from the station.

At 0555 2A condensate filter demineralizer, coated with Baxite, is placed in service. Unit Two chemistry parameters begin to diverge from normal due to chemical intrusion.

At 0600 crud release begins in the Unit Two drywell. Main steam line radiation levels begin to trend upward.

At 0645 1C condensate filter demineralizer, coated with Baxite, is placed in service. Unit One chemical intrusion begins.

At 0650 reactor recirculation pump seals and reactor water clean up pump mechanical seals begin to degrade as a result of the chemical intrusion.

At 0730 a seal leakage alarm is received due to failure of the Unit Two reactor recirculation pump seal. Leakage is a 2 gpm and rapidly increasing. Chemistry technician draws his daily Unit Two chemistry sample.

At 0810 Unit Two offgas and main steam line radiation monitors begin to trend upward due to fission release from failed fuel.

At 0830 loss of primary coolant greater than 25 gpm is calculated for the Unit Two drywell drain sump. Drywell pressure and temperature continue to increase. Unit Two begins power reduction to prepare for shutdown. An "Unusual Event" is declared at this time.

At 0900 Unit One drywell equipment sump leakage exceeds 25 gpm. Unit One begins power reduction to prepare for shutdown.

At 0920 a dramatic increase in Unit Two crud concentration causes drywell radiation levels to reach 200 Rem per hour (R/hr). Airborne, main steam line, and offgas radiation levels continue to increase due to fuel element failure. An Alert is declared at this time.

At 0945 Unit One drywell radiation level reaches 200 R/hr.

At 1000 Unit Two isolates on high main steam line radiation levels as fuel element failure accelerates. High Pressure Core Injection (HPCI) is started to control reactor pressure. Steam leakage occurs around the HPCI turbine seals which significantly increases reactor building airborne levels. Reactor building ventilation system trips on high radiation level. Control failure occurs allowing supply fans to continue to run and supply dampers to remain open. The control system starts and runs normally, but cannot control reactor building pressure increase resulting in overpressurization of the reactor building.

At 1020 Unit One "A" filter demineralizer is inadvertently placed in service. Since the 1A filter demineralizer hold pump is out of the system and the isolation valves leak, a large quantity of reactor coolant is released to the demineralizer room as the 1A demineralizer is placed on line. This source also significantly increases reactor building airborne levels.

At 1040 Unit Two drywell radiation level has reached 400 R/hr., and drywell pressure exceeds 2 lbs. A "Site Area Emergency" is declared.

At 1045 failure to the reactor building over and under pressure protection system allows overpressurization of the reactor building to continue until the simultaneous rupture of the blow-out panel and the reactor building roof occurs. This results in a loss of secondary containment and initiates an uncontrolled, unmonitored release from the reactor building.

Security reports to the control room that debris from the reactor building is "all over the place". A "General Emergency" is declared at this time.

At 1050 rapid shutdown of Unit One commences.

At 1100 Unit One drywell radiation level exceeds 400 R/hr.

At 1115 Unit One forced cooldown begins by dumping steam to the main condenser. Unit Two cooldown continues via HPCI.

At 1200 Unit Two drywell average air temperature reaches 290 degrees due to continued RR pump seal leakage while drywell cooling remains isolated.

At 1220 Unit One and Unit Two drywell radiation levels stabilize at 450 and 560 R/hr., respectively.

At 1255 release rate begins to taper off.

At 1300 a twenty-four hour time jump occurs. Shortly after the time jump, both Unit One and Unit Two successfully enter shutdown cooling.

At 1320-1345 several Residual Heat Removal (RHR) pump seals fail due to the ongoing chemical intrusion. A steady-state release of 1.0E+06 microcurie per second (uCi/sec) is maintained.

At 1400 the reactor building is temporarily repaired ending the uncontrolled release. The SGBT system is operating normally.

At 1430 end of scenario.

A list of major events with planned and actual times follow:

<u>Planned Time</u>	<u>Event</u>	<u>Actual Time</u>
0815	Unusual Event	0809
0915	Alert	0937
1030	Site Area Emergency	1042
1200	General Emergency	1155
1200	Release to Environment	1155
1400	Release is Terminated	1400
1430	Exercise Terminated	1435

1.6 STATE AND LOCAL RESOURCES

Listed below are organizations that planned to participate:

State of Iowa

1. Iowa Office of Disaster Services
2. Iowa State Department of Health
3. Iowa National Guard

4. Iowa Department of Public Safety (Iowa Highway Patrol)
5. Iowa Department of Natural Resources
6. Iowa Department of Transportation
7. University of Iowa Hygienic Laboratory
8. Office of the Governor
9. Office of the Attorney General
10. Iowa Department of Human Services
11. Iowa Department of Agriculture
12. Iowa Commission on Aging
13. Iowa Conservation Commission
14. Iowa Commerce Commission
15. Office of the Adjutant General
16. American Red Cross

Clinton County

Civil Defense
Sheriff's Department
Highway Department
County Supervisor
Social Services
Public Information Office
American Red Cross
Area Education Agency
Amateur Radio Club
Municipal Fire and Police
Municipal Mayors:
City Clinton
Town of Comanche
Town of Low Moor

Scott County

Sheriff's Department
Highway Department
Health Department
Public Information Office
American Red Cross
Human Services
Environmental Health
Area Education Agency
Municipal Fire and Police
Civil Defense
Municipal Mayors:
City of Princeton
Town of LeClaire
Town of McCausland

2 EXERCISE EVALUATION

2.1 IOWA OPERATIONS

2.1.1 State Emergency Operations Center (SEOC)

The following objectives were to be demonstrated at this facility: 1, 2, 3, 4, 5, 10, 13, 14, 15, 17, 21, 22, and 25.

The call to activate the Iowa State EOC was received at 0932 from the utility. The call was verified and staff mobilization procedures were adequately demonstrated with full staffing completed at 1000. Organizations represented at the EOC were the Office of Disaster Services, State Departments of Public Health, Natural Resources, Transportation, Agriculture, Human Services, Commerce, and Aging. Also represented were the State Highway Patrol, University Hygienic Laboratory and National Guard. Based on the above, Objective Number 1 was fully demonstrated.

Objective Number 2, ability to staff facilities around-the-clock, was partially demonstrated. The State Departments of Transportation and Agriculture and the Iowa National Guard demonstrated this objective by shift change. However, the remaining State Agencies provided rosters to demonstrate this capability. The use of rosters precluded a full demonstration of 24-hour staffing.

The ability to make decisions and to coordinate emergency activities, Objective Number 3, was not fully demonstrated. The State EOC failed to notify the Forward Command Post (FCP), located at the State Highway Patrol Headquarters, at the Alert stage. Consequently, the FCP was not activated in accordance with the State Plan. Actual activation of the facility occurred when a representative of the State Highway Patrol overheard the status (Alert) via their internal radio system. As the FCP is an integral part of emergency activity coordination, it is imperative that the facility be activated promptly. State procedures must be reviewed to assure that notification of this facility occurs in accordance with the State Plan.

In addition, the State EOC failed to notify FEMA of the General Emergency declaration. As FEMA is responsible for notifying other Federal Agencies with responsibilities during a radiological emergency, prompt notification of emergency classification must be made in accordance with the State Plan. The State procedures must be reviewed to assure that FEMA is promptly notified of emergency classification levels.

Objective Number 4, adequacy of facilities and displays to support emergency operations, was fully demonstrated. Status boards were clearly visible and kept up-to-date on significant events. All appropriate maps and displays were posted or available.

The ability to communicate with all appropriate locations, organizations and field personnel, Objective Number 5, was fully demonstrated. All appropriate primary communication systems were demonstrated. The Nuclear Accident Reporting System (NARS) provides a direct communication link with the utility and is continuously monitored.

Objective Number 10 is included under the Dose Assessment and Field Team Coordination section (2.1.5) of this report.

The ability to alert the public within the 10-mile EPZ and disseminate an initial instructional message within 15-minutes was fully demonstrated. The State function for the objective is limited to providing basic Emergency Broadcast Station (EBS) message content to the counties. The county will in turn add landmark descriptions and release the completed instructions to the EBS station. The basic messages prepared by the State were appropriate and distributed to the local level in a timely manner. Based on the above facts, Objectives Number 13 and 14 were fully demonstrated.

Evacuation and access control were effectively coordinated at the SEOC. The Iowa State Highway Patrol and the Department of Transportation adequately demonstrated the ability and resources necessary to control road, water, and rail traffic into the affected area. Estimates of expected traffic volume were discussed with activation of traffic control points promptly ordered. Resources are available to assist in keeping evacuation routes clear during inclement weather. Based on the above facts, Objectives Number 15 and 17 were fully demonstrated at the State level.

The ability to make decisions based on predetermined criteria whether to issue KI to emergency workers, Objective Number 21, was fully demonstrated. The appropriate decision to issue KI was reached at 1204 and subsequently transmitted to the counties.

Objective Number 22, ability to supply/administer KI once the decision has been made, could not be evaluated. As stated above, the decision to use KI is made at the State EOC; however, the actual distribution is performed at the local level, as the State EOC is well outside the Emergency Planning Zone of the power plant.

The ability to provide advance coordination of emergency information released, Objective Number 25, was fully demonstrated. The State function was only to provide basic EBS messages to the counties for release to the EBS. This same information was also provided to the Joint Public Information Center located near the Emergency Operations Facility.

Summary: There were no inadequacies identified during the previous exercise that required corrective action or subsequent demonstration for reevaluation during this exercise.

Objectives Number 2 and 3 were not fully demonstrated during this exercise.

Areas Requiring Corrective Action

1. The State EOC failed to notify the Forward Command Post (FCP) at the Alert stage. Consequently, the FCP was activated when a representative of the State Highway Patrol overheard the status via their internal radio system. As a result, the FCP was not activated in a timely manner and in accordance with the State Plan. (NUREG-0654, E.2.)

2. The State EOC failed to notify FEMA of the General Emergency classification level. As FEMA contacts other Federal Agencies with responsibilities during a radiological emergency, prompt notification of emergency classifications must be made in accordance with the State Plan. (NUREG-0654, E.1.)

2.1.2 Emergency Operations Facility (EOF)

The following objectives were to be demonstrated at this facility: 1, 2, 4, and 10.

The ability to mobilize staff and activate facilities promptly was adequately demonstrated. Round-the-clock staffing was demonstrated by roster. On-coming staff were briefed and generally displayed adequate training and knowledge. The State of Iowa dispatched two representatives from the Iowa Office of Disaster Services and one from the Department of Public Health. This was a staffing increase which corrected an inadequacy identified during the previous exercise concerning insufficient staffing levels. Based on the above facts, Objective Number 1 was fully demonstrated. Objective Number 2 was partially demonstrated as rosters were provided in lieu of a shift change.

Objective Number 4, adequacy of facilities and displays to support emergency operations, was fully demonstrated. Message logs were kept with appropriate distribution to all EOF staff members. This corrected an inadequacy identified during the previous exercise concerning message distribution. All maps, status boards and other visual aids were clearly displayed.

The ability to project dosage to the public via plume exposure, based on plant data and field data, and to determine appropriate protective measures based on PAG's, Objective Number 10, was demonstrated to the extent of the State participation. The State responsibilities at this facility consists of liaison roles only. All decisions within this objective were made at the State EOC in Des Moines.

Summary: The two inadequacies identified during the previous exercise conducted August 27, 1985, were corrected during this exercise.

Objective Number 2 was not fully demonstrated during this exercise.

There were no inadequacies observed that would require corrective action at the EOF.

2.1.3 Joint Public Information Center (JPIC)

The following objectives were to be demonstrated at the JPIC: 1, 2, 4, 5, 24, and 25.

The ability to mobilize staff and activate facilities promptly, Objective Number 1, was adequately demonstrated. The facility activation was initiated

at the Alert stage in accordance with the State and Utility Plans. Representative from the Office of Disaster Services, and Commonwealth Edison managed the Public Information function of this facility. Objective Number 2 was not fully demonstrated as round-the-clock staffing was demonstrated by presentation of a roster.

Objective Number 4, adequacy of facilities and displays, was fully demonstrated. Maps utilized for displays were well done and of sufficient size to be seen from any point in the briefing area. Telephones were available for the media.

The ability to communicate with all appropriate locations and organizations, Objective Number 5, was fully demonstrated. A dedicated communication link was established with the State EOC, local EOC's and Emergency Operations Facility. Commercial phone lines were utilized for a back-up communication system. A hard copy device was available at the JPIC and effectively demonstrated.

The ability to brief the media in a clear, accurate and timely manner, Objective Number 24, was fully demonstrated. However, one area was noted as a recommendation for improvement. During the four press briefings conducted, the affected areas were described by sectors only. Landmark descriptions of the affected areas were not provided. The failure to accurately describe the affected areas will leave interpretation of the landmark boundaries by media personnel. This may lead to erroneous or conflicting information regarding protective action recommendation areas. During future press briefings, landmark descriptions should be included with descriptions of affected sectors.

With the exception noted above, the briefings conducted were accurate and complete. Technical jargon was avoided or explained. Media kits were available which included background information on the utility, nuclear power plants, radiation, and the local areas that may be affected.

A correct rumor control number was published during the first press briefing, correcting an inadequacy identified during the previous exercise. However, it was not repeated during the subsequent meetings. During the third press briefing, a media person asked if there was a rumor control number. The State PIO responded that there was a number, but failed to provide the actual telephone number. It is recommended that the rumor control number be provided during each press briefing or be prominently posted for reference to ensure that the media provides as much useful information to the public as possible.

Objective Number 25, ability to provide adequate coordination of information provided, was fully demonstrated. The State and utility PIO's discussed the current status of the emergency prior to each press briefings. A consensus was reached on what would be said, by whom and in what order presentations would be made.

Summary: The one inadequacy noted during the previous exercise conducted August 27, 1985, was corrected during this exercise.

Objective Number 2 was not fully demonstrated during this exercise.

There were no inadequacies observed that would require corrective action at the JPIC.

Areas Recommended For Improvement

1. Rumor control numbers should be provided during each press briefing. This will ensure that the media provides as much useful information to the public as possible.
2. Landmark descriptions of affected sectors were not provided during the press briefings. To ensure that the media provide the public with accurate information concerning protective action recommendations within the affected sectors, landmark descriptions should be provided during press briefings to eliminate the potential for any erroneous or conflicting information.

2.1.4 Forward Command Post (FCP)

The following objectives were to be demonstrated at the FCP: 1, 2, 3, 4, and 5.

The FCP, located at the Iowa State Highway Patrol Headquarters, was not activated until 0945, after the Alert stage. The State EOC in Des Moines failed to contact the FCP to initiate activation of this facility. Activation of this facility finally occurred when a representative of the State Highway Patrol overheard the status (Alert) via their internal radio system. The facility was subsequently fully staffed by 1213. However, the failure to activate the FCP in a timely manner was caused by the State EOC. Consequently, this inadequacy is addressed in that section of this report (2.1.1) relative to the State EOC. Mobilization procedures were demonstrated correcting an inadequacy identified during the previous exercise concerning repositioning of Iowa Conservation Commission staff. Other organizations represented at the FCP were the Iowa Departments of Transportation and Natural Resources, Highway Patrol, Office of Disaster Services and National Guard. Based on the above facts, Objective Number 1, activation and mobilization of staff was adequately demonstrated.

Objective Number 2, ability to fully staff facilities and maintain staffing around-the-clock, was partially demonstrated. Round-the-clock capability was demonstrated by presentation of a roster. The use of rosters in lieu of double staffing or shift change, precluded a full demonstration of 24-hour staffing.

The ability to make decisions and coordinate emergency activities, Objective Number 3, was fully demonstrated with good interaction among the various organizations present. Traffic control points and estimates of expected traffic volumes were discussed and conclusions coordinated with the State EOC.

Objective Number 4, adequacy of facilities and displays, was fully demonstrated. Status boards were updated and clearly posted. All appropriate maps were posted or available concerning the plume EPZ, access control points and radiological monitoring points.

The ability to communicate with all appropriate locations, Objective Number 5, was fully demonstrated. Direct telephone lines were the primary communication link between the State EOC, local EOC's and Emergency Operation Facility. Commercial telephones were utilized as back-up.

Summary: The one inadequacy noted during the previous exercise conducted August 27, 1985, was corrected during this exercise.

Objective Number 2 was not fully demonstrated during this exercise.

There were no inadequacies observed that would require corrective action at the FCP.

2.1.5 Radiological Assessment and Field Team Coordination

The following objectives were to be demonstrated for the Radiological Assessment and Field Team Coordination function: 3, 4, 5, and 10.

Radiological Assessment was performed at the State EOC in Des Moines by the Iowa Department of Public Health. Field Team Coordination was performed at the Clinton County EOC by the University of Iowa's Hygienic Laboratory staff.

The ability to project dosage to the public via plume exposure, Objective Number 10, was fully demonstrated. Dose projections were derived from both plant release data and field readings. Protective action recommendations for the plume pathway were promptly reviewed and updated as conditions changed. This corrected an inadequacy noted during the previous exercise conducted on August 27, 1985, concerning staff response to high radioiodine field monitoring data.

Objective Number 3, ability to make decisions and to coordinate emergency activities, was not fully demonstrated. The Dose Assessment staff at the State EOC did not update the Field Team Coordination staff, located at the Clinton County EOC, of plant and off-site events in an adequate or timely manner. For example, the Field Team Coordinator did not learn of the initiation of the release until one hour after it occurred. Obviously, if the Field Team Coordinator is not aware of the release or the direction of the plume, he could unknowingly endanger the field teams, due to excessive or unnecessary exposure. In addition, the Field Team Coordinator was not promptly updated on plant conditions which caused the release or whether or not any protective action recommendations were implemented. Based on the above, procedures must be implemented or existing procedures amended to assure that the Field Team Coordinator is updated concerning all plant and off-site events that would impact on this function.

Objective Number 4, adequacy of displays to support emergency operations, was adequately demonstrated. However, it should be noted that displays available to support the field team coordination operation consisted only of a radiological monitoring point map and table for posting data. During the previous exercise an inadequacy was identified concerning the maps which show off-site radiological monitoring points. Monitoring points, as shown on the Iowa side, were identified by the same reference names as shown on the Illinois side causing considerable confusion during the exercise. This was corrected during this exercise as one map was utilized showing both states without duplicating the reference points.

Objective Number 5, ability to communicate with all appropriate locations, organizations and field personnel, was fully demonstrated. A backup communication system was demonstrated between the Field Team Coordinator and the field teams when the base station failed. A hand-held unit in conjunction with a repeater was quickly and efficiently utilized to resolve the problem. Radio contact between the Dose Assessment staff located at the State EOC, the Field Team Coordinator and the Field Teams was maintained throughout the exercise.

Summary: The two inadequacies identified during the previous exercise conducted August 27, 1985, were corrected during this exercise.

Objective Number 3 was not fully demonstrated during this exercise.

Area Requiring Corrective Action

3. The Dose Assessment staff (Iowa Department of Public Health) did not update the Field Team Coordination staff concerning plant and off-site events in a timely manner. (NUREG-0654, I.8.)

2.1.6 Field Monitoring Teams

The following objectives were to be demonstrated by the Field Monitoring Teams: 5, 6, 7, 8, and 20.

During this exercise two field teams were utilized consisting of two members each, both from the University Hygienic Laboratory.

Field team activation and mobilization, Objective Number 6, was fully demonstrated. Both field teams were dispatched from the University Hygienic Laboratory in Iowa City. Activation from work/home to the Oakdale facility was simulated due to the time constraint of the exercise scenario. Rapid deployment was enhanced as equipment utilized by the field teams was pre-packed in footlockers at the Oakdale facility.

The appropriate equipment and procedures for determining ambient radiation levels, Objective Number 7, was fully demonstrated for both teams with one exception. Radiation detection instruments and air sampling equipment were not calibrated within a year in accordance with the manufacturers' specifications as outlined in NUREG-0654, H.10. Specifically, the radiation detector instruments were last calibrated in June 1985. The air sampling equipment was calibrated in August 1984. In order to accurately determine ambient radiation levels and/or measure airborne radioiodine, the equipment must be calibrated on a periodic basis per the manufacturers' specification.

Objective Number 8, appropriate equipment and procedures for measurement of airborne radioiodine concentrations in the presence of noble gases, with the exception of the calibration noted above, was fully demonstrated by one of the field teams (Blue Team). This corrected an inadequacy identified during the previous exercise.

The ability to communicate with all appropriate locations, Objective Number 5, was fully demonstrated for both teams. Radio contact was maintained throughout the exercise. Representatives from the Clinton County amateur radio club accompanied the field teams in separate vehicles to provide a source for backup radios which was adequately demonstrated during this exercise.

The ability to continuously monitor and control emergency worker exposure, Objective Number 20, was not fully demonstrated for the Blue Team. Each team had adequate protective equipment including anti-contamination suits, boots, gloves, tongs and respirators. Both teams had the appropriate dosimetry and were aware of procedures for decontamination. However, the Blue Team was not aware of the maximum dose allowed without authorization. It is recommended that additional training be provided to the field team members on emergency exposure control limits. This lack of knowledge could result in excessive exposure to field team members. In addition, it should be noted that the potassium iodide (KI) supply that the Blue Team had on hand was out of date (January 1986, expiration date). As the ability to supply and administer KI was not an objective during this exercise, corrective action will not be required. However, this must be included as an objective during the next exercise.

Summary: The one inadequacy identified during the previous exercise conducted August 27, 1985, was corrected during this exercise.

Objectives Number 7 and 20 were not fully demonstrated during this exercise.

Area Requiring Corrective Action

4. Radiation detection instruments and air sampling equipment were not calibrated within a year in accordance with the manufacturers' specifications. (NUREG-0654, H.10)
5. The Blue Team members were not aware of the maximum exposure dose allowed without authorization. (NUREG-0654, K.5.a.)

2.1.7 Medical Emergency

The following objectives were to be demonstrated by the St. Luke's and Illini Hospital based area ambulance services: 20 and 30.

The ability to continuously monitor and control emergency worker exposure, Objective Number 20, was fully demonstrated by the Illini Hospital based ambulance service. This objective was demonstrated to correct an inadequacy identified during the previous exercise. The appropriate dosimetry was available including permanent record dosimeters (TLD's). The ambulance service staff displayed an adequate knowledge of procedures concerning the use of both pocket dosimetry and TLD's.

Objective Number 30, adequacy of ambulance facilities and procedures for handling contaminated individuals, was fully demonstrated for the St. Luke's Hospital based area ambulance service with one exception. The ambulance crew evaluated for this exercise performed an excellent demonstration of this objective. The crew demonstrated adequate procedures to restrict the spread of contamination within the vehicle. Injuries were treated and the patient was transported in accordance with appropriate standards. However, upon arrival at the hospital, the ambulance crew went to the wrong receiving area. As the area was not prepared for receiving

individuals exposed to radioactivity, the spread of contamination could possibly have occurred. Obviously, the crew was not familiar with the proper receiving area at the hospital. All ambulance crew members must be made aware of the designated areas for receiving contaminated patients.

Summary: The one inadequacy identified during the previous exercise conducted August 27, 1985 for the Illini Hospital based area ambulance service was corrected during this exercise.

Objective Number 30 was not fully demonstrated during this exercise.

Area Requiring Corrective Action

6. The St. Luke's Hospital based area ambulance service transported the contaminated patient to the wrong receiving area of the hospital. This would cause the unnecessary spread of contamination at this facility. (NUREG-0654, L.1.)

2.2. COUNTY OPERATIONS

2.2.1 Clinton County Emergency Operations Center (CCEOC)

The following objectives were to be demonstrated at the CCEOC: 1, 2, 3, 4, 5, 13, 14, 15, 17, 20, and 22.

The ability to mobilize staff and activate facilities promptly was partially demonstrated. The CCEOC received notification of the Alert at 0932; EOC staffing was complete at 1115 with the exception of the Mayor's of Low Moor and DeWitt. Round-the-clock staffing capability was demonstrated by the majority of the responders by double staffing. However, some agencies demonstrated 24-hour staffing by presentation of a roster which precluded a full demonstration of this objective. Based on the above facts, Objective Number 1 and 2 were not fully demonstrated.

Objective Number 3, ability to make decisions and to coordinate emergency activities, was fully demonstrated. Periodic briefings were held by the Director to update the staff concerning the status of the emergency. The briefings were informative and involved all appropriate staff members. Decision-making was strongly demonstrated. The EOC staff was well trained and displayed much enthusiasm during this exercise.

The adequacy of facilities and displays to support emergency operations, Objective Number 4, was fully demonstrated. The EOC has all the necessary resources and supplies to operate on a 24-hour basis. The plume EPZ, evacuation routes, relocation centers, and access control points, were all displayed and updated.

The ability to communicate with all appropriate locations, organizations and field personnel, Objective Number 5, was adequately demonstrated. The primary communication system was a dedicated administrative line connecting Clinton County, Scott County, the Emergency Operations Facility and the

State EOC. In one instance the line was lost during the exercise, but was quickly restored. An indoor warning call system has been established with the local schools; however, it was not demonstrated during this exercise.

Objective Number 13, ability to alert the public within the 10-mile EPZ and disseminate an initial instructional message within 15-minutes was fully demonstrated. At 1040 the utility notified Clinton County over the administrative line that a Site Area Emergency was declared. Siren activation was simulated at 1045. A simulated call was subsequently made to the Emergency Broadcast Station (EBS) with an initial instructional message at 1046. This objective was completed within approximately six minutes, which is well within the guidelines established pursuant to NUREG-0654. This corrected an inadequacy identified during the previous exercise.

In addition, as Clinton County has areas within the 5 to 10 mile portion of the EPZ without fixed siren coverage. Mobile route alerting is provided to alert residents within these areas. NUREG-0654 requires that route alerting be completed in areas such as these within 45 minutes. This objective was fully demonstrated during this exercise. Per the County Plans, the Clinton County Sheriff's Department performed this function. Mobilization was demonstrated as the deputies initiated route alerting from various locations outside the city limits thereby simulating routine patrol. Routes R.9.5, A.7 and A.9.5 were initiated from county road F12 at the west side of the Clinton city limits. Routes Q.7 and Q.7.5 were initiated from the intersection of Highway 30 and county road Z46. Finally, Route P.7 was initiated at Highway 67 at the west side of the Camanche city limits. Each of the six routes were independently verified by FEMA evaluators on August 27, 1986. The routes and the respective time to complete the alerting are as follows:

Route P.7	40 minutes
Route Q.7	31 minutes
Route Q.7.5	33 minutes
Route R.9.5	43 minutes
Route A.7	32 minutes
Route A.9.5	37 minutes

Objective Number 14, ability to formulate and distribute appropriate instructions to the public in a timely manner, was fully demonstrated. The EBS messages were clear and appropriate to each situation. Protective action areas were described in terms of familiar boundaries and landmarks. Evacuation instructions included information concerning school children, institutionalized and mobility impaired individuals.

The final protective action recommendations made by the Clinton County EOC were to evacuate all sectors from 0 to 2 miles and sectors M, N, and P from 2 to 5 miles and shelter sectors M, N, and P from 5 to 10 miles. As the plume traveled in a westerly direction into Iowa from the plant, the protective action recommendations were appropriate.

The organizational ability and resources necessary to manage an orderly evacuation of all or part of the plume EPZ, was adequately demonstrated.

Water traffic on the Mississippi River was controlled (simulated) by the State Conservation Commission. The Reception Center located at the DeWitt Central High School was activated (simulated) at 1115 and fully staffed by 1202. However, activation of access control points were not promptly ordered to control access into the affected areas. During the Site Area Emergency declaration at 1042, protective action recommendations were made to shelter the public in the 0 to 2 mile radius and from 2 to 5 miles in sectors M, N, and P. However, access control was not initiated until the General Emergency declaration was made at 1155. Obviously, without access control, the general public has unrestricted access into protective action recommendation areas and may be unnecessarily exposed to radiation. This inadequacy occurred because the County's Plan and procedures for access control are aligned with emergency classification levels, rather than protective actions. Consequently, per the County Plan, access control was not initiated until the General Emergency. The plans and procedures must be amended to align access control with protective actions and not with emergency classifications levels. Based on the above, Objective Number 15 was fully demonstrated and Objective Number 17 was partially demonstrated.

Objective Number 20, ability to continuously monitor and control emergency worker exposure, was fully demonstrated. All appropriate dosimetry was available, including permanent record dosimetry (TLD's). This corrected an inadequacy identified during the previous exercise concerning an insufficient supply of TLD's. The EOC staff was aware of the procedures for reading and recording dosimeter values.

The ability to supply and administer potassium iodide (KI) to emergency workers once the decision has been made, Objective Number 22, was fully demonstrated. An adequate supply of KI was available for the entire staff of emergency workers at the EOC. This corrects an inadequacy identified during the previous exercise. Procedures were also demonstrated for distribution to emergency workers.

Summary: The three inadequacies identified during the previous exercise conducted August 27, 1985, were corrected during this exercise.

Objectives Number 1, 2, and 17 were not fully demonstrated during this exercise.

Area Requiring Corrective Action

7. Access Control into protective action recommendation areas was not implemented during the Site Area Emergency and was delayed until the General Emergency declaration. This occurred because the County Plans and procedures do not require implementation of access control until the General Emergency. (NUREG-0654, J.10.j.)

2.2.2 Clinton County Reception and Decontamination - DeWitt Central High School

The following objectives were to be demonstrated at this facility: 1, 2, and 27.

The ability to mobilize staff and activate facilities promptly was fully demonstrated with one exception. The Standard Operating Procedures (SOP's) for the Clinton County Reception Centers show the Area Education Agency, County Civil Defense Agency and the local Fire Departments as participating organizations. However, there were numerous additional organizations participating during this exercise that are not reflected in the SOP and are as follows: City of DeWitt Police Department, Iowa National Guard, American Red Cross, local amateur radio group, and representatives from the Clinton County Medical Nurses Staff. As the majority of the organizations have an integral responsibility at the Reception Centers, their participation must be reflected in the SOP's in accordance with NUREG-0654, P.4. The SOPs must be updated to reflect all the organizations who actively participate at the Reception Centers.

Objective Number 2, ability to fully staff facilities, was fully demonstrated. Monitoring staff and appropriate equipment was available for ten teams, consisting of two persons per team. Sufficient staff was available to perform all the required responsibilities at this center.

Objective Number 27, adequacy of procedures for registration, radiological monitoring, and decontamination was fully demonstrated to the extent of current FEMA guidance. The American Red Cross was available for registration and was very well trained and prepared to perform this function. The National Guard and DeWitt Fire Department staff composed the ten monitoring teams and performed an excellent job in demonstrating monitoring techniques for both evacuees and vehicles. This corrected an inadequacy identified during the previous exercise concerning adequate staffing and monitoring capabilities.

Procedures were adequately demonstrated for determining the need to decontaminate. Decontamination of evacuees and vehicles was demonstrated. The registration, monitoring and decontamination areas were appropriately segregated to prevent cross contamination, which corrected an inadequacy identified during the previous exercise. Procedures for handling radioactive wastes were also demonstrated.

Trained personnel and equipment were available to monitor approximately 5,040 evacuees and 1,608 vehicles within a twelve hour period. This is based on monitoring time of 90 seconds per evacuee and four minutes per vehicle. An average of three persons per vehicle is assumed based on the Evacuation Time Estimate Study for the Quad Cities Nuclear Station.

The ability to continuously monitor and control emergency worker exposure was not an objective during this exercise. However, the evaluator noted that there was an insufficient number of self-reading dosimeters available for the emergency worker staff. As this was not an objective during this exercise, it will not be identified as an inadequacy requiring corrective

action; however, it must be included as an objective to be demonstrated during the next exercise.

Congregate care will be provided at a separate location from the DeWitt High School. The Clinton County School District will provide buses to be utilized to transport evacuees to this facility. However, these transportation procedures are not reflected in the SOP's. The SOP's must be amended to reflect this resource per NUREG-0654, P.4.

Summary: The two inadequacies identified during the previous exercise conducted August 27, 1985, were corrected during this exercise.

Areas Requiring Corrective Action

8. The Iowa National Guard, City of DeWitt Police Department, American Red Cross, the local amateur radio group and the Clinton County Medical Nurses were participants during this exercise. However, these organizations are not reflected in the SOP's. As the majority of these organizations have an integral responsibility at this facility, their function must be reflected in the SOP's. (NUREG-0654, P.4.)
9. Per the Reception Center Emergency Operations staff, the Clinton County School District would provide buses to transport evacuees to congregate care centers. However, this procedure is not reflected in the SOP's. The appropriate amendment must be made. (NUREG-0654, P.4.)

2.2.3 Clinton County Reception and Decontamination - Goose Lake High School

The objective to be demonstrated was: 28; adequacy of facilities for reception of evacuees.

This facility would be used as a alternate to the DeWitt Central High School. The same staff utilized at the DeWitt Central High School would be utilized at the Goose Lake High School. The registration, monitoring and decontamination procedures were fully demonstrated at the DeWitt High School as stated in Section 2.2.2 of this report. Therefore, only the adequacy of the facilities for reception of potential evacuees was evaluated. This was fully demonstrated. The shelter could accommodate approximately 1,100 evacuees. Food supplies could be obtained within 24 hours by the American Red Cross.

Summary: There were no inadequacies identified during the previous exercise which required corrective action during this exercise.

There were no inadequacies observed at this facility that would require correction action.

2.2.4 Scott County Emergency Operations Center (SCEOC)

The following objectives were to be demonstrated at the SCEOC: 1, 2, 3, 4, 5, 13, 14, 15, 17, and 35.

The ability to mobilize staff and activate facilities promptly, Objective Number 1, was fully demonstrated. The SCEOC received notification of the Alert at 0945 from the State EOC with full staffing completed by 1118. Round-the-clock staffing capability, Objective Number 2, was partially demonstrated as only the American Red Cross, County Public Information Officer and City of LeClaire officials demonstrated an actual shift change. The remaining staff at the EOC demonstrated 24-hour staffing by presentation of a roster which precluded a full demonstration of this objective.

Objective Number 3, ability to make decisions and to coordinate emergency activities, was adequately demonstrated. Periodic briefings were held to update the staff concerning the status of the emergency. Messages received over the Nuclear Accident Reporting System (NARS) were appropriately copied and handled efficiently. However, the evaluator noted that messages over the Administrative Hot Line were neither consistently logged nor distributed. The Administrative Hot Line is a direct communication link between the utility, State EOC and both counties and is the primary notification system for the Site Area and General Emergencies and the protective action recommendations. Based on the above, it is recommended that the same procedures utilized for tracking messages on the NARS be utilized for the Administrative Hot Line to assure that all pertinent messages be distributed to the appropriate staff within the EOC.

The adequacy of facilities and displays to support emergency operations, Objective Number 4, was fully demonstrated. The EOC has all the necessary resources to operate on a 24-hour basis. All appropriate maps and displays were posted and clearly visible. The plume EPZ, evacuation routes, relocation centers, access control points and radiological monitoring points were posted and updated in a timely manner. Access to the EOC was controlled.

The ability to communicate with all appropriate locations, organizations and field personnel, Objective Number 5, was fully demonstrated. Primary and secondary communication systems were demonstrated to the State EOC, utility and Clinton County EOC. Telephone capabilities were available to and from the Joint Public Information Center.

Objective Number 13, the ability to alert the public within the 10-mile EPZ and disseminate an initial instructional message within 15 minutes was fully demonstrated. At 1040, the utility notified Scott County over the administrative hot line that a Site Area Emergency was declared. Siren activation was simulated at 1047. A call was simulated to the Emergency Broadcast Station (EBS) with an initial instructional message at 1047. This objective was completed within approximately seven minutes which is within the 15 minute guidelines established in NUREG-0654. This corrected an inadequacy identified during the previous exercise.

As with Clinton County, Scott County has areas within the 5 to 10 mile portion of the EPZ without siren coverage which require mobile route alerting. NUREG-0654 requires that route alerting be completed in these areas within 45 minutes of initial notification. This objective was adequately demonstrated during this exercise. Per the County Plans, volunteer fire departments located in the communities of Princeton, LeClaire and McCausland performed this function. Actual mobilization was not demonstrated as the volunteer fire department staff were prepositioned at each fire station. The County Plans require mobilization at the Alert stage. Therefore, the staff would be readily available to begin route alerting at the subsequent Site Area Emergency declaration. However, this does not account for a fast breaking emergency. Mobilization time must be added to the time required to perform route alerting. As the average mobilization time for the volunteer fire departments staff during fires and other emergencies is two to four minutes and the majority of the responders live within close proximity of the stations, five minutes were added to each route. As with Clinton County, all ten routes were independently verified by FEMA evaluators on August 26, 1986. The routes and the respective time to complete the alerting, including mobilization time of five minutes, are as follows:

Route M.5.5	37 minutes
Route M.6	37 minutes
Route L.5.5	39 minutes
Route L.6	37 minutes
Route L.6.5	42 minutes
Route L.8.5	33 minutes
Route N.7	38 minutes
Route N.7.5	26 minutes
Route N.8	32 minutes
Route K.6	43 minutes

Objective Number 14, ability to formulate and distribute appropriate instructions to the public in a timely manner, was fully demonstrated. The EBS messages were clear and appropriate to the situation with one exception. During the General Emergency, the first Protective Action Recommendation (PAR) received from the State during this status was to evacuate in all sectors in the 0 to 2 mile radius and shelter in sectors M, N, and P from 2 to 5 miles. However, the State liaison at the EOC misunderstood the PAR and recommended to the Civil Defense Director to evacuate in sectors M, N, and P from 2 to 5 miles. The erroneous PAR was broadcast (simulated) over the EBS at 1208. Shortly afterward, the mistake was discovered and corrected. The Public Information Officer (PIO) quickly prepared a corrected EBS message explaining the mistake and simulated the call to the station at 1213. In addition, the PIO activated a local rumor control number to resolve any concerns that would have resulted and also notified the Joint Public Information Center of the mistake. The quick and decisive reaction by the PIO was commendable.

Protective action areas were described in terms of familiar boundaries and landmarks. Evacuation instructions included information concerning institutionalized and mobility impaired individuals.

The final PAR's made by the Scott County EOC were to evacuate all sectors in the 0 to 2 mile radius and from 2 to 5 miles in sectors M, N, and P and to shelter in sectors M, N, and P from 5 to 10 miles. As the plume traveled in a westerly direction into Iowa from the plant, the PARs were correct.

The organizational ability and resources necessary to manage an orderly evacuation of all or part of the plume EPZ was adequately demonstrated. Activation of access control points was promptly ordered to prevent entry into the affected areas. A call to activate the Reception Center located at the North Scott High School was simulated. Based on the above, Objectives Number 15 and 17 were fully demonstrated.

The ability to determine and implement appropriate measures for controlled recovery and reentry, Objective Number 35, was adequately demonstrated. Procedures were developed controlling reentry to evacuated areas for essential services which corrected an inadequacy identified during the previous exercise. Arrangements were made to provide the public with information concerning safety precautions during recovery and the effects of low level exposure on health. Individual State and local agency responsibilities were discussed for recovery and reentry.

Summary: The two inadequacies identified during the previous exercise conducted August 27, 1985, were corrected during this exercise.

Objective Number 2 was not fully demonstrated during this exercise.

There were no inadequacies observed that would require corrective action at the Scott County EOC.

Area Recommended For Improvement

3. Messages received over the Administrative Hot Line were not consistently copied and distributed. As the Administrative Hot Line is a direct communication link between the utility, State EOC and Clinton County and is the primary notification system for the Site Area and General Emergencies and PAR's; messages received should be copied and distributed to the appropriate staff within the EOC. The system utilized to record messages received over the NARS could be implemented for the Administrative Hot Line.

2.2.5 Scott County Reception and Decontamination - North Scott High School

The following objectives were to be demonstrated at this facility: 1, 2, and 27.

The ability to mobilize staff and activate facilities promptly was fully demonstrated with one exception. The Standard Operating Procedures (SOP's) for the Scott County Reception Centers do not show the American Red Cross and the Eldridge Police Department as participating organizations. As the American Red Cross and local Police Department have responsibility for registration and access control, respectively, their participation must be reflected in the SOP's in accordance with NUREG-0654, P.4. The SOP's must be updated to reflect all the organizations who actively participate at the Reception Center.

Objective Number 2, ability to fully staff facilities, was adequately demonstrated. Members of the Eldridge Fire Department comprised the five monitoring teams available at this facility. Each team consisted of two monitors.

Adequacy of procedures for registration, radiological monitoring and decontamination of evacuees, was adequately demonstrated to the extent of current FEMA guidance with the following exceptions. There were two areas of concern noted by the evaluator regarding the SOP's. An "evacuee monitoring record" form is included in the SOP's, and is to be completed if contamination is detected. However, the form was neither utilized during this exercise nor were the monitors aware of its existence. As this form and instructions for its use are in the SOP's, the monitors must be instructed to follow this procedure. Secondly, the SOP's state that a NaI (Sodium Iodide) probe will be used to survey evacuees if it is suspected, based on initial contamination survey, that radioiodine exposure has occurred. However, the equipment was neither available nor were the procedures demonstrated.

Trained personnel and equipment were available to monitor approximately 2,520 evacuees and 840 vehicles within a twelve hour period. This is based on monitoring time of 90 seconds per evacuee and four minutes per vehicle. An average of three persons per vehicle is assumed based on the Evacuation Time Estimate Study for the Quad Cities Nuclear Station. The registration, monitoring and decontamination areas were appropriately segregated to prevent cross contamination. Procedures for handling contaminated clothing and other items were also demonstrated.

With the exception noted above concerning the SOP's, the Eldridge Fire Department adequately demonstrated Objective Number 27, correcting two inadequacies identified during the previous exercise concerning monitoring and proper segregation of evacuees.

As congregate care will be provided at a separate location from the North Scott High School, transportation of evacuees to these centers must be provided. However, the SOP's do not reflect the means for this transportation. The SOP's must be amended to show this resource per NUREG-0654, P.4.

Summary: The two inadequacies identified during the previous exercise conducted August 27, 1985, were corrected during this exercise.

Objective Number 27 was not fully demonstrated during this exercise.

Areas Requiring Corrective Action

10. The American Red Cross and Eldridge Police Department were participants during this exercise. However, these organizations and their responsibilities are not reflected in the SOP's. As these organizations have responsibility for evacuee registration and access control respectively, their function must be reflected in the SOP's. (NUREG-0654, P.4.)

11. The SOP's require that an "evacuee monitoring record" form be completed if the evacuee is contaminated. However, this form was neither utilized nor were the monitors aware of its existence. (NUREG-0654, P.4.)
12. The SOP's state that a NaI (sodium iodide) probe will be used to survey an evacuee if it is suspected that radioiodine exposure has occurred. However, the equipment was not available and consequently, the procedures were not demonstrated. (NUREG-0654, P.4.)
13. As congregate care facilities will be provided at separate locations from the Reception Center at North Scott High School, transportation of evacuees to these centers must be provided. However, the SOP's do not reflect how this transportation will be accomplished. The SOP's must be amended to show this resource. (NUREG-0654, P.4)

3 SCENARIO

The initial scenario submitted by Commonwealth Edison was adequate for allowing the off-site objectives to be demonstrated with one exception. In order for off-site doses to reach or exceed the Protective Action Guide (PAG) dose at a distance of two miles and drive State Objective Number 15, an exposure time of greater than a six hour default time would have to be projected. This was subsequently corrected by the utility by adding maintenance information which would allow an exposure time of greater than 16 hours. This amendment to the scenario was adequate to allow demonstration of all the off-site objectives.

4 SUMMARY OF AREAS REQUIRING CORRECTIVE ACTIONS

IOWA OPERATIONS

State Emergency Operations Center (SEOC)

1. The State EOC failed to notify the Forward Command Post (FCP) at the Alert stage. Consequently, the FCP was activated when a representative of the State Highway Patrol overheard the status via their internal radio system. As a result, the FCP was not activated in a timely manner and in accordance with the State Plan. (NUREG-0654, E.2.)
2. The State EOC failed to notify FEMA of the General Emergency classification level. As FEMA contacts other Federal Agencies with responsibilities during a radiological emergency, prompt notification of emergency classifications must be made in accordance with the State Plan. (NUREG-0654, E.1.)

Radiological Assessment and Field Team Coordination

3. The Dose Assessment staff (Iowa Department of Public Health) did not update the Field Team Coordination staff concerning plant and off-site events in a timely manner. (NUREG-0654, I.8.)

Field Monitoring Teams

4. Radiation detection instruments and air sampling equipment were not calibrated within a year in accordance with the manufacturers' specifications. (NUREG-0654, H.10.)
5. The Blue Team members were not aware of the maximum exposure dose allowed without authorization. (NUREG-0654, K.5.a.)

Medical Emergency

6. The St. Luke's Hospital based area ambulance service transported the contaminated patient to the wrong receiving area of the hospital. This would cause the unnecessary spread of contamination at this facility. (NUREG-0654, L.1.)

COUNTY OPERATIONS

Clinton County Emergency Operations Center (CCEOC)

7. Access Control into protective action recommendation areas was not implemented during the Site Area Emergency and was delayed until the General Emergency declaration. This occurred because the County Plans and procedures do not require implementation of access control until the General Emergency. (NUREG-0654, J.10.j.)

Clinton County Reception and Decontamination - DeWitt Central High School

8. The Iowa National Guard, City of DeWitt Police Department, American Red Cross, the local amateur radio group and the Clinton County Medical Nurses were participants during this exercise. However, these organizations are not reflected in the SOP's. As the majority of these organizations have an integral responsibility at this facility, their function must be reflected in the SOP's. (NUREG-0654, P.4.)
9. Per the Reception Center Emergency Operations staff, the Clinton County School District would provide buses to transport evacuees to congregate care centers. However, this procedure is not reflected in the SOP's. The appropriate amendment must be made. (NUREG-0654, P.4.)

Scott County Reception and Decontamination - North Scott High School

10. The American Red Cross and Eldridge Police Department were participants during this exercise. However, these organizations and their responsibilities are not reflected in the SOP's. As these organizations have responsibility for evacuee registration and access control respectively, their function must be reflected in the SOP's (NUREG-0654, P.4.)
11. The SOP's require that an "evacuee monitoring record" form be completed if the evacuee is contaminated. However, this form was neither utilized nor were the monitors aware of its existence. (NUREG-0654, P.4.)
12. The SOP's state that a NaI (sodium iodide) probe will be used to survey an evacuee if it is suspected that radioiodine exposure has occurred. However, the equipment was not available and consequently, the procedures were not demonstrated. (NUREG-0654, P.4.)
13. As congregate care facilities will be provided at separate locations from the Reception Center at North Scott High School, transportation of evacuees to these centers must be provided. However, the SOP's do not reflect how this transportation will be accomplished. The SOP's must be amended to show this resource. (NUREG-0654)

CONTENTS

ABBREVIATIONS AND ACRONYMS.....	iii
EXERCISE SUMMARY.....	v
1 INTRODUCTION.....	1
1.1 Exercise Background.....	1
1.2 Exercise Evaluators.....	2
1.3 Evaluation Criteria.....	2
1.4 Exercise Objectives.....	3
1.5 Exercise Scenario.....	9
1.6 State and Local Resources.....	11
2 EXERCISE EVALUATION.....	13
2.1 Iowa Operations.....	13
2.1.1 State Emergency Operations Center.....	13
2.1.2 Emergency Operations Facility.....	15
2.1.3 Joint Public Information Center.....	15
2.1.4 State Forward Command Post.....	17
2.1.5 Dose Assessment and Field Team Coordination.....	19
2.1.6 Field Monitoring Teams.....	20
2.1.7 Medical Drill.....	21
2.2 County Operations.....	22
2.2.1 Clinton County EOC.....	22
2.2.2 Clinton County Reception and Decon - Dewitt High School.....	25
2.2.3 Clinton County Reception and Decon - Goose Lake High School.....	26
2.2.4 Scott County EOC.....	27
2.2.5 Scott County Reception and Decon - North Scott High School.....	29
3 SCENARIO.....	32
4 SUMMARY OF AREAS REQUIRING CORRECTIVE ACTIONS.....	33

ABBREVIATIONS AND ACROWYMS

ANL	Argonne National Laboratory
ARC	American Red Cross
CCEOC	Clinton County Emergency Operations Center
DOC	Department of Commerce
DOE	Department of Energy
DOI	Department of Interior
DOT	Department of Transportation
EBS	Emergency Broadcast System
EOC	Emergency Operations Center
EOF	Emergency Operations Facility
EPA	Environmental Protection Agency
EPZ	Emergency Planning Zone
FEMA	Federal Emergency Management Agency
FCP	Forward Command Post
GPM	Gallons Per Minute
HHS/PHS	Health and Human Services/Public Health Service
HPCI	High Pressure Core Injection
JPIC	Joint Public Information Center
KI	Potassium Iodide
LCO	Limiting Condition of Operation
mCi	Millicurie
MWe	Megawatt, electrical
MWth	Megawatt, thermal
NARS	Nuclear Accident Reporting System
NRC	Nuclear Regulatory Commission

NUREG-0654	Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants (NUREG-0654/FEMA-REP-1, Rev. 1)
PAG	Protective Action Guide
PAR	Protective Action Recommendation
PIO	Public Information Officer
QCNPS	Quad Cities Nuclear Power Station
RAC	Regional Assistance Committee
RHR	Residual Heat Removal
R/hr	Rem Per Hour
SCEOC	Scott County Emergency Operations Center
SEOC	State Emergency Operations Center
SOP	Standard Operating Procedure
TLD	Thermoluminescent Dosimeter
uCi	Microcuri
USCG	United States Coast Guard
USDA	United States Department of Agriculture

EXERCISE SUMMARY

The purpose of an exercise is to determine the ability of appropriate off-site agencies to respond to an emergency covered by State and local Radiological Emergency Response Plans. The evaluation of such an effort will, of necessity, tend to focus on the negative aspects of the exercise, on inadequacies in planning, preparedness and performance.

This focus of attention on the negative should not be taken to mean that there were not a great many positive accomplishments as well. Indeed there were; however, in the interest of brevity, only inadequacies will herein be summarized.

FEMA classifies exercise inadequacies as deficiencies or areas requiring corrective action. Definitions of these categories follow:

Deficiencies are demonstrated and observed inadequacies that would cause a finding that off-site emergency preparedness was not adequate to provide reasonable assurance that appropriate protective measures can be taken to protect the health and safety of the public living in the vicinity of a nuclear power facility in the event of a radiological emergency.

Areas requiring corrective actions are demonstrated and observed inadequacies of State and local government performance, and although their correction is required during the next scheduled exercise, they are not considered, by themselves, to adversely impact public health and safety.

In addition, FEMA identifies areas recommended for improvement, which are problem areas observed during an exercise that are not considered to adversely impact public health and safety. While not required, correction of these would enhance an organization's level of emergency preparedness.

There were no deficiencies identified at any location or activity during this exercise. Generally, the mobilization of staff and activation of facilities was successfully accomplished, and the appropriate response was carried out according to plan.

It should be noted that all of the inadequacies identified during the previous exercise, conducted August 27, 1985, were adequately corrected during this exercise.

However, our evaluation disclosed thirteen areas requiring corrective action and three recommendations for improvement. These items are explained in detail in Section Two of this report under the respective facility. A summary of the areas requiring corrective action are as follows:

IOWA OPERATIONS

State Emergency Operation Center

1. The State EOC failed to notify the Forward Command Post (FCP)

at the Alert stage in accordance with the plan. The facility was subsequently activated when a representative of the State Highway Patrol overheard the status via their internal radio system. As the FCP coordinates State resources to support access control into the EPZ, timely notification is imperative.

2. The State EOC failed to notify FEMA of the General Emergency classification level in accordance with the plan. As FEMA contacts other Federal Agencies with responsibilities during a radiological emergency, prompt notification of emergency classifications must be made.

Radiological Assessment and Field Team Coordination

3. The dose assessment staff at the State EOC did not update the Field Team Coordinator concerning plant and off-site events in a timely manner. For example, the Field Team Coordinator was not made aware of the initiation of the radiological release until one hour after it occurred.

Radiological Field Monitoring Teams

4. Radiation detection instruments and air sampling equipment were not calibrated within a year in accordance with the manufactures' specifications. To ensure accurate readings, the equipment must be appropriately calibrated.
5. Field team members of one of the two field teams were not aware of the maximum exposure dose allowed without authorization. This lack of knowledge could result in excessive exposure to field team members.

Medical Emergency

6. The St. Luke's Hospital based ambulance service transported a contaminated patient to the wrong receiving area of the hospital. This would cause the unnecessary spread of contamination at this facility as the area was not prepared for recovery of contaminated patients.

Clinton County Emergency Operations Center

7. During the Site Area Emergency, protective action recommendations were made to shelter the public in sectors within the county. However, access control was not implemented at this time and was delayed until the General Emergency declaration. This inadequacy occurred because the County's Plan and procedures for access control are aligned with emergency classification levels, rather than protective actions.

Clinton County Reception and Decontamination

8. Some of the organizations, such as the Iowa National Guard, American

Red Cross and others who were participants during this exercise, are not reflected in the Standard Operating Procedures (SOP's). As the majority of these organizations have an integral responsibility at this facility, their function must be reflected in the SOP's.

9. Per the Reception Centers Emergency Operations staff, the Clinton County School District would provide buses to transport evacuees to congregate care centers. However, this procedure is not reflected in the SOP's.

Scott County Reception and Decontamination

10. The American Red Cross and local police departments, who were participants during this exercise, are not reflected in the Standard Operating Procedures (SOP's). As both of these organizations have responsibility for evacuee registration and access control respectively, their function must be reflected in the SOP's.
11. The Standard Operating Procedures require that an "evacuee monitoring record" form be completed if an evacuee is contaminated. However, this form was not utilized nor were the monitors aware of its existence.
12. The Standard Operating Procedures state that a NaI (Sodium Iodine) probe will be used to survey an evacuee if it is suspected that radioiodine exposure has occurred. However, the equipment was not available and, consequently, the procedures were not demonstrated.
13. Per the County Plans, congregate care would be provided at separate locations from the reception center. However, the Standard Operating Procedures do not indicate how transportation will be accomplished.

FEMA requests that the State of Iowa submit a "Schedule of Corrections" summarizing the measures they intend to take to correct inadequacies noted above and the dates the measures will be accomplished. This must be submitted no later than 60 days from receipt of the exercise report.