U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No:	50-400
License No:	NPF-63
Report No:	50-400/97-11
Licensee:	Carolina Power and Light Company
Facility:	Shearon Harris Nuclear Power Plant Unit 1
Location:	5421 Shearon Harris Rd New Hill NC 27562-9998
Dates:	October 6-10, 1997
Inspectors:	W. Sartor, Exercise Team Leader W. Rankin, Sr. Project Manager J. Kreh, Radiation Specialist G. Salyers, Emergency Preparedness Specialist
Approved by:	K. Barr, Chief, Plant Support Branch Division of Reactor Safety

Enclosure

EXECUTIVE SUMMARY

HARRIS NUCLEAR PLANT
NRC Inspection Report No. 50-400/97-11

This routine, announced inspection involved the observation and evaluation of the biennial emergency preparedness exercise for the Harris Nuclear Plant. This NRC/FEMA evaluated exercise was a plume and ingestion pathway exercise fully participated in by the State of North Carolina and Risk Counties. The plume exposure exercise was conducted on October 7, 1997 from 2:00 p.m. until 9:00 p.m. This report summarized the observations of the four-person NRC team that assessed the adequacy of the licensee's emergency preparedness program as the utility implemented its Emergency Plan and Procedures for the plume exposure exercise. The NRC evaluators observed licensee response from the Control Room Simulator (CRS), the Technical Support Center (TSC), the Emergency Operations Facility (EOF), and the Joint Information Center (JIC). Based on the performance observed, the evaluators concluded that the licensee successfully demonstrated its ability to implement the Harris Emergency Plan and Procedures in response to the simulated accident.

Program Areas Evaluated and Results

- Scenario--The scenario developed for this exercise was effective for testing the integrated emergency response capability and exercise preparations were well organized.

- Onsite Emergency Organization--Predesignated personnel with well defined responsibilities promptly staffed the Emergency Response Facilities (ERFs).

- Emergency Classification System--The licensee had a standard system for emergency classifications and used it to effectively classify the off-normal events promptly and correctly.

- Notifications Methods and Procedures--The licensee demonstrated the ability to make timely and concise initial and follow-up notifications to the States and counties.

- Emergency Communications--Provisions existed for the prompt communications among principal response organizations to emergency personnel, and they were effectively used during the exercise to provide timely information and coordinate emergency response.

- Public Education and Information--The JIC and its staff were activated and functioned in a manner that provided for the dissemination of coordinated and accurate information to the public via the news media.

- Emergency Facilities and Equipment--ERFs were organized, equipped, and maintained in a manner that provided for the emergency response.

- Protective Responses--The licensee demonstrated the ability to implement protective measures for onsite personnel and to make the required Protective Action Recommendations (PARs) for the protection of the public, with the exception of Exercise Weakness concerning timely protective measures for the TSC.

- Exercise Critique--The controller/evaluator organization conducted an excellent critique process.

Report Details

Summary of Exercise Events

This biennial emergency preparedness exercise included full participation by the State of North Carolina and associated Risk Counties. The plume exposure exercise was evaluated by an NRC inspection team and was conducted from 2:00 p.m. to 9:00 p.m. on October 7, 1997. Player critiques were conducted by the licensee's emergency response participants in the Emergency Response Facilities (ERFs) following termination of the exercise. The NRC exit meeting was conducted on October 9, 1997, following the licensee's summary to management of exercise results.

IV. Plant Support

P4. Staff Knowledge and Performance in Emergency Preparedness (EP)

P4.1 Exercise Scenario

a. Inspection Scope (82302)

The inspectors reviewed the exercise scenario to determine whether provisions had been made to test the integrated capability and a major portion of the basic elements of the licensee's plan.

b. Observations and Findings

The licensee submitted its scenario scope and objectives for the Harris Nuclear Plant Emergency Preparedness Exercise to the NRC with a letter dated July 3, 1997. The exercise scenario with controller information and simulation data was submitted with a letter dated August 20, 1997. A review of the package indicated that the scenario was adequate to exercise the onsite and offsite emergency organizations of the licensee and provided sufficient information to the State of North Carolina and local government agencies for their participation in the exercise. The briefings provided to both the evaluators and players prior to the exercise were reflective of an exercise staff that was well organized and had given attention-to-detail in the preparation phase.

c. Conclusion

The scenario developed for this exercise was effective for testing the integrated emergency response capability and exercise preparations were well organized.

P4.2 Onsite Emergency Organization

a. Inspection Scope (82301)

The inspectors observed the functioning of the onsite emergency organization to determine whether the responsibilities for emergency response were defined and whether adequate staffing was available to respond to the simulated emergency.

b. Observations and Findings

The inspectors noted that the responsibilities for emergency response were clearly defined. The Superintendent for Shift Operations in the Control Room Simulator assumed the responsibilities as the Site Emergency Coordinator (SEC) and performed designated responsibilities to include the call-out of personnel to staff the emergency response facilities (ERFs). The predesignated personnel responded and staffed the ERFs. The Technical Support Center (TSC) was promptly staffed and fully activated within 41 minutes. The Operational Support Center (OSC) was staffed and activated within 17 minutes. Minimum staffing for the Emergency Operations Facility (EOF) was available within 20 minutes, and activated along with the TSC. The Joint Information Center activated two hours after the Alert, but prior to the Site Area Emergency declaration.

c. Conclusion

Predesignated personnel with well defined responsibilities promptly staffed the ERFs.

P4.3 Emergency Classification System

a. Inspection Scope (82301)

The inspectors observed selected emergency response personnel to determine whether a standard emergency classification and action level scheme was in use by the licensee.

b. Observation and Findings

The procedure PEP-110, Emergency Classification and Protective Action Recommendations provided guidance on the use of Emergency Action Levels (EALs) for classifying an emergency. An Alert was declared at 2:09 p.m. based on indications of a seismic event. The Site Area Emergency was declared at 4:32 p.m. due to the loss of all charging pumps. The General Emergency was declared at 6:56 p.m. due to all fission product barriers breached. The emergency declarations were all timely and made in accordance with the EALs projected by the scenario.

c. Conclusion

The licensee had a standard system for determing emergency classifications and used it to effectively classify the off-normal events promptly and correctly.

P4.4 Notification Methods and Procedures

a. Inspection Scope (82301)

The inspectors observed the licensee's notification of State and local governmental organizations and emergency personnel to determine whether timely and substantive emergency information was provided in accordance with procedures.

b. Observations and Findings

The initial emergency notifications to the State of North Carolina and the county authorities were made within 15 minutes following the Alert declaration. Responsibility for offsite notifications was assumed by the EOF when it activated. The notifications to the State and counties were made promptly from the EOF after the Site Area Emergency and General Emergency declarations, with concise and informative event descriptions. Follow-up notifications were made as necessary.

c. Conclusion

The licensee demonstrated the ability to make timely and concise initial and follow-up notifications to the States and counties.

P4.5 Emergency Communications

a. Inspection Scope (82301)

The inspectors observed the flow of communications within the emergency response organization and from and between the ERFs to determine whether provisions existed for the prompt transmission of emergency information.

b. Observation and Findings

The inspectors observed that the communications between the utility and offsite agencies and amongst the ERFs were generally effective for the prompt transmission of emergency information. Responsible personnel were kept informed of ongoing events and communicated effectively in performing accident mitigation and initiating protective actions for both onsite and offsite personnel.

c. Conclusion

Provisions existed for the prompt communications among principal response organizations to emergency personnel, and they were effectively used during the exercise to provide timely information and coordinate emergency response.

P4.6 Public Education and Information

a. Inspection Scope (82301)

The inspectors observed how information concerning the simulated emergency was made available to the public.

b. Observations and Findings

The Harris Nuclear Plant Joint Information Center (JIC) was located at the Center Plaza Building (11th floor) in downtown Raleigh, approximately 21 miles from the plant, with a media briefing room available for press conferences (located in the Civic Center, also in downtown Raleigh). The licensee provided a total of 13 news releases during the exercise. The news releases were timely and provided appropriate information regarding the emergency conditions.

c. Conclusions

The JIC and its staff were activated and functioned in a manner that provided for the dissemination of coordinated and accurate information to the public via the news media.

P4.7 Emergency Facilities and Equipment

a. Inspection Scope (82301)

The inspectors observed the activation, staffing, and operation of selected ERFs to determine whether adequate emergency facilities and equipment were available and maintained to support an emergency response.

b. Observations and Findings

Control Room Simulator - An inspector observed that the on-shift designated crew in the Simulator adequately responded to the off-normal events. The facility and equipment supported the crew as they entered the Emergency Plan and responded to the simulated emergency. This was the licensee's first use of the simulator for an NRC graded exercise.

Technical Support Center - The TSC was promptly activated with assigned emergency response personnel. The facility layout was adequate for the SEC and his staff. The inspector observed that good command and control was demonstrated by the SEC and his staff developed good strategies for accident mitigation.

Operational Support Center (OSC) - The OSC was activated in accordance with procedures and in a timely manner. The layout of the OSC provided for the dispatch of damage control teams in a timely manner. During the critique process the licensee noted that the damage control teams did not debrief upon returning to the OSC nor was there an established format for such debriefs.

Emergency Operations Facility - The EOF was located at the Harris Energy & Environmental Center within 10 miles of the plant. The EOF was organized and equipped in a manner that facilitated the emergency response.

c. Conclusion

ERFs were organized, equipped, and maintained in a manner that provided for the emergency response.

P4.8 Protective Responses

a. Inspection Scope (82301)

The inspectors observed the protective actions implemented for onsite personnel and the protective action recommendations (PARs) provided by the licensee to the offsite agencies.

b. Observations and Findings

The inspectors in the TSC observed that the failure of the TSC staff to promptly detect and evaluate the waste gas decay tank leak delayed onsite protective actions. Despite clear indications of an ongoing release in progress, there was no timely initiation of protective actions for TSC personnel and no sitewide PA announcement to inform personnel of the release. It was not until 3:41 p.m. that the Radiation Control Director (RCD) directed onsite exposure controls to include the start of the TSC emergency ventilation and filtration system, placed restrictions on eating, smoking, and drinking in the TSC and made a site wide PA announcement as to the changed radiological conditions onsite. These actions were untimely in that they were taken approximately 16 minutes after initial indications were available that the release had begun. The failure to promptly direct onsite protective actions in a timely manner for a release in progess was identified by the inspectors

as an Exercise Weakness. Inspector Follow-up Item 50-400/97-11-01: The failure of the TSC staff to promptly detect and evaluate the waste gas decay tank leak resulted in delayed protective actions for the TSC. The inspector in the EOF observed that the Emergency Response Manager provided for the prompt transmission of PARs to the offsite agencies.

c. Conclusion

The licensee demonstrated the ability to implement protective measures for onsite personnel and to make the required PARs for the protection of the public, with the exception of Exercise Weakness concerning timely protective measures for the TSC.

P4.9 Exercise Critique

a. Inspection Scope (82301)

The inspectors observed the facility critiques immediately following the exercise and portions of the controller/evaluator organization critique process to determine whether weaknesses noted in the licensee's emergency response organization were formally presented to licensee management.

b. Observations and Findings

The licensee conducted adequate player critiques following exercise termination. The controller and evaluator staff also conducted a detailed review of observations made during the exercise. The deficiencies noted by the evaluator staff were well defined with proposed corrective action, an assigned responsibility and proposed due date.

c. Conclusion

The controller/evaluator organization conducted an excellent critique process.

V. Management Meetings

X1 Exit Meeting Summary

The Team Leader presented the inspection summary to members of licensee management at the conclusion of the inspection on October 10, 1997. The summary indicated good performance with the exception of the exercise weakness identified in paragraph P4.8.

PARTIAL LIST OF PERSON CONTACTED

Licensee

R. Bassett, Emergency Preparedness Analyst
D. Corlett, Superintendent Operations Support
J. Donohue, Director Site Operations
B. Clark, Plant General Manager
J. Eads, Supervisor, Licensing/Regulatory Programs
T. Gilbert, Project Analyst, Harris Nuclear Assessment Section
S McNickle, Senior Analyst, Emergency Preparedness
C. Mitchell, Project Analyst, Outage Management
A. Moss, Emergency Preparedness Analyst
E. Neuschaefer, Superintendent, Radiation Protection
A. Poland, Senior Analyst, Environmental Radiation Control
W. Robinson, Vice President
C. Rose, Outage and Scheduling Analyst
R. Steiner, Human Resources Director
C. VanDenburgh, Manager, Regulatory Affairs
R. Varley, Emergency Preparedness Supervisor
M. Wallace, Senior Analyst, Licensing
M. Warren, Communications Specialist

INSPECTION PROCEDURES USED

IP 82301: Evaluation of Exercises for Power Reactors
IP 82302: Review of Exercise Objectives and Scenarios for Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-400/97-11-01	IFI	Exercise Weakness - The failure of the TSC staff to promptly detect and evaluate the waste gas decay tank leak resulted in delayed protective actions for the TSC. (Paragraph P4.8)

Attachment (3 pages):
Selected Drill Objectives, Scenario
Time Line and Narrative

Selected Drill Objectives

A. Scheduling Related Activities:	
A.1	Demonstrate performance of an exercise including an offsite radiological release, and involving on site participation, bi-ennially. This exercise will include the opportunity for the state and local agencies to participate.
A.2	Conduct a drill or exercise which provides an opportunity to satisfactorily demonstrate corrective actions in response to previous drill/exercise results as applicable.
A.3	Demonstrate performance of an exercise involving partial or full participation of state and local off-site agencies, at least every second year. The scenario should provide aspects required to support demonstration of FEMA Objectives selected by off-site officials.
B. Assessment & Classification Related Activities:	
B.1	Demonstrate the ability to detect accident conditions, perform accident assessment and implement those appropriate mitigating actions necessary to place the plant in a safe and stable condition annually.
B.2	Demonstrate the ability to perform EAL evaluations and emergency classifications annually.
B.3	Demonstrate the ability to perform dose projections, including the capability for detecting the magnitude and impact of the components of a release annually.
B.5	Demonstrate the ability to formulate Protective Action Recommendations based on plant parameters and/or environmental conditions, annually.
B.6	Demonstrate the ability of the technical analysis staffs to perform accident assessment, engineering evaluations of plant and reactor core conditions and formulation of near term mitigating actions, annually.
B.7	Demonstrate the ability of the TSC technical analysis staff to perform core damage assessments based on isotopic analysis of samples obtained via the Post Accident Sampling System (PASS) and to compare the results of this assessment to other indicators of core damage, annually.
B.8	Demonstrate response to, and analysis of, simulated elevated airborne & liquid samples and direct radiation measurements in the environment, semi-annually.
B.9	Demonstrate chemical and radiological analysis of actual radioactive liquid samples, annually
C. Notification, Comm. & Record Keeping Related Activities:	
C.1	Demonstrate on-site alerting and warning of plant personnel, annually.
C.2	Demonstrate complete and accurate State and Local initial and follow-up notifications within the time requirements specified within the emergency procedures, annually.
C.3	Demonstrate NRC notification and communications, annually.
C.4	Demonstrate the adequacy of documentation, logs and related record keeping in response to declared plant emergencies, annually.
C.5	Demonstrate the adequacy of communications between HNP Emergency Response Facilities and emergency response personnel, including use of the normal PABX telephones, ARD circuits, and radio systems, annually. This includes transmission and receipt of radiological, meteorological, and plant data as needed.
C.6	Demonstrate notification & activation of site emergency response personnel and facilities (OSC, TSC & EOF) via augmentation with assigned ERO members, during normal working hours, annually.
C.7	Demonstrate notification & activation of the Joint Information Center (JIC) via augmentation with assigned ERO members, biennially.
C.8	Demonstrate notification and activation of utility representatives to the State and County EOCs, biennially.

C. Notification, Comm. & Record Keeping Related Activities (Continued):	
C.9	Demonstrate the preparation, review and release of news information prior to JIC activation, biennially .
C.10	Demonstrate coordination of the preparation, review and release of news information with the state and counties following JIC activation, biennially.
C.11	Demonstrate rumor control activities at least once per 6 years.
C.12	Demonstrate JIC security/access control activities, biennially.
D. Radiological Consequences Related Activities:	
D.1	Demonstrate distribution of dosimetry and maintenance of dose records for emergency response personnel, annually.
D.2	Demonstrate the use of protective measures for entering radiologically controlled areas under simulated abnormal radiological conditions, annually.
D.3	Demonstrate radiological monitoring and decontamination of personnel and equipment, annually.
D.4	Demonstrate distribution and use of respirators and protective clothing for radiological protection, annually.
D.5	Demonstrate use of KI for protection of workers from uptake of radioactive Iodines once per 6 years.
D.6	Demonstrate radiological and contamination controls, including postings and barriers, annually.
D.7	Demonstrate coordination of In-plant surveys and out of plant on-site surveys, including TLD placement about the site, annually.
D.8	Demonstrate environmental monitoring and sampling (on-site and off-site) to include collection and analysis of sample media (water, vegetation, soil, and air), and provisions for communications and record keeping, annually.
D.9	Demonstrate contamination control of drinking water and food for on-site personnel, annually.
D.10	Demonstrate application of emergency condition dose limits and controls, annually.
E. Emergency Response Facilities Related Activities (Other than communications and activation):	
E.1	Demonstrate the adequacy of the emergency response facilities, emergency kits, supplies and equipment to support emergency operations, annually.
F. Direction & Control Related Activities:	
F.1	Demonstrate effective command and control of the Emergency Response Facilities and field personnel, annually.
F.2	Demonstrate coordination and tracking of in-plant and on-site activities/personnel, annually. This includes OSC teams, operations personnel and personnel dispatched by Security or from the TSC.
F.3	Demonstrate coordination and tracking of off site radiological and environmental monitoring activities annually.
F.4	Demonstrate security related support of the emergency plan related activities to provide prompt access to emergency equipment, supplies, and other support as needed, annually.
H. Other Activities:	
H.1	Demonstrate the ability to perform a self-critical post drill/exercise critique for all drills and exercises.
H.2	Demonstrate Access control for the Site and EOF at least annually.

SCENARIO TIME LINE AND NARRATIVE

14:00	Begin scenario from the Training Simulator with the plant near the end of the fuel cycle. The "B" Charging Pump (CSIP) is under repair for bearing vibration indications, with the "C" CSIP in service on the "B" Bus. The "B" Main Steam Line PORV Block Valve is closed due to excessive seat leakage past the PORV. The CP&L electrical grid is in a System Reliability Alert condition until 20:00 today. Rotating Brown outs are forecast for later this afternoon.
14:02	A minor Earth Quake is experienced at the plant site. This is less than the Operational Basis Earthquake (OBE) threshold (continued plant operation is permitted in this condition). This is an **ALERT** EAL Condition. Also, the "C" CSIP trips on over-current. Operators start the last operable CSIP ("A").
≈15:25	A Waste Gas Decay Tank leak is detected as a result of lowering tank pressure and increased radiation in Waste Processing Building Stack 5. (The tank contained 150 Curies of mostly noble gases which are released over the next 20 - 30 minutes). A measurable radioactive release to the North West is in progress. This event would result in declaration of an **Unusual Event,** had the previous events not resulted in a higher level Emergency Classification.
16:30	The "A" CSIP capabilities are lost as a result of a sheared shaft between the motor and pump. This is a loss of Charging Capability and ofBoration Capability, both are functions required for Mode 3. This is a **SITE EMERGENCY** EAL Condition.
17:20	The "B" Reactor Coolant Pump vibration increases & the Metal Impact Monitor System detects metallic impacts within the Reactor Coolant System. Alarms are received on Reactor Vessel Lower & "B" S/G channels.
≈17:25	Loose parts within the RCS result in mechanical damage to the fuel. The in line failed fuel monitor (Gross Failed Fuel Detector (GFFD)) and RCS related radiation monitors indicate increased RCS activity. The "Fuel" fission product barrier will be classified as breached.
17:30	The Turbine and Reactor will trip off line as a result of an Inadvertent Main Steam Line Isolation signal. Following the trip, steam flow will be detected from the "B" Steam Generator (S/G). This will be a result of the "B" S/G safety valve (1MS-47) failing in the open position.
≈17:32	Safety Injection actuation will be required as a result of the stuck open S/G Safety Valve causing a decrease in RCS pressure. The Charging pumps serve as the plant's High Head Safety Injection pumps. Therefore, there will be no Safety Injection make up flow to the Reactor. Saturated conditions will soon be present within the Reactor Coolant System. Also, as the operators verify proper component alignment following the Safety Injection, they will identify that the Charging Line Isolation valve (1CS-235) will not close.
18:52	RCS leakage into the "B" S/G occurs (rapidly increasing to design basis tube rupture). This will result in classifying both the RCS and the Containment fission product barriers as being Breached. A **GENERAL EMERGENCY** EAL Condition exists. A significant radiological release is occurring with the "B" Steam Line radiation rapidly rising to greater than 1100 mR/hr. The plant staff will be challenged with responding to a faulted & ruptured Steam Generator coincident with no High Head Safety Injection capability.
20:20	Plant staff actions to isolate the leaking S/G Safety valve will be successful. The radiological release will be terminated at this time.
≈21:00	Anticipated time to terminate day 1 of drill related activities. FEMA evaluated ingestion pathway related activities will be performed on October 8 & 9, 1997.