



UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
 REGION II  
 101 MARIETTA STREET, N.W.  
 ATLANTA, GEORGIA 30303

Report Nos. 50-327/82-25 and 50-328/82-24

Licensee: Tennessee Valley Authority  
 500A Chestnut Street  
 Chattanooga, TN 37401

Facility Name: Sequoyah Nuclear Plant

Docket Nos. 50-327 and 50-328

License Nos. DPR-77 and DPR-79

Inspection at Sequoyah site near Soddy Daisy, Tennessee

Inspectors:	<u><i>D.R. Quick for</i></u>	<u>11/1/82</u>
	E. J. Ford	Date Signed
	<u><i>D.R. Quick for</i></u>	<u>11/1/82</u>
	S. D. Butler	Date Signed
	<u><i>T.R. Collins</i></u>	<u>11/1/82</u>
	T. R. Collins	Date Signed
Approved by:	<u><i>D.R. Quick</i></u>	<u>11/1/82</u>
	D. R. Quick, Section Chief, Division of Project and Resident Programs	Date Signed

SUMMARY

Inspection on September 6 - October 5, 1982

Areas Inspected

This routine unannounced inspection involved 194 inspector-hours on site in the areas of Operational Safety Verification, Preparations for Unit 1 Refueling, Licensee Event Report Review, Plant Incidents and Independent Inspection Effort.

Results

Of the five areas inspected, no violations or deviations were identified in four areas; one violation was found in one area; (327/82-25-01, Failure to maintain EGTS operable).

## DETAILS

### 1. Persons Contacted

#### Licensee Employees

C. C. Mason, Plant Superintendent  
J. E. Cross, Assistant Plant Superintendent  
P. R. Wallace, Assistant Plant Superintendent  
J. M. McGriff, Assistant Plant Superintendent  
J. W. Doty, Maintenance Supervisor (M)  
B. M. Patterson, Maintenance Supervisor (I)  
D. C. Craven, Maintenance Supervisor (E)  
L. M. Nobles, Operations Supervisor  
R. W. Fortenberry, Engineering Supervisor  
R. J. Kitts, Health Physics Supervisor  
J. T. Crittenden, Public Safety Service Supervisor  
R. L. Hamilton, Quality Assurance Supervisor  
M. R. Harding, Compliance Supervisor  
W. M. Halley, Preoperational Test Supervisor  
J. Robinson, Field Services Director

Other licensee employees contacted included field services craftsmen, technicians, operators, shift engineers, security force members, engineers, maintenance personnel, contractor personnel and corporate office personnel.

#### Other Organizations

D. M. Verrelli, Chief Reactor Projects Branch 1, DPRP, RII  
D. R. Quick, Chief Reactor Projects Section 1A, DPRP, RII  
C. R. Stahle, Licensing Branch 4 Project Manager, NRR  
Three Region II inspectors and investigators

### 2. Exit Interview

The inspection scope and findings were summarized with the Plant Superintendent and/or members of his staff on September 28, 1982. The violation of Emergency Gas Treatment System technical specification requirements was discussed and the licensee acknowledged.

During the reporting period, frequent discussions are held with the Plant Superintendent and his assistants concerning inspection findings.

### 3. Licensee Action on Previous Inspection Findings

(Closed) 327/82-10-01 The inspector reviewed the licensee's response to the Notice of Violation dated June 23, 1982 and the implementation of corrective action and find them acceptable. This item is closed.

(Closed) 327/82-06-01 The inspector reviewed the licensee's response to the Notice of Violation dated May 26, 1982 and the implementation of corrective action and find them acceptable. This item is closed.

(Closed) 327/81-19-04, 328/81-23-02 The inspector reviewed the licensee's actions in response to this unresolved item which primarily consisted of upgrading their clearance procedure AI-3 to detail requirements to ensure systems are drained and heated prior to the start of work. In addition it is required that vent paths be tagged open if they are necessary to maintain the system depressurized during work. This item is closed.

(Closed) 328/82-09-01 The inspector reviewed the licensee's response to the Notice of Violation dated May 26, 1982 and the implementation of corrective action including review of Surveillance Instructions to determine and implement second party verification of system restoration where necessary. Response to the item is considered acceptable. This item is closed.

#### 4. Unresolved Items

Unresolved items were not identified during this inspection.

#### 5. Operational Safety Verification

The inspector toured various areas of the plant on a routine basis throughout the reporting period. The following activities were reviewed/verified:

- a. Adherence to limiting conditions for operation which were directly observable from the control room panels.
- b. Control board instrumentation and recorder traces.
- c. Proper control room and shift manning.
- d. The use of approved operating procedures.
- e. Unit operator and shift engineer logs.
- f. General shift operating practices.
- g. Housekeeping practices.
- h. Posting of hold tags, caution tags and temporary alteration tags.
- i. Personnel, package, and vehicle access control for the plant protected area.
- j. General shift security practices on post manning, vital area access control and security force response to alarms.
- k. Surveillance testing in progress.

- l. Maintenance activities in progress.
- m. Health Physics Practices.

On September 10, 1982 the inspectors were informed by the licensee that during the course of discussions with another utility that operates a reactor unit with an Upper Head Injection (UHI) accumulator system, they had learned of a different method of sampling the UHI water accumulator for dissolved nitrogen as required by Technical Specification 3.5.1.2. In that the licensee was concerned that the results being obtained by their present analytical technique were unreliable, they decided to sample their UHI water accumulators using the alternate technique. The inspectors observed the analysis of a pressurized sample obtained from the UHI water accumulator on Unit 2 and the results indicated the dissolved nitrogen level to be above the limits allowed and the licensee commenced preparations to shut the unit down as required by Technical Specifications. Preparations were being made to sample the Unit 1 UHI water accumulator which was already scheduled for shutdown on September 10 for a refueling outage. As the Unit 2 was being shutdown, the licensee commenced a feed and bleed of the water accumulator in an attempt to reduce the dissolved nitrogen levels to within limits in the time allowed. The licensee was successful in reducing the dissolved nitrogen levels and the Unit shutdown was stopped. A daily sampling program was commenced on the Unit 2 UHI system since it was suspected that the rupture disc separating the water and the nitrogen accumulator was broken. The accumulator went out of limits again on September 12 and the licensee was again successful in restoring it to within limits in the time allowed without shutting down the unit. Subsequent samples indicated that the dissolved nitrogen was again going to go out of limits and the licensee shut down Unit 2 on September 15 to depressurize and drain the UHI system and replace the rupture disc. The results from the Unit 1 accumulator showed it also to be out of limits but the Unit was already shutdown for its refueling outage. During the outage the water accumulator will be drained and refilled and the rupture disc replaced. On September 17 the inspector observed operations personnel placing the UHI system back in service after replacement of the rupture disc and draining and refilling the water accumulator. The operation was conducted in accordance with System Operating Instruction SOI-87.1 with changes made to provide for the use of temporarily installed test gages and equalizing lines across the UHI isolation valves to preclude breaking the new rupture disc. The system was placed in service and the Unit restarted and returned to full power. The licensee will submit design change requests to permanently modify the system to aid in maintaining the rupture disc intact.

On September 30, 1982 the inspector verified that the licensee complied with Technical Specification 3.2.1, Axial Flux Difference, during a Unit 2 load reduction on September 29 which was required to repair on secondary steam leak. The unit was returned to full power the same day.

No violations or deviation were identified.

## 6. Preparation for Unit 1 Refueling

The inspector reviewed Unit 1 Technical Specification and extracted mode 6 (refueling) Technical Specification requirements and compared them against the licensee's signoff sheets in Fuel Handling Instruction FHI-6 "Preparation for Refueling." The licensee's list of licensee requirements in FHI-6 appeared to cover the applicable Technical Specification requirements for entering mode 6.

The inspector reviewed procedures FHI-7, Revision 10 "Refueling Operation" which contains precautions prerequisites and instructions for the core loading of the reactor. The inspector reviewed Restart Test Instruction RTI-2 which provides further detail prerequisites and instructions for refueling and is to be used in conjunction with FHI-6 and FHI-7. The instructions reviewed appear to be adequate for the conduct of refueling operations.

No violations or deviation were identified.

## 7. Licensee Event Report (LER) Review

During the reporting period, LER's were reviewed on a routine basis as they were received from the licensee. Each LER was reviewed to determine that:

- a. the report accurately described the event,
- b. the reported cause was accurate and the LER form reflected the proper cause code,
- c. the report satisfied the Technical Specification reporting requirements with respect to information provided and timing of submittal,
- d. corrective action appeared appropriate to correct the cause of the event,
- e. corrective action has been or is being taken,
- f. generic implications if identified were incorporated in corrective action,
- g. corrective action taken or to be taken was adequate, particularly to prevent recurrence, and
- h. the event did not involve continued operation in violation of regulatory requirements or licensee conditions.

The following LER's were reviewed by the inspector and are considered closed: 82037, 82039 thru 82041, 82045 thru 82047, 82049, 82050, 82053 thru 82055, 82057 thru 82060, 82062, 82063, 82067, 82069, 82070, 82072, 82073, 82076, 82080, 82083, 82085, 82087, 82088, 82091, 82092, 82094 thru 82099 and 82101 thru 82104.



The following LER's were reviewed and selected for detailed followup or tracking of long term design changes: 8036, 82038, 82042, 82043, 82048, 82052, 82056, 82061, 82064 thru 82066, 82068, 82071, 82074, 82075, 82077 thru 82079, 82081, 82082, 82084, 82086, 82089, 82090, 82093 and 82100.

On September 13, 1982, the inspectors became aware of an event that occurred on September 11 during the Unit 1 shutdown for the current refueling outage. During the Unit cooldown, following reactor shutdown, the Emergency Gas Treatment System (EGTS) was inadvertently disabled when test personnel opened and obstructed the elevation 690 annulus door to perform required testing in the annulus area. With the door open the system would not have been able to maintain the required negative pressure in the annulus to meet the operability requirements. At the time of the event the Unit was in mode 3 (450°F) and Technical Specification 3.6.1.8 requires EGTS to be operable until the Unit reaches mode 5 (200°F). The event was reported to the NRC on September 13 in Licensee Event Report SQRO-50-327/82107.

The event was reviewed by the inspectors and Region II management and enforcement specialists. The inspector discussed the cause and details of the event with the licensee and requested that they perform a detailed analysis to determine the affects of the EGTS being disabled on the offsite dose limits of 10 CFR 100.

Apparently there had been missed communications between test personnel and operations personnel as to when the door could be maintained open and a failure of interlocks which should have prevented the annulus door and an outer door to the containment access area from being open simultaneously. The combination of the two problems allowed the EGTS system to become disabled. Once operations personnel became aware of the open annulus door it was immediately cleared of test lines and shut. Corrective actions discussed with the licensee included repair of the annulus door interlocks and establishment of a surveillance program for the interlocks, and a through review of reactor building and auxiliary building secondary containment enclosure boundaries to identify all doors that could affect the integrity of the secondary containment in order that a comprehensive program can be established consisting of hardware and/or administrative controls to prevent future breaches of secondary containment. Such a program could consist of preventive maintenance and surveillance of existing interlocks and the use of signs on the doors to inform personnel of the significance of disabling them.

The analysis done by the licensee to determine the consequences of the violation in terms of the offsite dose following an accident was reviewed by the inspector and forwarded to Region II for review. The analysis was performed using two major sets of assumptions. The first assumption included the worst case conditions used in the original design basis accident analysis. The second set assumed the conditions that actually existed in the plant at the time of the violation. In both cases the calculated offsite dose did not exceed the 10 CFR 100 limits and in the second case the calculated dose was several orders of magnitude less than

the regulatory limit. In that failure to maintain EGTS operable in mode 3 is a violation of Technical Specification 3.6.1.8 and a Notice of Violation will be issued as Appendix A (50-327/82-25-01).

No other violations or deviations were identified.

#### 8. Plant Incidents

On September 14, 1982 the licensee notified the NRC at 9:44 p.m. (CST) as required by 10 CFR 50.72 that they had experienced a 75-80 gpm reactor coolant system leak on Unit 1 and had spilled approximately 3000 gallons of water into the containment building before the leak was stopped. The Unit was in mode 5 at the time preparing to refuel the reactor with extensive maintenance and modification work in progress. The leak occurred when the #4 reactor coolant pump motor was being uncoupled from the pump in preparation for removing the motor for modification. Reactor coolant system pressure was 140 psig and temperature was 134°F. As the pump rotor was being jacked down onto its maintenance seal water began spraying past the shaft seal and maintenance and health physics personnel evacuated the area. Operations personnel evacuated unnecessary personnel from the containment and auxiliary building and maintained reactor coolant system inventory using normal charging flow and makeup. A Residual Heat Removal pump remained in operation throughout the event to remove core decay heat. A site alert was declared and proper notification made. A maintenance crew was assembled and reentered the containment to recouple the #4 reactor coolant pump and stop the leak.

The senior resident responded to the site to verify that plant conditions were stable and that the licensee was taking the necessary steps to protect personnel and recover from the spill. A preliminary assessment was made to determine if there was any significant personnel contamination or exposure and if there was any significant release of radioactive material to the environment. None was indicated.

On September 15 the inspector reviewed the incident to determine the cause and corrective action planned and to determine if any violation of regulatory requirements were involved. The event was discussed with operations and maintenance personnel and the inspector reviewed Maintenance Instructions MI 2.1 "Reactor Coolant Pump Seal Maintenance" and MI 2.3 "Reactor Coolant Pump Motor Removal." In addition the inspector reviewed vendor technical manuals for the reactor coolant pump and the controlled leakage seal. The licensee's maintenance procedures appeared to have been followed and adequately implemented the requirements and precautions of the vendor's technical manuals. The vendor technical manuals did not have any requirements or precautions about uncoupling the pump with the reactor coolant system pressurized.

The inspector discussed the significance of the release of noble gas from the shield building vent during the spill with the Engineering Section Supervisor. Engineering personnel calculated a release based on data obtained from the shield building vent monitor of less than 1% of the

instantaneous release limit for Xenon 133. The Section Chief of Reactor Projects Section 1A, Region II arrived at the site on September 15 and he and the inspector met with the Plant Superintendent, the Assistant Superintendent for Operations and a maintenance engineer to discuss the incident and the licensee's corrective action. The Plant Superintendent stated that their corrective action would include revising their maintenance procedures to require careful evaluation of system conditions in the future prior to uncoupling the reactor coolant pumps. If possible the work would be done with the system depressurized. In addition, maintenance and health physics personnel would receive detailed pre-job briefings on system conditions and problem contingency plans for future work of this type.

A health physics specialist from Region II arrived at the site on September 15 to review the event and evaluate the licensee's response to radiological hazards during the event. The following are his findings:

On September 14, 1982, the licensee experienced a spill of approximately 3,000 gallons of reactor coolant inside the unit one containment via a reactor coolant pump (RCP). The spill occurred while maintenance personnel were performing work on a RCP motor. The inspector reviewed the radiological surveys taken during this event (airborne, radiation, and contamination survey's) and concluded that health physics personnel took adequate and prompt action in protecting personnel involved in the incident. All workers inside containment during this event were wearing proper protective clothing and respiratory equipment. This equipment prevented any personnel contamination. In addition, the licensee whole body counts on all individuals involved. All results showed less than 1% of the maximum permissible body burden. The inspector discussed the cleanup of the water with a licensee representative and determined their method for processing the water was adequate and had no further questions.

On September 14, 1982, efforts began inside containment to cleanup the excessive radioactive contamination levels. However, it will take a special effort by the licensee to decontaminate the spill areas inside containment to levels which are acceptable for routine work activities without respiratory protection. The inspector was informed by a licensee representative that only essential work would be performed inside containment until decontamination efforts have been completed. The inspector concluded that the radiation surveys, evacuation of personnel, cleanup of the water and decontamination efforts being conducted by the licensee were adequate and had no further questions regarding this event.

No other violations or deviations were identified.

#### 9. Independent Inspection Effort

The inspector routinely attended the morning scheduling and staff meetings during the reporting period. These meetings provide a daily status report on the operational and maintenance activities in progress as well as a discussion of significant problems or incidents associated with the refueling and operations effort.



On September 29, 1982 the inspector attended a meeting at the Sequoyah Plant with the Sequoyah Licensing Project Manager, NRR and the responsible Branch and Section Chiefs for Sequoyah from Region II. The meeting was held with various licensee personnel to discuss and obtain additional information about the proposed Integrated Modification Schedule for Units 1 and 2. The proposed schedule would require approval to defer several modifications presently required by license condition and other commitments made to the NRC in response to IE Bulletins and Construction Deficiency Reports. The Licensing Project Manager obtained the necessary information to consider approval of deferring modifications required by the Unit 1 license and the licensee agreed to provide additional information necessary to evaluate the need to modify the Unit 2 license. The licensee was informed that changes to commitments made in response to IE Bulletins and reported construction deficiencies would require submittal of revised responses to those items.

No violations or deviations were identified.