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

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Report Nos.: 50-327/92-20 and 50-328/92-20

Licensee: Tennessee Valley Authority
6N38 A Lookout Place
Chattanooga, TN 37402-2801

Docket Nos.: 50-327 and 50-328 License Nos.: DPR-77 and DPR-79

Facility Name: Sequoyah 1 and 2

Inspection Conducted: June 22-26, 1992

Inspector: _____ 8/7/92
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Radiological Protection and Emergency
Preparedness Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, announced inspection involved the observation and evaluation of the annual emergency preparedness exercise. This full participation exercise was conducted on June 24 and 25, between the hours of 8:00 a.m. and 4:00 p.m. Emergency organization activation and response were selectively observed in the licensee's Emergency Response Facilities including: the Simulator Control Room; Technical Support Center; Operational Support Center; Joint Information Center and Central Emergency Control Center. The inspection also included a review of the exercise scenario and observation of the licensee's post exercise critique.

Results:

In the areas inspecte , one non-cited violation was identified concerning document control of emergency preparedness procedures. Exercise strengths included leadership and command in the Technical Support Cent r and Simulator Control Room, critique process, and aggressive play. Participating employees were innovative, exhibited good attitude, and worked well as a team. Player attitudes were excellent. Overall the licensee's performance during the exercise was good, with the licensee meeting most of their exercise objectives and demonstrating a capability to protect the public health and safety in the event of a radiological emergency.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*T. Adkins, Emergency Preparedness (EP) Program Manager (Corporate)
*W. Brooks, Site Quality Assurance (QA) Evaluator
*N. Catron, Site Program Manager
*M. Cooper, Compliance Licensing Manager
*J. Dodson, Communications
*J. Flanigan, Corporate Radcon
F. Flyn, Technical Support Center (TSC) Technical/Operations Controller
*J. Ford, EP Project Engineer (Corporate)
*M. Frye, Operations Support Center (OSC) Manager
*S. Johnson, QA
W. Karsner, Lead Controller
*K. King, Jr., EP Project Engineer (Corporate), Radiological Chemistry Controller
*R. Kitts, EP Programs Manager (Corporate)
*M. Lorck, Operations Superintendent
*S. Luck, Clerk
*B. Marks, EP Programs Manager (Corporate)
*R. Newman, EP (Corporate), Exercise Coordinator
W. Peggran, TSC Evaluator
J. Proffitt, Compliance Licensing
*R. Thompson, Compliance Licensing Manager
*W. Vanosdale, Maintenance Project Manager
P. Wallace, Site Support
N. Welsh, Shift Operation Supervisor
C. Whittemore, Licensing Engineer
*H. Williamson, Watts Barr EP Manager
*J. Wilson, Sequoyah Site Vice President

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

Nuclear Regulatory Commission

*W. Holland, Senior Resident Inspector
*S. Shaffer, Resident Inspector

*Attended exit interview

2. Exercise Scenario (82302)

The scenario for the emergency exercise was reviewed to determine that provisions had been made to test the integrated response capability and a major portion of the basic elements existing within the licensee's Emergency Plan

and organization as required by 10 CFR 50.47(b)(14), 10 CFR 50, Appendix E, Paragraph IV.F, and specific criteria in NUREG-0654, Section II.N. The scenario was reviewed in advance of the scheduled exercise date and was discussed with licensee representatives. The scenario was adequate to exercise the onsite and offsite emergency organizations of the licensee and provided sufficient emergency information to the State for their participation in the exercise. The scenario fully utilized the staff in resolving emergency problems until the exercise was terminated.

The players experienced some information problems that were caused by the administration and management of the scenario. The inspector noted that the licensee needed more controllers at key locations. For example, controllers were not made available to accompany the Auxiliary Operator (AO) on his rounds of the site. The AO was performing the AOI-8, "Tornado Damage Assessment" procedure. Thus, several pieces of plant status information were not able to be reported at the proper time by the AO. The inspectors observed critique activities conducted by the licensee's OSC controllers and evaluators the day after the exercise. The licensee and the inspectors concluded that all of the OSC exercise objectives were met. However, the inspector also noted that several of the scenarios were not implemented as planned due to a lack of adequate coordination between the controllers and the players in providing timely information to assure that all available information was quickly understood and communicated to the TSC. The inspectors concluded that additional controllers stationed at critical locations, such as the Essential Raw Coolant Water (ERCW) pump house and the turbine building, could have provided more timely critical information to players during the fast breaking drill scenario.

No violations or deviations were identified.

3. Assignment of Responsibility (82301)

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

The inspector observed that the onsite and offsite emergency organizations were adequately described and the responsibilities for key organization positions were clearly defined in approved plans and implementing procedures.

No violations or deviations were identified.

4. Onsite Emergency Organization (82301)

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

The inspector observed that the initial onsite emergency organization was adequately defined; the responsibility and authority for directing actions necessary to respond to the emergency were clear; that staff were available to fill key functional positions within the organization; and that onsite and offsite interactions and responsibilities were clearly defined.

The licensee adequately demonstrated the ability to alert, notify, and mobilize Tennessee Valley Authority (TVA) response personnel. Augmentation of the initial onsite emergency response organizations was accomplished through mobilization of additional day-shift personnel. Following the Alert declaration, the on-shift emergency organization was augmented with the activations of the Emergency Response Facilities (ERFs). The inspector observed the activation, staffing, and operation of the emergency organizations in the Simulator Control Room (SCR), TSC, OSC, Joint Information Center (JIC), and the Central Emergency Control Center (CECC). The inspector determined that the licensee was able to staff and activate the facilities in a timely manner. Because of the scenario scope and conditions, long term or continuous staffing of the emergency response organization was not required.

No violations or deviations were identified.

5. Emergency Classification System (82301)

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

Emergency Plan Implementing Procedure (EPIP) SQN-EPIP-1, "Emergency Plan Classification Flow Chart," Revision (Rev.) 6, dated January 4, 1991, was used to promptly identify and properly classify the scenario simulated events. The licensee utilized the procedure to make the following emergency classifications.

- The Notification Of Unusual Event (NOUE) was declared at about 8:33 a.m., due to loss of starting capability for all diesel generators (DGs). (Initiating Condition SU-3, "Loss of all offsite or onsite AC power capability to any unit, both unit-related DGs inoperable simultaneously when not in cold shutdown")

- The Alert was declared at about 9:16 a.m., due to a tornado striking a structure within the site area. (Initiating Condition HA-9, "Tornado striking any structure within the site area")

- The Site Area Emergency was declared at about 11:02 a.m. due to a ruptured Waste Gas Decay Tank (WGDT). (Initiating Condition HS-13, "WGDT ruptured")

- A General Emergency was declared at about 12:40 a.m. when the Site Emergency Director (SED) determined that conditions were met for initiating condition FG-2 and SG-2. The SED believed that he had lost Emergency Core Cooling System (ECCS), the containment would fail within two hours and that there was significant failed fuel. (Initiating Condition FG-2, "ECCS failure, pumps unable to deliver water and both: 1. Containment failure within 2 hours, and 2. Significant failed fuel") Additionally, the SED knew that there had been no makeup to the steam generators for more than 30 minutes and the steam generator levels were decreasing (Initiating Condition SG-2, "Main feedwater, condensate and auxiliary feedwater failure consider 1. No makeup to steam generators for greater than 30 minutes, 2. All steam generator wide range levels decreasing toward zero")

Generally, the emergency classifications were made in a timely manner. However, in one case, the Site Area Emergency classification could have been more timely and conservative.

At 10:15 a.m. the WGDT began losing pressure. An assistant to the SED pointed out that a Site Area Emergency classification was appropriate for a ruptured WGDT. Initiating condition HS-13, as stated in the Radiological Emergency Plan (REP), was "waste gas decay tank ruptured." In accordance with the scenario the release was through a WGDT relief valve that had lifted and failed to reseat. The licensee knew the uncontrolled release rate was low and the radioactivity at the site boundary was also low and estimated to present a radiation dose of less than one millirem at the site boundary. The SED decided that the Initiating Condition HS-13 had not been met, even though the release of radioactive gases was not isolable, since the

tank was not ruptured. The SED also knew that the uncontrolled release was not sufficient to upgrade to a Site Area Emergency. The licensee's controllers had a contingency message scheduled for delivery at 10:30 a.m. to prompt the SED to declare a Site Area Emergency based on HS 13. The controllers eventually delivered the message and a Site Area Emergency was issued based on HS-13.

A reactor trip and complete loss of off-site power occurred at 10:30 a.m. due to effects of a tornado that had touched down on-site at about 09:00 a.m. Damage assessments were in progress, but incomplete, thus the full extent of the tornado damage was unknown. Degraded auxiliary feedwater conditions accompanied the 10:30 a.m. event and a loss of the second motor-driven feedwater pump occurred at 10:55 a.m.; with a swap-over of the turbine-driven auxiliary feedwater pump to ERCW because both condensate storage tanks were empty. The SED and TSC staff conducted a review of the Initiating Conditions for possible upgrade to Site Area Emergency just before the Site Area Emergency WGDT contingency message was issued. The licensee considered the following applicable Initiating Conditions for classification upgrade:

- Initiating Condition SS2. 1, "In mode 1, 2, or 3 loss of secondary heat sink, feedwater and steam release path, when only method of reactor coolant system heat removal," and

- Initiating Condition SS3, "Loss of all offsite and all onsite AC power supply to any unit for more than 15 minutes."

The SED concluded the upgrade to a Site Area Emergency classification was not required because:

- The secondary heat sink had not been lost when it was the only method of RCS heat removal. (Initiating Condition SS2.1), and

- All on-site and off-site power had not been lost for 15 minutes or more. (Initiating Condition SS3).

In each of the cases cited above, the licensee decided that the initiating condition had not been met and remained at a lower classification level. The licensee's staff in the SCR and the TSC consumed excessive amounts of time in studying and analyzing the language of the Initiating Conditions in the EPIPs. Whether or not the WGDT had ruptured was the subject of an extended discussion, as was whether Initiating Condition HA-4, "Missile impact within the site area" or HA-9 was the proper basis for the Alert classification.

The inspector reported to licensee representatives that the Emergency Action Levels were meant to be simple, direct, measurable or observable indicators of reactor problems and when multiple degraded plant conditions exist, the full extent of which were unknown, the prudent course is to be conservative in classifying events.

No violations or deviations were identified.

6. Notification Methods and Procedures (82301)

This area was observed to assure that procedures were established for notification of State and local response organizations and emergency personnel by the licensee, and that the content of initial and follow up messages to response organizations was established. This area was further observed to assure that 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 50, and specific guidance promulgated in Section II.E of NUREG-0654.

The inspector determined that the licensee's method for notifying the state for the Site Area Emergency or the General Emergency, as demonstrated in the emergency preparedness exercise were not procedurally controlled.

The inspector reviewed the following licensee documents:

- SQN-EPIP-1, Emergency Plan Classification Flow Chart, Rev. 6;
- SQN-EPIP-2, Notification of Unusual Event, Rev. 6
- SQN-EPIP-3, ALERT, Rev. 6
- SQN-EPIP-4, Site Area Emergency, Rev. 6
- SQN-EPIP-5, General Emergency, Rev. 6
- Central Emergency Control Center (CECC)-EPIP-1 Alert, Site Area Emergency, and General Emergency, Rev. 11
- CECC-EPIP-2, Operations Duty Specialist Procedure for Notification of Unusual Event, Rev. 10
- CECC-EPIP-3, Operations Duty Specialist Procedure for Alert, Rev. 11
- CECC-EPIP-4, Operations Duty Specialist Procedure for Site Area Emergency, Rev. 12

CECC-EPIP-5, Operations Duty Specialist Procedure for General Emergency, Rev. 11

The Sequoyah Shift Operations Supervisor (SOS), or the SED, utilized EPIP-1 to classify the emergency for a particular set of circumstances. The SOS was responsible for declaring the emergency and providing the initial activation of the REP through the appropriate classification procedure SQN-EPIP-2, SQN-EPIP-3, SQN-EPIP-4, or SQN-EPIP-5. As described in the licensee's REP, the SOS or SED initiated the appropriate procedures based upon the classification of the emergency referenced by the site EPIP-1. Each of the referenced procedures, SQN-EPIPs 2 through 5, gave specific instructions for notifying the Operations Duty Specialist (ODS) and NRC.

Procedure Steps 3.1.B. of SQN-EPIP 2 and 3.1.G. of SQN-EPIPs 3, 4, and 5; require the SOS complete Attachment 1 and notify the ODS within about five minutes after declaration of the event. The procedures also required the forms be faxed to the ODS.

The ODS position was staffed seven days a week, 24 hours a day and was located in Chattanooga, Tennessee. The ODS was responsible for making initial notifications to the appropriate State emergency organization. The ODS was also required to notify local response agencies if the initiation of the event was classified as a General Emergency.

Upon receiving a call from the Sequoyah SED the ODS was required to complete Appendix B, Sequoyah Nuclear Plant Operations Duty Specialist Incident Form (ODSIF), of CECC-EPIP-2, 3, 4, or 5, and notify the State. Upon receiving a telecopy of the SOS event form, the ODS verified that the information recorded on the ODSIF was correct, telecopied the ODSIF to the affected State, and verified that the telecopy to the State had been received. The ODS was required to notify and relay the information to the State within 15 minutes of declaration of the event.

The licensee followed the procedures during the declaration of the NOUE and the Alert. However, the licensee did not follow the above procedures for the Site Area Emergency or the General Emergency.

The CECC was activated and declared operational at 09:50 a.m. During the remainder of the exercise, the State was notified of the Site Area Emergency and the General Emergency classification changes by the CECC Director.

The inspector determined that during the Site Area Emergency and General Emergency, the SED in the Technical Support

Center did not complete and forward a copy of the:

- Site Area Emergency ODS Information/Notification Form to the ODS as required by SQN EPIP-4, or

- General Emergency ODS Information/Notification Form to the ODS as required by SQN EPIP-5.

As a result, the ODS did not complete the appropriate Operation Duty Specialist Incident Form and send a copy of the form to the State as required, by CECC EPIP-4, CECC EPIP-5, and Section 5 of the REP.

The licensee's State communicator in the CECC did provide the State initial notifications of the Site Area Emergency and the General Emergency with "Information Periodically Supplied to the State" forms which contained the necessary information required by State authorities to perform their duties.

The inspector identified the following problems with the licensee's state notification process during the emergency exercise:

- SQN-EPIP-2, 3, 4, and 5 procedures do not adequately describe the State notification process when the CECC is activated. The procedures require the completion of the Operations Duty Specialist Information/Notification Forms following the declaration of each emergency classification. However, the forms include a statement on the top of the form "Not required if the TSC and CECC Emergency Centers are staffed." The procedures also do not discuss an exemption or alternate method to notify the State of emergency classification declarations.

- The Operator Duty Specialist Information/Notification Forms did not have a time entry for form completion time and time form was faxed to ODS.

- The SQN EPIP procedures 2, 3, 4, and 5 require the Site Emergency Director to notify the ODS within five minutes of the classification declaration. For the two completed during the exercise it took the SED 8 and 12 minutes to notify the ODS of the NOUE and the Alert classifications respectfully. The ODS was able to notify the State within five minutes and the total notification lines for the NOUE and Alert classification were 13 and 17 minutes respectfully.

Summary of Exercise Classification Notification Times

	NOUE	ALERT	SAE	GENERAL
Event Declared	08:33 a.m.	09:16 a.m.	11:02 a.m.	12:40 a.m.
ODS Notified SED	08:41 a.m.	09:28 a.m	Not Perfor...	Not Performed
State Notified by ODS	08:46 a.m.	09:33 a.m.	Not Performed	Not Performed
State Notified by CECC Director (Verbal)	N/A	N/A	11:10 a.m.	12:43 a.m.
State Notified by CECC State Communicator (CECC EPIP 1 ATT C)		N/A	N/A	11:23 a.m. 13:04 a.m.
Total time for State Notification in Minutes				
(verbal)	13	17	8	3
(written)	13	17	21	24

The inspector found the licensee's State Notification process was somewhat cumbersome which could lead to untimely notification. The licensee did not commit to any specific corrective action in the notification process but did agree to review the State notification process for improvements. The licensee did commit to make corrections to CECC and site procedures to clearly describe the notification process. The inspector stated that a review of the licensee's emergency preparedness State notification process and procedures would be reviewed in a future inspection as an Inspector Followup Item (IFI).

IFI 50-92-20-01: Review licensee's notification procedures and evaluation, assessment and proposed measures to improve initial notification times to State and local agencies.

No violations or deviations were identified.

7. Emergency Communications (82301)

This area was observed to determine 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 that adequate communications existed among the licensee's emergency response organization and offsite authorities. However, the licensee identified some communication problems associated with emergency response teams which are discussed in Paragraph 8 of the report. Communications to and from the emergency response facilities were good, however, there were some blind spots for radio transmission within the plant. Whenever radio communications were poor the staff directed communication by telephone. The SCR staff demonstrated good communication techniques by repeating transmitted information.

No violations or deviations were identified.

8. Emergency Facilities and Equipment (82301)

This area was observed to determine that adequate emergency facilities and equipment to support an emergency response was 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, staffing and operation of key ERFs, including the SCR, TSC, OSC, JIC and CECC. In addition, the inspector observed an emergency medical drill.

a. Simulator Control Room

Overall, operations personnel adequately assessed the problems faced during the exercise and their responses were timely and appropriate to the circumstances. Prior to TSC activation, the SOS had announced to the control room crew that he was the SED with all of its responsibilities. The SOS demonstrated outstanding leadership and command qualities and exceptional knowledge of plant systems and EPIPs. The SOS delegated responsibilities and redirected team actions as he recognized changing conditions and requirements. The SOS effectively managed control room activities with respect to classification, analysis, and mitigation in spite of a time consuming notification process. The SED classified the emergency according to the Initiating Conditions in EPIP 1 and made the required notifications to the ODS.

Reactor operators and supervisors demonstrated good use of the normal and emergency operating procedures throughout the exercise. The Assistant SOS (ASOS) followed the emergency operating procedures with precision. He read out each step of the procedure in a loud and clear voice and made the transition to other procedures in compliance with the step instructions or the "response not obtained" contingency step. During lulls in control room activity, he directed the Reactor Operators to go through the procedure again to insure that it had been followed properly.

When the TSC was activated, the SOS transferred promptly the responsibilities of the SED to the TSC. The control room staff deferred to the TSC for quick problem resolution. For example, at 09:46 a.m., the reactor shutdown had commenced and the load coordinator requested a delay in shutdown because of the need for power following the tornado, the ASOS immediately directed the load coordinator to talk to the SED at the TSC. The SOS made frequent and timely briefings to the control room crew on the status of the emergency situation and on actions planned by the TSC.

The SOS directed the Shift Technical Advisor (STA) to keep the official log for the control room. The STA's log was observed to be accurate and comprehensive. However, log books were kept by the SOS and the ASOS were not always up to date. It was observed at 11:20 a.m. that the most recent entry was at 09:38 a.m. At a later time the SOS log was filled in by reference to the STA's log, which was observed by the inspector to be accurate and comprehensive.

The following occurrence indicated that the licensee should consider further training in mitigating consequences of accidents. At 12:17 p.m., approximately 6 minutes after loss of ERCW, a reactor operator wanted to shut down the operating DG since jacket cooling, which is provided by the ERCW system, was required for safe operation. The control room crew elected to keep the DG running until it tripped at 12:22 p.m. The rationale was that, at that juncture, the DG furnished the only source of power. However, in permitting continued operation, the crew risked permanent damage to the DG with the consequence that it would not be operable when and if cooling became available. In retrospect, the SOS felt that the best course of action would have been to shutdown the DG. The control room crew did consider the consequence of shutdown, i.e., the loss of water to the charging pumps. While the discussion was proceeding, the DG

tripped out on oil pressure. The inspector determined that the SOS had been trained on loss of all power on the simulator, but he had never been confronted with the specific loss presented in this exercise.

The use of the SCR permitted operations personnel to more realistically demonstrate performance and actions that they would take to cope with an actual emergency in the plant. However, the Sequoyah simulator was not programmed to simulate core melt accidents and as a consequence the simulator crashed at least 6 times during the latter stages of the exercise. The controllers used previously prepared lists of data to be read to the operators. The operators coped as well as they could. However, such lists are not the most satisfactory solution since operators are trained to look for changes in parameters, and realism was lost with the lists.

All SCR players were professional and aggressive in use of their procedures while acting and talking through their emergency response actions.

No violations or deviations were identified.

b. Technical Support Center

The SOS requested activation of the OSC and TSC at 09:23 a.m., following the Alert classification at 09:16 a.m. The TSC was staffed at about 9:41 a.m. The SOS began briefing the SED in the TSC by phone at about 9:37 a.m. and the TSC assumed command of emergency operations at about 9:52 a.m. Colored badges for staff personnel were used to quickly identify when minimum staffing for activation was available.

The inspector observed good command and control of the emergency organization. Technical assessment and mitigation activities were aggressively and properly pursued by the TSC staff. The SED exercised dynamic control of the TSC staff through periodic conferences with key managers, periodic briefings of the entire TSC and OSC staffs, and through thoughtful questioning of the staff about their intended actions. The SED briefings were timely and informative assisting staff to better understanding plant status and emergency conditions and to understand what was needed to resolve the most urgent problems. TSC work prioritization was excellent.

Since the TSC was quite small at Sequoyah, the SED demonstrated sensitivity to high noise levels and obstruction to status boards, caused by standing personnel, by ordering persons to sit down and maintain quiet. Nevertheless, noise caused by staff was occasionally high. For example, during SED periodic briefings, the staff would continue telephone conversations and conversations with other staff. The inspector noticed that no alerting announcement was made to the staff, such as, "... a briefing will start in five minutes", to permit them to terminate such conversations.

The SED frequently conducted caucuses with his managers in the room designated for the NRC site team to reduce confusion in the TSC proper. Although this action was good from the standpoint of TSC management, such an area would not be available during an actual event.

Strong operations support was provided to the control room by the Operations Manager keeping abreast of progress made by the control room in executing response procedures and by forecasting the potential adverse effects of plant equipment degradation (e.g., the loss of power causing the loss of coolant charging pumps causing the loss of reactor coolant pump seals). Additionally, conservative pro-active action was initiated at 09:35 a.m. in beginning to ramp reactor power down due to potential tornado damage.

Rapidly changing and degraded plant conditions required the dispatch of twenty-eight teams. The TSC staff reassessed and prioritized the team objectives approximately every 30 minutes to assure resources were expended on the most important efforts. Although the TSC exercised good command and control of field teams from the standpoint of initiating response to events, the TSC did not begin to require feedback from the OSC about team progress and estimated completion times until about 11:30 a.m. when the SED expressed concern about not knowing what teams were accomplishing. The OSC communicator then began to post estimated completion times on the OSC Team Task board which proved of significant benefit to the TSC staff.

Although the response team tracking board was effective in keeping track of tasks assigned to teams for corrective actions, other status boards were noted to be marginal in providing information to plant staff. For example, the Plant Status board did not clearly reflect the exact status of various equipments or alignments so that the TSC staff had a clear picture of

system degradation and times of failure. Additionally, the Radiological Status board was noted to contain radiological data for time 1:50 p.m. as late as real time 3:00 p.m. The evaluator was advised that this occurred due to a failure of computer systems that transferred the data automatically.

Initial and follow-up habitability evaluations of the TSC were promptly made.

No violations or deviations were identified.

c. Operational Support Center

The inspectors monitored activities associated with the OSC organization, briefing and dispatching of response teams, and effectiveness in making necessary repairs to plant equipment as required. Upon the direction by the SED, the OSC was activated, fully staffed, and functional in a timely manner (approximately 16 minutes). The OSC Supervisor was well qualified and assumed the responsibility in a professional and organized manner. It was apparent that personnel were prepared to implement the necessary actions requested by management to assist in the mitigation of problems incurred during the emergency exercise. The OSC had been moved to a larger room adjacent to the plant cafeteria since the last drill and appeared to be organized in a manner to allow adequate interface of OSC managers. The OSC Manager was well organized and directed activities of the OSC in a professional manner. Also, arrangement of supporting equipment, with the exception of team assignment boards, was good. The computer equipment which allowed for control and reporting of radiation dose exposure (REX) was located in the cafeteria area in proximity to the response team members. This arrangement was beneficial in minimizing craft traffic in the OSC. One potential improvement, which was recognized by both the licensee and the inspectors, would be consideration of the relocation of team assignment boards so that all personnel in the OSC could better monitor and track recorded team information such as team assignments, priority, briefing status, feedback, etc.

During the course of the exercise, 28 teams were requested to be dispatched by the OSC to provide for damage assessment, equipment repairs, monitor for radiological conditions, and to align equipment for operation. After identification of team requirements, the teams were organized, given thorough briefings, and after verification of readiness, were given permission

by the OSC Manager to accomplish required tasks. Appropriate contact with the teams was maintained and a debrief was accomplished after most teams returned to the OSC. However, the information obtained during some debriefs was not communicated back to the TSC in a timely manner. Another problem noted by the inspector was an apparent lack of communication of urgency of some assignments by management to teams with regard to plant conditions. For example, at approximately 12:33 p.m. the OSC received an assignment from the TSC to dispatch a team to the ERCW pump house to clear strainers which had become clogged with debris. This was a very urgent request due to continuing degradation of the plant and loss of the ultimate heat sink water being supplied from the ERCW pump house. However, the inspectors noted that team preparation and briefing that were made for the critical task were not completed until 1:30 p.m.

Corrective actions for communication problems within the OSC, which were identified during the last graded emergency preparedness exercise, had been effectively implemented. The SED and the OSC Manager provided frequent updates to the emergency organizations on the status of plant conditions and emphasized the critical activities to focus on. Of particular note was the speaker system installed in the OSC which allowed for clear briefs of OSC personnel by the SED. Also noted was good communication between the OSC HP personnel and the TSC HP personnel. This excellent communication allowed for timely radiological updates and proper management evaluation of plant conditions when core degradation caused rapid change of radiological conditions in plant areas where teams were dispatched. Some minor communications problems were noted with regard to battery powered headsets which were used by the OSC communicator; however, backup telephones were available and used.

Use of procedures and log taking by OSC personnel was considered to be good.

No violations or deviations were identified.

d. Central Emergency Control Center

The CECC was promptly staff ' and activated with qualified personnel at 09:59 a.m., approximately 43 minutes after an alert was declared. The CECC

Director provided timely and accurate status updates to the CECC staff. Emergency notifications were correct and good State interaction was observed throughout the exercise.

The inspector observed that the CECC was properly equipped and staffed to provide technical assistance, dose assessment, and field monitoring team control.

The CECC staff was proactive in plant accident assessment.

Security performance was prompt and effective in the establishment of access controls.

No violations or deviations were identified.

e. Joint Information Center

The inspector noted that the licensee's procedures for activating the JIC provided guidance for the process of determining when the JIC should be activated and provided instructions for contacting members of the JIC once the decision has been made to activate it. However, the procedures did not specify the minimum requirements for declaring the JIC activated. Licensee personnel indicated that the JIC was activated at 10:00 a.m., even though the State was not present and ready to function. The licensee representatives reported that they had intended the statement to apply only to TVA personnel. A second JIC "activation" was declared at 10:30 a.m. which included all participants. Defining the minimum requirements for JIC activation in written procedures could prevent the facility from being prematurely activated and ensure all necessary participants are in place or provisions are established for their absence.

Some coordinator problems were observed with news briefings. TVA commenced a briefing on declaration of a General Emergency in the news briefing auditorium without apparent coordination with the State of Tennessee. Tennessee officials saw it on the TV monitor in their work area and at that point proceeded to the briefing. Later, the State informed TVA personnel that they would conduct a briefing on their decision to administer potassium iodine (KI) to the population and commenced its news conference. The (Mock) Media representatives were not informed, saw it on their TV monitor, and at that point proceeded to the auditorium.

Additional attention in recording information reported to the JIC from the CECC was needed. At one point, participants were unsure of whether reports of 5,000 units of radiation were in rems or millirems. This type of information was important and every effort should have been made to correctly convey it.

The overall performance of the TVA public information staff during the exercise in the JIC was good.

No violations or deviations were identified.

9. Accident Assessment (82301)

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

The accident assessment program included both an engineering assessment of plant status and an assessment of radiological hazards to both onsite and offsite personnel resulting from the accident. In general, both programs appeared effective during this exercise in analyzing the plant status so as to make recommendations to the SED concerning mitigating actions to reduce damage to plant equipment, to prevent release of radioactive materials, and to terminate the emergency condition. However, despite an overall effective demonstration of accident assessment, some areas of potential improvement were noted. For example, on more than one occasion improper plant assessments were performed by TSC staff that required controller intervention to prevent staff activities from departing the scenario time line. For example, the loss of power event at 10:30 a.m. was caused by tornado debris shorting the Unit 1, 1A and 1B Start Busses. The initial field report indicated that all four Start Busses were shorted, but conflicting reports of continued power availability to Unit 2 were received that clearly indicated power had not been lost to Unit 2. Notwithstanding, the electrical group of the Technical Assessment Team did not take substantive investigative steps to confirm the exact status of power to each of the Units by simply obtaining a round of voltage readings on various busses from the control room. At approximately 1:15 p.m., a controller had to intervene with information that the Unit 2 Start Busses were not affected by tornado damage in order to assure power was restored by scenario time-line requirements. Power availability was a critical resource necessary to mitigate the accident and should have commanded exacting attention of the TSC staff.

In a similar manner, assessment of the loss of ERCW was not carefully pursued to exacting completion. ERCW differential pump pressures and flows began to decrease at 11:50 a.m., and system alarms were annunciated at 12:05 p.m. The TSC was advised of high pressure differences on ERCW strainers at 12:11 p.m. and advised of the loss of ERCW at 12:21 p.m. The loss of ERCW resulted in a loss of cooling water to the operating emergency DG and a loss of feedwater supply to the operating turbine-driven auxiliary feedwater pump. Neither the control room nor the TSC pursued the alarm response procedure requirements of cleaning strainers and backwashing traveling screens. As late as 1:00 p.m., the TSC believed that the ERCW pump house had been so badly damaged from the storm that the priority of ERCW restoration was moved to Priority 4 by TSC staff. This TSC evaluation of the ERCW pump house was made in spite of the fact that ERCW pumps operated satisfactorily from 09:00 a.m. until about 12:00 p.m., meaning that something besides pump house condition may have been the cause of ERCW loss. ERCW availability was a critical resource necessary to mitigate the accident and should have commanded exacting attention of the TSC staff.

No violations or deviations were identified.

10. Protective Responses (82301)

This area was observed to determine that guidelines for protective actions during the emergency, consistent with Federal guidance, were developed and in place, and 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 NUREG-0654, Section II.J.

The inspector verified that the licensee had and used emergency procedures for formulating Protective Action Recommendations (PARs) for off-site populations within the 10 mile Emergency Planning Zone. The CECC Director provided timely and accurate PARs to State personnel. PARs were routinely reevaluated for accuracy and status updates were provided to the offsite authorities. Assembly for accountability procedures were initiated by the SED at 09:27 a.m. following the Alert declaration at 09:16 a.m. This was perceived as an effective means of quickly determining personnel status following the life-threatening event of a tornado. The site accountability process was achieved and reported within 30 minutes. Similarly, the SED initiated SQN-EPIP-14, "Radiological Control Response" procedure, at 09:27 a.m. even though a radiological release was not occurring. This action resulted in the early dispatch of radiation monitoring teams. The SOS also

initiated prompt onsite protective actions with the evacuation of non-essential personnel in the area near the waste gas delay tank by making a public address announcement.

No violations or deviations were identified.

11. 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), 10 CFR 50, Appendix E, Paragraph IV.E, and specific criteria in NUREG-0654, Section II.N.

The licensee conducted facility critiques with exercise players immediately following the exercise termination. Licensee controllers and observers conducted additional critiques prior to the formal critique to management on June 26, 1992. The critique process, including the critique to management, was well organized. Issues identified during the exercise were discussed by licensee representatives during the critique. Licensee action on identified findings will be reviewed during subsequent NRC inspections. The licensee's critique addressed both substantive deficiencies and improvement areas. The conduct of the critique was consistent with the regulatory requirements and guidelines cited above and considered a program strength.

No violations or deviations were identified.

12. Document Control

SSP 2.7 Document Control, Section 3.6.C states, in part, the controlled document holder ensures that controlled documents are properly filed, receipt acknowledged, and superseded copies are returned to Document Control Records Management.

While reviewing licensee documents completed during the emergency preparedness exercise, the inspector discovered that a CECC-EPIP in an emergency preparedness manual was out of date. The inspector discovered the problem when he observed a completed form had a later revision date than the corresponding one in the procedure. The out-of-date EPIP was in a controlled document titled Central Emergency Control Center Implementing Procedures Document. The specific document was manual number 111 and had been obtained from the Operations Training Group library in the licensee's Sequoyah Training Center (STC). The main STC library did not have a copy of the manual. The inspector determined from licensee personnel that copy 111 of the

manual had been removed from the document control program in July of 1991 and should have been destroyed at that time. The inspector stated that failure to maintain control of a controlled document in accordance with the licensee's quality assurance program requirements appeared to be a violation of the licensee's procedures.

In addition to removing and destroying the identified manual the licensee reported that an audit of the library would be made to identify any additional documents that may not be controlled as required by the licensee's document control program.

Section VII.B.(1) of the NRC Enforcement Policy provides that Severity Level V violations, whether identified by the NRC or the licensee may not be cited in a Notice of Violation provided the following criteria are met:

- Appropriate corrective action committed to by the end of the inspection,
- Not willful, and
- Not similar to prior violations for which corrective actions have not been sufficient to prevent recurrence.

This NRC-identified violation is not being cited because the criteria specified in Section VII B. of the NRC Enforcement Policy were satisfied.

NCV 92-20-02, Failure to remove a controlled document from use that had been removed from the controlled document distribution list.

The licensee documented the problem in a Problem Evaluation Report (PER) number SQPER920247. The licensee completed the corrective action for the violation and faxed a copy of the PER to Region II office. The PER documented that the licensee had removed the manual from the Operations Training Library and that it had been destroyed. Additionally, the licensee had conducted an audit of procedures and manuals in the Operations Training Library against the list of manuals that had been identified for removal from distribution during an audit conducted in July of 1991. The licensee completed the review on June 27, 1992. No additional manuals were found in the Operation Training Library that had been identified for removal from the list. The inspector determined that the corrective action was not complete in that, the licensee had not performed the audit against a current list of controlled documents.

During a telephone conversation on July 16, 1992, between F. N. Wright of the NRC and N. Catron of TVA the licensee was informed that the additional corrective action was required for the non-cited violation. The inspector reported to the licensee that the audit of the Operations Training Library needed to be performed with a current controlled manual distribution list. Licensee representatives agreed to complete the audit during the week of July 20-24, 1992. The licensee completed the review on July 20, 1992 and revised the PER to document the additional corrective action. The licensee faxed a copy of the amended report to the Region II Office on July 20, 1992. The licensee reported that no additional uncontrolled manuals had been found. The corrective action documentation was reviewed by the inspector and found acceptable.

13. Exit Interview

The inspection scope and findings were summarized with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed below. The licensee did not identify any such documents or processes as proprietary. Dissenting comments were not received from the licensee.

A non-cited violation was identified and discussed with licensee personnel following the exit. The violation concerned document control violation for failure to remove a Emergency Preparedness Manual that had been deleted as a controlled manual, from the Operations Training Library at the Sequoyah Training Center. The licensee's proposed corrective actions were discussed with the inspector onsite and appeared adequate to meet the requirements for a non-cited violation. The licensee documented the corrective action in a problem evaluation report and sent a copy to the Region II office. A review of the licensee's documented corrective action was made and the inspector determined that the corrective action was incomplete in that an audit of the library was made against an old controlled document list. During a telephone conversation on July 16, 1992, between F. N. Wright of the NRC and N. Catron of TVA the licensee was informed that the additional corrective action was required for the non-cited violation. On July 20, 1992 the licensee reported that the additional corrective action had been completed and faxed a copy of the documentation to the region office which was reviewed by the inspector and found acceptable.

Item Number	Description and Reference
50-327/92-20-01	IFI - Review licensee's notification procedures and review, assessment and proposed measures to improve initial notification times to state and local agencies (Paragraph 6).
50-327/92-20-02	NCV - Failure to remove a controlled document from use that had been removed from the controlled document distribution list (Paragraph 12).

Attachments:
Exercise Objectives and Narrative
Summary

SEQUOYAH NUCLEAR PLANT (SQN)
EMERGENCY PLAN EXERCISE

GOALS AND OBJECTIVES

The 1992 SQN Radiological Emergency Plan Exercise will be a full scale ingestion pathway exercise requiring full participation by the TVA and State and Local emergency response agencies. The Joint Information Center (JIC) will be manned to support CECC operations.

Exercise Goals

TVA's goals for the 1992 SQN exercise are as follows:

1. Allow plant and offsite personnel to demonstrate and test the capabilities of the emergency response organization to protect the health and safety of plant personnel and the general public in accordance with the Nuclear Power - Radiological Emergency Plan (NP-REP), SQN Emergency Plan Implementing Procedures (EPIPs), and CECC EPIPs.

2. Identify significant weaknesses, strengths and areas which may be improved in emergency response capabilities, organization or emergency plans.

3. Provide an interactive exercise to ensure proficiency is maintained in plant and offsite emergency response capabilities.

Exercise Objectives

A. Control Room/Simulator Objectives

   1. Demonstrate the ability of the Shift Operations Supervisor to recognize conditions, classify emergencies, and make required notifications in a timely manner.

   2. Demonstrate the Control Room staff's ability to assume the initial responsibilities of the TSC, OSC, and CECC prior to their activation.

   3. Demonstrate the ability of the SOS to manage Control Room activities in a manner to prevent interference with the classification, analysis, or mitigation of an accident.

   4. Demonstrate the ability of the Control Room staff to organize, dispatch and track response teams as needed until the OSC is functional.

   5. Demonstrate the ability to perform a precise and clear transfer of responsibilities from the Control Room staff to the Technical Support Center (TSC) staff.

   6. Demonstrate the ability to recognize problems that cannot be quickly resolved by the Control Room staff and their deferral to the TSC for resolution.

7. Demonstrate the ability of the Shift Operations Supervisor to periodically inform the Control Room staff of the status of the emergency situation and of actions currently being planned by the TSC.

8. Demonstrate the ability of the Control Room staff to keep onsite personnel apprised of the emergency status through periodic PA system anncuncements, prior to activation of the TSC.

9. Demonstrate the ability of the Control Room staff to use proper procedures.

10. Demonstrate the ability of the Control Room staff, through detailed logkeeping, to maintain an accurate chronological account of equipment and plant status including the corrective actions taken.

11. Demonstrate the ability of the Control Room staff, through an effective command and control process, to make a timely determination of the cause of an incident and perform mitigating actions to place the unit in a safe and stable condition.

12. Demonstrate the ability to provide an effective flow of information between the Control Room, TSC, OSC, NRC, and CECC.

13. Demonstrate the adequacy of Control Room facilities, resources, and equipment to support emergency operations.

14. Demonstrate the Control Room staff's ability to continuously evaluate available information and redefine/confirm conditions and event classification.

15. Demonstrate the adequacy of Control Room communication systems to support emergency operations.

B. Technical Support Center (TSC) Objectives

1. Demonstrate the ability to alert and mobilize TSC emergency response personnel and activate the TSC in a timely manner.

2. Demonstrate the Site Emergency Director's (SED) ability to provide effective command and control and manage TSC activities in a manner to prevent interference with the classification, analysis, or mitigation of an event.

3. Demonstrate the problem-solving capabilities of the TSC staff in support of the effort to identify the causes of an incident, mitigate the consequences, and place the unit in a safe and stable condition.

4. Demonstrate the TSC's ability to initially assume the primary responsibilities of the CECC prior to CECC activation.

5. Demonstrate the SED's proficiency in classification of conditions and direction of mitigation activities.

6. Demonstrate the Site Vice President's proficiency in directing site resources to support accident mitigation activities.

7. Demonstrate the TSC's ability to formulate, coordinate, implement, and track onsite protective actions.

8. Demonstrate the TSC's ability to perform timely assessments of onsite radiological conditions through surveys and/or installed monitoring equipment information.

9. Demonstrate the TSC's ability to maintain an accurate account of equipment status, plant status and corrective actions through detailed chronological logkeeping.

10. Demonstrate the TSC's ability to determine the appropriate sampling and monitoring required to support accident investigation and mitigation.

11. Demonstrate the TSC's ability to maintain effective communications between the Operations Support Center (OSC), Control Room, CECC, and NRC.

12. Demonstrate the TSC's ability to maintain effective communications between the various groups within the TSC.

13. Demonstrate the adequacy of TSC communication systems to support emergency operations.

14. Demonstrate the ability of the SED to perform periodic briefings for TSC/OSC staff and onsite personnel.

15. Demonstrate the ability to assemble onsite personnel within the protected area and provide an accountability report to the SED within thirty minutes of sounding the emergency siren.

16. Demonstrate Security's ability to maintain effective site and Control Room access controls.

17. Demonstrate the adequacy of TSC facilities, resources, and equipment to support emergency operations.

18. Demonstrate the ability of the TSC staff to use proper procedures.

19. Demonstrate the ability of the TSC to continuously evaluate available information and redefine/confirm the conditions and event classification.

20. Demonstrate the ability to perform a precise and clear transfer of responsibilities from the Control Room staff to the Technical Support Center (TSC) staff.

C. Operations Support Center (OSC) Objectives

1. Demonstrate the ability to alert and mobilize OSC response personnel and activate the OSC in a timely manner.

2. Demonstrate the ability of the OSC staff, through an effective command and control process, to coordinate and initiate activities in a timely manner.

3. Demonstrate the ability of the OSC staff to properly plan required tasks; then, organize, brief, and promptly dispatch response teams.

4. Demonstrate the ability of the OSC response teams to quickly and effectively enter the plant, make necessary repairs, and adequately de-brief upon their return.

5. Demonstrate the adequacy of communications between OSC response teams and the OSC's ability to track each team.

6. Demonstrate the effective transfer of information between the OSC, TSC, RADCON laboratory, and Chemistry laboratory including briefings to keep OSC personnel apprised of the emergency status.

7. Demonstrate the OSC's ability to maintain OSC status board information accurate and up to date (current).

8. Demonstrate the adequacy of OSC resources, facilities, and equipment to support emergency operations.

9. Demonstrate the OSC's ability to maintain an accurate account of equipment, plant, and response team status, including corrective actions through detailed chronological logkeeping.

10. Demonstrate the adequacy of RADCON activities and personnel to effectively support accident mitigation efforts while ensuring adequate worker protection.

11. Demonstrate the ability of the OSC staff to use proper procedures.

12. Demonstrate the ability of the RADCON staff to perform effective inplant and site boundary surveys during radiological emergencies while using proper procedures and following good RADCON and ALARA practices.

13. Demonstrate the OSC's ability to track changing radiological conditions through survey results and/or in-plant monitors; and incorporate the information into personnel protective actions.

14. Demonstrate the OSC's ability to control internal and external exposures, and personnel contamination of onsite emergency workers including exposure tracking.

15. Demonstrate the timely and efficient activation of the plant environmental monitoring van including establishment of adequate communications.

16. Demonstrate the ability to conduct habitability surveys for the TSC, OSC, and Control Room.

17. Demonstrate the OSC's ability to maintain effective communications between the various groups within the OSC.

18. Demonstrate the adequacy of OSC communication systems to support emergency operations.

D. Central Emergency Control Center (CECC) Objectives

1. Demonstrate the Operations Duty Specialist's ability to make initial notifications to State agencies in a timely manner.

2. Demonstrate the ability to alert and mobilize CECC emergency response personnel and activate the CECC in a timely manner.

3. Demonstrate the CECC Director's ability to maintain effective command and control in the CECC.

4. Demonstrate the CECC's ability to effectively call upon and obtain TVA corporate, vendor, or other outside support resources as appropriate or needed. (technical, logistics, financial, federal, industrial, etc.)

5. Demonstrate the CECC's ability to establish and maintain effective communications between the various emergency centers (CECC, Control Room, TSC, JIC, RMCC, State/Local EOC).

6. Demonstrate the CECC's ability to establish and maintain effective communications between the various groups within the CECC.

7. Demonstrate the CECC's ability to effectively dispatch and control Radiological/Environmental Monitoring Teams, and coordinate with the State when applicable.

8. Demonstrate the CECC's ability to obtain, analyze, and utilize meteorological, onsite and offsite radiological conditions, and source term information to develop dose assessments in a timely manner.

9. Demonstrate the CECC's ability to inform, update, coordinate offsite activities with, and provide protective action recommendations to the State in a timely manner.

10. Demonstrate the CECC's ability to analyze current plant conditions, identify projected trends and determine the potential consequences.

11. Demonstrate the adequacy of CECC communications systems to support emergency operations.

12. Demonstrate the CECC's ability to maintain CECC status board information accurate and up to date.

13. Demonstrate the adequacy of CECC facilities, resources, and equipment to support emergency operations.

14. Demonstrate the ability to establish and maintain adequate security access control for the CECC.

15. Demonstrate the CECC's ability to maintain an effective interface with the NRC, including NRC responders.

16. Demonstrate the proficiency of CECC personnel with emergency procedures, equipment, and methods.

17. Demonstrate the CECC's ability to maintain an accurate account of plant status, ongoing activities, external TVA correspondence, corrective actions taken, and protective action recommendations through detailed chronological logkeeping.

18. Demonstrate the ability of Environmental Monitoring Teams to efficiently and effectively utilize their procedures to perform dose rate surveys, collect and analyze radiological samples, and conduct other prescribed radiological activities.

19. Demonstrate the Environmental Monitoring Team's abilities to adhere to appropriate contamination control procedures in field conditions.

20. Demonstrate the CECC's ability to adequately monitor and control the exposure levels of offsite TVA personnel.

21 Demonstrate the ability to effectively transfer radiological survey information from the field and keep field teams informed of emergency conditions.

22. Demonstrate the adequacy of the Environmental Monitoring Vans to support emergency operations. (monitoring equipment, supplies, communications equipment, etc.)

23. Demonstrate the CECC's ability to continuously evaluate available information and redefine/confirm the conditions and event classification.

24. Demonstrate the ability to perform a precise and clear transfer of reponsibilities from the Technical Support Center (TSC) staff to the Central Emergency Control Center (CECC) staff.

E. Joint Information Center/ Public Information Objectives

1. Demonstrate the ability of the CECC Communications staff to coordinate information with non-TVA agencies.

2. Demonstrate the ability of the CECC Communications staff to develop timely and accurate news releases.

3. Demonstrate the ability of the CECC Information Manager to exercise effective command and control of the overall communications response.

4. Demonstrate the ability of the JIC to coordinate public news briefings with State and Federal agencies and provide timely information to the public during periodic JIC briefings.

5. Demonstrate the ability of media relations personnel in the JIC to answer telephone calls from the media professionally and accurately.

6. Demonstrate the ability of TVA's public information staff in the JIC to provide timely and accurate information to anyone calling the public information telephone numbers.

7. Demonstrate the ability to provide reasonable media access with minimal impact on emergency response activities.

8. Demonstrate the ability to provide information to the public that is accurate, presented at a meaningful technical level, and to take corrective actions for inaccuracies.

9. Demonstrate the adequacy of the media communications system.

F. The following drills will be conducted in the course of this exercise:

1. Accountability Drill

2. Plant Radiological Monitoring Drill (Environs Monitoring)

3. CECC/State Communications Drill

4. TSC/CECC Communications Drill

5. CECC Radiological Dose Assessment Drill

6. Plant RADCON Drill

SEQUOYAH NUCLEAR PLANT (SQN) 1992 GRADED
EXERCISE SCENARIO NARRATIVE SUMMARY

INITIAL CONDITIONS

Detailed initial conditions will be provided to players through pre-exercise initial condition packages and are summarized as follows:

UNIT 1

* Operating at the end of Cycle 6 and currently on day 100 of a continuous run at 100% power.
* 6.9KV Board 1A is currently aligned to Startup Bus 1A for maintenance on the normal supply breaker (1112).
* Reactor coolant conditions are:
  1) Boron concentration @ 57 ppm.
  2) I-131 equivalent activity @ 8.45E-3 uCi/gm with total activity of 1.554 uCi/gm.
* The following equipment is out-of-service for repair:
  1) Diesel Generator (DG) 1B for replacement of current transformers (CT).
  2) Motor Driven Auxiliary feedwater (MDAFW) pump 1B.

UNIT 2

* Day 20 of a scheduled 65 day refueling outage.
* Refueling cavity is filled and the vessel head is removed.
* Condensate Storage Tank (CST) "B" has been drained for inspection and maintenance.

COMMON

* Common Station Service Transformer (CSST) B is drained and out of service.

EXERCISE

Day 1

Fifteen minutes into the exercise (T=00:15), the 1A1 DG air accumulator loses pressure due to a damaged relief valve caused by a worker moving equipment. Control Room personnel are alerted to the condition by a control panel alarm. Upon being notified, the Shift Operations Supervisor (SOS) should determine that DG 1A is inoperable and conditions therefore exist for the classification of a Notification of Unusual Event (NUE) due to the "loss of all onsite power to any unit" (SU3). An AUO should be dispatched to investigate the problem and align DG 1A to its alternate air accumulator.

Forty five minutes into the exercise (T=00:45), the 1A DG is expected to be aligned to the alternate air accumulator and declared operational. The SOS should re-assess conditions for possible downgrading.

Fifty five minutes into the exercise (T=00:55), a tornado watch is issued by the National Weather Service for parts of Hamilton, Rhea, and Bradley counties. An intense line of thunderstorms is moving in a northeasterly direction and has already produced periods of heavy rainfall, local flooding, and scattered hail damage in Sequatchie and Marion counties.

One hour and five minutes into the exercise (T=01:05), a funnel cloud is observed by a Security Guard that touches down on site striking the warehouses located in the north section of the site. The tornado is accompanied by heavy rainfall and large hail. Immediately following passage of the front only heavy to moderate rainfall continues with some gusting winds. Control Room personnel will be alerted to the condition by wind speed indication and panel annunciators in the Control Room with additional information coming from the field. The storm results in the following site damage:

* Some missile damage to Condensate Storage Tank A is evident in the form of a large dent in its side.
* Warehouse #1 is essentially destroyed.
* Debris is scattered in the protected area and up against the security fence but the perimeter remains intact.

The SOS should determine that conditions exist for a classification of an Alert due to a tornado striking any structure within the site area (HA9) and missile impact within the site area (HA4).

Two hours and ten minutes into the exercise (T=02:10), a relief valve on the "B" Waste Gas Decay Tank (WGDT) lifts (burps) but does not reseat resulting in a slow, uncontrolled release of radioactive gases to the environment via the Unit 1 shield building exhaust. The Site Emergency Director (SED) should determine that conditions exist for a classification of a Site Area Emergency (SAE) due to a waste gas decay tank rupture (HS13).

Two hours and thirty minutes into the exercise (T=02:30), a loss of offsite power to Unit 1 occurs due to debris from the tornado shorting across the 1A and 1B Start busses. As a direct result of the loss of power:

* Unit 1 reactor trips.
* Diesel Generator 1A auto starts.
* The turbine driven auxiliary feed water pump starts but an instrumentation problem limits maximum flow to approximately 500 gallons per minute.

Condensate Storage Tank "A" begins to leak at this time due to structural weakening caused by the tornado damage. The full contents of the CST will leak out over approximately a twenty minute period.

Three hours into the exercise (T=03:00), weather conditions have settled with clearing skies and light winds from the north.

Approximately three hours and fifty minutes into the exercise (T=03:50) the Emergency Raw Cooling Water System (ERCW) screens and strainers begin to clog due to increased sediment and debris in the river water created by the runoff due to the heavy rains that occurred during the passage of the storm front. Continued loading of the screens and strainers results in a gradual decrease in ERCW flow accompanied by increased pump discharge pressure. Control Room personnel are alerted to this condition by control panel annunciators at approximately four hours and five minutes (T=04:05) into the exercise.

A total loss of ERCW flow occurs at approximately four hours and fifteen minutes (T=04:15) into the exercise. Depending upon the information available to the SED and based on the SED's professional judgement, conditions exist at this time for the classification of a General Emergency (GE) due to major internal or external events which could cause massive damage to plant systems (HG2). If diesel generators are allowed to continue running under loss of ERCW conditions after approximately eighteen minutes they will sieze and be unavailable for the remainder of the exercise.

Approximately four hours and thirty minutes into the exercise (T=04:30), a failure of all Unit 1 reactor coolant pump seals occurs due to a loss of seal water that occurred on loss of power to the charging pumps. This seal failure results in a LOCA inside containment.

Approximately four hours and thirty five minutes into the exercise (T=04:35), boiling begins in the vessel. The SED should determine that conditions exist for a classification of General Emergency (GE) due to the loss of any 2 of 3 fission product barriers with a potential loss of 3rd barrier (FG3).

Approximately five hours and fifteen minutes into the exercise (T=05:15), the Unit 1 reactor core becomes uncovered.

Approximately five hours and forty minutes into the exercise (T=05:40), the Unit 1 containment begins leaking to the Auxiliary Building when the containment purge supply isolation valves give way and the upstream ductwork ruptures.

Approximately five hours and fifty minutes into the exercise (T=05:50), fuel damage begins in the form of clad perforations and a subsequent release of gap activity occurs. Continued fuel uncovery results in increased fuel pellet overtemperature, an associated increase in radioactivity release, and the eventual slump of melted fuel rods and fuel into the lower portions of the vessel.

A radioactive release to the environment occurs via the Auxiliary Building through leaking ventilation dampers and other open penetrations. Dose rates inside the Auxiliary Building exceed 1000 R/hr and dose rates onsite but outside the plant increase rapidly and eventually exceed 50 R/hr.

Approximately six hours and twenty minutes into the exercise (T=06:20), the ERCW system is cleared of debris or alternate cooling water is restored to the DGs.

Approximately six hours and twenty five minutes into the exercise (T=06:25), AC power is restored when the 1A DG is started or offsite power is restored. ECCS pumps are started and water from the RWST is supplied to the vessel.

Approximately seven hours and thirty minutes into the exercise (T=07:30), the reactor core is recovered.

Approximately eight hours into the exercise (T=08:00), the exercise terminates for day one.

Day 2

* Plant conditions have been stabilized with long term core cooling established via the Residual Heat Removal (RHR) system.
* Current transformer replacements have been completed on DG 1B.
* Condensate Storage Tank 'B' has been closed out and returned to service.
* Reactor Coolant System (RCS) temperature has been decreased to less than 200 degrees Fahrenheit.
* A small steady release of noble gas continues as a result of the decay of I-133 and I-135 isotopes inside containment and on the ABGTS filters.
* Arrangements have been made for the use of robots to perform initial surveillance entries into the auxiliary building.
* Cleanup of the major tornado debris has been completed with assessment and minor repairs still in progress.
* Repairs to CST 'A' have been completed and tank inspection is in progress.
* Start busses 1A and 1B have been repaired and returned to service.
* Radiation levels inside the Auxiliary Building currently range from 1 mr/hr to greater than 1000 R/hr.
* TVA and State environmental monitoring teams continue to perform surveys and gather offsite samples for radiological analysis.
* Airborne radioactivity levels in the auxiliary building have begun to rapidly decrease.

Day 3

* Initial survey entries, by two remotely operated robots, into the auxiliary building have been conducted and a breech discovered in the ductwork of the containment purge air supply line.
* Modifications to one of the robots has allowed it to be used to apply a temporary patch to seal the Unit 1 containment ventilation breech.
* Radiation levels inside the Auxiliary Building currently range from 1 mr/hr to approximately 900 R/hr.
* Long term core cooling continues with RCS temperature stable at approximately 155 degrees F.

Day 4

* Long term core cooling continues with RCS temperature stable at approximately 150 degrees F.
* Initial entry of plant personnel into the Auxiliary Building to conduct more extensive radiological surveys and assess general conditions is anticipated today.
* Radioactivity levels inside the Auxiliary Building currently range from 1 mr/hr to approximately 775 R/hr.

SQN

EMERGENCY PREPAREDNESS

1992

GRADED EXERCISE

SCENARIO TIMELINE

REV DATE 4-21-92