



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

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Report No.: 50-261/89-27

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 Steam Electric Plant, Unit 2

Inspection Conducted: November 13-16, 1989

Inspector:

James L. Kreh
J. L. Kreh

12-11-89

Date Signed

Accompanying Personnel: K. R. Jury
M. E. Stein

Approved by:

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

12-11-89

Date Signed

SUMMARY

Scope:

This routine, announced inspection involved observation and evaluation of the annual emergency response exercise. Emergency organization activation and response were selectively observed in the Control Room, Technical Support Center (TSC), Operations Support Center (OSC), Emergency Operations Facility (EOF), and Plant Media Center (PMC). The inspection also included a review of the exercise objectives and scenario details, as well as observation of the licensee's postexercise critique activities. The exercise, involving partial participation by State and local governments, was conducted on November 13 (4:30 p.m. - 8:30 p.m.) and November 14 (8:30 a.m. - 12:25 p.m.), 1989.

Results:

In the areas inspected, no violations or deviations were identified. However, three Exercise Weaknesses were identified as follows: failure of the Shift Foreman to recognize the occurrence of an initiating condition for a Notification of Unusual Event (Paragraph 4); failure to follow procedures for off-hour activation of the emergency response organization, which contributed

to untimely activation of the OSC and TSC (Paragraph 5); and internally inconsistent scenario data and exercise control (Paragraph 2).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *J. Curley, Manager, Environmental and Radiation Control
- C. Dietz, Manager, Robinson Nuclear Project Department (RNPD)
- *P. Jenny, Total Quality Coordinator
- *R. Johnson, Manager, Control and Administration (representing Manager, RNPD, at exit interview)
- *J. Kloosterman, Director, Regulatory Compliance
- *B. McFeaters, Project Specialist, Emergency Preparedness (Corporate)
- *M. Morrow, Senior Specialist, Emergency Preparedness
- *M. Page, Manager, Technical Support
- *D. Quick, Acting General Manager
- *R. Smith, Manager, Maintenance
- *R. Steele, Operations Coordinator
- M. Thompson, Manager, Emergency Preparedness (Corporate)
- *L. Williams, Supervisor, Emergency Preparedness and Security
- *H. Young, Manager, Quality Assurance/Quality Control

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

NRC Resident Inspectors

- *L. Garner
- *K. Jury

*Attended exit interview

2. Exercise Scenario (82301, 82302)

The scenario for the emergency exercise was reviewed to determine whether provisions had been made to test the licensee's integrated emergency response capability as well as to test a major portion of the basic elements within the licensee's Emergency Plan as required by 10 CFR 50.54(t), 50.47(b)(14), and Section IV.F of Appendix E to 10 CFR 50.

The inspector's advance review of the scenario disclosed no major problems. However, several minor discrepancies were identified and were telephonically conveyed to a licensee representative on November 8, 1989. The inspector was provided, upon arrival at the plant, written responses to the identified discrepancies; appropriate corrections to the scenario package were provided to the inspectors, controllers, and evaluators prior to the exercise.

During the course of the exercise, however, numerous problems and inconsistencies in the scenario data became apparent. In several instances, the scenario data for Process and Accident Radiation Monitors were inconsistent with postulated plant conditions. Examples included the following:

- The reading on R-15 (Condenser Air Ejector) went offscale high while R-14 (plant stack) remained constant (and normal).
- R-16 (Containment Fan Cooling Water) went offscale high although there was no postulated Reactor Coolant System (RCS) leak into the Service Water System.
- The reading from R-31 A ("A" steam generator) resulted in calculation of a source term substantially higher than was consistent with the results of the Post-Accident Sampling System (PASS) sample analysis.

In other instances of inconsistent scenario data, plant parameters did not track correctly over time. Examples included the following:

- The containment sump level increased to 24 inches in one 15-minute period after the RCS leak began and remained at that level for the remainder of the exercise.
- The level of the Refueling Water Storage Tank (RWST) was 91 percent throughout the scenario, even though water from the RWST was injected for several hours.

Player confusion resulting from the inconsistencies listed above was compounded when the controllers told the operators that the Condenser Air Ejector had switched to the stack and that there was vacuum in the condenser, but later (at 1023) retracted the statement by telling the operators that the switch to the stack had not occurred and that the vacuum pumps had been secured at 0931. Another exercise control problem occurred because the TSC lead controller did not know that calling an offsite ambulance service was to actually be performed rather than simulated (a last-minute scenario change of which the inspector, but not the TSC lead controller, was informed prior to the exercise).

The problems cited in this paragraph seriously detracted from the exercise play by introducing unnecessary elements of confusion and distraction. The problems are considered in the aggregate to represent an Exercise Weakness for which corrective actions are required.

Exercise Weakness 50-261/89-27-01: Failure to produce a technically consistent scenario and to demonstrate proper exercise control.

No violations or deviations were identified.

3. Onsite Emergency Organization (82301)

The licensee's organization was observed during the simulated emergency to determine whether the requirements of Paragraph IV.A of Appendix E to 10 CFR Part 50 were met addressing the descriptions, responsibilities, and assignments of the onsite emergency response organization.

The inspector observed that the initial onsite emergency organization was adequately defined and that primary and alternate assignments for the positions in the augmented emergency organization were clearly designated.

Because of an unconventional approach to staffing the Control Room during the exercise, the ability of the Control Room crew to execute the requirements of the Emergency Plan with the nominal staffing levels expected during off-hours could not be evaluated. Augmentation from the training/relief crew and from on-shift procedure writers enabled the Shift Foreman to assign personnel to dedicated emergency response functions while keeping the on-shift crew (i.e., the personnel predesignated as Control Room players for the exercise) intact to focus exclusively on plant operations and accident mitigation. Additionally, the Operations Manager was involved in the emergency response from the Control Room well before the Alert was declared, first as an advisor to the Shift Foreman and later as the Site Emergency Coordinator (SEC) when he relieved the Shift Foreman of SEC responsibilities at 1728 hours (November 13). The Operations Manager was serving as SEC when the Alert was declared. The inspectors considered the availability of the referenced Control Room augmentation personnel to be abnormal for a time outside of regular day-shift hours; however, licensee representatives insisted during postexercise discussions that those personnel were not prestaged for exercise play but were typically onsite at any given time.

An unusual feature of the licensee's response organization was that the command of activities controlled from the TSC was not centralized in the Site Emergency Coordinator. Each of the several directors comprising the SEC's principal staff routinely initiated actions unilaterally (i.e., without approval from or consultation with the SEC). The prioritization of assessment and repair activities was left to the discretion of the individual directors. Although this mode of operation was created in response to previously identified problems with the TSC/OSC interface, the inspector discussed with licensee representatives alternatives to this approach. During the exercise, such activities as sampling, surveys, and investigation of equipment failures were not tracked in the TSC in a manner that allowed the priority and status of those activities to be quickly available to all key TSC staff.

No violations or deviations were identified.

4. Emergency Classification System (82301)

This area was observed to verify that a standard emergency classification and action level scheme was in use by the licensee as required by 10 CFR 50.47(b)(4) and Paragraph IV.C of Appendix E to 10 CFR Part 50.

The licensee's emergency classification system was contained in the Emergency Action Level (EAL) Flowpath. The EAL Flowpath was effectively used by the SEC to correctly and expeditiously classify the postulated scenario conditions at the Alert, Site Area Emergency, and General Emergency levels. However, the Shift Foreman did not recognize that loss of the start-up transformer (SUT) was an initiating condition for a Notification of Unusual Event (NOUE) based on loss of offsite power.

The message initiating the loss of SUT was given to the Control Room crew at 1630. Because the message did not specify annunciator window numbers, the Shift Foreman initially interpreted the event as a loss of both the SUT and the Main Transformer without turbine trip. At approximately 1636, the Control Room lead controller explained that the event was a loss of only the SUT. At 1640 the Shift Foreman notified the Operations Manager of the event, directed that Technical Specifications be reviewed, then entered the EAL Flowpath at 1644. After reviewing the EALs, the Shift Foreman apparently concluded that no EAL had been reached because he put the EAL chart aside. At 1652 the Control Room lead controller entered the Shift Foreman's office and began reviewing the EAL Flowpath. When the Shift Foreman saw this, he joined the lead controller and began explaining the reasoning he used when assessing the EALs. After going through the Flowpath with the controller, the Shift Foreman called the Operations Manager at 1654 for a conference on the event classification. During the conference it was decided that the loss of the SUT was equivalent to a loss of offsite power and required declaration of a NOUE.

It appeared to the inspector that the Shift Foreman had concluded after reviewing the EAL Flowpath at 1644 that no declaration was required and was unintentionally cued to re-enter the EALs by the controller. Even after being cued that his decision not to make an emergency declaration was incorrect, the Shift Foreman required a conference with the Operations Manager in order to finally declare a NOUE 24 minutes after losing the SUT. The problem described in this paragraph was identified as an Exercise Weakness for which corrective actions are required.

Exercise Weakness 50-261/89-27-02: Failure of the Shift Foreman to recognize the occurrence of an initiating condition for a Notification of Unusual Event.

No violations or deviations were identified.

5. Notification Methods and Procedures (82301)

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. This area was further observed to determine whether means to provide early notification to the population within the plume exposure pathway were established 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.

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 goals 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 declared activated 65 minutes after the Alert, but without personnel to fill the designated positions of I&C/Electrical Foreman, Mechanical Maintenance Foreman, and Radiological Control functions (four positions).
- The TSC was declared activated 78 minutes after the Alert without a person filling the position of Logistics Support Coordinator.

The inspectors were unable to observe the causes of these untimely responses, but the licensee's critique indicated that the callout procedure, involving the use of a notification "tree", was not implemented correctly. Specifically, one group of persons was called to respond prematurely (prior to the Alert), and another group was not called at all. The result of this confusion in the callout process was untimely activation of the TSC and OSC, as discussed above. This problem was identified as an Exercise Weakness for which corrective actions are required.

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.

No violations or deviations were identified.

6. Emergency Communications (82301)

This area was observed to determine whether provisions existed for prompt communications among principal response organizations and emergency personnel pursuant to 10 CFR 50.47(b)(6), Paragraph IV.E of Appendix E to 10 CFR Part 50, and specific guidance in Section II.F of NUREG-0654.

The inspector observed communications within and between the licensee's emergency facilities, and the offsite environmental monitoring teams and the EOF. The inspector also observed information flow among the various groups within the licensee's emergency organization. In general, communication of information occurred in an adequate manner.

No violations or deviations were identified.

7. Accident Assessment (82301)

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

The accident assessment program included an engineering assessment of plant status and an assessment of radiological hazards to both onsite and offsite personnel resulting from the accident. In general, these assessments were adequately performed and the results properly employed in the development of mitigating actions (but see Paragraph 8 for a discussion of related problems).

The activities of onsite and offsite radiological monitoring teams were not observed by the inspector.

No violations or deviations were identified.

8. Protective Response (82301)

This area was observed to determine whether guidelines for protective actions during the emergency, consistent with Federal guidance, were developed and in place, and whether protective actions for emergency workers, including evacuation of nonessential personnel, were implemented promptly as required by 10 CFR 50.47(b)(10) and specific criteria in Section II.J of NUREG 0654.

The inspector verified that the licensee had and used emergency procedures for formulating protective action recommendations for offsite populations within the 10-mile emergency planning zone. The inspector observed that protective actions were initiated for onsite emergency workers following the Alert declaration by conducting an accountability of those personnel inside the protected area. The (simulated) evacuation of nonessential plant personnel was ordered in a timely manner.

The licensee's supply of potassium iodine (KI) for use as a thyroid-blocking agent was maintained at the TSC and in the field kits for the Environmental Monitoring Teams. With a (simulated) release of radioactivity in progress at 1100 hours on November 14, the SEC directed that onsite personnel performing work outside should be administered KI. At the same time, the Shift Foreman requested that KI be delivered to the

Control Room for use by personnel there. Therefore, with a release in progress, a licensee employee was required to hand-carry supplies of KI to the OSC and Control Room. The resultant (simulated) personnel radiation exposure could have been obviated by means of strategic repositioning of KI supplies.

Inspector Follow-up Item (IFI) 50-261/89-27-04: Considering placement of KI at the OSC and Control Room.

The inspector observed that the Residual Heat Removal (RHR) system was placed in service at 1155 hours on November 14. As the plant operators were well aware, this action significantly degraded the radiological conditions in the Auxiliary Building. However, the OSC was not notified of this action until about 20 minutes after it occurred. Information on start-up of the RHR system should have been immediately communicated to the OSC (preferably in advance of start-up) so as to protect teams already in the plant as well as those that were being readied for dispatch.

IFI 50-261/89-27-05: Notifying the OSC prior to placing the RHR system in service.

The onsite structure housing both the TSC and EOF had a common system for heating, ventilation, and air-conditioning (HVAC). This HVAC system had an air intake which was continuously monitored by installed radiological instrumentation. When the instrumentation detected airborne radiation levels above a preset value, the HVAC system was supposed to automatically switch to filtered, pressurized operation (emergency mode) to assure continued habitability from a radiological standpoint. The inspector noted that the licensee's mode of operation placed complete reliance on the "autostart" feature. Even though a General Emergency had been declared and a radiological release was known to be occurring, the licensee did not consider manually placing the HVAC system into the emergency mode.

IFI 50-261/89-27-06: Considering manual actuation of the emergency mode of the HVAC system for the TSC/EOF when a significant release is known to be occurring.

No violations or deviations were identified.

9. Exercise Critique (82301)

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), Paragraph IV.F of Appendix E to 10 CFR Part 50, and specific guidance promulgated in Section II.N of NUREG-0654.

The licensee conducted effective player and evaluator critiques following exercise termination. A formal licensee critique of the emergency exercise was held on November 15, 1989, with controllers, evaluators, key participants, licensee management, and NRC personnel attending. The subject critique identified many (but not all) of the findings and weaknesses in this exercise. The inspector did not disagree with the licensee's preliminary assessment that 31 exercise objectives (of a total of 43) were fully met, while 7 were only partially fulfilled and 5 were not met (see attachment for list of objectives). Follow-up of corrective actions taken by the licensee will be accomplished through subsequent NRC inspections.

No violations or deviations were identified.

10. Federal Emergency Management Agency (FEMA) Report

A report of FEMA's evaluation of offsite preparedness will be provided by a separate transmittal.

11. Action on Previous Inspection Findings (92701)

- a. (Closed) Exercise Weakness 50-261/87-31-01: Failure to make a timely news release following declaration of a General Emergency.

A news release was issued in a timely manner from the Plant Media Center 32 minutes after the General Emergency declaration during the exercise.

- b. (Closed) Exercise Weakness 50-261/87-31-02: Failure to conduct a timely initial news briefing.

Several news briefings were conducted, including one about 45 minutes after the Site Area Emergency declaration, and another about 35 minutes after the General Emergency declaration (the latter briefing was observed by the inspector).

- c. (Closed) Exercise Weakness 50-261/87-31-04: Failure to implement appropriate exposure control for offsite workers.

Revisions to Plant Emergency Procedures had acceptably addressed the subject findings.

- d. (Closed) IFI 50-261/88-20-01: Failure to provide properly dressed-out accident assessment teams on a timely basis.

The inspector observed that OSC teams were formed and prepared on a timely basis during the exercise.

12. Exit Interview

The inspection scope and results were summarized on November 16, 1989, with those persons indicated in Paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results listed below. Licensee management agreed to review the three IFIs for potential applicability to their emergency preparedness program. Although proprietary information was reviewed during this inspection, none is contained in this report. Dissenting comments were not received from the licensee.

<u>Item Number</u>	<u>Description and Reference</u>
50-261/89-27-01	Exercise Weakness: Failure to produce a technically consistent scenario and to demonstrate proper exercise control (Paragraph 2).
50-261/89-27-02	Exercise Weakness: Failure of the Shift Foreman to recognize the occurrence of an initiating condition for a Notification of Unusual Event (Paragraph 4).
50-261/89-27-03	Exercise Weakness: Failure to adequately implement the notification procedure for plant augmentation staff, and to activate the TSC and OSC in a timely manner (Paragraph 5).
50-261/89-27-04	IFI: Considering placement of KI at the OSC and Control Room (Paragraph 8).
50-261/89-27-05	IFI: Notifying the OSC prior to placing the RHR system in service (Paragraph 8).
50-261/89-27-06	IFI: Considering manual actuation of the emergency mode of the TSC/EOF HVAC system when a significant release is known to be occurring (Paragraph 8).

Attachment:
 Exercise Objectives and Narrative
 Summary of Scenario

1989 EMERGENCY PREPAREDNESS EXERCISE OBJECTIVES

A. OPERATIONAL ASSESSMENT

1. Demonstrate the Control Room staff's ability to recognize operational symptoms and parameters indicative of degrading plant conditions.
2. Demonstrate the ability to properly classify emergency conditions.
3. Demonstrate the ability to formulate appropriate offsite protective action recommendations.
4. Demonstrate the ability to properly escalate the emergency response based upon event classification.
5. Demonstrate the adequacy of the RNP Emergency Plan Implementing Procedures applicable to the scenario.
6. Demonstrate the ability to effectively coordinate emergency response with state and county emergency response agencies.
7. Demonstrate effective coordination of information and plant status with the South Carolina Emergency Preparedness Division (EPD) emergency response organization.

B. COMMUNICATIONS

1. Demonstrate that appropriate communication systems exist to accomplish notification of offsite agencies in accordance with emergency plans and procedures.
2. Demonstrate the ability to adequately notify and activate emergency response organization personnel.
3. Demonstrate the ability to effectively communicate with plant emergency teams and company environmental monitoring teams located offsite.
4. Demonstrate proper recordkeeping at emergency response facilities.
5. Demonstrate that accurate messages concerning the emergency are transmitted in accordance with established procedures.
6. Demonstrate that follow-up messages are transmitted to county and state officials, so as to keep them properly informed of developments at the plant site.
7. Demonstrate that status boards are accurately maintained and updated in accordance with emergency response plans and procedures.
8. Demonstrate that appropriate briefings are held and incoming personnel are briefed and updated on the current conditions of the plant and other aspects to the emergency situation.

1989 EMERGENCY PREPAREDNESS EXERCISE OBJECTIVES

(Continued)

C. RADIOLOGICAL AND ENVIRONMENTAL ASSESSMENT

1. Demonstrate the proper use of post-accident sample results to support the dose projection process.
2. Demonstrate the ability to evaluate field radiological monitoring data, offsite radiological dose projections, and plant conditions, to arrive at appropriate protective action recommendations.
3. Demonstrate the activation, operation, and reporting of the field monitoring teams within and beyond the site boundary.
4. Demonstrate the capability to perform radiological monitoring activities and assessments.
5. Demonstrate effective coordination of the radiological and environmental assessment process with the South Carolina Bureau of Radiological Health.
6. Demonstrate the ability to support the radiological assessment process while maintaining personnel radiation exposure ALARA.
7. Demonstrate the use of post-accident sampling equipment to obtain, transport, and analyze samples of reactor coolant or a containment air sample under conditions specified by the scenario. Actual liquid sample will be demineralized water.

D. EMERGENCY RESPONSE FACILITIES

1. Demonstrate that sufficient and adequate emergency equipment exists to effectively perform necessary emergency actions.
2. Demonstrate that adequate access control of facilities can be maintained.
3. Demonstrate that emergency response facilities (TSC, OSC, EOF, and Plant Media Center) can be activated in accordance with the emergency plan and procedures.

E. PUBLIC INFORMATION

1. Demonstrate the activation of the Plant Media Center in accordance with the emergency procedures.
2. Demonstrate the ability to develop and disseminate accurate news releases in accordance with established emergency procedures.
3. Demonstrate that briefings concerning plant events are provided to the media during the emergency.
4. Demonstrate that public information is coordinated between CP&L and state and/or county officials.

1989 EMERGENCY PREPAREDNESS EXERCISE OBJECTIVES

(Continued)

F. EMERGENCY RESPONSE ORGANIZATION

1. Demonstrate that sufficient emergency response organization personnel are available to support the emergency response on a round-the-clock coverage schedule.
2. Exhibit proper response of emergency personnel to activate emergency response facilities and carry out assigned roles and responsibilities in accordance with emergency response procedures.
3. Demonstrate the ability to transfer command and control responsibilities between the Control Room, Technical Support Center and Emergency Operations Facility.

G. PERSONNEL PROTECTION

1. Demonstrate that the accountability process within the Protected Area can be accomplished in accordance with emergency response procedures.
2. Demonstrate the ability to provide onsite access to local offsite emergency services and/or support in accordance with emergency response procedures.
3. Demonstrate the ability to conduct area surveys under emergency conditions.
4. Demonstrate the ability to provide adequate radiation protection services such as dosimetry and personnel monitoring.
5. Demonstrate the ability to provide first aid for an individual who has become ill and, as a result, requires transportation for further medical treatment.
6. Demonstrate the ability to adequately control the spread of contamination and the radiological exposure of onsite and offsite emergency workers.
7. Demonstrate the decision-making process for consideration of thyroid-blocking agent distribution to emergency personnel.
8. Demonstrate proper radiation exposure recordkeeping for emergency personnel.

1989 EMERGENCY PREPAREDNESS EXERCISE OBJECTIVES
(Continued)

H. GENERAL

1. Demonstrate the ability to conduct a controller/evaluator meeting before the beginning of the exercise which addresses final concerns about the conduct of the exercise.
2. Demonstrate the ability to self-critique and to identify areas needing improvement.
3. Demonstrate that previously identified NRC deficiencies, exercise weaknesses or inspector follow-up items (IFIs) from the 1987 and 1988 annual Emergency Preparedness exercise have been resolved.

NARRATIVE SUMMARY

This exercise is based on a loss of offsite power with a runback to ~73%, a recovery of offsite power, an ATWS with fuel damage, a RTD thermowell failure that damages a steam generator tube, and a main steam PORV that sticks open releasing radioactivity to the environment.

Initial conditions are that the plant is at 100% power. The following equipment is out of service:

- "B" SI pump is not available.
- DS Diesel is out of service for preventative maintenance.
- Channel "A" of reactor protection is being tested under MST-020.

Severe weather in the plant area causes a lightning strike at 1630 hours which causes a failure in the startup transformer controls which causes the East-West tie breaker to open. The resulting loss of offsite power causes the plant to runback to about 73%. An Unusual Event should be declared due to loss of offsite power.

The substation maintenance crew from Hartsville is onsite performing a visual inspection of the startup transformer. They are directed to determine cause of problem and correct. By 1800 hours, offsite power has been restored.

At 1805 hours, while increasing power, an air line on the feedwater flow control valve (FRV-478) fails and the valve fails shut. The "A" S/G loses level and reaches the low-low level which should trip the reactor. However, the reactor does not trip and the operator must push the manual scram button which does trip the control rods. An Alert should be declared due to the Anticipated Trip Without SCRAM (ATWS).

The transient caused by the ATWS event causes some fuel failure and the resulting rise in radioactivity in the RCS is detected by Chemistry samples. I-131 levels are approximately 340 $\mu\text{Ci/ml}$.

At 1925 hours, the Auxiliary Operator hears a loud noise on the "A" SW Booster Pump. The OSC should respond with mechanics being sent to the pump.

At about 2030 hours, play will be suspended. On the next day, following a short time (~30 min.) to settle players back into their roles, the play will resume at 0900 hours.

At about 0905 hours, a RTD thermowell on "A" hot leg fails, causing alarms on the Loose Parts Monitoring System (LPMS). The leakage of RCS to the CV is approximately 20 gpm. At 0920, a tube leak on "A" S/G occurs. The S/G tube leak is approximately 300 gpm which causes the level in the faulted S/G to rise. The operator should manually accuate SI and a Site Emergency should be declared due

to the S/G tube rupture. Later, at approximately 1030 hours, a main steam power operated relief valve (PORV) lifts, sticks open and releases radioactivity to the environment. A General Emergency should be declared due to the release of radioactivity to the environment. The OST should respond by sending a team to shut the valve. Efforts to manually shut the PORV are successful after approximately one hour.

During the evacuation of the site, three people will be missing. After the GE has been declared, someone in the TSC will become ill due to diabetic shock at about 1140.

Plant Operations will stabilize the Plant by use of the EOPs. Recovery efforts will focus on maintaining and isolating the faulted S/G. Dose assessments should be made and use of KI tables considered.

The exercise will terminate at about 1230 hours.