

SALP REPORT - WATTS BAR

50-390/94-41 AND 50-391/94-41

1. Background

The SALP Board convened on July 14, 1994, to assess the nuclear safety performance of Watts Bar Nuclear Station for the period June 13, 1993, through June 18, 1994. The Board was conducted pursuant to the guidance contained in NRC Management Directive 8.6, "Systematic Assessment of Licensee Performance." Board members were Johns P. Jaudon (Chairperson), Acting Deputy Director, Division of Reactor Projects, RII; Albert F. Gibson, Director, Division of Reactor Safety, RII; Frederick J. Hebdon, Director, Project Directorate II-4, NRR; Bruce S. Mallett, Acting Deputy Director, Division of Reactor Safety, RII; and Ellis W. Merschoff, Director, Division of Reactor Projects, RII.

2. Construction, Modifications, Corrective Action Programs, and Special Programs

This functional area assesses the planning, engineering, and implementation of construction and modification activities, and the implementation of Corrective Action Programs (CAP) and Special Programs (SP).

A substantial amount of construction, modification, and CAP/SP completion work was accomplished during this SALP period. In general, construction work was well planned, appropriately supported by engineering, properly implemented in the field, and effectively verified prior to completion. In most cases, the CAPs and SPs were satisfactorily implemented with good field work and comprehensive inspections to assure quality. Although there were several programmatic problems in the second half of the SALP period, overall, performance in this area was good.

During this period, detailed assessments were performed on the work completed for twelve CAPs and Sps at either the 75% or 100% completion point for in process welding and NDE activities and for major modifications such as the Eagle 21 Reactor Protection System modification. Work plans for these efforts were generally found to be sound and sufficiently detailed to provide effective guidance in the field.

Engineering performance during this period was generally good, with calculations, drawings, deficiency disposition, and other design outputs meeting regulatory requirements. The extensive design efforts completed for the Hanger and Analysis Update Program CAP and the Heating, Ventilating, and Air Conditioning Duct and Duct Supports CAP were considered to have been accomplished successfully. Other areas

reviewed, however, revealed instances where the expected quality of the engineering product was not completed as well. Specifically, implementation of the Design Baseline and Verification Program CAP failed to identify several instances wherein the installed hardware differed from the configuration control drawings; at least one example required a plant modification to correct the discrepancy. Review of the Equipment Seismic Qualification CAP also revealed design input errors and an inadequately justified assumption. These were judged to be examples of poor engineering support.

The extensive field work associated with hanger and support modifications was generally of high quality and satisfactorily corrected the original problems. Effective work controls were evidenced by the substantial amount of cable installation, splicing, termination and pressure transmitter calibration and modifications which were successfully completed.

Additionally, improvement was noted in the area of eliminating damaged, loose, and missing hardware inside containment, although there were still examples of this problem found. In general, the condition of the plant was good and had improved since the last assessment.

Problem identification and construction verification activities have improved, although significant lapses were noted during the period. Specifically, walkdowns conducted for the Electrical Issues CAP failed to identify numerous non-conforming flexible conduits, and quality assurance reviews of the Instrument Lines CAP failed to identify separation, slope, and damage deficiencies. The bulk of the problem identifications and quality verification activities, however, were timely, thorough, and effective in identifying problems.

The Construction, Modifications, Corrective Action Programs, and Special Programs functional area is rated Category 2.

3. Pre-Operational Testing

The functional area of Pre-operational Testing assesses all measures taken to test safety-related plant structures, systems, and components in order to demonstrate their ability and readiness to support operation of the plant.

Test document accuracy and preparation timeliness were major issues early in the assessment period. Many of the test procedures had errors - some of which were substantive - when the procedures were presented to the NRC for review. The management action to resolve this issue was initially ineffective but later efforts, which included a major organizational change were more effective. A new Startup Manager was brought in from outside of TVA. Other changes included hiring a large number of experienced test personnel (i.e., more than fifty).

This management and organization change resulted in major changes in the way that test procedures were drafted and reviewed. Both the quality

and rate of test procedure preparation improved. Although errors continued to be identified in test procedures during NRC reviews, their significance decreased, and the overall quality of procedures was acceptable throughout the remainder of the assessment period. TVA productivity, accountability, and effectiveness in the pre-operational test area improved from unsatisfactory (in the first third of the assessment period) to good (for the last four months of the assessment period). The result was that Watts Bar reached and completed (albeit with significant retests required) a major test milestone, Hot Functional Testing. Late in the assessment period, near the end of the Hot Functional Testing, the licensee again changed the manager of the test organization. Because this was near the end of the assessment period, no definitive conclusion of the effect of this last organizational change was reached.

The conduct of pre-operational testing was generally acceptable. As a norm, test personnel took a careful approach to testing and to assuring that test objectives were met. For instance only one problem during Hot Functional Testing (the mis-wiring of a temperature detector) was directly attributable to an error in individual component testing. However, TVA did not make effective use of previous test data. For example, TVA encountered difficulty during the Integrated Leak Rate Test of the containment in maintaining stable temperatures within the containment while attempting to keep the ice region cold without ice loaded. A similar problem had occurred when this same test had been conducted under the same conditions during 1983, but current TVA management was not aware of this before the problem was encountered during this assessment period. Thus the test was delayed by a problem that should have been addressed before the test began.

TVA was not effective in dealing with the equipment failures of the Auxiliary Feedwater System identified during Hot Functional Testing. TVA was unable to complete endurance testing of the Turbine Driven Auxiliary Feedwater pump before deciding to terminate Hot Functional Testing, thereby requiring a second a Hot Functional Test period, for which TVA was slow to develop a retest schedule and plan.

Although very few of the records of field completed tests had been through Joint Test Group review and approval during the assessment period, no specific problems were identified in this limited sample of accepted test results and vaulted record. Assessment of Joint Test Group effectiveness in test review was based on the limited sample size available.

Control of the plant and plant conditions during Hot Functional Testing and the Integrated Leak Rate Test was generally good. There were some configuration problems identified by the NRC just prior to Hot Functional Testing, but TVA responded with effective measures, and there were no significant problems in this area during the remainder of the assessment period including the Integrated Leak Rate test.

The Pre-Operational Testing functional area is rated Category 2.

4. Licensing Readiness

This functional area assesses TVA's readiness and actions to support the license process.

TVA has a capable and dedicated site licensing staff. The site licensing staff has maintained open and frank communication with the NRC staff, has been responsive to NRC inquiries, and has been instrumental in driving many licensing actions to closure during this SALP period.

TVA has been timely and thorough in working with the NRC staff to finalize the draft Technical Specifications, and this document is now nearly ready for issuance as a final draft for certification by TVA.

The same level of performance was not noted in the update of the Final Safety Analysis Report (FSAR). Corrective actions for a large backlog of FSAR changes were not fully effective. Also the quality of FSAR changes was mixed. At the beginning of the assessment period, the inventory of FSAR change packages had accumulated for a prolonged period. When TVA issued them as amendments, they had quality problems. For example, material for Chapter 3, which had been available within TVA since 1989, was not submitted until Amendment 79. Examples of the problems found were:

Amendment 79 was submitted despite the fact that TVA was aware of additional changes that needed to be made. Hence TVA revised Chapter 3 again, only three months later, in Amendment 86. In addition, deficiencies in Amendment 79 required an extensive request for additional information (RAI). Thus, while submittal of Amendment 79 met TVA's schedule commitment, the completeness and adequacy of the submittal were poor.

Amendment 77 which revised Chapter 11 required a six-page RAI due to missing information, inconsistencies, and errors, indicating that the amendment review was carefully and thoroughly completed.

The staff had to make several contacts with TVA to obtain missing information and to clarify unclear information in Amendment 80, leading the staff to conclude that the TVA review of Westinghouse and EBASCO analyses without was weak.

The Licensing Readiness functional area is rated Category 2.

5. Readiness to Support Plant Operations

This area assesses TVA's progress in readiness in order to support plant operations in the areas of operations; plant support (emergency preparedness, radiological controls, radiological effluent monitoring, environmental monitoring and chemistry controls, and security) and maintenance.

During Hot Functional Testing, the operators demonstrated adequate skills and abilities, but the number of specific problems noted indicated the need for improvement in the areas of procedural adherence, communications, and attention to detail before fuel load. Operations management had attempted to set appropriate standards of conduct. Communications and professionalism in the control room were often good during Hot Functional Testing. But there were also examples of poorer operator performance during this major evolution. For example, operators did not always follow procedures and failed to communicate effectively several times. On one occasion this resulted in the deadheading of a safety injection pump. There were also some positive examples. Operators were usually attentive and took conservative actions in response to events. In addition, the response to an inadvertent steam generator Power Operated Relief Valve (PORV) opening during Hot Functional Testing was quick and correct.

Development of operational maturity was noted, but the sufficiency of this progress does not yet support fuel load at this time and will have to be re-assessed during the second Hot Functional Testing. Early in the assessment period, TVA had not established effective operations shift teams; TVA had improved this toward the end of the assessment period. There was a good pass rate for operators on examinations, and a strength was noted in crew communications during simulator use, but candidates exhibited some difficulty in evaluating the consequences of actions before taking them and in utilizing certain indicators to diagnose plant problems (e.g., did not identify an open PORV). Operators also exhibited a common weakness in their understanding of 10 CFR Part 20 radiation control requirements.

In general, there was a good program in place for establishing procedures. A review of operations procedures identified design basis and vendor items not incorporated on several occasions. The quality of procedures in chemistry and radiological waste areas improved over the assessment period, and the procedures appeared ready for operational use.

The emergency preparedness program was excellent. Emergency response training was strong. Individuals demonstrated knowledge of duties and an ability to respond to emergent conditions and mitigate the consequences during the October 1993 full-scale exercise. TVA's emergency response facilities were good and capable of supporting emergency operations. TVA conducted thorough critiques and was timely in correcting identified problems.

Although the radiological controls and environmental monitoring programs had progressed over the assessment period, they were not ready to support plant operations. Procedures and equipment in the radiological controls area were not complete. TVA had implemented a good quality environmental monitoring program; however, onsite personnel did not have good knowledge of the program being run by licensee staff offsite. There was a comprehensive continuing training program for health physics technicians, and staff appeared to be well qualified. Radiation worker

training was generally good, but there was a weakness in that TVA waived the demonstration of job specific requirements at the site. The As Low As Reasonably Achievable (ALARA) program showed good initiation in identifying areas for reducing potential exposure; however, TVA did not have a good process for documenting and dispositioning corrective actions to items identified during ALARA walkthroughs. Thus, these programs were also still developing.

In the radiological waste and effluent monitoring area, adequate progress was made toward the support of operations. Procedures were in place to support operations, but the knowledge or understanding of the operations of the systems was still weak. For example, operators were unable to monitor control panel readouts properly for condenser polisher operations. Also, a test of the post accident sampling systems demonstrated a failure on the part of engineers to account for actual times to collect samples. Many radiological effluent system readouts were not complete in the control room for demonstration of monitoring at the end of the assessment period.

Security planning processes in place were thorough, but there was little progression toward completing the required systems during the assessment period. TVA has submitted a good security plan and system test procedures, but there was neither much equipment nor staffing in place, to support plant operation.

The Readiness to Support Plant Operations functional area is rated Category 2.

6. Safety Assessment and Quality Verification

This functional area encompasses TVA's self-assessment activities, the Employee Concerns Program, management review committees, and Corrective Action Program.

Effective self-assessments provided assurance that regulatory requirements and commitments were met. TVA's Program for Assurance of Completion and Assurance of Quality was effective for confirming that Watts Bar was constructed in accordance with licensing commitments. A Performance Evaluation Program provided good self-assessment of operational readiness activities performed by the line organization. Quality assurance audits conducted in a wide variety of areas provided management good feedback regarding the quality of work and status of operational readiness.

Management review committees were appropriately established and their performance was adequate. The Nuclear Safety Review Board was established early to review operational readiness and the Plant Operating Review Committee was in place and functioning for procedure reviews. Although the activities of these groups were limited during this assessment period, the scope of reviews was appropriate and the quality of work was adequate. The Joint Test Group was not effective in assuring quality in pre-operational test procedures early in the

assessment period as evidenced by numerous deficiencies found in procedures that had been reviewed and approved by this group. However, the performance of this group improved over the assessment period and was adequate by the end of the period.

The program which was implemented late in the previous assessment period to verify independently the quality and completion status of items CAPs and SPs was generally effective. This effectiveness was evident from the good performance found in the implementation of most of the CAPs and SPs inspected by the NRC during this assessment period. However, late in the period, the NRC found significant deficiencies in the implementation of CAPs for electrical issues and instrument lines which had not been identified by TVA's independent quality assurance review.

TVA's performance in implementing the Employee Concerns Special Program improved and the program was generally effective in assuring that concerns raised by licensee employees and contractors were properly resolved. Management involvement was appropriate and the classification of concerns as intimidation and harassment was conservative. A Lookback Program was established to provide additional assurance that concerns were properly reviewed and that corrective actions were properly tracked and documented. The overall quality of corrective action tracking documents was satisfactory.

Although significant corrective actions were achieved as indicated by progress resolving CAPs, SPs and employee concerns, deficiencies in the implementation of the Corrective Action Program continued from the previous assessment period. In particular, the root causes of problems were not always properly identified and corrective actions did not always address the identified problems; the full extent of problems was not always fully identified resulting in repetitive problems of similar nature; and, numerous deficiencies were identified in corrective action documents. Although few hardware problems were attributed to these programmatic deficiencies, the deficiencies were significant because they increased the potential for undetected and uncorrected problems.

The Safety Assessment and Quality Verification functional area is rated Category 2.