UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report Nos. 50-259/80-09, 50-260/80-09 and 50-296/80-10

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

Facility Name: Browns Ferry

Docket Nos. 50-259, 50-260 and 50-296

License Nos. DPR-33, DPR-52 and DPR-68

Inspection at Browns Ferry Site near Decatur, Alabama

Inspected by: AK Hardin for B. W. Riley — 4/7/80 Date Signed

R. C. Sauer — 4/4/80 Date Signed

B. A. Taylor for R. F. Sullivan — 4/7/80 Date Signed

Approved by: AK Hardin for P. J. Kellogg, Acting Chief, Rons Branch — 4/7/80 Date Signed

SUMMARY

Inspection on February 26-28, 1980

Areas Inspected

This special, announced inspection involved 40 inspector-hours on site in the areas of small break loss of coolant accident procedures and training.

Results

Of the two areas inspected, no items of noncompliance or deviations were identified.

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DETAILS

1. Persons Contacted

Licensee Employees

*H. L. Abercrombie, Power Plant Superintendent
*J. L. Harness, Assistant Power Plant Superintendent
*J. B. Studdard, Operations Supervisor
R. Hunkapillar, Assistant Operations Supervisor
*R. Boyer, Public Relations Officer
*R. T. Smith, QA Supervisor
*R. Cole, QA Site Representative Office of Power
*J. D. Glover, Shift Engineer (Training)
J. McCullough, Shift Engineer (Training and Procedure)

Other licensee employees included unit operators, nuclear shift engineers and nuclear plant supervisors.

NRC Resident Inspector
*R. F. Sullivan, Resident Inspector
*J. W. Chase, Resident Inspector (In Training)

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on February 28, 1980 with those persons indicated in paragraph 1 above. The inspectors summarized the purpose and scope of the inspection and findings. The licensee was informed of the decision to make the items addressed in paragraph 5.c unresolved subsequent to the inspection.

3. Licensee Action on Previous Inspection Findings

Not inspected.

4. Unresolved Items

Unresolved items are matters about which information is required to determine whether they are acceptable or may involve noncompliance or deviations. New unresolved items identified this inspection are discussed in paragraph 5.

5. Small Break Loss of Coolant Procedure Review

The inspectors compared the following licensees' small break loss of coolant accident (SBLOCA) emergency operating instructions (EOI) to the operator

guidelines developed by the General Electric Operating Plant Owner's Group as approved by the NRC Bulletins and Orders Task Force in its letter to the owner's group dated October 26, 1979:

EOI-36 Loss of Coolant Accident Inside Drywell (Revised 2/5/80)

EOI-15 Breaks/Leaks Outside of Primary Containment (Revised 2/19/80)

In addition, the procedures were reviewed as to technical content, clarity in terms of individual actions and precautions, and procedural flow with respect to timely initiation of all operator actions.

For the most part, each of the licensees' emergency operating instructions reflected the majority of the elements contained within the approved guidelines, however placement of certain immediate actions such as verification of the automatic transfer of the High Pressure Coolant Injection (HPCI) system suction and manual transfer of the Reactor Core Isolation Cooling (RCIC) suction from the condensate storage tank to the suppression chamber; the manual control of injection flow water rates to the high pressure injection systems in order to stabilize level; and the depressurization of the vessel should vessel pressure increase above the shutoff head of the low pressure systems being used to maintain level were considered subsequent actions and placed accordingly in the instructions. The licensee representative indicated the guidelines were implemented as guidelines as addressed in the letter written by Denwood F. Ross, Jr., to the General Electric Boiling Water Reactor Owners Group dated October 26, 1979.

Based on procedure review and licensed operator interviews the inspectors identified the following procedural comments requiring further licensee consideration.

a. EOI-36 Loss of Coolant Accident Inside Drywell

(1) Step III.B Break 1 should also provide titles of the particular primary containment isolation groups with the numeric designators currently addressed. Several operators, during the interviews, had difficulty in defining what a particular isolation group isolates (e.g., Group 2).

(2) Primary containment isolation of Group 3 valves (Reactor Water Cleanup System (RWCU)) does not occur on a high drywell pressure (greater than two psig) condition as defined in step III.B Break 1. Actual conditions which close the RWCU system isolation valves are presented in the technical specifications for each unit, e.g., for Unit 1 see the notes to Table 3.7.A (259/260/80-09-01; 296/80-10-01).

(3) The licensee should consider developing a pictorial representation of the suppression chamber detailing the location of each of the safety/relief valve (SRV) tail pipes to aid the operator in evenly heating the torus when using SRV's for cooldown under step IV.A Break 1.

(4) The caution warning reactor water level reading inaccuracies as a result of high drywell temperature affects in Section IV.A Break 2 should also be incorporated into Section V.B Break 1 and expanded in both cases to:

(a) Indicate that level inaccuracies may occur with drywell temperature greater than 135°F with the thirty inch level error possibility being determined to occur at 340°F.

(b) Indicate the high drywell temperature affects are slow since the thermal time constant of the yarway reference leg is approximately 20 to 30 minutes.

(5) Reference should be made to OI-73 in the NOTE of step V.C Break 1 in case the operator must manually shift the HPCI suction from the condensate storage tank to the suppression pool.

(6) Initiation of containment spray per OI-74 referenced by step V.K Break 1 cannot be performed as written since containment spray isolation valves 74-74, 74-75, 74-60 and 74-61 are not instructed to be opened (259/260/80-09-02; 296/80-10-02).

(7) Subsequent operator actions steps V Break 1 and IV Break 2, should not allow the operator the option to secure Emergency Core Cooling Systems (ECCS) without first obtaining the shift engineer's approval.

b. EOI-15 Breaks/Leaks Outside of Primary Containment

A caution should be considered for step III.B to identify if an automatic isolation of a particular system has occurred, do not attempt to de-isolate or restore the system until all available indications have been checked and are found normal.

c. The inspectors review of the emergency operating instructions also identified two items of concern involving the licensee's approach to alerting the unit operator to check that the reactor is in a safe condition:

(1) The immediate operator actions portion of the two procedures specifies the operator should follow the scram procedure addressed in general operating instruction GOI-100-1. A statement disavowing strict adherence to the instruction and authorization to deviate precedes the contents of the instruction. This statement is contrary to technical specification 6.3.A which states in part "detailed written procedures...shall be prepared, approved and adhered to...". Further, specification 6.3.B states in part that temporary changes to a procedure may be made by a member of the plant staff knowledgeable in the area affected by the procedure except that temporary changes to emergency conditions involving

potential or actual releases of radioactivity, and others detailed in the specification, require the additional approval by of a member of the plant staff who holds an SRO license on the unit affected. In addition, the change must be documented and subsequently reviewed by PORC and approved by the plant superintendent.

Unresolved item: This matter of allowing the shift engineer to deviate from the written text of facility approved procedures without obtaining proper concurrences as detailed in the units technical specifications is considered an unresolved item pending licensee review and further inspector examination during a subsequent inspection (259/260/80-09-03; 296/80-10-03).

(2) Placement of emergency action steps such as emergency shutdown with MSIV's open (section V.VI) and emergency shutdown with MSIV's closed (section V.VII) in the normal shutdown from power section (section V) of GOI-100-1 does not meet the intent of Regulatory Guide 1.33 to have separate and distinct procedures to cover emergency situations.

Unresolved item: This matter of incorporating procedures for combating emergencies and other significant events into general operating instructions is considered unresolved pending licensee review and further inspector examination during a subsequent inspection (259/260/80-09-04; 296/80-10-04).

6. Small Break Loss of Coolant and TMI Lessons Learned Training

The inspectors reviewed the training the licensed personnel received on the small break LOCA procedure required to be completed by December 31, 1979 as indicated on page 5 of Enclosure 6 to Darrell G. Eisenhut's letter to all operating nuclear power plants dated September 13, 1979. Formal classroom training for shift and non-shift licensed operators was given during the period December 4, 1979 through January 2, 1980. The lesson outline covered the following topic areas:

a. General Electrics' Services Information Letter SIL No. 299 dated July 25, 1979 detailing high drywell temperature effects on reactor vessel water level instrumentation.

b. Level Instrumentation, especially effects of Small Breaks on level instrumentation.

c. Safety/Relief valve modifications.

d. PCIS Logic - Bases and logic changes

e. Review of the TMI Incident

f. Standard Practice BF-8.2 Temporary Alterations

g. Standard Practice BF-12.5 Operation of Plant - Policy for Operator Responsibility.

h. Standard Practice BF-12.7 Shift Turnover

i. EOI-15 Breaks/Leaks Outside of Primary Containment

j. EOI-16 Steam or Water Leaks Inside the Drywell

k. EOI-36 Loss of Coolant Accident Inside the Drywell

l. EOI-46 Loss of Feedwater in Conjunction with RPV Isolation

In addition, to the 3-3.5 hour classroom lecture the operators were given a 2-2.5 hour walk through of the procedures and modifications addressed above in the control room with a shift engineer. Further, SBLOCA events, procedures and concerns will be covered during the operators annual 40 hour simulator requalification training which began for the first group of attendees on January 14, 1980 and is to be completed by mid-March 1980.

The inspectors reviewed the training outlines, hand-outs, and materials associated with the above training areas. In addition, training records were reviewed to insure that all licensed personnel had attended training sessions that had been completed prior to the inspection.

Based upon the review of the training program as defined above the inspectors determined that the licensees' training program was adequate.

7. Small Break Loss of Coolant Accident - Operator Interviews

The inspectors interviewed nine licensed operators, which included two staff (off-shift) SRO's, one shift engineer (SRO), two SRO's on shift but not shift engineers, and four shift unit operators.

The licensed operator interviews were performed to determine the adequacy of the appropriate procedures from a functional standpoint and the effectiveness of the training program. The following areas were covered.:

a. Understanding what constitutes a small break LOCA.

b. Differentiation between a LOCA and other depressurization events.

c. Familiarity with the SBLOCA procedures.

d. Operator knowledge of appropriate related procedures.

e. Confirmation that the appropriate procedures immediate actions were memorized.

f. Understanding the procedures subsequent actions and precautions that ensure plant safety.

g. Recognition of the importance of the primary and backup heat sinks.

h. Ability to determine break locations

i. Walk-throughs of the procedures including system-related aspects of the procedure to ensure that the licensed operator actions could be performed (see also paragraph 8).

j. Knowledge of transient response characteristics necessary to guide the licensed operator to the correct procedure.

k. The ability of the operator to recognize level variances and their meaning.

l. Recognition of possible instrumentation abnormalities including those encountered during the TMI transient and environmental considerations.

m. The understanding of how Emergency Core Cooling Systems (ECCS) initiate and how they function to place the reactor in a safe shutdown condition.

n. Understanding the underlying causes of TMI and how these causes can be related to a BWR.

Based on the operator interviews in the above areas the inspectors judged the SBLOCA training adequate, however they identified to the licensee that its requalification program should be enhanced to cover the following areas:

(1) Heat transfer and fluid flow fundamentals

- Saturated temperature conditions in the reactor vessel are obtained through the conversion of reactor dome pressure versus Reactor Water Cleanup System or Recirculation System suction leg temperature readouts.

- Significance of safety-relief valve thermocouple readout.

- Determination of superheated conditions

(2) Drywell high temperature affects on level instrumentation - degree of variance and time frame associated to cause the affect.

(3) Alternate methods of determining if the core is adequately cooled should level instrumentation be lost.

(4) Verification that support systems are operable in order to support ECCS components.

(5) Instruction as to the operation of the ADS logic after reactor vessel blowdown is accomplished.

(6) Instruction as to the meaning and reliability of the fuel zone level indicators during accident situations.

8. Small Break Loss of Coolant Accident - System Considerations

The inspectors reviewed system-related aspects of procedures to ensure that operator actions subsequent to a SBLOCA could be performed. System considerations in the following areas were reviewed:

a. Instrumentation to carry out operator actions in the SBLOCA procedure.

b. Understanding of the power operated safety-relief valve (SRV) position indication system (acoustic valve position monitors on the individual SRV tail pipes) including thermocouple monitoring.

c. Equipment response to safety injection reset.

d. Safety injection effects on containment isolation.

e. Real time consideration of SBLOCA procedure actions, including adequate time to remove one RHR (LPCI) division for containment spray/torus cooling.

f. Instrumentation verified for environmental effects (for the conditions prevailing at the time of the accident), power supply (with loss of offsite power and a single failure in the most limiting instrument bus), and redundancy (in sensor and readout device).

No problems were identified with system considerations a through e. All drywell instrumentation satisfy system consideration f except torus level and temperature which the inspectors could only verify met redundancy. Power supply and environmental effects on these instruments could not be established during this inspection. This item is considered open pending further inspection by the Regional Office (259/260/80-09-05; 296/80-10-05).