MEETING SUMMARY

FEB 6 1979

Docket File
NRC PDR
Local PDR
TIC
NRR Reading
LWR #4 File
E. Case
D. Bunch
R. Boyd
D. Ross
D. Vassallo
W. Gammill
J. Stolz
R. Baer
O. Parr
S. Varga
C. Heltemes
L. Crocker
D. Crutchfield
F. Williams
R. Mattson
R. DeYoung
Project Manager: C. Stahle
Attorney, ELD
M. Service
ACRS (16)
R. Denise
L. Rubenstein
NRC Participants:

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

FEB 6 1979

Docket Nos: 50-390
50-391

APPLICANT: TVA

FACILITY: Watts Bar, Units 1 & 2

SUBJECT: MEETING SUMMARY REPORT ON SITE VISIT TO WATTS BAR

In accordance with Appendix 7-B of the NRC Standard Review Plan, the Instrumentation and Control Systems Branch made a site visit as part of their review of the Watts Bar design. The agenda for the site visit, list of attendees, and the summary report of the visit are enclosed. Our report was discussed with the TVA staff and they acknowledged that the enclosure summarizes the discussions that took place during the site visit. Representatives of the Office of Inspection and Enforcement, who attended the site visit meetings, had no objections to the report.

C. Stahle

C. Stahle, Project Manager
Light Water Reactors Branch No. 4
Division of Project Management

Enclosures:
As stated

cc: See next page

M 4
GD

Tennessee Valley Authority

ccs:
Herbert S. Sanger, Jr. Esq.
General Counsel
Tennessee Valley Authority
400 Commerce Avenue
E 11B 33
Knoxville, Tennessee 37902

Mr. E. G. Beasley
Tennessee Valley Authority
W9C135 400 Commerce Avenue
Knoxville, Tennessee 37902

Mr. Michael Harding
Westinghouse Electric Corporation
P. O. Box 355
Pittsburgh, Pennsylvania 15230

Mr. David Lambert
Tennessee Valley Authority
303 Power Building
Chattanooga, Tennessee 37401

Mr. N. B. Hughes
Manager of Power
Tennessee Valley Authority
830 Power Building
Chattanooga, Tennessee 37401

Enclosure

# General Agenda for Watts Bar Site Visit

NRC Attendees (ICSB): R. Satterfield
C. Miller
R. Scholl
R. Stevens

1. Preliminary Discussions

   a. Unresolved items.
   b. Plant layout for touring.
   c. Special interest areas.

2. Control Room

   a. General layout.
   b. Nuclear and reactor protection instrument arrangement and layout.
   c. Rod position indication.
   d. Protection system initiation and bypass switch arrangements.
   e. Cabling in control room (separation).
   f. Radiation monitoring.
   g. Engineered safety feature initiation and bypass switch arrangements and status panels.

3. Cable Runs and Cable Spreading Area

   a. General layout.
   b. Degree of separation.
   c. Fire detection.

4. Switchgear Rooms

   a. General layout.
   b. Fire detection.

5. Battery Installations

   a. General layout.
   b. Fire detection and security.
   c. Monitoring instrumentation.

6. Diesel Generators

   a. General layout.
   b. Fire detection and protection.

7. Shared Systems for Multi-Unit Sites

   a. Equipment location and potential for damage.
   b. Control room control and assignment to accident unit.
   c. Availability upon completion of first unit.
   d. ERWCS

8. Shutdown Outside Control Room

   a. Location for potential damage
   b. Feedwater system, etc.

ENCLOSURE

LIST OF ATTENDEES

NRC

R. Satterfield
C. Miller
R. Scholl
R. Stevens
C. Stahle
B. Crochran
K. Thomas

TVA

J. Cross
L. Nobles
G. Williams
T. Hayes
R. Deney
N. Black
B. Nicholson
B. Cochoran
J. Groves
J. Linehan
D. Reagon
C. Sudduth
D. Lambert
D. Ormsby

ENCLOSURE

SUMMARY REPORT OF

WATTS BAR SITE VISIT

In the three days that the staff was at the Watts Bar Plant, we audited the design and/or implementation of several systems. The following are the salient results of our visit:

1. The applicant was advised that the staff has not completed the qualification review of the Barton 763 and 764 transmitters. Furthermore, we suggested that the review of these devices may not be compatable with the applicant's fuel load schedule.

2. We noted that the instrumentation grounding system in the control boards provided a common flammable path between the divisional wiring and non-divisional wiring. We requested that the applicant determine if any fire tests were conducted by Westinghouse on this configuration and, if so, provide the staff with a copy of the reports. We also informed the applicant that we would advise the Auxiliary Systems Branch (ASB) of our concerns and would coordinate our review of this aspect of the Watts Bar design with them.

3. The staff noted that the barriers were missing between meters of opposite trains which were closer together than six inches and that some non-Class 1E indicators of opposite trains were barriered. We suggested that the applicant review the criteria for separation

inside of the control room cabinets and the use of barriers in particular. We also requested that the Resident Inspector follow up on this item.

4. We reviewed the isolation of several control room indicators and recorders from their Class 1E circuits and determined that adequate isolation is provided so long as the routing between the isolators in the Auxiliary Equipment Room and the Control Room did not expose these circuits to a voltage greater than that for which the isolators (Foxboro I/I Converters) are qualified. The applicant will inform the staff of the qualification rating and the results of a routing review. We informed the applicant that we will request that Inspection and Enforcement (I&E) and the Power Systems Branch (PSB) audit their review of the routing.

   In order to assist the staff in this review, the applicant was requested to identify the cables, circuits, and functions which are associated with the following conduits:

   A. 1 PM 6182 from Cabinet 1 R 14
   B. 1 PM 6183 from Cabinet 1 R 14
   C. 1 AC 818 from Cabinet 1 R 16
   D. MC 864 A from Cabinet 1 R73
   E. M 3123 from Cabinet 1 R 54

This information was not available during our visit because the design work involving the routing of cables has not been completed. The applicant will provide this information, as it becomes available, in response to the minutes of this meeting.

5. The staff noted that Pressurizer Heater Banks A and B were given divisional power assignments. We asked for an explanation of and justification for such designations. The applicant explained that the use of these heaters to maintain pressurizer pressure was a matter of preference and that such use was justified under Regulatory Guide 1.75 by virtue of the fact that a LOCA signal would strip these loads. The staff agreed.

6. The staff noted that the Pressurizer Vapor Space Temperature had been designated for post accident monitoring. Because the staff was aware of the fact that this parameter had been proposed, in past Westinghouse designs, as the diverse signal for Residual Heat Removal (RHR) interlocks; we questioned the applicant in this regard. The applicant agreed that this parameter had been used for the diverse signal and further stated that a diverse Reactor Coolant System Pressure (using different type of pressure transmitter) was or would be used in place of this temperature. The applicant agreed to document this design change.

7. The staff noted that the applicant had provided two full capacity motor driven and one double capacity turbine driven auxiliary feedwater pumps for each unit. We further noted that the instrumentation and controls for the turbine driven system were dc powered. We expressed our concern that both trains of ac and dc were required for the proper functioning of the motor driven pumps and that train A dc was required for proper functioning of the turbine driven system. This matter was discussed further and the staff has concluded that the loss of all ac event can be considered to include a single failure and that the reliance on a single, specific system (Train A dc) is therefore acceptable for this vintage plant if the Technical Specification requires Train A dc (including battery) be operable for operation of the plant above Mode 3.

The applicant was also requested to identify the instrument functions which are found in cabinet 1-R-141 and are a part of the AFW system.

Beyond the question of the Auxiliary Feedwater System, however, the staff discussed the philosophy of the use of shared systems at length with the applicant. (For a further discussion see Item 23).

8. The staff noted that the design of the 6.9 Kv emergency power system included the capability of interconnecting Trains A and B by the use of two normally racked out circuit breakers. (Our review included visual confirmation that these breakers were racked out). The applicant stated that these breakers were designed to provide additional flexibility for casuality control and noted that such features were permitted under Regulatory Guide 1.6. The staff responded by expressing concern that the status indication for these breakers was provided by the dc of the associated train and that the indication wiring was run together in non-safety trays.

The applicant agreed that this was an unacceptable design and proposed to correct this situation be removing the fuses. The staff responded to this proposal by noting that the indication would be defeated and that one or both breakers could be accidentially racked in and closed without the control room operator's knowledge. We stated that we would advise PSB of our concern and coordinate this aspect of our review with them.

9. We reviewed plant drawings which indicated that the instrument rack power transfers which could be effected from the control room were limited to non-Class 1E sources.

10. We noted that the High Pressure Fire Pumps were powered from Class 1E sources and asked if they were qualified to seismic Category 1 requirements. The applicant stated that they were so qualified and that FSAR Section 9.5 will so state if it does not so state now.

11. The staff noted that there was insufficient evidence to support the fact that Class IE radiation monitors were being used to provide inputs to the Solid State Protection System. The applicant agreed to clarify this matter.

12. The staff's tour of the diesel generator building revealed that there were no provisions made to prevent accidental maladjustment of the governor, fuel filter, or oil filter controls. The applicant was advised that this matter would be brought to the attention of the PSB.

The staff also noted that the applicant proposed to provide only a 20 second preaction alarm on the Cardox system for the diesel generator board rooms. We advised the applicant that we would pass this information on to the ASB for their evaluation.

13. The staff noted that several safety related instruments used tubing which was exposed to a partially freezing environment. The applicant was unable to adequately describe the heat tracing systems during our site visit and agreed to amend the FSAR to include the following information:

A. The identification of all Class 1E instrument lines which require heat tracing,

B. A description of how such heat tracing is implemented,

C. A description of how heat tracing failures are identified, and

D. Identification of the energy source for each heat trace circuit which is identified as a result of items A and B above.

14. The staff noted that the cable runs to the pump house required the splicing of cables and that such splices could be subjected to prolonged periods of flooding. The applicant stated that the butt splices were prototype tested by Raychem for 100 day submersion and agreed to provide the staff with a copy of the test report.

15. The staff discussed the design of the Essential Raw Cooling Water System with TVA engineers and visited the pump house as well as other major component sites. The following items were resolved as noted:

A. There have been several major changes in valve arrangements and/or valve control schemes. The revised drawings will be provided in the FSAR.

B. The screens, motors, and differential level instruments are siemiscally qualified, however the air supply system to the back wash instrumentation are not seismically qualified. The applicant was advised that we would consult the ASB with regard to the resolution of this item.

C. The applicant agreed to provide the staff with a copy of the environmental qualification report for the Robert Shaw equipment which is typical of that found in racks 1-R-140 and 1-R-143.

D. The staff advised the applicant that we wished to discuss the impact of a malpositioning of valve 1-67-146 or 2-67-146 with the ASB.

16. The staff visited the cable spreading room and noted that the vertical trays did not satisfy the criteria given on FSAR page 8.3-41. The applicant was advised that this aspect of our review would be coordinated with the ASB and PSB.

17. The staff noted that each control panel was provided with forced ventilation and that the fan could be automatically stopped by ionization detectors which were mounted on the centerline of the fans on the suction side. The salient points of the discussion of this design are:

A. The applicant will assure that this combination is seismically qualified because the addition of the detectors was not a part of the Westinghouse scope of supply.

B. As a part of the preoperational testing, a smoke test will be conducted to assure that the detectors are in the fan flow path.

C. The applicant will advise the staff as to:

(1) The consequences of a loss of ventilation in each cabinet containing redundant Class 1E equipment.

(2) The time which is required to detect a loss of forced ventilation, and

(3) The time in which corrective action must be initiated and the time in which it must be completed.

18. The staff audited the provisions for remote shutdown and noted that the design provided independence from the control room.

19. The staff's audit of the battery rooms revealed that non-seismic Category I fresh water piping terminated in each room. The applicant stated that he understood the staff's concern that a seismic event could result in the simultaneous flooding of each room. TVA will provide suitable drains for each battery room.

20. The staff audited the implementation of the Solid State Protection System. The following are the salient points of that effort:

A. The staff noted that a previously unknown field modification was being made to the input cabinets. I&E will follow up on this item including a determination of:

(1) Why the modification was being made,

(2) The consequences of this modification upon (a) the assumptions which were made when the Solid State Protection System was approved and, (b) the Topical reports which are referenced in the FSAR.

(3) The NRC Branch which reviewed and approved this change to a previously approved design.

B. The implementation of the isolation devices which provide data transmission between the A and B trains for the general alarm and to the plant and plant computer for other alarms was not properly implemented. The applicant stated that he was aware of the staff's concern as a result of our review of Sequoyah, that the required changes were being made on those units, and would be made on Watts Bar. I&E will assure that the isolation which is provided in the Solid State Protection System at Watts Bar is:

(a) The same as at Sequoyah,

(b) Modified from the present design such that the inputs are at the opposite end of the edge connectors from the outputs, and

(c) Satisfies the requirements of IEEE Std 279-1971 and the recommendations of Regulatory Guide 1.75.

C. The staff noted that a red conduit with two cables was connected to a Train A output relay cabinet (1R54). The cables were identified as Source Range Channel I control cables 1NM100D and 1NM101D. The exact function of these cables and an explanation as to why similar cables for Channel II were not found in Train B will be provided by the applicant as part of his repsonse to these minutes.

21. The applicant was further advised that unless acceptable information is received in response to points 2, 4, 6, 7, 10, 11, 13, 14, 15, 17, 19 and 20 of these minutes, the concerns expressed herein will be identified as open issues in our safety evaluation report.

22. The staff noted that the Source Range and Power Range Block Switches were tagged with the Train designation and identifing flag. The Intermediate Range (IR) Block Switches were tagged with the Train designation but not flagged. The applicant stated that the IR tags were improperly engraved and would be corrected by adding the flags. Inspection and Enforcement will verify completion of this item.

23. The site visit confirmed the staff's impression of a design which may rest too much on shared systems and raised several questions with regard to what constitutes a single failure.

As examples, the following were noted:

A. Although there are four diesel generators, they are paired such that a single event can cause the failure of both Train A on-site supplies or both Train B on-site supplies.

B. In addition to sharing trains between units (e.g. Closed Cooling Heat Exchanger C provides cooling for all Train B heat loads in both Unit 1 and Unit 2, some sensors are shared between trains within a unit. In spite of the use of isolation devices (see Item 11D thru 11G above) the magnitude and consequences of failures in such systems cannot be determined until further information is received from the Applicant and evaluated by the staff.

C. Given that two diesels in train B fail (see Item 23A) and the operator in non-accident unit fails to properly throttle the discharge of his operating reactor building closed cooling water heat exchanger cooling path (see Item 15D) then all onsite sources and other critical components may overheat. TVA responded that such a postulated series of events are highly unlikely; however, they would submit a discussion on this matter to demonstrate the remoteness of this postulated situation.

24. The staff also toured the turbine building and noted that:

A. There is no ammonia sump,

B. Ammonia spills will be collected in the turbine building sump, and

C. The turbine sump pump motors and level switches are located outside of the sump in a well ventilated space.

D. Question 031.059 need not be issued.