

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

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Report No: 50-348/98-10, 50-364/98-10

Licer.see: Southern Nuclear Operating Company, Inc.

Facility: Farley Nuclear Plant

Location: 7388 N. State Highway 95
Columbia AL 36319

Dates: September 8-11, 1998

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Enclosure

EXECUTIVE SUMMARY

FARLEY NUCLEAR PLANT NRC Inspection Report Nos. 50-348/98-10, 50-364/98-10

This routine, announced inspection involved the observation and evaluation of the biennial emergency preparedness exercise for the Farley Nuclear Plant. This NRC/FEMA-evaluated exercise was a plume exposure pathway exercise with offsite participation by the States of Alabama, Georgia, and Florida, and local governments within the plume exposure pathway. The exercise was conducted on September 9, 1998 from 8:05 a.m. to 12:30 p.m. This report summarizes the observations of the four-person NRC team that assessed the adequacy of the licensee's emergency preparedness program as it implemented its emergency plan and procedures in response to the simulated accident. A separate FEMA report will be issued that evaluates the performance of the States and counties.

The NRC team observed the licensee's response in the Control Room Simulator (CRS), the Technical Support Center (TSC), the Operational Support Center (OSC), and the Emergency Operations Facility (EOF). Based on the performance observed, the team concluded that the licensee successfully demonstrated its ability to implement the Emergency Plan and Implementing Procedures.

Program Areas Evaluated and Results

Scenario - The scenario developed for this exercise was effective for testing the integrated emergency response capability of the onsite and offsite emergency organizations (Section P4.1).

Control Room Simulator - Because the exercise was not driven by an active simulator, CRS observation was limited to initial classification and notification. These functions were accomplished in a satisfactory manner (Section P4.2.b.1).

Technical Support Center - Command and control of TSC operations were effective. The TSC staff was proactive in formulating mitigation strategies to minimize offsite releases (Section P4.2.b.2).

Operational Support Center - TSC - OSC communications were not fully effective in communicating important plant conditions. The potential radiological hazard from a radioactive plume to site personnel using the Secondary Access Point (SAP) was not considered by the TSC or the OSC. High priority teams were not dispatched from the OSC in a timely manner (Section P4.2.b.3).

Emergency Operations Facility - Command and control of EOF operations by the Recovery Manager was generally very good. Effective working relationships were observed between licensee personnel and State and county representatives at the EOF (Section P4.2.b.4).

Licensee Critique - The licensee's controller/evaluator organization was effective in identifying most minor performance issues. Although a sufficient number of monitors was used, some of the more significant performance issues observed by the NRC, particularly in the OSC, were not identified by the licensee monitors (Section P4.2.b.5).

Report Details

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.

r. Observations and Findings

The licensee submitted the scope and objectives for the biennial emergency exercise to the NRC with a letter dated June 3, 1998. The exercise scenario package was submitted with a letter dated July 24, 1998. 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 offsite agencies for their participation in the exercise.

c. Conclusion

The scenario developed for this exercise was effective for testing the integrated emergency capability of the onsite and offsite emergency organizations.

P4.2 Emergency Response Facility (ERF) Observations and Critique

a. Exercise Evaluation Scope

During this inspection, the inspectors observed and evaluated the licensee's biennial full-participation, emergency preparedness exercise in the Technical Support Center (TSC), Operational Support Center (OSC), and the Emergency Operations Facility (EOF). The inspectors assessed licensee recognition of abnormal plant conditions, classification of emergency conditions, notification of offsite agencies, development of protective action recommendations (PARs), command and control, communications, and the overall implementation of the Emergency Plan. Observations in the Control Room Simulator (CRS) consisted only of the initial classification and notification. In addition, the inspectors attended the post-exercise critique to evaluate the licensee's self-assessment of the exercise. Acceptance criteria are contained in Appendix E to 10 CFR Part 50, site Emergency Plan, Emergency Plan implementing procedures, and industry guidance in NUREG-0654/FEMA-REP-1, Revision (Rev.) 1, "Criteria for Preparations and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants."

b. ERF Observations, Findings, and Facility Critiques

b.1 Control Room Simulator (CRS)

Observations and Findings

The initial emergency response was observed by the inspector in the CRS. The simulator was not active, therefore plant parameters were provided by the controller staff. The initial event of the exercise occurred at 8:08 a.m. when a phone call was received in the CRS that damage to a fuel assembly had occurred during movement and there was high radiation in the Auxiliary Building. The Unit 2 Shift Supervisor promptly classified the Alert condition and assumed the responsibilities as the Emergency Director (ED). Notifications were directed by the ED and a turnover briefing was made shortly thereafter. No further observations were made by the NRC team from the CRS.

Conclusion

Because the exercise was not driven by an active simulator, CRS observation was limited to initial classification and notification. These functions were accomplished in a satisfactory manner.

b.2 Technical Support Center

Observations and Findings

Staffing of the TSC was initiated with the public address announcement for the Alert emergency classification made at 8:21 a.m. Twenty minutes later the ED for the TSC completed the turnover briefing from the U2 Shift Supervisor who was the ED in the Control Room Simulator. With the activation of the TSC, the ED assumed the responsibilities for making notifications, emergency classification, PARs, and dose assessment. The ED promptly upgraded the emergency classification to a Site Area Emergency (SAE) at 9:42 a.m. due to the reactor coolant system (RCS) leak greater than 130 gallons per minute (gpm) and an RCS activity greater than 300 microcuries/gram dose equivalent I-131 (DEI). The responsibility for dose assessment and follow-up notifications to the States and counties transferred to the EOF at approximately 10:10 a.m. The General Emergency (GE) declaration was made at 10:52 a.m. with the loss of the three fission product barriers. The inspector observed that the ED exercised effective command and control and his staff was proactive in formulating mitigation strategies to minimize offsite releases.

Conclusion

Command and control of TSC operations were effective. The TSC staff was proactive in formulating mitigation strategies to minimize offsite releases.

b.3 Operational Support Center

Observations and Findings

The inspector observed several instances where TSC - OSC communications were not fully effective:

- A SAE was declared at 9:42 a.m. The inspector observed and the OSC logs confirm that the OSC was not aware of the plant conditions which led to the declaration of the SAE (Greater than 130 g.p.m. leak, DEI of 300 microcuries/gram and radiation monitor - R27 reading of 14.6 R/hr). At 9:45 a.m., the inspector observed that OSC discussion continued to focus on the damaged fuel in the spent fuel pool which occurred at 8:08 a.m.
- A GE was declared at 10:52 a.m. About 20 minutes later at 11:15 a.m., the OSC became aware of the GE by an announcement on the public address (PA) system made by the Assistant to the ED.
- At 10:35 a.m., radiation monitor - R27 was reading 170 R/hr. The inspector observed and the OSC logs confirm that, through 12:17 p.m., the OSC was not aware that severe fuel damage had occurred.

During this exercise, the Primary Access Point was out of service and access to the plant was through the Secondary Access Point (SAP). The OSC did not consider this off normal situation and did not establish the necessary radiological controls for exiting the Radiological Controlled Area (RCA) and for entry into the OSC.

During this exercise, a radioactive plume was blowing directly over the SAP. Maintenance, security, and Emergency Response Organization (ERO) relief personnel walked directly into the plume when entering the protected area through the SAP. The potential radiological hazard to site personnel using the SAP was not considered by the TSC or the OSC.

During the exercise, the OSC dispatched four re-entry teams. Re-entry teams three and four were designated as priority one teams and assigned to perform an RCS leak search of the different elevations of the auxiliary building. Their mission was to identify the source of the known leak and stop the release. Both teams took an excessive amount of time, over an hour each, to be dispatched from the OSC.

Conclusion

TSC - OSC communications were not fully effective in communicating important plant conditions. The potential radiological hazard from a radioactive plume to site personnel using the SAP was not considered by the TSC or the OSC. High priority teams were not dispatched from the OSC in a timely manner.

b.4 Emergency Operations Facility

Observations and Findings

Following the Alert declaration at 8:18 a.m., an announcement on the PA directed the activation of the ERFs. Required minimum staffing for the EOF was achieved at 9:05 a.m., at which time the EOF was considered "activated" (i.e., ready to assume its designated functions). Thus, the EOF was activated 47 minutes after the Alert declaration, meeting the established goal of 75 minutes.

At 9:20 a.m., the EOF assumed control of the licensee's offsite radiation monitoring teams. At this same time, a reactor trip with subsequent complications justifiably delayed the EOF's assumption of dose assessment and communications activities from the TSC until 10:10 a.m.

In general, command and control of EOF operations by the Recovery Manager (RM) was very good. Effective working relationships were observed between licensee staff and State and county representatives at the EOF. The EOF staff functioned efficiently and professionally.

The inspectors observed that by 9:40 a.m. (which was actually before the SAE declaration) the status board entitled "Offsite Protective Actions" listed the licensee's PARs as evacuation of zones A, D-5, E-5, F-5 and sheltering of zones D-10, E-10, F-10. Discussion with licensee exercise controllers disclosed that these PARs, written in black ink, were what would be recommended, based on current meteorological conditions, if a GE were declared; actual PARs, when issued, were to be written on the board in red. This practice was known only to those personnel who had participated in recent drills. Others at the EOF were perplexed by the information. Licensee representatives planned to clarify use of this status board.

At 10:25 a.m., with a SAE classification in effect since 9:42 a.m., the licensee concurred in the State's desire to commence evacuation of the 5-mile radius around the plant. The RM indicated that this action was taken to demonstrate a unified effort by the licensee and local governmental agencies. However, this PAR was not developed in accordance with the Guidelines in FNP-0-EIP-9.0, "Emergency Classification and Actions", Rev. 42, dated May 27, 1997. Guideline 2 (for SAE) stated the following in Note 2 near the end of the procedure:

Only the protective actions specified by plant procedures should be recommended, unless there are obvious relevant factors (e.g., severe natural phenomena) that probably were not anticipated when the PARs were developed and that would make the standard PAR recommendations impractical, or obviously non-conservative.

No such "obvious relevant factors" existed at the time the PAR was made. At the end of Guideline 2, step 1 stated that, for an emergency classification based solely on plant conditions and not on dose projections (as was the case at the time in question), PARs "are not required; however, they may (at the discretion of the ED) be made as a precautionary measure, depending on the severity of the plant condition." The licensee's PAR at SAE was not in accordance with the applicable procedural

requirements because it was issued solely to concur with the State's decision, and was not determined to be necessary based on plant conditions. The licensee's critique also identified this issue for follow-up and possible corrective action.

The declarations of Alert, SAE, and GE were correct. However, the inspectors questioned the licensee's procedure for determining the time at which an emergency is to be declared. Procedure FNP-0-EIP-9.0 specified that the emergency declaration time was to be recorded as the time at which the ED signed the initial Emergency Notification form. This practice was inconsistent with NRC guidance found in various documents and had the potential to undermine the timeliness of emergency notifications. Licensee management agreed that this procedural direction may be inappropriate and stated that corrective action would be considered to ensure that management expectations and NRC requirements were being met.

Conclusion

The EOF functioned efficiently and professionally. Command and control of EOF operations by the RM was generally very good. Procedural and performance issues were identified in the areas of emergency declaration timing and PAR decision-making and presentation.

b.5 Licensee Facility Critiques

Following the exercise, the licensee conducted facility critiques in which the players provided their own assessment of their performance and identified areas that needed improvement. The post-exercise critiques in the TSC, OSC, and EOF were observed to be thorough, open, and self-critical. The licensee controller/evaluator organization then conducted detailed discussions, reviewed documentation, and conducted interviews as required to develop their critique results. On September 11, 1998, the Emergency Preparedness Director provided an excellent presentation to licensee management of the critique results.

Conclusion

A thorough critique process was followed with a well-prepared management presentation that summarized the most significant exercise observations.

V. Management Meetings

X1 Exit Meeting

The Team Leader presented the inspection summary to licensee management on September 11, 1998. The summary indicated the exercise was fully satisfactory.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Badham, Site Supervisor, Safety Audit and Engineering Review
T. Esteve, Supervisor, Planning and Control
R. Fucich, Manager, Engineering Support
S. Fulmer, Manager, Plant Training and Emergency Planning
D. Grissette, Assistant General Manager, Plant Operations
W. Lee, Emergency Planning Coordinator (corporate)
C. Nesbitt, Assistant General Manager, Plant Support
M. Stinson, General Manager, Farley Nuclear Plant
R. Vanderbye, Emergency Planning Coordinator (plant)
G. Waymire, Manager, Technical Support

INSPECTION PROCEDURES USED

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

Attachment (5 pages):
Exercise Scope, Objectives,
Scenario Narrative, and Time Line

**1998 FARLEY NUCLEAR PLANT
EXERCISE OBJECTIVES
SEPTEMBER 9, 1998**

I. Participating Organizations

Full Participation: Southern Nuclear Operating Company (SNC), Alabama Power Company (APC), State of Alabama, State of Georgia, Houston/Henry County, and Early County.
Partial Participation: State of Florida

II. Purpose

- A. To meet the requirements of 10CFR50, Appendix E, 44CFR350.0 and NUREG-0654/FEMA-REP-1, Rev. 1.
- B. To conduct a full scale plume exposure drill which will include the mobilization of SNC, APC, State and Local personnel and resources adequate to verify the capability of participating organizations to respond to an accident scenario requiring response.

III. Southern Nuclear Operating Company and Alabama Power Company Objectives

A. On-site

- 1. Demonstrate that control room staff can assess the event, classify the event, take corrective measures to control the event and activate emergency response procedures.
- 2. Demonstrate that plant staff can activate and staff the Technical Support Center (TSC) and perform accident response activities including:
 - a. Dose Assessment
 - b. Off-site notification and protective action recommendations
 - c. Reclassification of emergency status
 - d. Personnel Accountability for all personnel on-site
 - e. Radiation Monitoring Team (RMT) Dispatch and Control (if required)
 - f. Site access control and admittance of essential personnel
 - g. Dispatch and control of re-entry teams
- 3. Demonstrate the capability to turn over Emergency Operations Facility (EOF) functions to the EOF staff when the EOF is activated and staffed.
- 4. Demonstrate that plant staff can activate and staff the EOF and perform accident response activities including:
 - a. Assuming the dose assessment function and the RMT direction and control function from the TSC staff.
 - b. Coordinating logistics, engineering functions, licensing functions and manpower with the TSC and EOC.
 - c. Preparing and coordinating news releases and activating the News Media Center (NMC).

* Emergency Communication Organization staff assigned to the EOF and NMC will be prepositioned in the Dothan Area to reduce transport time and thus allow for sufficient time to exercise the facilities.

ATTACHMENT

5. Demonstrate the capability to augment EOF staff with plant personnel.
6. Demonstrate the adequacy of the plant's communication system including:
 - a. Communication links to Corporate Emergency Operations Center (EOC)
 - b. News Media Center (NMC)
 - c. Interplant communications
 - d. Communication links to state and local authorities
7. Demonstrate the capability to perform radiological monitoring.

B. Off-Site

1. Demonstrate that the corporate staff can be activated and staff the EOC.
2. Demonstrate that Corporate Headquarters Emergency Operations Center (EOC) staff can provide support for:
 - a. Activation of facilities
 - b. Logistics (as required)
 - c. Engineering and Licensing (as required)
 - d. Support organization notification
 - e. Briefing of company management
 - f. News release preparation
3. Demonstrate that the Public Information Organization can respond to media and public inquiries, establish a rumor control center, and issue and coordinate news releases.

IV. State and Local Objectives

See Attachment 1 (Any State or Local objective that cannot be demonstrated due to conditions inconsistent with the scenario will be demonstrated in a separate drill.)
(Reference Extent of Play Agreements between the States and FEMA.)

V. Joint Objectives (SNC, APC, State of Alabama, State of Georgia, State of Florida, Houston/Henry County and Early County)

- A. Demonstrate that all parties can coordinate news releases and conduct a joint news conference.
- B. Demonstrate that adequate technical information can be exchanged among involved agencies.

VI. Exercise Limits

The plume exposure exercise will be conducted on September 9 and will begin prior to 8 A.M Central and conclude by 2:30 P.M. Central.

**EMERGENCY EXERCISE
NARRATIVE SUMMARY
SEPTEMBER 9, 1998**

The drill starts at 0800 with the Unit 1 Control Room staff maintaining reactor power at the current power level of 99.7%. At 0805 radiation monitor alarms indicate that a vent stack release is occurring and that radiation levels in the Spent Fuel Pool area are elevated. At approximately 0808 a report from the SRO in charge of fuel movement indicates that a spent fuel assembly has been deformed due to apparent failure of the Spent Fuel Pool bridge controls. The Spent Fuel Pool area has been evacuated. The Control Room staff should follow the appropriate Annunciator Procedure guidance.

By approximately 0823 the Control Room staff should declare an **ALERT** emergency based on EIP-9.0, Guideline 3, step 3.1.d. Plant staff will start taking actions for an Alert emergency and the TSC, EOF, EOC, and ECO staffs will be activated. When offsite dose calculations are performed the results should indicate that the NOUE whole body noble gas release limits may have been exceeded but that levels remain less than the ALERT limits. The vent stack release ends at approximately 0923 when all fuel rod gap noble gases have been released from the damaged spent fuel assembly.

Within 75 minutes of the Alert declaration, the TSC and EOF should have minimum staff in place ready to perform designated functions. The EOC in Birmingham will also have staff available to support plant operations.

At approximately 0920 the crew receives indications of increasing reactor power due to increasing steam flow. At approximately 0921 an automatic reactor trip occurs due to resultant overpower condition. All plant systems function properly except that the #4 Main Turbine governor valve still indicates fully open. Reports from the Turbine Building indicate that a steam release did occur in the vicinity of the Unit 1 Main Turbine high pressure housing. The steam release was isolated when the Main Turbine tripped and no injuries have been reported.

The crew enters and begins following the procedural guidance of EEP-0 and ESP-0.1. At approximately 0925 indications of increasing Containment sump level lead the crew to reference AOP-1 to deal with potential RCS leakage. By approximately 0930 the crew has indications of excessive RCS leakage and activity levels (DEI > 300 μ Ci/gm).

By approximately 0945 the Plant Staff should declare a **SITE AREA** emergency based on EIP-9.0, Guideline 2.0, step 3.1. Once declared the plant staff should begin taking actions for a Site Area emergency based on the EIPs to include activation of the Plant Emergency Alarm, assembly, and Protected Area accountability.

At approximately 1036 the crew receives indications of high vibration, seal damage, and seal leakage on the 1A Reactor Coolant Pump (RCP). Approximately one minute later

the 1A RCP trips on high current and the crew observes a rapid decrease in pressurizer level, a corresponding increase in Containment pressure, increasing Containment radiation levels and Safety Injection automatically actuates. The cause of the transient is a large break loss of coolant accident on the 1A Reactor Coolant loop which causes fuel cladding failure to increase to approximately 80%. Containment pressure peaks at > 27 psig and Containment Spray does automatically actuate.

The crew reenters EEP-0 in response to the accident. All equipment works properly following the SI except the 1A Component Cooling Water (CCW) pump does not start automatically and cannot be manually started. When investigated the 1A CCW pump motor breaker is damaged and needs repair. The crew may realign the 1B CCW pump to the B train to allow use of the B train LHSI and HHSI pumps.

At 1045 indications of release from containment to the environment through the penetration room are observed. By approximately 1100, plant staff should declare a **GENERAL EMERGENCY** based on plant conditions per EIP-9.0, Guideline 1, step 2.1. Dose projections, when performed, will also indicate the need to upgrade based on sight boundary dose. Once declared the plant staff should begin taking actions for a General emergency per EIP-9.0 while the crew continues to stabilize the plant per the procedural flow path of EEP-0, FRP-Z.1, EEP-1, FRP-P.1, ESP-1.3.

At approximately 1107 the Reactor Vessel Level Indication System (RVLIS) indicates that water level has been restored in the reactor vessel. By approximately 1140 the crew completes alignment of the Emergency Core Cooling System (ECCS) to the cold leg recirculation mode.

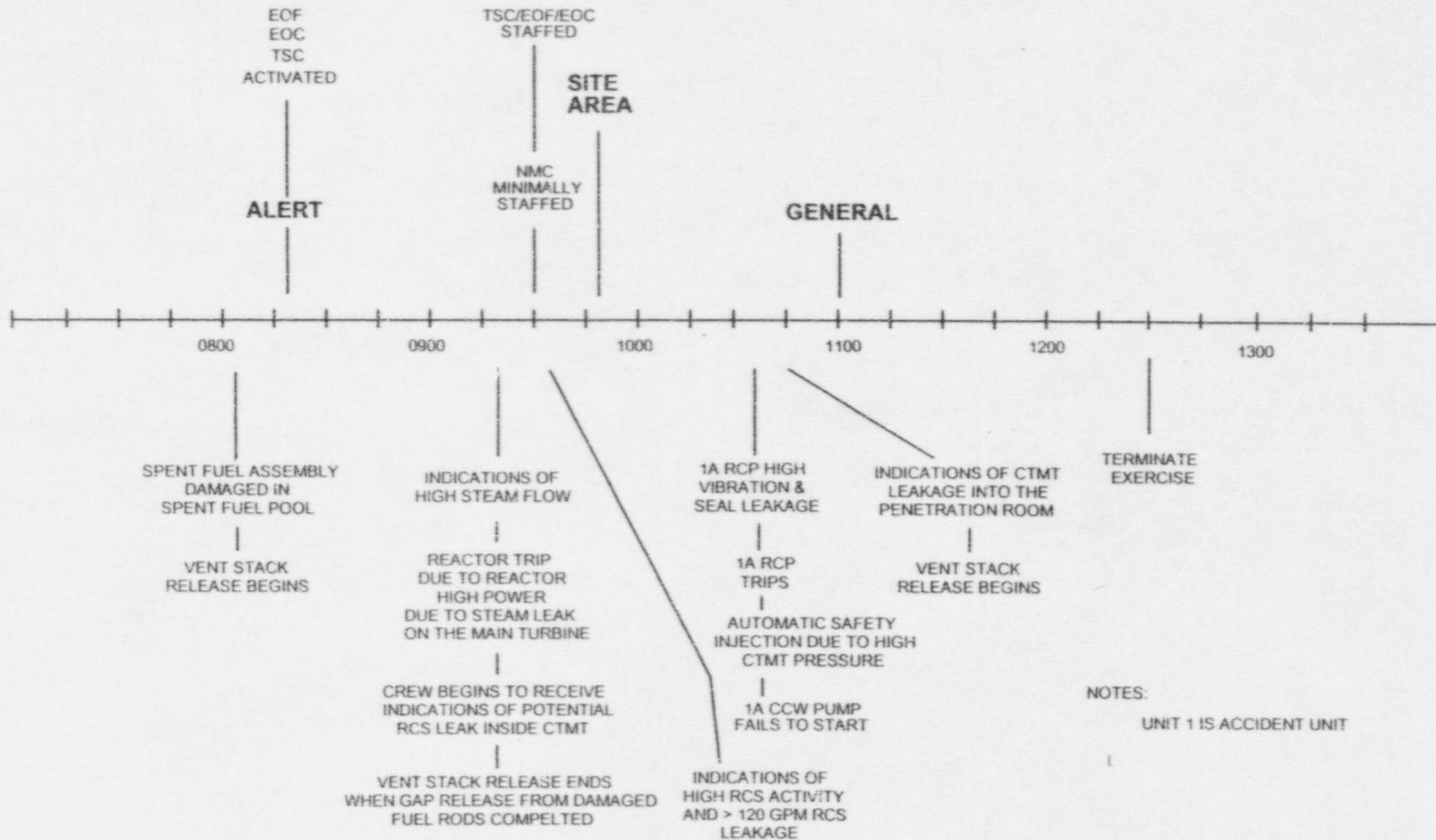
The release path to environment is from the 139' Electrical Penetration Room via a failed electrical penetration. It is anticipated that the actual leak source may not be identified prior to the end of the scenario due to the high energy release that is taking place in the Electrical Penetration Room. It is also, therefore, not anticipated that the leak from containment can be stopped prior to the end of the exercise due to the identification problems, high energy releases, and high dose rates in the area where work would need to be performed.

The News Media Center (NMC) will be activated and staffed by representatives from SNC, APC, the State of Alabama, the State of Georgia, the State of Florida, Houston/Henry County, and Early County. Media and public interest will be simulated and news releases will be prepared and released.

The exercise will terminate once the radiation monitoring teams have tracked the plume, the EOF has been staffed and is performing EOF activities and the NMC has conducted a press conference. The termination will be coordinated with the States of Alabama, Georgia, and Florida if occurring prior to 1230 Central time to ensure that all objectives have been demonstrated.

FARLEY NUCLEAR PLANT RADIOLOGICAL EMERGENCY SCENARIO TIMELINE

September 9, 1998



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