



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

July 30, 2007

Tennessee Valley Authority
ATTN: Mr. William R. Campbell Jr.
Chief Nuclear Officer and
Executive Vice President
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT
05000390/2007003 AND 05000391/2007003

Dear Mr. Campbell:

On June 30, 2007, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Watts Bar Nuclear Plant, Units 1 and 2. The enclosed integrated inspection report documents the inspection results which were discussed on July 3, 2007, with Mr. M. Lorek and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents one NRC-identified finding of very low safety significance (Green). The finding was determined not to involve a violation of NRC requirements. Additionally, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section VI.A.1 of the NRC Enforcement Policy because of the very low safety significance of the violation and because it is entered into your corrective action program. If you contest this NCV, you should provide a response within 30 days of the date of this inspection report, with basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Watts Bar facility.

In accordance with 10 *Code of Federal Regulations* (CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly

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Sincerely,

/RA/

Gerald J. McCoy, Acting Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket Nos. 50-390, 50-391

License No. NPF-90 and Construction Permit No. CPPR-92

Enclosure: NRC Inspection Report 05000390/2007003, 05000391/2007003
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-390, 50-391

License Nos: NPF-90 and Construction Permit CPPR-92

Report Nos: 05000390/2007003, 05000391/2007003

Licensee: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Units 1 and 2

Location: Spring City, TN 37381

Dates: April 1, 2007 through June 30, 2007

Inspectors: J. Bartley, Senior Resident Inspector
M. Pribish, Resident Inspector
R. Hamilton, Senior Health Physicist (Section 2OS1)
J. Diaz Velez, Health Physicist (Section 2PS2)
W. Loo, Senior Health Physicist (Section 2OS2)

Approved by: Gerald J. McCoy, Acting Chief
Reactor Projects Branch 6
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000390/2007-003, 05000391/2007-003; 04/01/2007 - 06/30/2007; Watts Bar, Units 1 & 2; Maintenance Risk Assessment and Emergent Work Evaluation.

The report covered a three-month period of routine inspection by resident inspectors and an announced inspection by three regional health physicists. One NRC-identified Green finding was identified. The significance of most findings is indicated by its color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process." The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified Findings and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a finding associated with 10 CFR 50.65 (a)(4), Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, for the licensee's failure to perform an adequate risk assessment which resulted in an underestimation of the risk associated with performing a planned maintenance activity on the 1B residual heat removal pump. The licensee entered the issue into their corrective action program for resolution as Problem Evaluation Report (PER) 124269.

The finding is more than minor because, when assessed correctly, the planned maintenance would put the plant into a higher licensee-established risk category. The inspectors determined that the finding was of very low safety significance because of the duration of the inadequate risk assessment. The inspectors concluded the cause of the finding had no definitive cross-cutting aspect that was reflective of current licensee performance. (Section 1R13)

B. Licensee-Identified Violations

A violation of very low safety significance, which was identified by the licensee has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation is listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near 100 percent power for the entire inspection period. Unit 2 remained in a suspended construction status.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R04 Equipment Alignment

a. Inspection Scope

The inspectors conducted three equipment alignment partial walkdowns to evaluate the operability of selected redundant trains or backup systems, listed below, with the other train or system inoperable or out of service. The inspectors reviewed the functional system descriptions, Updated Final Safety Analysis Report (UFSAR), system operating procedures, and Technical Specifications (TS) to determine correct system lineups for the current plant conditions. The inspectors performed walkdowns of the systems to verify that critical components were properly aligned and to identify any discrepancies which could affect operability of the redundant train or backup system.

- A-train containment spray (CS) during B-train CS component outage
- A-train residual heat removal (RHR) during B-train RHR component outage
- A and B-train motor-driven auxiliary feedwater (MDAFW) systems during a turbine-driven auxiliary feedwater (TDAFW) pump component outage

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors conducted tours of nine areas important to reactor safety, listed below, to verify the licensee's implementation of fire protection requirements as described in the Fire Protection Program, Standard Programs and Processes (SPP)-10.0, Control of Fire Protection Impairments, SPP-10.10, Control of Transient Combustibles, SPP-10.11, Control of Ignition Sources (Hot Work). The inspectors evaluated, as appropriate, conditions related to: (1) licensee control of transient combustibles and ignition sources; (2) the material condition, operational status, and operational lineup of fire protection systems, equipment, and features; and (3) the fire barriers used to prevent fire damage or fire propagation.

- A-train RHR pump room
- B-train RHR pump room

- A-train CS pump room
- B-train CS pump room
- TDAFW pump room
- A-train centrifugal charging pump (CCP) room
- B-train CCP room
- A-train safety injection pump (SIP) room
- B-train SIP room

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

On May 4, 2007, the inspectors observed operators in the plant's simulator during simulator scenario 3-OT-SRT-ESO.1-2, Loss of Normal Feedwater and #3 Heater Drain Tank Pump Trip, to verify operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with procedures TRN-1, Administering Training, and TRN-11.4, Continuing Training for Licensed Personnel. In addition, the inspectors verified that the training program included risk-significant operator actions, emergency plan implementation, and lessons learned from previous plant experiences.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the Maintenance Rule (a)(1) action plans for the two systems listed below. The focus of the reviews was to verify the effectiveness of the corrective action plans to address the performance issues that caused the systems to go (a)(1) and to verify completion of the corrective actions as specified in the action plans. The review also assessed the effectiveness of maintenance efforts that apply to scoped structures, systems, or components (SSCs) and to verify that the licensee was following the requirements of Technical Instruction (TI)-119, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting 10 CFR 50.65, and SPP-6.6, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting 10 CFR 50.65. Reviews focused, as appropriate, on (1) appropriate work practices; (2) identification and resolution of common cause failures; (3) scoping in accordance with 10 CFR 50.65; (4) characterization of reliability issues; (5) charging unavailability time; (6) trending key parameters; (7) 10 CFR 50.65 (a) (1) or (a) (2) classification and reclassification; and (8) the appropriateness of performance criteria for SSCs classified as (a)(2) or goals and corrective actions for SSCs classified as (a)(1). Specific documents reviewed are listed in the attachment.

- PERs 75953, 119409, Station air compressors (a)(1) action plan
- PERs 78261, 95337, 123150, Essential raw cooling water (ERCW) (a)(1) action plan

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

The inspectors evaluated, as appropriate, for the five work activities listed below: (1) the effectiveness of the risk assessments performed before maintenance activities were conducted; (2) the management of risk; (3) that, upon identification of an unforeseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and (4) that maintenance risk assessments and emergent work problems were adequately identified and resolved. The inspectors verified that the licensee was complying with the requirements of 10 CFR 50.65 (a)(4); SPP-7.0, Work Control and Outage Management; SPP-7.1, Work Control Process; and TI-124, Equipment to Plant Risk Matrix. Additional documents reviewed are listed in the attachment.

- Maintenance risk due to extension of 2B diesel generator (DG) component outage due to emergent work
- Maintenance risk and risk management actions associated with 2A-A DG generator replacement outage
- Maintenance risk for concurrent work on 2A DG, A-train shutdown boardroom chiller and the standby main feedwater pump
- Maintenance risk and risk management actions associated with the 1B RHR pump outage
- Maintenance risk for a yellow grid condition

b. Findings

Introduction: A Green NRC-identified finding of 10 CFR 50.65 (a)(4) was identified for the licensee's failure to perform an adequate risk assessment which resulted in an underestimation of the risk associated with performing a planned maintenance activity on the 1B RHR pump.

Description: On May 2, 2007, the licensee removed the 1B RHR pump from service for a planned component outage scheduled for a 34-hour duration. The licensee assessed the risk for this maintenance activity using licensee procedure TI-124, Equipment to Plant Risk Matrix, which specifies a plant risk profile of Green for the first 26 hours, followed by a Yellow risk profile for the 26 to 72-hour point.

The inspectors reviewed the plant risk profile for the in-progress maintenance activity on May 3, 2007, and noted that the risk associated with the activity was assessed and reported as Green for the 34 hour duration of the planned maintenance activity. The inspectors noted that the licensee did not address the plant's transition to a Yellow risk

profile 26 hours after the 1B RHR pump was removed from service. When questioned by the inspectors on what risk management actions (RMAs) would be in place for the upcoming Yellow risk condition, the licensee consulted with the risk engineer who provided the RMAs that would be required beyond the 26-hour point. These RMAs were conveyed to the shift manager to ensure they were in place prior to the 26-hour point. The licensee initiated PER 124269 to document that the transition to Yellow, per TI-124, was overlooked during the planning of the RHR pump component outage.

Analysis: The licensee's failure to perform an adequate risk assessment of in-progress maintenance, scheduled for a 34-hour duration, on the 1B RHR pump constitutes a performance deficiency and a finding. The finding was more than minor because the risk assessment, when correctly assessed, would put the plant into a higher risk category at the 26-hour point. The finding was evaluated in accordance with Appendix K of Inspection Manual Chapter 0609, Maintenance Risk Assessment and Risk Management Significance Determination Process (SDP), and determined to be of very low safety significance (Green), using Flowchart 1. This determination was based on the licensee's incremental core damage probability deficit of less than 1E-6 for the given condition of the 1B RHR train out of service between the 26 and the 34-hour point. The inspectors concluded the cause of the finding had no definitive cross-cutting aspect that was reflective of current licensee performance.

Enforcement: No violation of regulatory requirements occurred. The inspectors determined that the finding did not represent a noncompliance since, due to the inspectors prompting, the licensee established the required RMAs prior to the plant transition to a Yellow risk profile. Because this finding does not involve a violation of regulatory requirements and has very low safety significance, it is identified as FIN 05000390/2007003-01, Inadequate Risk Assessment for Work in Progress.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed five operability evaluations affecting risk-significant mitigating systems, listed below, to assess, as appropriate: (1) the technical adequacy of the evaluations; (2) whether continued system operability was warranted; (3) whether other existing degraded conditions were considered as compensating measures; (4) whether the compensatory measures, if involved, were in place, would work as intended, and were appropriately controlled; (5) where continued operability was considered unjustified, the impact on TS Limiting Conditions for Operation (LCOs) and the risk significance in accordance with the SDP. The inspectors verified that the operability evaluations were performed in accordance with SPP-3.1, Corrective Action Program. Additional documents reviewed are listed in the attachment.

- PER 121702, Low temperature in DG exhaust fan room prevents fan operation for H₂ removal
- PER 123288, 1A and 2B ERCW headers were inadvertently cross-tied
- PER 123501, Missing restraints on scaffolding in the 1B CS pump room
- PER 126359, A-train shutdown boardroom chiller temperature control valve in manual

- PER 125669, Relief valve lifted during 1B-B safety injection quarterly performance test

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed six post-maintenance test (PMT) procedures and/or test activities, as appropriate, for selected risk-significant mitigating systems to assess whether: (1) the effect of testing on the plant had been adequately addressed by control room and/or engineering personnel; (2) testing was adequate for the maintenance performed; (3) acceptance criteria were clear and adequately demonstrated operational readiness consistent with design and licensing basis documents; (4) test instrumentation had current calibrations, range, and accuracy consistent with the application; (5) tests were performed as written with applicable prerequisites satisfied; (6) jumpers installed or leads lifted were properly controlled; (7) test equipment was removed following testing; and (8) equipment was returned to the status required to perform its safety function. The inspectors verified that these activities were performed in accordance with SPP-8.0, Testing Programs; SPP-6.3, Pre-/Post-Maintenance Testing; and SPP-7.1, Work Control Process.

- WO 07-813823-000, Vital battery I individual cell replacement
- WO 06-813423-001, 2A-A DG generator replacement
- WO 07-815297-000, Eagle 21 input board replacement
- WO 06-813123-000, Repair boron leak and replace test tee associated with 1-FIS-74-24, 1B RHR pump miniflow indicating switch
- WO 05-821034-000, Replace belts, flange bearings and seals, and pillow block bearing on 1A SIP room cooler
- WO 05-819697-000, Replace tubing section and elbow for Auxiliary Building Gas Treatment System (ABGTS) isolation damper

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors witnessed five surveillance tests and/or reviewed test data of selected risk-significant SSCs, listed below, to assess, as appropriate, whether: the SSCs met the requirements of the TS; the UFSAR; SPP-8.0, Testing Programs; SPP-8.2, Surveillance Test Program; and SPP-9.1, ASME Section XI. The inspectors also determined whether the testing effectively demonstrated that the SSCs were operationally ready and capable of performing their intended safety functions.

- WO 07-810443-000, 1-SI-74-901-B, RHR Pump 1B-B Quarterly Performance Test*
- WO 04-816104-000, 0-SI-82-7, 10 Year DG Interdependence Test
- WO 06-822641-000, 0-SI-65-7-A, Emergency Gas Treatment System (EGTS) Humidity Control Heaters - Train A
- WO 06-813423-001, 0-SI-82-19-A, 184 Day Fast Start and Load Test DG 2A-A
- WO 07-813946-000, 0-SI-65-9-B, EGTS Pressure Test - Train B

*This procedure included inservice testing requirements

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

On May 10, 2007, the inspectors observed a licensee-evaluated emergency preparedness drill to verify that the emergency response organization was properly classifying the event in accordance with Emergency Plan Implementing Procedure (EPIP)-1, Emergency Plan Classification Flowchart, and making accurate and timely notifications and protective action recommendations in accordance with EPIP-2, Notification of Unusual Event; EPIP-3, Alert; EPIP-4, Site Area Emergency; EPIP-5, General Emergency; and the Radiological Emergency Plan. In addition, the inspectors verified that licensee evaluators were identifying deficiencies and properly dispositioning performance against the performance indicator criteria in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas

a. Inspection Scope

Access Control: The inspectors evaluated licensee activities for monitoring and controlling worker access to radiologically significant areas, focusing on activities associated with routine operations. The inspection included direct observation of administrative and physical controls, appraisal of the knowledge and proficiency of radiation workers and health physics technicians in implementing radiological controls, and review of the adequacy of procedural guidance and its implementation.

The inspectors reviewed licensee procedures regarding access control to radiologically significant areas. Selected procedural details for posting, surveying, and access control to airborne radioactivity, radiation area, high radiation area, locked high radiation area

(LHRA), and very high radiation area (VHRA) locations were reviewed and discussed with the licensee. The inspectors attended a prejob briefing for a primary filter changeout. The inspectors observed the work to assess radiation protection (RP) technician proficiency and radiation worker practices. The inspectors reviewed the radiation work permits (RWPs) that were used for the changeout as well as the RWP used to consolidate the spent filters in solid radioactive waste. The selected RWPs were assessed for adequacy of access controls and specified electronic dosimeter alarm setpoints against expected work area dose rates and work conditions. Access control procedures for posted LHRA and VHRA locations were reviewed and discussed with selected RP management, supervision, and technicians.

During facility tours, the inspectors evaluated selected radiological postings, barricades, and surveys associated with radioactive material storage areas and radiologically significant areas within the reactor auxiliary building and the fuel handling building. The inspectors conducted independent dose-rate measurements at various building locations and compared those results to licensee radiation survey map data. The inspectors independently assessed implementation of LHRA controls and evaluated the adequacy of the licensee's LHRA and VHRA key controls through procedural reviews and supervisory interviews.

During the inspection, the proficiency and knowledge of the radiation workers and the staff in communicating and applying radiological controls for selected tasks were evaluated. The inspectors attended RWP briefings for selected work activities. Radiological worker and radiation protection technician training/skill levels, procedural adherence, and implementation of RWP-specified access controls, including those associated with changing radiological conditions, were observed and evaluated by the inspectors during selected reviews and tours within the licensee's radiological control area. In addition, the inspectors interviewed selected management personnel regarding radiological controls associated with work activities.

RP activities were evaluated against the UFSAR, Section 12, Radiation Protection; TS, Sections 5.7, Procedures and Programs, and 5.11, High Radiation Area; 10 CFR 19.12; 10 CFR Part 20, Subparts B, C, F, G, H, and J; and approved licensee procedures. The procedures and records reviewed are listed in the attachment.

Problem Identification and Resolution: PERs associated with access control to radiologically significant areas, radiation worker performance, and RP technician proficiency were reviewed and assessed. The PERs listed in the attachment were reviewed and evaluated in detail during inspection of this program area. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with approved CAP procedures.

The inspectors completed 21 of the required 21 samples for Inspection Procedure (IP) 71121.01. All samples have now been completed for this IP.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls

a. Inspection Scope

As Low As Reasonably Achievable (ALARA): Implementation of the licensee's ALARA program was evaluated by the inspectors. The inspectors reviewed and discussed with cognizant licensee representatives the ALARA planning, dose estimates, and prescribed ALARA controls for Unit 1 Cycle 7 (U1C7) outage work tasks that were expected to incur the maximum collective exposures. Also, incorporation of planning, established work controls, expected dose rates, and dose expenditure into the ALARA pre-job briefings and RWPs for those U1C7 activities were reviewed and discussed. During the inspection, the inspectors directly observed the performance of a reactor coolant system (RCS) filter changeout while evaluating the licensee's use of engineering controls, low-dose waiting areas, and on-the-job RP supervision.

Selected elements of the licensee's source term reduction and control program were examined to evaluate the effectiveness of the program in supporting implementation of the ALARA program goals to include the licensee's Collective Radiation Exposure Long-Term Reduction Plan. In addition, auxiliary building dose rate trending data and active hot spots were reviewed and discussed with the licensee.

Trends in individual and collective personnel exposures at the facility were reviewed and discussed with the licensee. Records of year-to-date individual radiation exposures sorted by work groups were examined for significant variations of exposures among workers as well as radiation exposures that were incurred during the U1C7 outage. The inspectors examined the dose records of all declared pregnant workers from November 1, 2006, to the present to evaluate total or current gestation dose. The applicable RP procedure was reviewed to assess licensee controls for declared pregnant workers. Trends in the plant's three-year rolling average collective exposure history, outage, non-outage, and total annual doses for selected years were reviewed and discussed with the licensee.

The licensee's ALARA program implementation and practices were evaluated for consistency with UFSAR Chapter 12, Sections 1-5, Radiation Protection; 10 CFR Part 20 requirements; Regulatory Guide 8.29, Instruction Concerning Risks from Occupational Radiation Exposure, February 1996; and licensee procedures. Documents reviewed during the inspection of this program area are listed in Section 2OS2 of the attachment.

Problem Identification and Resolution: The inspectors reviewed CAP documents listed in Section 2OS2 of the attachment that are related to the ALARA program. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with SPP- 3.1, Corrective Action Program, Revision 12.

The inspectors completed 25 samples for IP 71121.02 (minimum sample size is 15; however, additional line items were completed since the licensee was in the 4th quartile three-year rolling average for occupational collective dose ranking). All samples have now been completed for this IP.

b. Findings

No findings of significance were identified.

2PS2 Radioactive Material Processing and Transportation

a. Inspection Scope

Waste Processing and Characterization: The inspectors reviewed the plant's solid radioactive waste system as described in the Watts Bar UFSAR and process control program. The most recent radiological effluent release report was reviewed for information on the types and amounts of waste disposed. The scope of the licensee's audit program was reviewed to verify that it met the requirements of 10 CFR 20.1101. The inspectors walked down the accessible portions of the liquid and solid radioactive waste processing systems to verify that the current system configuration and operation agreed with the UFSAR and process control program. The liquid radioactive waste system status was discussed with radwaste personnel to determine its potential to create an unmonitored release pathway.

The inspectors reviewed the plant's process for transferring radioactive resin and sludge discharges into shipping/disposal containers to determine if appropriate waste stream mixing and/or sampling procedures and methodology for waste concentration averaging provided representative samples of the waste product for waste classification purposes. The inspectors reviewed current 10 CFR 61 analysis results and the procedures for obtaining the samples to support the analysis.

The scaling factors used for radioactive waste streams were reviewed, including licensee calculations used to determine the amount of hard-to-detect nuclides. The program was reviewed to verify compliance with 10 CFR 61.55-56 and 10 CFR 20, Appendix G.

The inspectors reviewed the program for provisions that would ensure that the waste stream composition accounted for changes in operational parameters and would remain valid between required periodic updates.

Transportation: The inspectors observed the shipment of radioactive material, low specific activity (LSA-II), dry active waste to a waste processing facility. In particular, the inspectors observed the creation of shipping papers including the use of radiation surveys, waste characterization, waste manifest creation and completion of documents when shipping was completed. The inspectors observed shipping personnel conducting radiation surveys, reviewing package labeling, vehicle placarding, routine vehicle safety checks, and driver's briefing (including the provision and discussion of emergency instructions). The inspectors also noted the shipper's preparation of emergency response documentation for the 24-hour emergency telephone number monitored by plant control room personnel. The inspectors reviewed shipping documentation for several shipments that had occurred in the previous year. The inspectors reviewed the training records of the radwaste workers who were involved in the shipment and discussed training with these workers.

Transportation program implementation was reviewed against regulations detailed in 10 CFR Part 20, 10 CFR Part 71, 49 CFR Parts 172-178; as well as the guidance provided in NUREG-1608. TS 6.13, Process Control Program, was used as a basis for evaluation of the solid radioactive waste program. Training activities were assessed against 49 CFR Part 172 Subpart H. Documents reviewed during the inspection are listed in Section 2PS2 of the report attachment.

Problem Identification and Resolution: Nine PERs, one self-assessment and one fleet-wide audit were reviewed in detail. The inspectors assessed the licensee's ability to characterize, prioritize, and resolve the identified issues in accordance with licensee procedure SPP-3.1, Corrective Action Program, Revision 12. Documents reviewed for problem identification and resolution are listed in Section 2PS2 of the report attachment.

The inspectors completed six of the required six samples for IP 71122.02. All samples have now been completed for this IP.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verifications

a. Inspection Scope

Licensee records were reviewed to determine whether the submitted PI statistics were calculated in accordance with the guidance contained in Nuclear Energy Institute 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 4.

Mitigating Systems and Barrier Integrity Cornerstones

The inspectors verified the accuracy of the data for the PIs, listed below, which was reported to the NRC. The inspectors reviewed data from April 1, 2006, through March 31, 2007. The inspectors reviewed LERs and maintenance rule records to verify the accuracy of the safety system functional failures PI data. Additionally, the main control room operator logs were reviewed to verify that the licensee had accurately determined the RCS identified leakage during the period. Additional documents reviewed are listed in the attachment.

- Safety system functional failures (Mitigating System Cornerstone)
- RCS identified leakage (Barrier Integrity Cornerstone)

b. Findings

No findings of significance were identified.

4OA2 Identification & Resolution of Problems

.1 Review of Items Entered into the Corrective Action Program (CAP)

As required by Inspection Procedure 71152, Identification and Resolution of Problems, and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished by reviewing daily PER summary reports and attending daily PER review meetings.

.2 Semi-Annual Review to Identify Trends

a. Inspection Scope

As required by Inspection Procedure 71152, Identification and Resolution of Problems, the inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on human performance trends, licensee trending efforts, and repetitive equipment and corrective maintenance issues. The inspectors also considered the results of the daily inspector CAP item screening discussed in Section 4OA2.1. The inspectors' review nominally considered the six-month period of January through June 2007, although some examples expanded beyond those dates when the scope of the trend warranted. The inspectors compared and contrasted their results with the results contained in the licensee's latest integrated quarterly assessment report and trend PERs in the CAP.

b. Assessment and Observations

No findings of significance were identified. The inspectors compared the licensee process results with the results of the inspectors' daily screening and did not identify any discrepancies or potential trends in the CAP data.

4OA3 Event Followup

.1 (Closed) LER 05000390/2006-005-00: Automatic Reactor Trip Due to Generator Trip

On July 31, 2006, the generator output breaker opened resulting in a turbine trip and a reactor trip. A root cause investigation determined that the most likely cause was a problem in the main generator automatic excitation circuitry. The inspectors' review of this event is documented in Inspection Report 05000390, 0500391/2006004, Sections 1R14 and 4OA3. No findings of significance or violations of NRC requirements were identified. This LER is closed.

.2 (Closed) LER 05000390/2006-006-00: Reactor Coolant System Pressure Boundary Leak

On August 1, 2006, while performing a Mode 3 containment walkdown with the RCS at normal operating temperature and pressure, the licensee identified a pinhole leak in a socket weld on the Loop 1 cold leg safety injection line. Estimated leak rate from the

pinhole was 0.1 gallons per minute. The licensee determined that the most likely cause of the failure was due to the technique of the individual welder when the weld was performed in 1993. No findings of significance or violations of NRC requirements were identified. This LER is closed.

.3 (Closed) LER 05000390/2006-008-00: Auxiliary Feedwater Auto-Start Function Upon Loss of Main Feedwater Pumps

The licensee submitted this LER based on non-cited violation 05000390/2006004-04, Failure to Have an AFW Autostart Signal on Loss of All MFW Pumps During Plant Startup documented in NRC Inspection Report 05000390, 05000391/2006004. The violation was identified during a review of a licensee-requested TS change. The cause of the violation was determined to be a misunderstanding of the TS due to a disconnect between the design of Watts Bar and the assumed generic design in the standard TS. The licensee made procedure changes to comply with TS requirements. This LER is closed.

.4 (Closed) LER 05000390/2006-009-00: Containment Spray Valve Interlock Inoperable

In October 2006, the licensee identified that the containment sump to B-train CS pump suction flow control valve 1-FCV-72-45 would not open electrically as required for B-train CS operability. The licensee determined that the condition had existed since March 2005 due to inadequate post-maintenance testing. During this period, A-train CS was inoperable for maintenance which rendered both trains of CS inoperable for greater than the TS allowed outage time. The enforcement aspects of this LER are documented in Inspection Report 05000390, 05000391/2006005, Section 4OA7. This LER is closed.

4OA6 Meetings, including Exit

The inspectors presented the inspection results to Mr. M. Lorek and other members of licensee management at the conclusion of the inspection on July 3, 2007. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as an NCV.

- TS 5.7.1 requires that procedures be established, implemented, and maintained covering the activities specified in Appendix A of Regulatory Guide 1.33, Revision 2. Paragraph 3s of the Appendix requires procedures for operating emergency power sources (e.g., diesel generators). Licensee procedure SOI-82.01, Diesel Generator 1A-A, specified the ERCW cooling water alignment for the diesel. Contrary to this procedure, on April 12, 2007, operators inadvertently cross-connected the A and B-train ERCW headers for approximately 9 hours until noticed and corrected by the control room staff. This was documented in PER 123228. This violation is of very low significance because the inappropriate

actions did not represent an actual loss of safety function of the ERCW or DG systems.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

D. Feldman, Training Manager
A. Hinson, Site Engineering Manager
J. Hinman, Manager of Projects
M. Lorek, Plant Manager
K. Lovell, Maintenance and Modifications Manager
M. McFadden, Site Nuclear Assurance Manager
P. Sawyer, Radiation Protection Manager
M. Skaggs, Site Vice President
J. Smith, Licensing and Industry Affairs Manager (acting)
S. Smith, Operations Superintendent
D. White, Operations Manager

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

05000390/2007003-01	FIN	Inadequate Risk Assessment for Work In Progress (Section 1R13)
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Closed

05000390/2006-005-00	LER	Automatic Reactor Trip Due to Generator Trip (Section 4OA3.1)
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05000390/2006-006-00	LER	Reactor Coolant System Pressure Boundary Leak (Section 4OA3.2)
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05000390/2006-008-00	LER	Auxiliary Feedwater Auto-Start Function Upon Loss of Main Feedwater Pumps (Section 4OA3.3)
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05000390/2006-009-00	LER	Containment Spray Valve Interlock Inoperable (Section 4OA3.4)
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Discussed

None

LIST OF DOCUMENTS REVIEWED

Section 1R12: Maintenance Effectiveness

- PER 123150, Actions to Eliminate Monitoring of ERCW Discharge Header Level
- PER 95337, Air in AFW ERCW Suction
- PER 78261, Raw Water Foreign Material (silt, clams, and MIC)

Section 1R13: Maintenance Risk Assignment & Emergent Work Evaluation

- PER 124269, RHR Pump 1B LCO Duration

Section 1R15: Operability Evaluations

- Watts Bar SI Pump Discharge Piping Hydraulic Transient Analysis

Section 2OS1: Access Control to Radiologically Significant AreasProcedures, Instructions, Guidance Documents, and Operating Manuals

- BP-250, Corrective Action Program Handbook, Revision (Rev.) 12
- RCI-100, Control of Radiological Work, Rev. 29
- RCI-101, Radiation, Contamination, and Airborne Surveys, Rev. 22
- RCI-102, Contamination and Hot Particle Control, Rev. 9
- RCI-103, Radioactive Material Control, Rev. 23
- RCI-152, Radiological Postings, Rev. 0
- RCDP-3, Administration of Radiation Work Permits (RWPs), Rev. 2
- SPP-3.1, Corrective Action Program, Rev. 12
- SPP-5.1, Radiological Controls, Rev. 5
- Watts Bar Nuclear Plant (WBNP) Technical Specifications 5.11, High Radiation Area

Records and Data Reviewed

- RWP 0700010, Non-contaminated areas within the RCA-General Plant Access for Nuclear Security, Engineering, Job Planners, Plant Management, and NRC performing plant tours, surveillances, and walkdowns
- RWP 0700015, Contaminated areas within the RCA-General Plant Access for Nuclear Security, Engineering, Job Planners, Plant Management, and NRC performing plant tours, surveillances, and walkdowns
- RWP 0700100, High radiation areas (contamination or non-contamination areas) in the RCA-General Plant Access for Nuclear Security, Engineering, Job Planners, Plant Management, and NRC performing plant tours, surveillances, and walkdowns
- RWP 0701030, NSSS filter changeout and all associated work
- RWP 0701032, NSSS filter consolidation. Remove filters from EL. 692' and 737' filter cubicles and spent filter pit, place them in the filter transport casks and/or drums. Transport of "LHRA" drums stored in Unit 2 713', remove filters from transport cask and place in spent filter storage vault HIC. Support activities including transporting

casks/drums from 692', 713', and 737' to 729' RR bay, boundary guards, firewatch, and crane/hoist operation.

Corrective Action Program (CAP) Documents

- PER 112920, During radiography in lower containment, two Bechtel employees tried to enter area. The RP technician who was posted in the area stopped the two employees thus preventing a near miss.
- PER 114000, During a review of U1C7 RWPs it was discovered that not all RWP back-out dose and dose rate values were consistent with the ALARA plan (APRs) back-out values.
- PER 114089, Radiation protection is inconsistent on how access to some high radiation/locked high radiation areas is controlled.
- PER 114199 documented an unexpected dose rate alarm which occurred on 11/05/06 for two plant services employee working in railroad bay on RWP # 06007604.
- PER 114563, During radiography activities conducted on 11/10/06, an RP radiography boundary watch was prevented from continuously observing the radiography boundary by Bechtel personnel who were moving equipment in upper containment.
- PER 114589, On 11/12/06 an RP technician identified a possible access to the inside of the radiographer's boundary through duct work in the area.

Section 2OS2: ALARA Planning and Controls

Procedures, Instructions, Guidance Documents, and Operating Manuals

- ALARA Pre-Planning Report (APR) 06-015, Temporary Shielding Activities APR 06-023, U1Cy Refueling Outage - Work Associated with Reactor Pressure Vessel Head Assembly and Disassembly and Associated Refuel Floor Support Activities
- APR 06-048, U1C7 Refueling Outage - Core Exit Thermocouple Cable Replacement
- APR 06-109, SGR Steam Generator Secondary Side Work
- APR 06-1008, SGR RCS System Work
- APR 07-001, Miscellaneous minor plant work activities including walkdowns, inspections, PMs, corrective maintenance, modifications, surveillances, rad protection surveys, and chemistry sampling, etc.
- APR 07-003, Rev. 1, NSSS filter change-out, consolidation, and disposal
- APR 07-010, U1C8 spent fuel pit B.5.b fuel moves
- RCI-100, Control of Radiological Work, Rev. 29
- RCI-128, ALARA Program Implementation, Rev. 9
- RCTP - 105, Personnel Inprocessing and Dosimetry Administrative Processes, Rev. 0
- SPP - 3.1, Corrective Action Program, Rev. 12
- SPP, SPP - 5.2, ALARA Program, Rev. 3
- WBNP, Chemistry Manual, Chapter 5.09, Shutdown Primary Control Chemistry, Rev. 14

Records and Data

- Cobalt 58 and 60 Reactor Coolant System Concentrations for Cycle 7 and 8
- Dose Records of All Declared Pregnant Workers During the Period November 1, 2006 to present
- Listing of Active Hot Spots, dated 05/22/07
- RWP 07000507, U1 Upper Ice Condenser - All Groups Performing Maintenance and Surveillances

- RWP 07000520, U1 Upper Containment - General Access for Operations and Fire Operations Performing Surveillance Activities and System Configurations in Support of Plant Operations
- RWP 07000530, U1 Upper Containment - Maintenance and Modification Groups Performing Preventive and Corrective Maintenance Activities and Modifications
- RWP 07000756, Contaminated, Non-Contaminated Areas and High Radiation areas - Fuel Shuffle, Refuel Bridge Crane Positioning and Support Activities
- RWP 07001030, NSS Filter Changeout and All Associated Work
- TVA, WBNP, Collective Radiation Exposure Long-term Reduction Plan, 2007 - 2011
- U1C7 ALARA Summary dated 05/23/07
- WBNP Exposure Goals for FY 2005, 2006 and 2007
- WBNP - Quarterly ALARA Committee Meeting Minutes dated 11/06/06, 11/08/06, 11/28/06, 12/13/06, 01/04/07, 01/17/07, 01/24/07, and 02/21/07
- WBNP RFO-7 ALARA Outage Report
- WBNP Site Dose Reduction Strategy
- WBNP Steam Generator Replacement Outage ALARA Report, Unit 1 Cycle 7
- WBNP Year 2005 Annual ALARA Report

CAP Documents

- Nuclear Assurance, WBNP, Audit Report WBA0604, Radiological Protection Program.
- PER 115547, WBN U1CY collective performance exposure target was exceeded.
- PER 118353, WBN exceeded 2007 Winning Performance Collective Radiation Exposure Business Plan Goal.
- PER 119126, Lessons learned for APRs in accordance with RCI-128 for APRs 06-010, 06-011, 06-012, 06-013, 06-016 and 06-017.
- PER 119365, Initiated to evaluate trends associated with dose estimates being higher than actual dose received.
- PER 121569, APR review issues from Self-Assessment SA-WBN-RP-07-002.
- PER 121588, RP and OPS Departmental Refueling Outage dose goals were exceeded without explanation in a PER.
- PER 123525, During and after RCS Filter Change activities on 04/17/07, increased dose rates were observed in various auxiliary building areas.

Section 2PS2: Radioactive Material Processing and Transportation

Procedures, Guidance Documents and Manuals

- Process Control Program (PCP), Rev. 1
- Radioactive Material Shipment Manual (RMSM), Vol. I, II and III, Rev.38
- RWTP-100, Radioactive Material/Waste Shipments, Rev. 4
- RWTP-101, 10 CFR Part 61 Waste Characterization, Rev. 0
- RWTP-102, Use of Casks, Rev. 1
- RCI-116, Bead Resin/Activated Carbon Dewatering Procedure for CNS-14-215 or Smaller Liners Prior to Shipment, Rev 5
- RCI-117, High Integrity container (HIC) Handling Procedure, Rev. 2
- RCI-125, Operation of the Mobile Demineralizers, Rev. 8
- RCI-136, Loading Radioactive Material For Shipment, Rev.2
- RWT-000, General Employee Training, Dated 08/31/06

Records and Data

- 10 CFR Part 61 Waste Stream Reports dated 12/29/05, 11/16/06, 11/10/06, 02/27/07, and 04/24/07
- 2006 and 2007 Shipping Log
- 49 CFR Part 172, Subpart H, HAZMAT Training Certificates for Shipping Personnel
- Material Safety Data Sheet for Mobil Hydraulic Oil AW 32 583013-00, dated 08/07/98
- Teledyne Reports of analysis/Certificates of Conformance, dated 09/01/06, 10/26/06 and 11/03/2006
- TR-OP-008, Handling Procedure for Transport Cask Number CNS 14-195H, Rev. 17
- WBN 05-044, 06-001, 06-014, 06-063, 06-079, 06-116, 07-006, 07-022, and 07-026 Waste Manifests (Packages)
- CRP-BPS-05-003, Transportation and Shipping of Radioactive Material Self-Assessment, dated 08/12/05
- Audit Report No.SSA0502, Radiological Protection and Control Audit, dated 01/19/06

CAP Documents

- PER 82465, Radioactive material in sealand
- PER 87252, Incomplete General Awareness Training
- PER 91819, Torque Wrench Accuracy
- PER 93565, Unqualified Carrier Arrives for RAM Shipment
- PER 94706, Dropped Resin HIC Cap
- PER 97351, Radwaste Cleanup
- PER 106430, Untimely Shipping Paperwork Review
- PER 109364, Radioactive Material Shipping Survey
- PER 121729, Final Shipment Survey Too High For Shipment

Section 4OA1: Performance Indicator (PI) VerificationsProcedures and Records

- SPP-3.1, Corrective Action Program, Rev. 12
- SPP-3.4, Performance Indicator and MOR Submittal Using INPO Consolidated Data Entry, Rev. 3