

ENCLOSURE

INITIAL SALP BOARD REPORT

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

INSPECTION REPORT NUMBERS

50-390/93-46 AND 50-391/93-46

TENNESSEE VALLEY AUTHORITY

WATTS BAR UNITS 1 AND 2

JUNE 14, 1992 - JUNE 12, 1993



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I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) program is an integrated Nuclear Regulatory Commission (NRC) staff effort to collect available observations and data on a periodic basis and to evaluate licensee performance on the basis of this information. The SALP program is supplemental to normal regulatory processes used to ensure compliance with NRC rules and regulations. It is intended to be sufficiently diagnostic to provide a rational basis for allocation of NRC resources and to provide meaningful feedback to the licensee's management regarding the NRC assessment of their facility's performance in each functional area.

An NRC SALP Board, composed of the staff members listed below, met on July 9, 1993, to review the observations and data on performance, and to assess licensee performance in accordance with Chapter NRC-0156, "Systematic Assessment of Licensee Performance."

This report is the NRC's assessment of the licensee's safety performance at Watts Bar Units 1 and 2 for the period June 14, 1992, through June 12, 1993.

The SALP Board for Watts Bar was composed of:

- E. W. Merschoff, Director, Division of Reactor Projects (DRP),
Region II, (RII) (Chairperson)
- J. P. Stohr, Director, Division of Radiation Safety and Safeguards,
RII
- A. F. Gibson, Director, Division of Reactor Safety (DRS), RII
- R. V. Crlenjak, Chief, Reactor Projects Branch 4, DRP, RII
- G. A. Walton, Senior Resident Inspector, Watts Bar, DRP, RII
- F. J. Hebdon, Director, Project Directorate II-4, Office of Nuclear
Reactor Regulation (NRR)
- P. S. Tam, Senior Project Manager, Watts Bar, Project Directorate
II-4, NRR

Attendees at SALP Board Meeting:

- P. E. Fredrickson, Chief, Project Section 4B, DRP, RII
- W. S. Little, Project Engineer, Project Section 4B, DRP, RII
- C. A. Julian, Chief, Engineering Branch, DRS
- G. A. Hallstrom, Reactor Inspector, Materials and Processes Section,
DRS, RII
- J. F. Lara, Resident Inspector, Watts Bar, DRP, RII
- M. M. Glasman, Resident Inspector, Watts Bar, DRP, RII

II. SUMMARY OF RESULTS

During this 12-month assessment period, construction and modification of Watts Bar was performed in an overall acceptable manner. The area of Auxiliary Systems was considered to be superior while the Safety Assessment/Quality Verification area was noted as being weak.

The functional areas of Soils and Foundations; Containment, Major Structures, and Major Steel Supports; Mechanical Components; and Instrumentation were not evaluated because there was insufficient licensee activity and NRC inspection in those areas to support an assessment of licensee performance.

The Piping Systems and Supports area showed a good level of management attention to and involvement in nuclear safety. Strengths included the Preservice Inspection program, the Microbiological Induced Corrosion program, and current welding quality. Management involvement in the piping erosion control program was a weakness.

The Auxiliary Systems area showed a superior level of management attention to and involvement in nuclear safety. Strengths included the engineering controls, work quality, Thermo-lag testing, and the security system upgrade. No major weaknesses were noted in this area.

The Electrical Equipment and Cables area showed a good level of management attention to and involvement in nuclear safety. Significant weaknesses, early in the assessment period, involved corrective action for cable design deficiencies and implementation of the Master Fuse List Special Program. These problems were adequately addressed during the assessment period. No major strengths were identified.

The Engineering and Technical Support area showed a good level of management attention to and involvement in nuclear safety. Strengths included the Motor Operated Valve program implementation, quality of vendor technical manuals, and the Unit 1 Technical Specifications. Weaknesses included training on plant procedures and inconsistent control of vendor information.

The Safety Assessment/Quality Verification area showed an acceptable level of management attention to and involvement in nuclear safety. No major strengths were noted in this area. Weaknesses included timeliness of Final Safety Analysis Report updates, Quality Assurance department effectiveness, and the corrective action rollover process.

The Preoperational Testing area showed a good level of management attention to and involvement in nuclear safety. Strengths included secondary hydrostatic test performance and Emergency Operating Procedure based plant labeling. Weaknesses included test program changes and the initial test program submittal.

Overview

The last SALP performed was for the period that ended May 31, 1985. The NRC SALP process was temporarily suspended for all of TVA after the transmittal of the TVA SALPs on September 17, 1985. All TVA operating plants were in shutdown at that time. The September 17, 1985 transmittal letter included a request under 10 CFR 50.54(f) relating to staff concerns about TVA's ineffective management of its nuclear power program and confirmed TVA's commitment to the NRC not to restart operation of any of its nuclear plants without NRC concurrence.

Construction of Watts Bar Unit 1 was essentially finished in 1985. As a result of safety concerns raised by employees and NRC staff concerns stated in the September 17, 1985 10 CFR 50.54(f) request for information, the licensing process was delayed. The licensee retracted the Unit 1 fuel load readiness letter in 1986 and began a rigorous assessment of what corrective actions were necessary to license Watts Bar Unit 1. The results were the issuance of a Nuclear Performance Plan for Watts Bar (TVA's response to the 10 CFR 50.54(f) request for information), and several Corrective Action Program plans (CAPs) and Special Programs (SPs).

In December 1990 the licensee voluntarily stopped physical construction work due to work control problems. During the work stoppage, the licensee decided to hire a contractor to perform all future construction/modification work. During the work stoppage, the licensee significantly upgraded the work control process and reduced its backlog of items necessary to support construction work. All systems were transferred back to the Engineering and Modifications organization and a decision was made to again perform the entire preoperational testing program. Limited construction work was restarted in November 1991, with full construction resuming in June 1992. Since construction restart, almost all work performed has been on Unit 1, or Unit 2 systems necessary to support Unit 1 operation. As a result there was insufficient information to provide separate systematic assessment ratings for Unit 2.

Due to the 8 years since the previous SALP assessment and the history described above, a comparison to the previous assessment ratings was not considered meaningful in assessing licensee performance trends. Therefore, the ratings from the previous period are not provided in this report.

<u>Functional Area</u>	<u>Rating This Period</u>
Soils and Foundations	N
Containment, Major Structures, & Major Steel Supports	N
Piping Systems and Supports	2
Mechanical Components	N
Auxiliary Systems	1

Electrical Equipment and Cables	2
Instrumentation	N
Engineering/Technical Support	2
Safety Assess./Quality Verif.	3
Preoperational Testing	2

III. CRITERIA

The evaluation criteria which were used, as applicable, to assess each functional area are described in detail in NRC Manual Chapter 0516. This chapter is in the Public Document Room. Therefore, these criteria are not repeated here, but will be presented in detail at the public meeting to be held with licensee management.

The performance categories used when rating licensee performance are defined as follows:

Category 1. Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in a superior level of performance. NRC will consider reduced levels of inspection effort.

Category 2. Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in a good level of performance. NRC will consider maintaining normal levels of inspection effort.

Category 3. Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in an acceptable level of performance; however, because of the NRC's concern that a decrease in performance may approach or reach an unacceptable level, NRC will consider increased levels of inspection effort.

Category N. Insufficient information exists to support an assessment of licensee performance. These cases would include instances in which a rating could not be developed because of insufficient licensee activity or insufficient NRC inspection.

IV. PERFORMANCE ANALYSIS

A. Soils and Foundations

Analysis

This area includes all activities pertaining to soils and foundations related to the construction of the ultimate heat sink and major structures.

No major work activities occurred in this category during the assessment period but documentation for the Soil Liquefaction Special Program was

completed for closure. The documentation was adequate to determine that the licensee correctly implemented the Special Program. During the period, extensive discussions were conducted between the licensee and the NRC concerning the stability analysis of the underground barriers for the essential raw cooling water pipeline. The licensee was responsive to the NRC concerns and reperformed the analysis to show that there was sufficient margin against failure.

Performance Rating

Not Rated

Recommendations

None

B. Containment, Major Structures, and Supports

Analysis

This area includes all activities related to structural concrete and steel used in the containment, major structures, and major steel equipment supports.

Only minor corrective action work activities occurred in this functional area during the assessment period.

Performance Rating

Not Rated

Recommendations

None

C. Piping Systems and Supports

Analysis

This functional area addresses safety-related piping systems associated with the primary pressure boundary and other safety-related water, steam, and radioactive waste containment piping systems.

Pipe support installation and design was conducted in a satisfactory manner in accordance with licensing commitments in the Final Safety Analysis Report, and the American Institute of Steel Construction (AISC) Code. During the assessment period, the licensee continued the implementation of a Hanger Analysis And Update Program (HAAUP) Corrective Action Program plan (CAP) to resolve outstanding deficiencies with large and small bore pipe supports and pressure boundary retention

pipng. The CAP involved reanalysis of piping stress calculations, configuration walk-downs, and extensive hardware modifications. The licensee had previously reported the engineering work essentially completed and approximately 60 percent of field modifications completed for this program. With some exceptions (loose or missing hardware), the support and piping hardware matched the quality assurance records or alternate records. The hardware quality of items modified was acceptable.

Performance in pipe system and support activities, other than the HAAUP CAP, was mixed. Completed work from the Upper Head Injection system removal effort was of good quality. However, need for additional improvement was demonstrated by several problems in other areas. The problems involved installation discrepancies in pipe supports, snubber test discrepancies, installation problems with wedge anchor bolts installed through grouted pads, and failure to perform American Society of Mechanical Engineers (ASME) Code, Section III post-modification hydrostatic testing in accordance with the Quality Assurance Manual. The licensee's initial response to each of the discrepancies was satisfactory, except in the case of the wedge bolt installation problems. Lack of management and Quality Assurance department involvement and effectiveness was especially evident on this issue and caused delays in problem resolution. However, corrective action for the problem and identification for extent of condition was in process at the end of the assessment period. Installation practices were improved under a revised procedure for wedge bolt installation.

The licensee's design process for piping supports was generally adequate. During this period, NRC performed an Integrated Design Inspection (IDI) in civil/structural engineering areas. In most cases, NRC regulations and design commitments made in the Final Safety Analysis Report were implemented. Strengths were identified in competence of the technical support staff, programs and data bases for tracking design changes, and good housekeeping in the plant. One problem area was the numerous examples of loose and missing hardware associated with completed support hardware.

Welding activities were well controlled during the assessment period and accomplished in a professional and quality manner. Welders were qualified and welding quality was good. The Welding CAP addressed previously completed Unit 1 safety-related welds. The licensee's review for the CAP included review of the written welding program and evaluation of welds in safety-related structures, systems, and components. Corrective actions, including program corrections and repairs and/or re-work, where deemed necessary, were identified in the CAP. The Welding CAP Final Report was thorough and comprehensive. Final review of the Welding CAP was ongoing at the end of the assessment period.

The licensee had a strong and well-implemented Preservice Inspection (PSI) program. The licensee has been constantly reviewing and updating

its PSI program, as evidenced by the high number of revisions. Licensee management was effectively involved. The PSI program and relief requests showed conservatism, well-thought-out approaches, and an understanding of safety and regulatory concerns. The licensee recently decided to repeat the PSI for Watts Bar Class 1 and 2 pipe welds. Also, as a result of the ASME Code update, the Reactor Coolant system welds were re-examined using an automated UT system. Pipe welds recently made during repair and replacement activities were examined using procedures equivalent to procedures being used today and thus do not need to be re-examined. Examinations were performed in a conscientious manner by experienced and qualified examiners in accordance with detailed procedures. In-process nondestructive examination records were found to be in order.

The program and implementation for Microbiological Induced Corrosion (MIC) was determined to be good with the exception of some minor problems which were resolved during the assessment period. The licensee implemented the MIC Special Program to control corrosion in raw water systems. Plant management was found to be very supportive of the program and had provided necessary funding and manpower. Although the licensee had been slow in implementing the MIC program (1986-1993), the program in place at the end of the assessment period was determined to be excellent in MIC control and reflected good engineering and technical support.

The piping erosion control program indicated a lack of aggressive maintenance for pipe erosion problems that if not addressed could create operational problems later on. A pinhole leak discovered by the licensee during the assessment period on a 24-inch carbon steel line was repaired. A monitoring program revealed that this particular section of pipe was losing wall thickness due to cavitation. However, the area with a reduced wall thickness was not repaired until the pipe experienced a through-wall leak. The repair work was performed in a satisfactory manner, with good controls, including procedure compliance with material accountability.

Performance Rating

Category: 2

Recommendations

None

D. Mechanical Components

Analysis

This functional area includes mechanical components such as pressure vessels, reactor vessel internals, pumps, and valves located in and attached to, the piping systems described in the preceding functional

area. This area also includes foreign material exclusion (FME) control for the associated mechanical components.

Late in the assessment period, a problem occurred involving inadequate FME protection of the open reactor vessel with ongoing overhead work in process. Immediate corrective actions were adequate. A contributor to this problem was inadequate interface controls between the Modifications and Startup groups when both organizations were working in the same physical area. The licensee's follow up investigations revealed foreign material exclusion procedure violations in other systems. This indicated inadequate management and Quality Assurance department oversight of ongoing activities requiring foreign material exclusion control. At the end of the assessment period, the licensee was in the process of developing comprehensive corrective actions for the overall FME problem.

Overall, housekeeping was adequate during the assessment period.

Performance Rating

Not Rated

Recommendations

None

E. Auxiliary Systems

Analysis

This functional area includes safety-related auxiliary systems which are essential for the safe shutdown of the plant, or the protection of the health and safety of the public. Specifically, this area includes the Heating, Ventilation, and Air Conditioning (HVAC) Duct and Supports, Cable Tray and Supports, Conduit and Supports, and Instrument Lines Corrective Action Program plans (CAPs). These activities included calculations, design change notices, and field inspections.

Engineering controls and installation were well controlled and implemented for both the HVAC ducts and duct supports. An IDI in the civil/structural engineering areas was performed during the period. The critical case and bounding case calculations for HVAC ducts indicated that sound engineering controls were evident. HVAC duct supports were of acceptable quality and matched the quality assurance alternate records, except for some minor discrepancies involving timely incorporation of design change notices. The design change notices for this hardware were adequate and retrievable indicating effective engineering controls.

Engineering activities involving the Essential Raw Cooling Water (ERCW) and Component Cooling systems were also performed in a thorough and

competent manner. A follow-up IDI in the mechanical engineering areas was performed during the period. The system descriptions and calculations were thorough and consistent, and adequately support the design. These documents were improved in terms of content, consistency, accuracy and completeness compared to those reviewed during the IDI performed in 1991. The design change notices were properly documented and were correctly implemented in the field. The system engineers for the ERCW and Component Cooling systems were competent and generally able to respond adequately to the technical questions.

Performance of construction work activities and documentation associated with the Thermo-lag fire barrier test program was at an acceptable quality level. The licensee completed construction and testing of samples for configurations to be used at the Watts Bar facility.

Work in the area of security system upgrades was progressing well. These upgrades included erection of two access portal buildings, erecting the perimeter fencing, and installation of a number of high mast security lights. One exception was a rebar deficiency in the construction of pedestals for the high-mast security lights. Aggressive corrective actions were taken including removal of the sub-contractor.

Performance Rating

Category: 1

Recommendations

None

F. Electrical Equipment and Cables

Analysis

This functional area includes safety-related electrical components, cables and associated items used in the electrical systems of the plant. In addition, it includes those activities being implemented as part of the corrective actions for the Cable Issues Corrective Action Program (CAP), Electrical Issues CAP and Master Fuse List (MFL) Special Program (SP). These activities included cable installations and terminations, cable splices, cable support, and fuse controls. This area also includes activities not directly associated with the corrective action programs such as cable physical separation, containment electrical penetration assembly conductor replacements, and electrical equipment maintenance.

Overall, during the assessment period, cable installation activities were adequately performed in accordance with the Cable Issues CAP. Over 400,000 feet of cable were installed during the period. Also, cable removal activities to resolve cable damage issues were observed to be well implemented. However, early in the assessment period, problems

were noted with engineering and modification design input documentation. Specifically, cable installation calculation deficiencies were identified which indicated that corrective actions to resolve previous outstanding concerns were inadequate. These deficiencies included incorrect inputs for cable pull tension and cable bend radii calculations. A contributing cause was ineffective management oversight to ensure the established corrective actions were properly implemented. As a result of the NRC findings, responsibility for cable installation calculations was promptly reassigned to a dedicated calculation group within Nuclear Engineering. An increase in the quality of calculations to support cable installations was evident through the remainder of the assessment period as a result of the increased management attention and allocation of resources. Later in the assessment period, one other cable pull tension calculation problem occurred regarding the use of a different cable attachment method than specified in the corresponding cable pull calculation. Prompt and acceptable corrective actions were developed to address the cause of this deficiency.

Cable splice rework effort was performed at an overall acceptable quality level. The licensee undertook an extensive effort to inspect and rework cable splices and terminations. Over 9500 splices were installed as part of the Cable Issues CAP and as part of the effort to correct various deficiencies associated with containment electrical penetration assemblies.

Overall, fuses were verified to be properly installed as specified in the MFL. However, the licensee failed to implement the objectives of the Special Program (SP) early in the assessment period by not verifying the accuracy of the MFL as compared to engineering analyses. As a result, the MFL did not accurately reflect the fuses analyzed. Similar to the Cable Issues CAP, the same type problems were noted with engineering design documentation, and management oversight of this activity being initially guided by the result of NRC findings. The design control deficiencies noted are discussed in the Engineering/Technical Support functional area. Quality Assurance overview of the implementation of the SP was also noted as a weakness in providing assurance that the SP was adequately implemented. This observation is discussed in the Safety Assessment/Quality Verification functional area. In response to NRC concerns, increased management oversight was apparent in identifying the root cause of the deficiencies and development of additional corrective actions. Later in the assessment period the deficiencies and concerns in the MFL had been adequately addressed and resolved.

Preoperational testing identified previously unknown construction deficiencies and showed that component testing was not always successful. Other deficiencies identified during the assessment period involved completeness of evaluation on the adequacy of adhesive-backed cable support mounts for providing cable restraint and support as part of the Electrical Issues CAP, pressure testing of containment electrical penetrations and maintenance inspections of 6900 Volt circuit breakers.

Corrective action for these issues was either completed or ongoing at the end of the assessment period.

The fire protection analysis, the protective device quality assurance program, and the periodic test program for the protective devices in circuits with less separation than required by Regulatory Guide 1.75 was adequate. Prior to this assessment period, the original protection analysis was completely redone as part of an overall calculation update program. The new analysis incorporated any modifications completed since the previous analysis and were based on actual walk-down information.

The licensee revealed good initiative by submitting information to address the station blackout rule (10 CFR 50.63) on a schedule significantly earlier than is required by the rule. As a result, the NRC was able to complete its review during this period and found all proposed actions acceptable.

Performance Rating

Category: 2

Recommendations

Design input problems noted early in the assessment period are of concern and warrant continued management attention.

G. Instrumentation

Analysis

This functional area covers instrument components and systems that are designed to measure, transmit, display, record, and/or control various plant variables and conditions.

Only minor work activities occurred in this functional area.

The licensee's submittal regarding post-accident monitoring instrumentation was consistent and adequately addressed NRC questions. The submittal indicated an understanding of the technical issues involved and how they related to safety. The additional NRC questions that were raised as a result of the review were adequately addressed by the licensee.

Performance Rating

Not Rated

Recommendations

None

H. Engineering/Technical Support

Analysis

This functional area addresses activities associated with the design of the plant; engineering and technical support for maintenance, testing, surveillance, procurement, and preoperational testing activities; training; and configuration management.

The overall design process was managed and implemented in a generally adequate manner during the assessment period. Early in the assessment period, the civil/structural IDI found that the design process was adequate. Specifically, programs and procedures related to the design change process were found established and controlled and design calculations were generally based on a sound technical basis and were sufficiently conservative. Examples of design control problems were identified, though, such as a backlog of advanced authorized field design change notices awaiting design engineering verification; and examples of not using or following correct design criteria, design commitments or conservative design approaches. The mechanical IDI conducted late in the period also found the design process to be adequate and that the system descriptions and calculations adequately supported the design. Specifically, design change notices were correctly implemented and the quality of design documents had improved from a previous review conducted prior to the assessment period. Examples of weaknesses were in the integration of precautions, limitations and setpoints into the operation of systems and ensuring that all affected documents are revised when design documents are revised. Other design control deficiencies during the assessment period included electrical cable calculation deficiencies; inadequate procedural controls for design activities involving the MFL SP; and inaccurate design drawings, incomplete design documents and failure to implement the established design control measures for preoperational test observation.

The Use-As-Is CAQR Special Program was adequately closed. The Special Program resulted from accepting corrective action documents without documenting an adequate basis for not performing corrective action. The licensee resolved the technical issues identified by the Special Program. The approaches to resolution of the technical issues were technically sound.

During the assessment period, training on plant procedures was weak. Several problems relating to the implementation of the procedure training program occurred including the adequacy of modifications work planning training matrices, completion of individual training for maintenance and modifications personnel, and the performance of work activities without applicable procedure training. Specifically, various personnel had not received required training on the System Plant Acceptance Evaluation (SPAЕ) procedure prior to authorizing the

acceptance of items in the SPAE package. An individual who performed the function of Selected Review Manager for a CAQR root cause analysis (RCA) involving Westinghouse equipment specifications for control room panel modifications had not received training required by procedures for root cause analysis reviewers. Training of Quality Control personnel on the requirements of a new storage inspection procedure, which became effective on September 28, 1992, was not conducted until December 6, 1992. Numerous administrative errors were noted in the completed record of training. Initial Motor Operated Valve program training was adequate and site personnel had been trained; however, there was a lack of established provisions for refresher training on actuator maintenance or MOV diagnostics.

The licensee's corrective actions during the assessment period for multiple deficiencies identified in the Material Improvement Project (MIP) just prior to the assessment period, were adequate. The MIP program had been initiated to regain control of stock material so that it could be issued to the field. The corrective actions were the licensee's second attempt at fixing these problems.

During the assessment period, a material traceability issue was identified and reviewed because, prior to 1991, the fact that the licensee's material control program did not provide material traceability for commodity material (i.e structural steel) past receipt into the warehouse, coupled with warehouse control problems, created the potential for material to be improperly installed in the plant. Late in the period, the licensee determined that there was adequate assurance that commodity material would perform its intended safety function. The safety function determination was based on a review of employee concerns investigations and the licensee's deficiency reporting system, as well as confirmatory hardness testing of installed materials by both the licensee and the NRC.

The licensee made good progress in implementing the Motor Operated Valve (MOV) program during this assessment period. Identified strengths included: (1) All MOVs had been refurbished in the 1989-92 time frame; (2) All design-basis reviews and initial calculations for valves considered necessary for Unit 1 operation had been completed; (3) The licensee had clearly assigned responsibilities for MOV maintenance; and (4) The licensee had good corporate involvement in the Generic Letter 89-10 program.

The Watts Bar Vendor Information (VI) CAP was established to resolve and prevent recurrence of identified problems and to provide reasonable assurance that vendor technical documents for safety-related equipment remained current, complete, and appropriately updated for the life of the plant. The VI CAP also addressed NRC concerns identified in Generic Letter 83-28 relative to the control of vendor information. During this assessment period the Vendor Information Program was adequate and a strength was noted in the vendor technical manuals (VTMs) reviewed. However, weaknesses in the program were noted including: (1) Uncontrolled vendor drawings and VTMs which habitually remained in the

work area even though controlled copies were available; (2) Inadequate documentation supporting the licensee's conclusions for completion status; and (3) Several examples of procedure adherence problems. Licensee corrective actions in response to the identified weaknesses had begun but were not complete at the end of the assessment period.

The licensee's efforts on the draft Unit 1 Technical Specifications demonstrated technical competence and commitment by upper management. The Technical Specifications, modeled after the latest version of the Westinghouse Standard Technical Specifications (STS), incorporated the latest industry comments applicable to Watts Bar. The licensee's personnel were proactive in the industry group that works with the NRC on the STS, which produced positive results in upgrading the draft Technical Specifications. Near the end of the assessment period, the licensee was very responsive to NRC questions and requests for additional information.

Performance Rating

Category: 2

Recommendations

None

I. Safety Assessment/Quality Verification

Analysis

This functional area addresses licensee implementation of safety policies; license amendments, exemptions, and relief requests; responses to Generic Letters, Bulletins, and Information Notices; resolution of safety issues; 10 CFR 50.55 requirements, 10 CFR 21 assessments, safety committee and self assessment activities; analysis of industry operational experience and use of feedback from self-assessment programs and activities. In addition, the area involved activities associated with review and implementation of the Corrective Action Program plans (CAPs) and Special Programs (SPs), and Quality Assurance department oversight of engineering and modification activities and oversight of the contractor Quality Assurance program implementation.

The licensee's submittal for several technical issues was good. Specific issues were pressurized thermal shock (10 CFR 50.61), moderate energy line break flooding, preservice inspection program, natural circulation cooldown, preoperational environmental monitoring program, and compliance with Regulatory Guide 1.97.

The licensee was slow to revise the Final Safety Analysis Report as major design and procedural revisions were made. A number of electric power system unresolved issues first identified in the 1982 NRC Safety Evaluation Report (NUREG-0847) remained unresolved at the end of the

assessment period. Drawings to support FSAR amendments were submitted much later than the text, creating a wide information gap between the text and the drawings. In addition, a few Final Safety Analysis Report amendments provided design change information that led to additional unresolved issues.

During the assessment period, the Quality Assurance (QA) Program did not provide consistent assurance that the activities were being performed in accordance with the established QA requirements. An inquisitive view of licensed activities was lacking during the performance of QA monitorings and evaluations. Problems with the Master Fuse List Special Program, wedge bolt installation practices, Foreign Material Exclusion controls, Upper Head Injection removal and hydrostatic testing were examples of inadequate QA department oversight. For example, although the licensee identified that the Upper Head Injection modification was complete, the closure of the project would have been premature at that time since all the associated documentation and field work had not been completed. This premature presentation indicated a lack of management and QA department attention to assure that records and work activities were complete to support project closure. These examples indicated a weakness in the organization's ability to focus on new emerging activities and to provide an influential on-site presence.

In response to these problems, the QA department re-assessed their priorities and made changes intended to improve performance. Specifically, the licensee initiated a third-party, independent QA assessment to provide an evaluation of the QA program implementation. Additionally, self-assessments and critiques were performed for each of the CAPs and SPs as they approached 75 percent completion. Although some improvement occurred late in the assessment period, these changes had not been in place a sufficient amount of time to have a significant impact on QA program performance.

The licensee's verification process for the 75/100 percent completion milestones, including inspection of the closure documentation books, was generally complete and accurate. Seven inspections of the CAPs and SPs were performed at the 75 percent or 100 percent completion milestones which included QA Records, Vendor Information, Welding, Master Fuse List, Microbiological Induced Corrosion, Use-As-Is CAQRs, and Soil Liquefaction. The Soil Liquefaction, Use-As-IS CAQRs, and Master Fuse List Special Programs were satisfactorily completed during the assessment period. Corrective actions pertaining to the CAPs and SPs were satisfactorily implemented during the assessment. Also, the technical resolution of the CAPs was generally thorough. However, CAPs and SPs rarely met the 75/100 percent milestones consistent with the licensee's schedule. Instances were noted where management assessments did not provide assurance that the implementation of several corrective action programs was adequate. Specifically, implementation problems and deficiencies in the milestone documentation books were identified at the 75% milestone with the Master Fuse List SP and Vendor Information CAP.

The licensee's program for trending of conditions adverse to quality (CAQs) was determined adequate to provide for prompt implementation of corrective measures for identified deficiencies. Trend analysis reports were properly evaluated and the procedural requirements were being implemented.

The licensee had limited success in achieving permanent corrective action to identified problems. Although the majority of corrective actions successfully resolved the immediate problem, some corrective actions failed to address the root cause, as indicated by occasional recurrence of problems. These included foreign material exclusion problems, failure of the Master Fuse List Special Program to meet the objectives, document control record auditing problems, some employee concerns that were not resolved, start-up test deficiency notices for 6900 Volt Shutdown Power system that were closed without correcting the problems, improperly implemented corrective action for selective breaker coordination for the 480 Volt Shutdown Power system, inadequate corrective action for wedgebolt installation problems, and ineffective corrective action for cable installation calculations. Problems also were noted related to the development of proposed resolutions for some CAQs.

During the assessment period, instances were noted of inadequate implementation of the corrective action rollover process. Several problems were noted with the practice of closing one corrective action document by "rolling" the identified conditions into another corrective action document. The first was that adequate procedural guidance was not provided for the rollover process. The second was that some collector documents had gotten so large that tracking and correcting the rolled in deficiencies was unmanageable, resulting in some corrective actions being missed. Specifically, two nonconformance conditions were closed under the new rollover process without being evaluated or having corrective actions implemented.

The Safeguards Information and Fitness For Duty programs were generally effective. Multiple example licensee identified violations of failure to control and secure Safeguards Information and to enter contractor personnel in the Random Drug Screen Selection Pool were noted during the assessment period. Problems with the licensee's drug testing program for contract personnel showed that the corrective actions taken had limited success in preventing recurrence. Further corrective actions in both programs have been effective in precluding recurrence.

Performance of the Joint Test Group (JTG) was not consistent. JTG members were dedicated to insuring a quality test program. Specific examples of good performance were the reduction of open items associated with each system prior to allowing preoperational testing and a strict requirement for verbatim compliance with procedures utilized in the test program. Initially, the members were uninformed on the material being reviewed because the material had not been distributed to the members prior to the meeting. The corrective action taken was effective.

However, late in the assessment period, problems occurred regarding the poor quality of JTG reviewed preoperational test procedures.

Overall, licensee performance in the records area has been mixed. The development of the records plan concept was good. The Quality Assurance Records CAP was established to address all known records deficiencies prior to 1989 including inadequacies in retrievability, storage, and record quality. In 1991 the scope was enlarged, by the addition of the Additional Systematic Records Review (ASRR), to provide for a systematic review of records that will identify and correct all records problems, including inadequacies in hardware associated with the records, as well as deficiencies in record technical content. The licensee reached the 75% completion milestone for the Quality Assurance Records Corrective Action Program plan (CAP) during the assessment period. The licensee developed 39 QA Record Plans to provide a road map, which would identify which records (original records or corrective action program records) would provide the records licensing basis for the plant. During the period, a problem occurred involving records being designated as the alternate technical records licensing basis for some attributes on a plan, when that information was not classified as site QA records. The licensee revised the record plans to improve the technical content. The first inspection of the revised plans was performed on the Cable Records Plan near the end of the assessment period. The plan was technically adequate, the cable records sampled adequately documented the installation of the cables, the reviews conducted by the ASRR in this area were thorough, and the corrective action for ASRR identified problems concerning cable records was technically adequate.

Records retrievability was a problem during the assessment period. There was a backlog of several thousand records which needed to be indexed into the records management system, and deficiencies were noted in the timely placement of training records and receipt inspection records into the document control system. At the end of the assessment period, the licensee was developing corrective actions.

Concerns Resolution Program procedural guidance was generally good and usually followed. Employee concerns were in general adequately handled, resolved, and closed. Exceptions found included several minor deficiencies in technical resolutions; several letters were ambiguous that reported investigation results to the concerned employees; and an example was identified where the investigation of a concern was inappropriately referred.

Performance for the Employee Concerns Special Program (ECSP) was mixed. Policies and procedural guidance for Corrective Action Tracking Documents (CATDs) were well stated and understandable. Approaches to the resolution of technical issues were viable and generally sound and thorough. Implementation weaknesses existed in relation to following procedural guidance for closure of CATDs and adequacy of CATD closure folder documentation; and in some cases the corrective actions for closed CATDs were not completed and did not resolve the associated employee concerns. Resolutions were often delayed as indicated by less

than 50 percent of the CATD closure packages being ready for NRC review at the end of the assessment period. The CATD corrective actions were identified prior to the end of 1987, at least 6 years ago. The tracking and resolution verification of Class C employee concerns (concerns substantiated but already with corrective action in place) was a problem. At the end of the assessment period, improvements to the ECSP were being evaluated by the licensee.

The licensee's performance in addressing deficiencies and NRC open items was adequate. The deficiencies that the licensee identified were reported in a timely manner. The licensee's responses to NRC violations and deviations submitted during the period were generally acceptable. During the evaluation period, 232 items were closed by NRC and 178 new items were opened by ongoing NRC inspections and licensee construction deficiency submittals. At the end of the assessment period, 379 items remained open that require closure prior to fuel load. The open item closure documentation package completion rate averaged approximately 20 per month which is not consistent with achieving closure of required items prior to the scheduled fuel load date in the first half of 1994. The open item closure packages reviewed were acceptable in quality with few exceptions.

Performance Rating

Category: 3

Recommendations

The Board is concerned with the marginal performance of the QA program in identifying and assuring deficiencies are corrected. Immediate attention to this area is necessary.

J. Preoperational Testing

Analysis

This functional area addresses the licensee's preoperational test program and performance of preoperational tests.

At the beginning of the assessment period, the licensee's preoperational test program submittal was of poor quality and needed major revisions. Changes to the program, although slow in coming, were made so that late in the period the program was found generally in conformance with the associated Standard Review Plan.

The licensee demonstrated improvement in the preoperational test program performance during the assessment period. Initial activities revealed numerous problems. Activities associated with a preoperational test instruction for the 6900 Volt Shutdown Boards were the first examined. Three NRC reviews noted that the procedure contained numerous discrepancies between specified test acceptance criteria and design basis information shown on development design drawings. Recurrence

control was a problem in that a later review of the procedure identified that Advance Authorizations were issued against the 6900 Volt Shutdown Boards without being coordinated with the Startup and Test Manager. These documents were important to the Startup Group during test procedure development and were obtained only through this established method. Other systems with problem Preoperational Test Instructions (PTIs) included the 161,000/6900 Volt Preferred Offsite Power System, the 120 Volt AC Vital Power System, Vital 125 Volt DC Power System, and 480 Volt Shutdown Power Unit 1 "A" Train. Significant weaknesses were also noted in the licensee process for changing test program documents which affected system tests and Final Safety Analysis Report commitments and requirements. At the end of the assessment period, the licensee continued to have problems with preoperational test procedures.

The hydrostatic test of the secondary system as well as the preparations and coordination were performed in a quality manner and in compliance with the ASME Code Section III. Performance of this test was a major evolution for the licensee involving much pre-planning, coordination, support from a number of organizations on site, and major temporary hardware modifications to heat the water to the required temperature to avoid over-pressurization of the steam generators at low temperatures.

The licensee's Emergency Operating Procedures (EOPs) adequately covered the broad range of accidents and equipment failures necessary for safe shutdown of the plant. The new EOP based plant labeling program was a strength. However, five areas where the EOP network needed improvement were identified. These were access to equipment, support procedures, operations without the Inadequate Core Cooling Monitor, failure to develop certain EOPs specified by the Westinghouse Owners Group Emergency Response Guidelines, and EOP setpoint conservatism.

Performance Rating

Category: 2

Recommendations

The Board is concerned with the quality of preoperational test procedures. Increased management attention is necessary to maintain the quality of procedures.

V. SUPPORTING DATA

A. Licensee Activities

Units 1 and 2 began the assessment period with the NRC unconditional release of construction activities from a December 1990 work stoppage. Almost all of the work accomplished during this assessment period was Unit 1 work or Unit 2 work necessary to support the startup schedule for Unit 1.

At the beginning of the period, 3 of 27 Corrective Action Program plans (CAPs) and Special Programs (SPs) had been completed. The licensee reached the 75% milestone on 5 CAPs (QA Records, Design Baseline, Replacement Items, Hanger Analysis and Update, and Vendor Information) and 2 SPs (Master Fuse List and Microbiological Induced Corrosion); and completed 1 CAP (Welding) and 3 SPs (Master Fuse List, Soil Liquefaction, and Use-As-Is CAQRs) during the period. At the end of the period, 7 of 27 CAPS and SPs were complete.

The Startup and Test organization that had been established under Engineering and Modifications was transferred to the plant manager. During the period 26 of 169 preoperational and acceptance tests were completed (7 safety-related) and 27 of 143 systems (2 safety-related) were turned over to the plant operations organization. The reperformance of the secondary hydrostatic test was also completed.

One minor reorganization occurred during the period when the Engineering and Modifications manager left. The Engineering manager and Modifications manager reported directly to the Site Vice President in the interim. The plant manager's position was filled during the period.

B. Direct Inspection and Review Activities

During the assessment period, 70 inspections (7 team inspections) were performed at Watts Bar by the NRC staff. The team inspections were:

- Civil Integrated Design Inspection
- Mechanical Integrated Design Inspection
- Corrective Action
- Upper Head Injection Removal
- Motor Operated Valves
- Vendor Information
- Microbiologically Induced Corrosion

During the assessment period, the staff closed 35 licensing actions for Unit 1, most of them were plant-specific and the remainder were multi-plant and other regulatory actions, including NRC Bulletins and Generic Letters. The staff has completed review of the Final Safety Analysis Report up to Amendment 74. The results of most of these review efforts were published during the assessment period in Supplements 9, 10 and 11 of the Watts Bar Safety Evaluation Report (NUREG-0847).

C. Enforcement Activity

1. ENFORCEMENT ACTION SUMMARY

Functional Area	Severity Level (SL)					
	Dev.	V	IV	III	II	I
Soils and Foundations						
Containment, Major Structures, & Major Steel Supports						
Piping Systems and Supports			5			
Mechanical Components						
Auxiliary Systems						
Electrical Equipment and Cables			1			
Instrumentation						
Engineering/Technical Support	1	1*	19*			
Safety Assess./Quality Verif.			8			
Preoperational Testing	1		5			
TOTAL	2	1	38			

* 1 SL V and 7 SL IVs issued during the assessment period were identified prior to the period.

2. ENFORCEMENT CONFERENCES HELD

- December 9, 1992 Implementation of the Corrective Action Program - Issued as SL IV
- March 22, 1993 Intimidation and Harassment - Pending

D. Review of Construction Deficiency Reports

For the assessment period, a total of 5 Construction Deficiency Reports were reported and 11 updates to previous reports were submitted. The distribution of the 5 deficiencies reported during the period by cause, as determined by the NRC staff, was as follows:

<u>Cause</u>	<u>Number</u>
1. Component Failure	0
2. Design	3
3. Construction, Fabrication, or Installation	1
4. Personnel Error	
a. Operating Activity	0
b. Maintenance Activity	0
c. Test/Calibration Activity	0
d. Other	1
5. Other	0
TOTAL	5

E. MANAGEMENT MEETINGS

July 17, 1992	Construction/Licensing Schedule
July 30, 1992	Unit 1 Completion Status, Quality Assurance (QA) Construction Records, Plans for Training of Licensed Operators
September 9, 1992	Readiness for Unit 1 Preoperational Testing
September 9, 1992	Inaccuracies in Preventive Maintenance Records
October 23, 1992	Construction/Licensing Schedule, QA Records and Material Traceability Concerns
November 16, 1992	Preoperational Testing Lessons Learned
November 22, 1992	Plant Construction Activities
January 5, 1993	Construction/Licensing Schedule, QA Records Concerns
March 4, 1993	Proposed QA Plan Changes
March 4, 1993	Ongoing and Planned Activities
March 19, 1993	Preoperational Test Program
May 13, 1993	Construction/Licensing Schedule, Completion Assurance, Corrective Action Tracking Documents/Class C Employee Concerns