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

DEC 20 1990

Report No.: 50-395/90-28

Licensee: South Carolina Electric & Gas Company
Columbia, SC 29218

Docket No.: 50-395 License No.: NPF-12

Facility Name: V. C. Summer

Inspection Conducted: November 5-8, 1990

Inspector: W. M. Sartor 12/20/90
W. M. Sartor Date Signed

Accompanying Personnel: W. Rankin
G. Salyers
F. Victor

Approved by: for Douglas M. Collins 12-20-90
W. H. Rankin, Chief Date Signed
Emergency Preparedness Section
Radiological Protection and Emergency
Preparedness Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, announced inspection was the observation and evaluation of the annual radiation emergency exercise. Team observers evaluated the licensee's response and performance in the Simulator Control Room, Technical Support Center (TSC), Operational Support Center (OSC), Emergency Operations Facility (EOF), and News Media Center. This was a partial participation exercise which progressed to a General Emergency. The exercise began at 5:30 a.m., and terminated at 11:05 a.m.

Results:

The licensee was successful in meeting the exercise objectives. Exercise strengths included the use of the Simulator Control Room and the Emergency Director setting realistic goals and priorities for the TSC staff. One exercise weakness was identified for delayed accountability and evacuation due to lack of procedural adherence (Paragraph 10). One follow-up item addressed the requirement for fifteen minute followup notifications which interfered with

the Interim Emergency Director's ability to monitor plant conditions (Paragraph 6).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*W. Baehr, Manager, Chemistry and Health Physics
*K. Beale, Supervisor, Emergency Services
*R. Bender, Training Instructor
*C. Bowman, Manager, Maintenance Services
*M. Browne, Manager, Systems Engineering
*B. Christiansen, Manager, Technical Services
*M. Counts, Emergency Services Coordinator
*R. Cox, Supervisor, Mechanical Support
*H. Donnelly, Senior Engineer, Nuclear Licensing
*G. Gibson, Manager, Nuclear Protection Services
*W. Higgins, Supervisor, Regulatory Compliance
*A. Koon, Acting General Manager Nuclear Safety
*D. Moore, General Manager, Station Support
*C. Price, Manager, Technical Oversite
*M. Quinton, General Manager, Engineering Services
*J. Skolds, Vice President, Nuclear Operations
*G. Taylor, Acting General Manager, Nuclear Plant Operations
*R. Waselas, Acting Manager, Design Engineering
*B. Williams, Manager, Planning

Other licensee employees contacted during this inspection included technicians, security, and office personnel.

Nuclear Regulatory Commission

*M. Williams, General Manager, Administration and Support Services
*F. Zonder, Manager, Nuclear Technical Training

NRC Resident Inspector

R. Haag

*Attended exit interview

2. Exercise Scenario (82302)

The scenario for the emergency exercise was reviewed to determine that provisions had been made to test an integrated emergency response capability as well as 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 developed for this exercise was reviewed in advance of the schedule exercise date and was determined to be adequate for the scope and objectives of this partial participation exercise. During the exercise, several minor inconsistencies in scenario data became apparent; however, the inconsistencies did not detract from the overall performance of the licensee's emergency organization. Examples of the inconsistencies included discrepancies in the radiological area monitoring readings and the failure of the scenario developers to predict the emergency classifications declared by the shift supervisor. The negative impact of the latter inconsistency was the prompt for the Alert classification by the lead exercise controller which negated the opportunity for the Interim Emergency Director (IED) to classify the event. Because the IED demonstrated an awareness of the Emergency Action Levels (EALs) and the requirement to implement the Emergency Plan and Procedures with the Notification of Unusual Event (NOUE) and the Site Area Emergency (SAE) declarations, the inability to classify the Alert due to the controller prompt was not identified as a finding.

No violations or deviations were identified.

3. Onsite Emergency Organization (82301)

The licensee's onsite emergency organization was observed to assure that the following requirements were implemented pursuant to 10 CFR 50.47(b)(2), Paragraph IV.A of Appendix E to 10 CFR 50, and specific guidance promulgated in Section II.B of NUREG-0654: (1) unambiguous definition of responsibilities for emergency response; (2) provision of adequate staffing to assure initial facility accident response in key functional areas at all times; and (3) specification of onsite and offsite support organization interactions.

The inspector observed that the licensee's on-shift organization for the drill responded to the simulated abnormal conditions that initiated the exercise. The shift supervisor promptly assumed the responsibilities as the Interim Emergency Director (IED). The responsibilities for emergency response were unambiguously defined; however, portions of the response as observed differed from the Emergency Plan. For example, Paragraph 5.2.2 of EP-100, Radiation Emergency Plan, stated that the Emergency Director (ED) in the TSC would assume responsibilities which included classifying the emergency and providing protective action recommendation (PAR).

Following the activation of the EOF, an inspector observed that it was the Offsite Emergency Coordinator (OEC) in the EOF that classified the General Emergency and provided the PAR with the ED monitoring these events. This observation did not impact the timeliness of the classification or PAR.

The inspector observed that adequate staffing was available to assure timely activation of the OSC, TSC, and the EOF. Onsite and offsite support organization interaction was demonstrated with the annual medical drill. The drill encompassed the ability of the OSC personnel and the

Fairfield Emergency Medical Services personnel to effectively render aid to a contaminated injured person.

No violations or deviations were identified.

4. Emergency Response Support and Resources (82301)

This area was observed to determined that arrangements for requesting and effectively using assistance resources have been made, that arrangements to accommodate State and local staff at the licensee's near-site EOF had been made, and that other organizations capable of augmenting the planned response have been identified as required by 10 CFR 50.47(b)(3), 10 CFR 50, Appendix E, Paragraph IV.A, and specific criteria in NUREG-0654, Section II.C.

Section 5.0, "Organizational Control of Emergency," of the Radiation Emergency Plan discussed assistance resources and responsibilities for an emergency situation. Space had been provided in the EOF for representatives from Federal, State, and local governments.

No violations or deviations were identified.

5. Emergency Classification System (82301)

This area was observed to assure that a standard emergency classification and action level scheme was in use by the nuclear facility licensee pursuant to 10 CFR 50.47(b)(4), Paragraph IV.C of Appendix E to 10 CFR 50, specific guidance promulgated in Section II.D of NUREG-0654, and guidance recommended in NRC Information Notice (IN) 83-28.

The licensee's emergency classification system was described in Section 4.0 of the Emergency Plan. EAL tables with initiating conditions and detection methods provided for emergency classifications. The tables were used effectively by the emergency response organization to classify the simulated events with the exception of the prompted Alert classification which was discussed in Paragraph 2.

No violations or deviations were identified.

6. Notification Methods and Procedures (82301)

This area was observed to determine that procedures had been established for notification by the licensee of State and local response organizations and emergency personnel, and that the content of initial and follow-up messages to response organizations had been established and means to provide early notification to the populace within the plume exposure pathway had been established as required by 10 CFR 50.47(b)(5), 10 CFR 50, Appendix E, Paragraph IV.D, and specific criteria in NUREG-0654, Section II.E.

The Emergency Plan Procedure EPP-002, Communication and Notification, contained the initial notification forms and the Event Notification Worksheet used to make offsite and NRC notifications respectively. Contained in the procedure was the requirement to make follow-up notifications to the offsite government agencies every 15 minutes. An inspector noted in the Simulator Control Room that the IED was so involved in the drafting of a follow-up message every fifteen minutes that it significantly degraded his effectiveness in controlling plant conditions and his awareness of plant conditions. As an example, the IED was not aware that the Digital Metal Impact Monitoring System (DMIMS) had alarmed at 0630 since the IED was involved with off-site communications. The inability of the IED to maintain awareness of changing plant conditions because of the involvement in making follow-up notifications at fifteen minute intervals will be tracked as an Inspector Follow-up Item (IFI) (50-395/90-28-01).

The prompt notification system for alerting the public within the plume exposure pathway was in place and operational. The system consisted of the Early Warning Siren System and the Voice Command Radios located at the schools within the 10-mile Emergency Planning Zone (EPZ).

No violations or deviations were identified.

7. Emergency Communications (82301)

This area was observed to verify that provisions existed for prompt communications among principal response organizations 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.

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, communications of information occurred in an adequate manner. Some minor equipment problems were noted with the OSC radios and a facsimile machine failure in the EOF.

No violations or deviations were identified.

8. Public Education and Information (82301)

This area was observed to determine that information concerning the simulated emergency was made available for dissemination to the public as required by 10 CFR 50.47(b)(7), 10 CFR 50, Appendix E, Paragraph IV.D and specific criteria in NUREG-0654, Section II.G.

Information was provided to the media and the public in advance of the exercise. The information included details on how the public would be notified and what initial actions they should take in an emergency. A News Media Center was established in the Nuclear Training Center.

Periodic news conferences were provided by a company spokesperson. A rumor control program was also in place at the Nuclear Training Center.

No violations or deviations were identified.

9. Emergency Facilities and Equipment (82301)

This area was observed to determine that adequate emergency facilities and equipment to support an emergency response were provided and maintained as required by 10 CFR 50.47(b)(8), 10 CFR 50, Appendix E, Paragraph IV.E and specific criteria in NUREG-0654, Section II.H.

The inspector observed the activation and staffing of key emergency response facilities and evaluated equipment used by the emergency responders during the exercise.

a. Simulator Control Room - An inspector observed that the Simulator Control Room personnel acted promptly to initiate emergency response to the simulated emergency. Emergency procedures were readily available.

b. Technical Support Center - The TSC was located adjacent to the Control Room Plant. Drawings and supporting information were readily available to the TSC emergency responders.

c. Operational Support Center - The OSC was located at the 448' elevation of the Control Building. It provided an area for the OSC responders to muster for subsequent assignment to duties in support of the emergency operations.

d. Emergency Operations Facility - The EOF was located in the basement of the Nuclear Training Center. The licensee did not identify any activation or equipment problems in the EOF with the exception of the facsimile machine mentioned in Paragraph 7.

No violations or deviations were identified.

10. 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.

An inspector verified the licensee had and used emergency procedures for formulating protective action recommendations for offsite populations within the 10-mile EPZ. The initial recommended protective actions were for the sheltering of zones A-0, E-1, and F-1. An inspector noted that

Section 2 of the form, "Recommendation For Activation of the EWSS" was not completed; however, the simulated siren activation occurred as scheduled.

The protective actions for onsite personnel included protected area evacuation of non-essential personnel which was directed by Paragraph 5.2.1 of EPP-001.3, Site Area Emergency. An inspector noted that the evacuation was not announced until 13 minutes after the SAE declaration, which is contrary to the procedure which required this to be an immediate action following the announcement of the emergency condition over the plant paging system. This resulted in delayed personnel evacuation and accountability and was identified as an exercise weakness.

Exercise Weakness (EW) 50-395/90-29-02: The ED failed to follow procedural steps for the SAE resulting in delayed personnel accountability and evacuation of non-essential personnel.

No violations or deviations were identified.

11. Exercise Critique (82301)

The licensee's critique of the emergency exercise was observed to determine that deficiencies identified as a result of the exercise and weaknesses noted in the licensee's emergency response organization were formally presented to licensee management for corrective actions as required by 10 CFR50.47(b)(14), 10 CFR 50, Appendix E, Paragraph IV.E and specific criteria in NUREG-0654, Section II.N.

The licensee's drill controllers conducted emergency response facility critiques with the players following the exercise termination. The next day a formal critique was provided to licensee management. The critique identified strengths as well as areas requiring improvement. The most significant weakness identified by the licensee's critique appeared to be the poor first aid response. The medical drill was not observed by the NRC team.

No violations or deviations were identified.

12. Action on Previous Inspection Findings (92701)

(Closed) EW 50-395/89-10-02: Excessive delay in provision of offsite dose assessment/projection data to the offsite emergency coordinator following the initial release of radioactive materials to the environment. An inspector observed that the offsite emergency coordinator was promptly informed of offsite dose assessment/projection data during the exercise.

13. Exit Interview

The inspection scope and results were summarized on November 8, 1990, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed

below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

Item Number	Description/Reference
50-395/90-28-01	IFI - IED was unable to maintain awareness of plant status because of requirement for 15-minute follow-up notifications (Paragraph 6).
50-395/90-28-02	EW - Delayed accountability/evacuation of personnel because ED failed to follow implementing procedure (Paragraph 10).

Attachment:
Scope and Objectives and Narrative Summary

VIRGIL C. SUMMER NUCLEAR STATION
SCOPE AND OBJECTIVES

On November 7, 1990, South Carolina Electric & Gas Company (SCE&G) will conduct a Radiological Emergency Exercise at the Virgil C. Summer Nuclear Station (VCSNS). The purpose of this exercise is to test the integrated capability and a major portion of the basic elements existing within emergency plans and organizations. The simulated emergency will require mobilization and response of on-site and off-site SCE&G personnel to validate response capability in emergency conditions.

The exercise will not require the mobilization of state and local government emergency personnel. Conditions resulting in major off-site releases will not be included.

Specific elements of the VCSNS Radiation Emergency Plan to be exercised include:

- Accident assessment and classification
- Managerial Direction and Control
- Technical Support Center operations
- Operations Support Center operations
- Emergency Operations Facility operations
- News Media Center operations
- Site evacuation, personnel accountability and access control
- Medical assistance to a contaminated, injured individual
- Public alerting and notification procedures (simulated activation of the siren system)

The specific objectives of the Radiological Emergency Exercise for SCE&G personnel are to:

1. Test the ability of operations personnel to effectively assess and respond to an abnormal operating condition which could produce an off-site radioactive release.

2. Test the abilities of health physics and environmental monitoring personnel, operating under emergency conditions, to monitor and assess radiological dose rates; to determine specific contamination levels, airborne and/or surface deposited concentrations; and, to assess specific indications (including their rates to change) that may be used for initiating emergency measures. This constitutes one of the semiannual Health Physics Drills and the annual Radiation Monitoring Drill.

3. Test the VCSNS site warning and evacuation procedures with regards to effectiveness and operability.

4. Test the VCSNS emergency communications systems for effective intercommunication with federal, state and local governments and field monitoring teams. This constitutes the Annual Communications Drill.

5. Test the operations of the Technical Support Center and the ability of staffing personnel to respond to an emergency condition.

6. Test the ability of the Operations Support Center to effectively dispatch and track the progress of Emergency Repair Teams and to report team status and results.

7. Test the ability of Operations Support Center personnel to efficiently and effectively repair damaged equipment under emergency conditions.

8. Test the ability of Operations Support Center personnel and Fairfield Emergency Medical Services personnel to effectively render aid to a contaminated injured person. This constitutes the annual Medical Drill. (The agreement hospital, Richland Memorial Hospital, is participating in a MS-1 FEMA drill.)

9. Test the adequacy of command and control efforts of the First Aid Team Leader (previously identified drill weakness).

10. Ensure that emergency response personnel are familiar with their duties and responsibilities.

11. Test the adequacy and operability of emergency equipment and to identify any deficiencies in the quantity or quality of equipment.

12. Identify any deficiencies in personnel training.

13. Test the operations of the Emergency Operations Facility with respect to physical facilities, communications, emergency equipment, operations and assistance provided to the Station.

14. Test the ability of Emergency Operations Facility personnel to perform timely and accurate dose assessments (previously identified deficiency).

15. Test the operation of the News Media Center and the ability of staffing personnel to respond to an emergency condition with respect to public information and news media interface.

16. Utilize the training simulator in the exercise with real time Station operating information to provide more realism to the simulated emergency condition.

NARRATIVE SUMMARY

This exercise will begin with events that should be declared as an Alert condition. Plant conditions will degenerate to a point where a General Emergency should be declared. A precautionary Site Area Emergency could be declared but the scenario does not require this.

Before the exercise begins, source range monitors N31 and N35 will indicate failed. I&C will be dispatched to troubleshoot and repair the instruments. N33 is tagged out with detector problems.

The exercise will begin with alarms on the Main Control Board indicating loss of control of numerous valves. The Fire Indication Panel in the Control Room will alarm and indicate a smoke alarm for the 463' West Penetration Area. The Fire Brigade should be dispatched.

When the Fire Brigade Leader responds to the 463' West Penetration Area, he will discover severe electrical arcing in Penetration 705 resulting in a small fire and moderate smoke. The Shift Supervisor should declare an Alert based on a fire affecting more than one safety system. The radio-pager system will be activated to call in emergency response personnel.

The arcing in the penetration will cause operational problems such as isolation of letdown, charging, certain sample valves, PORV's, etc. The Control Room should begin a controlled shutdown of the plant and begin evaluating the impact of inoperable equipment.

At T=60, the Digital Metal Impact Monitoring System will alarm for the lower reactor vessel. Fuel damage will occur but will not be observable at this time because CVCS letdown is isolated.

At T=90, the number 1 seal on RCP "A" fails causing reliance on #2 seal to hold while the plant is cooling down. A precautionary Site Area Emergency could be declared at this time because of the potential for a release if the remaining RCP "A" seals fail.

At T=130, the number 2 seal fails and at T=140, the RCP "A" seal housing will rupture resulting in a 600 gpm LOCA. Personnel will be unable to tell the actual source of the leaks.

A General Emergency should be declared based on loss of fission product barriers. The siren system will be activated (simulated). Dose assessments will be performed using effluent monitor readings and sample data from Environmental Monitoring Teams in the field.

The path of the radioactive release will be through Penetration 705. This will cause increased radiological controls to be implemented for the Repair Team. The release will go to the West Penetration Area and then out the Main Plant Vent. This is a monitored, unfiltered release path.

At T=240, a medical emergency will occur. A Chemistry Specialist is sampling the Reactor Coolant System in the Sample Room. After drawing the sample, he drops the sample bottle. Attempting to catch the sample bottle, he strikes

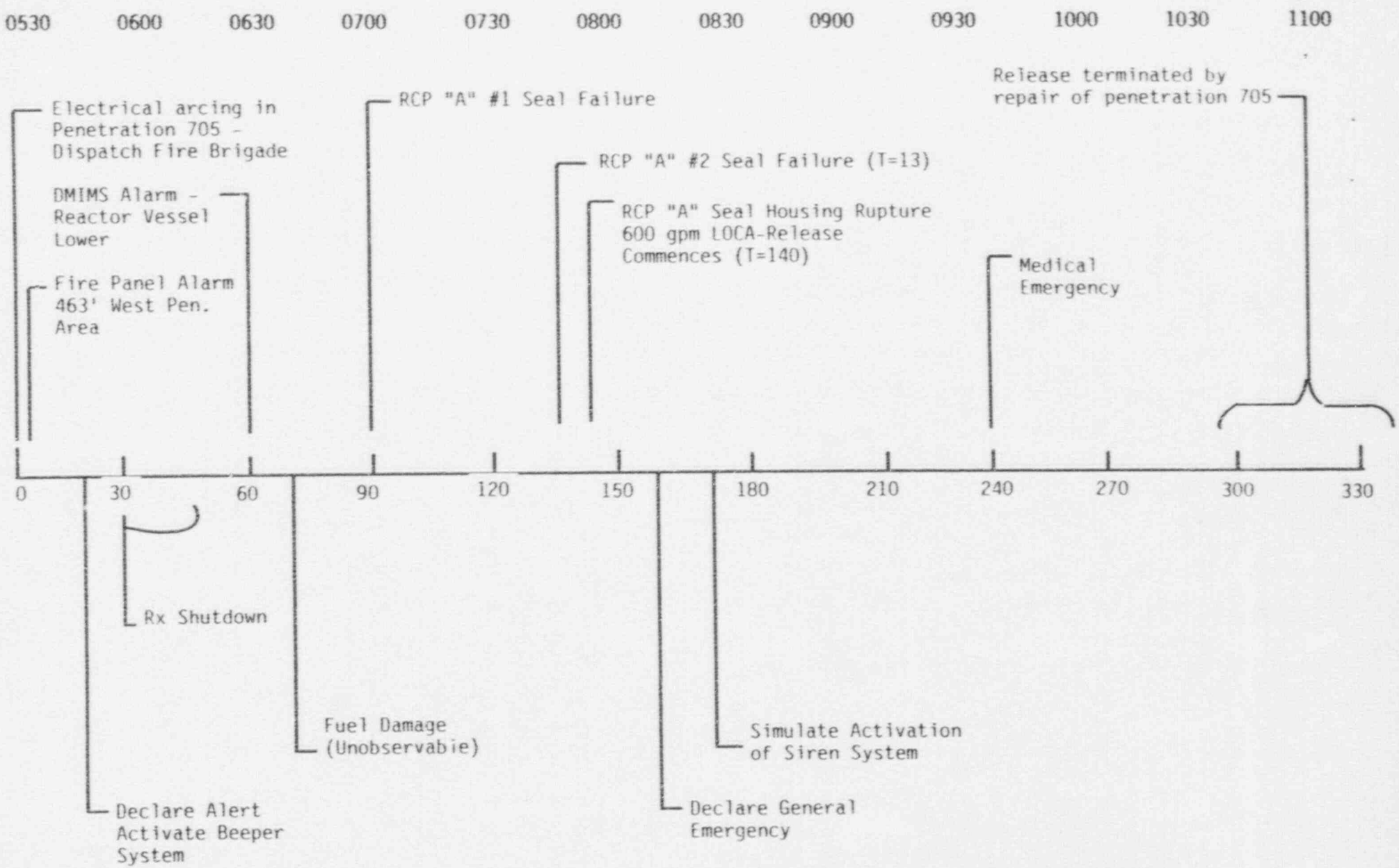
his head against a sharp corner. The sample is spilled on the floor. The Chemistry Specialist suffers a gash in his forehead and a slight concussion and is contaminated by the RCS sample. The First Aid Team is dispatched to administer to the victim. Fairfield Emergency Medical Services will be requested to assist. Transport to Richland Memorial Hospital will be simulated.

The leak in Penetration 705 will be stopped at about T=300. The short-term recovery plans will be formulated.

CHRONOLOGICAL LISTING OF MAJOR EVENTS

0530	T=0	Electrical arcing, smoke, and flames in penetration 705 (XRP 0028). Dispatch Fire brigade. Alarm for West Penetration Area on Fire Panel in Control Room. Multiple alarms on Main Control Board indicating isolated valves, inoperable equipment, etc.
*0550	T=20	Alert declared. Beeper system activated to call in onsite emergency response organization. Notification process initiated (EPP-002).
*0600	T=30	Reactor shutdown
0630	T=60	DMIMS alarm for lower reactor vessel. Fuel damage occurs but is unobservable at this time.
0700	T=90	RCP "A" number 1 seal failure. (there is a possibility of a Site Area Emergency being declared as a precautionary measure.)
0740	T=130	RCP "A" number 2 seal failure
0750	T=140	RCP "A" seal housing rupture. Commence 600 gpm LOCA. Release through main plant vent (monitored and unfiltered).
*0810	T=160	General Emergency declared. Offsite emergency organization activated if not done previously.
*0820	T=190	Simulate activation of siren system
*0930	T=240	Medical emergency. Chemistry Technician injured and contaminated in Sample Room. Dispatch First Aid Team.
*0940	T=250	Request Fairfield EMS to respond
*0950	T=260	Fairfield EMS arrives. Simulate transport to hospital.
*1030	T=300	Release terminated by repair/blocking of penetration 705. Commence short-term recovery planning.
*1100	T=330	Terminate exercise.

* Approximate times


0530
0600
0630
0700
0730
0800
0830
0900
0930
1000
1030
1100
Electrical arcing in Penetration 705 - Dispatch Fire Brigade
DMIMS Alarm - Reactor Vessel Lower
Fire Panel Alarm 463' West Pen. Area
RCP "A" #1 Seal Failure
RCP "A" #2 Seal Failure (T=13)
RCP "A" Seal Housing Rupture 600 gpm LOCA-Release Commences (T=140)
Medical Emergency
Release terminated by repair of penetration 705
0
30
60
90
120
150
180
210
240
270
300
330
Rx Shutdown
Declare Alert Activate Beeper System
Fuel Damage (Unobservabie)
Declare General Emergency
Simulate Activation of Siren System

RELEASE INFORMATION

I. Meteorological Conditions

A.	Wind Speed	4 MPH
B.	Wind Direction	85°
C.	Stability Class	F

II. Release

A.	Exhaust Point	Main Plant Vent
B.	Exhaust Rate	6E4 CFM
C.	Curie Content	1.5E-2 μCi/cc
D.	Filtered	No
E.	Monitored (List)	RM-A3

III. RCS Leakage

A.	Origin	RCP "A" Seal Housing
B.	Leakage Rate	600 GPM
C.	Curie Content	250 μCi/cc

IV. Maximum Dose Rates in Environment (NG or I_2) NG

At 1 mile	8.4	m Rem/Hr at T=	310
At 2 mile	3.3	m Rem/Hr at T=	310
At 5 mile	0.8	m Rem/Hr at T=	310
At 10 mile	0.08	m Rem/Hr at T=	310