



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA STREET, N.W.  
ATLANTA, GEORGIA 30323

JUL 27 1990

Report No.: 50-261/90-13

Licensee: Carolina Power and Light Company  
P. O. Box 1551  
Raleigh, NC 27602

Docket No.: 50-261

License No.: DPR-23

Facility Name: H. B. Robinson

Inspection Conducted: June 17-21, 1990

Inspector: W. M. Sartor, Jr.

7/27/90  
Date Signed

Accompanying Personnel: J. Kreh  
W. Rankin  
J. Will

Approved by: William H. Rankin

7/27/90  
Date Signed

William H. Rankin, Chief  
Emergency Preparedness Section  
Emergency Preparedness and Radiological  
Protection Branch  
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, announced inspection involved the observation and evaluation of the annual emergency preparedness exercise. Emergency organization activation and response were selectively observed in the Control Room, Technical Support Center (TSC), Operational Support Center (OSC), and Emergency Operations Facility (EOF). The inspection also included a review of the exercise objectives and scenario details, as well as observation of the licensee's post exercise critique activities. The exercise was conducted from 6 p.m., June 18 to 1:30 a.m. on June 19, 1990.

Results:

In the areas inspected, one violation and one exercise weakness were identified. The violation addressed the failure to correct a weakness from the 1989 exercise for untimely activation of the OSC and TSC (Paragraph 6). The exercise weakness was a failure to classify the General Emergency (Paragraphs 2 and 5). Exercise strengths included the licensee's ability to maintain the start time and exercise day as unannounced; the applicability of the fuel handling scenario as it relates to near term operations at H.B. Robinson; and the excellent critique provided to licensee management. As a result of the

exercise findings, licensee management committed to prompt corrective action, a drill to demonstrate the effectiveness of the correction action, and requested a management meeting within 30 days with Region II management for discussions of improvements needed.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*R. Barnett, Manager, Outages and Modifications
- \*R. Crook, Senior Specialist, Regulatory Compliance
- \*J. Curley, Manager, Environmental and Radiation Control
- \*C. Dietz, Manager, Robinson Nuclear Project Department
- \*D. Dixon, Manager, Control and Administration Section
- \*H. Goodwin, Project Specialist, Emergency Preparedness and Spent Fuel Management Section
- \*W. Hammond, Senior Engineer, Technical Support
- \*J. Harrison, Program Director, Plant Support
- \*J. Kloosterman, Director, Regulatory Compliance
- \*B. McFeaters, Project Specialist, Emergency Preparedness and Spent Fuel Management Section
- \*T. McLeod, Office Supervisor
- \*R. Morgan, Plant General Manager
- \*M. Page, Manager, Technical Support
- \*D. Quick, Manager, Plant Support Unit
- \*J. Sheppard, Manager, Operations
- \*B. Slone, Records Management Supervisor
- \*R. Smith, Manager, Maintenance
- \*L. Williams, Supervisor, Emergency Preparedness and Security
- \*H. Young, Manager, Quality Assurance/Quality Control

Other licensee employees contacted during this inspection included craftsmen, engineers, operators, mechanics, security force members, technicians, and administrative personnel.

#### NRC Resident Inspector

\*K. Jury

\*Attended exit interview

### 2. Exercise Scenario

The scenario for the emergency exercise was reviewed to determine that provisions had been made to test the integrated capability and a major portion of the basic elements existing within the licensee, State and local emergency plans and organization as required by 10 CFR 50.47(b)(14), 10 CFR 50, Appendix E, Paragraph IV.F and specific criteria in NUREG-0654, Section II.N.

The scenario was reviewed in advance of the scheduled exercise date and was discussed with licensee representatives. The scenario developed for this exercise was adequate to fully exercise the onsite and offsite emergency organizations of the licensee and provided sufficient emergency information to the State and local government agencies for their limited communications-only participation in the exercise. A significant strength of the scenario development was the licensee maintaining the start time and day as unannounced; this was very effective to test the augmentation times of the emergency response facilities. While no major problems with the scenario were identified during the review, several inconsistencies became apparent during the exercise. One inconsistency detracted from the overall performance of the licensee's emergency organization by providing conflicting radiological data as to whether or not the Emergency Action Level for a General Emergency had been exceeded. The licensee identified the failure to classify the General Emergency as a weakness requiring corrective action during their management critique. This finding was also identified as an exercise weakness (50-261/90-13-01).

No violations or deviations were identified.

### 3. Assignment of Responsibility

This area was observed to determine that primary responsibilities for emergency response by the licensee have been specifically established and that adequate staff was available to respond to an emergency as required by 10 CFR 50.47(b)(1), 10 CFR 50, Appendix E, Paragraph IV.A, and specific criteria in NUREG-0654, Section II.A.

The inspectors observed that specific emergency assignments had been made for the licensee's emergency response organization, and there were adequate staff available to respond to the simulated emergency. The initial response organization was augmented by designated licensee representatives. The capability for long-term or continuous staffing appeared to be questionable due to a lack of depth in certain positions and was identified by the licensee during their management critique for corrective actions.

No violations or deviations were identified.

### 4. Onsite Emergency Organization

The licensee's on-shift emergency organization was observed to determine that the responsibilities for emergency response were unambiguously defined, that adequate staffing was provided to insure initial facility accident response in key functional areas at all times, and that the interfaces were specified as required by 10 CFR 50.47(b)(2), 10 CFR 50, Appendix E, Paragraph IV.A, and specific criteria in NUREG-0654, Section II.B.

The inspectors observed that the initial on-shift emergency organization was well defined and the responsibility and authority for directing actions necessary to respond to the emergency were unambiguously defined. Adequate staff was on-shift to fill key functional positions within the emergency organization. Augmentation of the initial emergency response organization was accomplished through mobilization of off-shift personnel and corporate assistance. The procedure for the augmentation was Plant Emergency Procedure PEP-171, titled "Emergency Communicator and Staff". An inspector noted that the callout procedure as implemented did not provide for timely augmentation. For example, it was noted that the Operational Support Center (OSC) Leader arrived eighty minutes after the Alert declaration; however, a review of PEP-171 indicated the OSC Leader was in a call tree that required a minimum of fifteen personnel to be notified sequentially prior to the OSC Leader being called. This probably contributed significantly to the delayed activation of the OSC as further discussed in Paragraph 6.

No violations or deviations were identified.

#### 5. Emergency Classification System

This area was observed to determine that a standard emergency classification and action level scheme was in use by the nuclear facility licensee as required by 10 CFR 50.47(b)(4), 10 CFR 50, Appendix E, Paragraph IV.C, and specific criteria in NUREG-0654, Section II.D.

An inspector observed that the emergency classification system was in effect as stated in the Radiological Emergency Plan and in the Implementing Procedures. The system appeared to be adequate for the classification of the simulated accident and the emergency procedures provided for initial and continuing mitigating actions during the simulated emergency; however, after the TSC had been activated, an inspector observed confusion regarding emergency classification when radiological data was being interpreted differently by the TSC personnel and Control Room personnel. Specifically, the Control Room personnel were interpreting the data as requiring a General Emergency classification whereas the Radiological Control Director in the TSC informed the Site Emergency Coordinator (SEC) in the TSC that the model used by the Control Room personnel was conservative and believed a Site Area Emergency (SAE) to be the proper classification. The SEC declared a SAE. During the licensee's management critique, the failure to classify the General Emergency was identified for corrective action as previously identified in Paragraph 2.

No violations or deviations were identified.

#### 6. Notification Methods and Procedures (82301)

Pursuant to 10 CFR 50.47(b)(5), Paragraph IV.D of Appendix E to 10 CFR Part 50, and specific guidance promulgated in Section II.E of NUREG-0654, this area was observed to determine whether procedures were

established for notification of State and local response organizations and plant emergency personnel by the licensee, and whether the content of initial and follow-up messages to response organizations was established.

An inspector observed that notification methods and procedures had been established and were effectively used to provide prompt and accurate offsite notifications to the State and local authorities. The NRC was also notified whenever required. However, the inspector determined that the licensee's commitments for activation of the OSC and TSC (viz., partial activation within 45 minutes and full activation within 75 minutes of an Alert declaration) were not acceptably demonstrated as indicated by the following observations:

- ° The OSC was activated 89 minutes after the Alert declaration, but even then without personnel to fill the designated positions of Access Control Clerk, Dosimetry Clerk, and PASS/Chemistry Technician. (Absence of the access control function at the OSC was of particular concern to the inspector.)
- ° The TSC was activated 125 minutes after the Alert declaration.

These activation times were significantly longer than observed during the November 1989 exercise. An Exercise Weakness was identified during that previous inspection for failure to (1) adequately implement the notification procedure for staff augmentation and (2) activate the TSC and OSC in a timely manner (see NRC Inspection Report No. 50-261/89-27).

The current inspection disclosed that the Exercise Weakness identified in November 1989 was not adequately corrected. Further evidence of this was obtained through review of the licensee's documentation of off-hour staff augmentation drills conducted on May 9 and June 11 and 14, 1990. The inspector concluded that all three of these drills were unsuccessful in demonstrating the capability to activate the TSC and OSC within 75 minutes of a simulated emergency declaration.

The licensee's critique of the November 1989 exercise identified a weakness for failure to demonstrate the ability to adequately notify and activate the emergency response organization for the TSC and the OSC (a finding substantively identical to the Exercise Weakness discussed earlier in this paragraph). Failure to correct this previous weakness, as indicated by the results of the three augmentation drills and the current exercise as discussed above, was determined to be a violation of Section IV.F.5 of Appendix E to 10 CFR Part 50, which specifies that any weaknesses that are identified by the licensee's critique of an emergency preparedness exercise shall be corrected.

Violation 50-261/90-13-02: Failure to demonstrate adequate corrective action for a previous exercise weakness regarding inability to notify and activate the emergency response organization for the TSC and OSC in a timely manner.

One violation and no deviations were identified.

7. Emergency Communications

This area was observed to determine that provisions existed for prompt communications among principal response organization and emergency personnel as required by 10 CFR 50.47(b)(6), 10 CFR 50, Appendix E, Paragraph IV.E, and specific criteria in NUREG-0654, Section II.F.

Communications among the licensee's emergency response facilities and emergency organization and between the licensee's emergency response organization and offsite authorities were good. The one communications equipment problem noted by the licensee was the loss of the Emergency Notification System (ENS) telephone in the TSC when the power to the TSC was shut off as part of the exercise. This did not negatively impact the exercise because the responsibility for making offsite notifications to include the NRC remained in the Control Room; however, it did require a 50.72 reporting requirement for the licensee which was promptly made.

No violations or deviations were identified.

8. Accident Assessment

This area was observed to determine that adequate methods, systems and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition were in use as required by 10 CFR 50.47(b)(9), Paragraph IV.B of Appendix E to 10 CFR Part 50, and criteria in Section II.I of NUREG-0654.

The accident assessment program included both an engineering assessment of plant status and an assessment of radiological hazards to both onsite and offsite personnel resulting from the accident. Although sufficient personnel and teams appeared to be available for accident assessment, this area was not aggressively pursued. For example, although severe after shocks followed the initial earthquake, walkdowns of areas previously examined were not inspected again. It was also noted in the TSC that it took almost two hours to regain power to the TSC, an event the scenario developers anticipated to take 15 to 30 minutes. The inconsistencies addressing the radiological accident assessment have been discussed in Paragraph 5.

No violations or deviations were identified.

9. Exercise Critique

The licensee's critique of the emergency exercise was observed to determine whether shortcomings in the performance of the exercise were brought to the attention of management and documented for corrective action pursuant to 10 CFR 50.47(b)(14), 10 CFR 50, Appendix E, Paragraph IV.E, and specific criteria in NUREG-0654, Section II.N.

The licensee conducted effective player critiques immediately following exercise termination. Evaluator critiques were also held with a formal licensee critique being held on June 21, 1990 with controllers, evaluators, key participants, licensee management, and NRC personnel attending. The licensee critique was thorough and indicated five significant deficiencies had been identified. Follow-up of corrective actions taken by the licensee will be accomplished through subsequent NRC inspections.

No violations or deviations were identified.

#### 10. Action on Previous Inspection Findings (92701)

- a. (Open) Exercise Weakness 50-261/89-27-01: Failure to produce a technically consistent scenario and to demonstrate proper exercise control. Although the licensee's scenario was greatly improved and exercise control was not a problem, this item remains open because of the inconsistent radiological data that created confusion regarding the General Emergency classification.
- b. (Open) Exercise Weakness 50-261/89-27-02: Failure of a shift foreman to recognize an initiating condition for a NOUE. This item remains open because of the observations discussed in Paragraph 5.
- c. (Closed) Exercise Weakness 50-261/89-27-03: Failure to adequately implement the notification procedure for plant augmentation staff and to activate the TSC and OSC in a timely manner. Failure to correct this weakness has been reclassified as violation 50-261/90-13-03 (See Paragraph 6).
- d. (Closed) Inspection Follow-up Item 50-261/89-27-05: Notifying the OSC prior to placing the RHR system in service. Inspectors noted that the TSC kept the OSC fully informed of any plant conditions that could endanger OSC repair teams.

#### 11. Exit Interview

The inspection scope and results were summarized on June 21, 1990, with those persons indicated in Paragraph 1. The team leader described the areas inspected and discussed the inspection results. No proprietary information is contained in this report. Dissenting comments were not received from the licensee. Following the NRC exit interview, senior licensee management committed to prompt corrective action and a drill to demonstrate the effectiveness of the correction action, and requested a management meeting within 30 days with Region II management for discussion of improvements needed. On July 24, 1990, in a conversation with the



Manager, Robinson Nuclear Project Department, one item that was identified separately for followup by the NRC was combined with item 90-13-02 below.

<u>Item Number</u>	<u>Description and Reference</u>
50-261/90-13-01	Exercise Weakness - Failure to classify the General Emergency (Paragraph 2).
50-261/90-13-02	Violation - Failure to correct previous weakness of not activating the TSC and OSC in a timely manner (Paragraph 6).

The licensee was also informed that four previously identified open items were reviewed, and two were being closed with the other two remaining open (Paragraph 10).

Attachment:  
Exercise Objectives and  
Narrative Summary of Scenario

CAROLINA POWER & LIGHT COMPANY  
ROBINSON NUCLEAR PROJECT DEPARTMENT

**1990 ROBINSON EMERGENCY PREPAREDNESS EXERCISE**

SCOPE

An emergency will be simulated at the H. B. Robinson Nuclear plant (HBR2) which will escalate in emergency classification to at least a SITE AREA EMERGENCY and possibly to a GENERAL EMERGENCY and will involve planned response and recovery actions to include: emergency classification; notification of off-site organizations and plant personnel; actions to correct or mitigate the emergency conditions; and initiation of accident assessment and protective actions as necessary to cope with the accident. The exercise will simulate an emergency which requires appropriate responses by state and local government personnel (state and county participation will be limited to communications functions to support plant exercise play). This simulated event is a utility only exercise for 1990.

OBJECTIVES

A. ACCIDENT DETECTION AND ASSESSMENT

1. Demonstrate the ability to detect emergency accident conditions, assess and project radiological consequences, and formulate near term mitigating actions.
2. Demonstrate the adequacy of the Technical Support Center in providing accident assessment and mitigation, dose assessment, and communication/notification activities.

B. EMERGENCY CLASSIFICATION

1. Demonstrate the ability to identify and classify the emergency in accordance with the emergency plan and appropriate plant implementing procedures.

C. NOTIFICATION OF ON-SITE & OFF-SITE EMERGENCY RESPONSE PERSONNEL

1. Demonstrate the adequacy of procedures for alerting, notifying, and mobilizing on-site and off-site emergency response organization personnel.

CAROLINA POWER LIGHT COMPANY  
ROBINSON NUCLEAR PROJECT DEPARTMENT

1990 ROBINSON EMERGENCY PREPAREDNESS EXERCISE  
(continued)

2. Demonstrate the timeliness and adequacy of the information provided in the initial notifications to state and county agencies.
3. Demonstrate the ability to provide follow-up notifications to the state and county agencies.
4. Demonstrate the capability to make timely and accurate notifications to the Nuclear Regulatory Commission. Actual participation of the NRC Operations Center may be simulated.

D. COMMUNICATIONS

1. Demonstrate the ability to communicate between emergency response facilities, as well as environmental monitoring teams and damage control teams.
2. Demonstrate that the radiological, meteorological, and process data transmittal to the Technical Support Center, Operations Support Center and Emergency Operations Facility is adequate.

E. RADIOLOGICAL EXPOSURE CONTROL

1. Demonstrate that emergency exposure control procedures have been established and are utilized in the protection of emergency workers.
2. Demonstrate the capability to monitor personnel and equipment for contamination.

CAROLINA POWER & LIGHT COMPANY  
ROBINSON NUCLEAR PROJECT DEPARTMENT

1990 ROBINSON EMERGENCY PREPAREDNESS EXERCISE  
(continued)

F. STAFF AUGMENTATION

1. Demonstrate the ability to augment the on-shift emergency response organization within the time limits specified within the emergency plan and implementing procedures.
2. Demonstrate that emergency response facilities (TSC, OSC, and EOF) can be activated in accordance with the emergency plan and procedures.

G. SHIFT STAFFING

1. Demonstrate that sufficient emergency response organization personnel are identified and can be made available to support the emergency response on a round-the-clock coverage schedule.

H. PUBLIC INFORMATION

1. Demonstrate the capability to coordinate the preparation, review and release of information to the news media.

I. FIELD MONITORING

1. Demonstrate the adequacy of the equipment utilized for the off-site radiological monitoring.

J. ASSEMBLY AND ACCOUNTABILITY

1. Demonstrate the ability to perform on-site accountability as required by the emergency plan.
2. Demonstrate the ability to evacuate nonessential personnel from the Protected Area and to conduct on-site monitoring of these evacuees. Release of nonessential personnel from the site may be simulated.
3. Demonstrate that adequate control measures have been established for plant access control.

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**1990 ROBINSON EMERGENCY PREPAREDNESS EXERCISE**  
(continued)

K. FACILITIES AND EQUIPMENT

1. Demonstrate the adequacy of the Operations Support Center in providing additional manpower support and coordination of emergency repair and damage control activities.
2. Demonstrate the adequacy of the Emergency Operations Facility in providing off-site dose assessment, environmental monitoring, and evaluation/coordination of off-site activities.
3. Demonstrate the adequacy of emergency kits and equipment in emergency response facilities.
4. Demonstrate the ability of the Technical Support Center to perform their functions under loss of primary and backup electrical power to the facility.

L. USE OF FIRE CONTROL TEAMS

1. Demonstrate proper procedures for the fire brigade response to the type of fire chosen for the exercise.
2. Demonstrate the adequacy of the interface between off-site fire support personnel and the plant fire brigade.

M. GENERAL

1. Demonstrate that the previously identified NRC exercise weaknesses from the 1989 annual Emergency Preparedness exercise have been resolved.

CAROLINA POWER AND LIGHT COMPANY  
ROBINSON NUCLEAR PROJECT DEPARTMENT

1990 EMERGENCY PREPAREDNESS EXERCISE

3.0 SCENARIO

The Shift Foreman is now the Site Emergency Coordinator (SEC). Concern for potential earthquake - related problems may prompt him to halt the movement of spent fuel. Therefore, he may communicate with workers in the Spent Fuel Pit (SFP) and direct them to halt the fuel movement. Presently one fuel element has already been moved into the cask, and a second fuel element is directly over the cask. As the second fuel element is moved, it accidentally disengages from the spent fuel handling tool and falls. It comes to rest in a leaning position, its bottom is on the rim of the cask and its top is propped against the SFP wall. An immediate evacuation of all personnel from the SFP occurs. While evacuating, workers encounter difficulty in opening the SFP door, but successfully exit the SFP and force the door closed. The Control Room announces the location of the accident over the PA, and sounds the Local Evacuation alarm.

The first aftershock occurs and the associated seismic alarm is received in the Control Room. The leaning fuel element falls into the cask and damages the one (1) fuel element already in the cask. Also due to the aftershock, a fire is caused when the Artemis computer fails and "shorts" to ground. The fire is discovered in the southeast corner of the Design Engineering Building. The fire spreads rapidly and involves a large portion of this building. Given the magnitude of the fire, and the other ongoing plant situations, the SEC should conclude that offsite fire company assistance might be needed. The plant fire brigade responds, begins initial fire attack, and indeed requests the offsite assistance. The City of Hartsville Fire Department is called and responds to provide assistance. Shortly after the combined firefighting begins, the fire is extinguished with no further complications. If an attempt is made to determine the source of the fire, it will be observed that the Artemis Computer room was most heavily damaged.

Meanwhile, efforts to recover from the situation of the dropped spent fuel element continue. Radiation monitoring outside the SFP door and vicinity shows no appreciable increases in radiation levels. Therefore, the Shift Foreman forms an investigation team to determine the condition of the dropped fuel element. The team assembles and attempts to enter the SFP but finds the computer-operated latching mechanism on the SFP door has become jammed and it will not open. Maintenance and security could be dispatched to assist the team to gain access to the SFP. Maintenance accesses the door without much delay. The team enters the SFP and finds the dropped fuel element has fallen onto the top of the open cask and a single stream of bubbles is seen rising from within the cask. They observe that the fallen element has struck the top of the one fuel element that was already in the cask. The fallen element is still in a leaning position, its bottom rests on the top of the spent fuel cask, and the top of the element is still propped against the SFP wall.

While the investigation team continues to evaluate the situation, radiation levels have risen slightly in the SFP. The fuel element already inside the cask has been damaged by the falling element such that GAP gas is escaping. The radiation monitor for the spent fuel pit alarms in the Control Room. Again, there is an immediate evacuation of all personnel from the SFP.

Upon considering the known information, the SEC realizes there has been fuel damage to at least one fuel element. The SEC makes an ALERT declaration based upon one fuel element being damaged. Because an ALERT has been declared, the Technical Support Center (TSC) and the Operations Support Center (OSC) personnel are notified and begin to assemble. Off-site notifications are accomplished within 15 minutes of the ALERT declaration. During the next 30 to 45 minutes and 60 to 75 minutes respectively, the OSC and TSC members are mustering and their organizations are preparing to activate.

Shortly after the TSC activates, a second aftershock occurs and another seismic alarm is received in the Control Room. The entire TSC/EOF building experiences a loss of all lighting as well as all power. This loss is caused by the loss of the offsite power feeding the building (NOT the offsite power feeding Unit 2) and the subsequent failure of the automatic transfer switch (ATS#1) to operate. Investigation will reveal that the TSC/EOF/Security emergency diesel generator is operating, and that the relay controlling the automatic transfer switch (ATS#1) did not function. A manual bypass can be accomplished at ATS#1 using the method described in the vendor tech manual. As soon as this or some other suitable method is accomplished, the lights and power will be restored. Shortly after the second aftershock, a chemical spill (ammonium hydroxide) is observed which must be cleaned up. Concurrent with the second aftershock, the Control Room will receive a Grid Under Frequency alarm of less than 59 Hertz which should cause operators to perform a manual trip of the unit and maintain it in hot shutdown status.

Meanwhile the radiation levels in the SFP have been decreasing. The OSC determines they need radiological samples from the SFP. Sampling team members are designated and preparations are made to collect the various samples. The sampling team enters the SFP. The dropped element is still leaning against the wall. At this time the third aftershock occurs. This causes the leaning element to slide from its position and fall across the spent fuel racks and damage itself severely and strikes a fresh spent fuel element. Large bubbles (GAP gas) rush to the surface. One of the wall panels in the SFP becomes detached, leaving a large opening in the wall. All personnel immediately evacuate the spent fuel building. Radiation levels increase rapidly. This new information regarding damage to the spent fuel is given to the appropriate OSC, TSC and/or Control Room personnel.

Since bubbles are seen coming from the sheared fuel element, the top of the SFP rack, and from within the cask, it is evident that at least two different fuel elements have been damaged. Several radiation monitors alarm and go offscale high. Upon observing the increase in radiation levels and dose projections of greater than 5 Rem thyroid dose, the SEC declares a GENERAL EMERGENCY.

Then based on Environmental Monitoring data which is collected by field teams, the SEC will probably maintain that classification.