



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

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

January 28, 2005

Tennessee Valley Authority  
ATTN: Mr. K. W. Singer  
Chief Nuclear Officer and  
Executive Vice President  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NRC INTEGRATED INSPECTION REPORT 05000390/2004005  
AND 05000391/2004005

Dear Mr. Singer:

On December 31, 2004, the US 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 January 4, 2005, with Mr. W. Lagergren 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 reports documents one NRC-identified finding concerning inadequate corrective action which resulted in not promptly identifying and correcting a blockage of an essential raw cooling water line that provides backup cooling to a high head injection pump. This finding has potential significance of greater than very low safety significance. The finding did not present an immediate safety concern because there were no operability issues with the normal cooling water supply to the affected high head injection pump. The blockage was promptly cleared and measures are in place for increased frequency monitoring of the line for blockage while long term corrective actions are being determined. In addition, the report documents two NRC-identified findings of very low safety significance (Green). These findings were determined to involve violations of NRC requirements. However, because of the very low safety significance and because they are entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs) consistent with Section VI.A of the NRC Enforcement Policy. If you contest any NCV in the enclosed report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Watts Bar facility.

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

Stephen J. Cahill, 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 05000390/2004005, 05000391/2004005  
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 No: 05000390/2004005, 05000391/2004005

Licensee: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Units 1 and 2

Location: 1260 Nuclear Plant Road  
Spring City TN 37381

Dates: September 26 through December 31, 2004

Inspectors: J. Bartley, Senior Resident Inspector  
J. Reece, Resident Inspector  
R. Bernhard, Senior Risk Analyst (Section 4OA5)  
G. Kuzo, Senior Health Physicist (Sections 2OS3 and 2PS3)  
G. Hopper, Senior Operations Examiner (Section 1R11.1)  
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D. Jones, Senior Health Physicist (Sections 2OS1 and 4OA1)

Approved by: Stephen J. Cahill, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000390/2004005, 05000391/2004005, 09/26/2004 - 12/31/2004, Watts Bar, Units 1 & 2; Licensed Operator Requalification, Surveillance Testing, Problem Identification and Resolution

The report covered approximately a three-month period of routine inspection by resident inspectors and announced inspections by a senior risk analyst, regional reactor inspectors, health physicists, and operations examiners. The significance of issues is indicated by the color (Green, White, Yellow, Red) using the Significance Determination Process in Inspection Manual Chapter 0609, Significance Determination Process (SDP). The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, Reactor Oversight Process, Revision 3, dated July 2000.

### A. NRC-Identified Findings and Self-Revealing Findings

#### **Cornerstone: Mitigating Systems**

- Green. The inspectors identified a non-cited Severity Level IV violation (NCV) of 10 CFR 50.9 for failure to provide complete and accurate information for one licensed operator on his initial license application. The applicant did not meet the American Nuclear Standards Institute /American Nuclear Society (ANSI/ANS) 3.4, 1983, standard for visual acuity without corrective lenses and had a pre-existing medical condition, both of which required a license restriction. The licensee submitted his NRC Form 396, Certification of Medical Examination by Facility Licensee, along with supplemental medical information, without recommending these restrictions. The NRC imposed a no-solo restriction on the operator's license after reviewing the supplemental information. The failure to certify the need for corrective lenses resulted in an incorrect licensing action by the NRC because a license was issued without a restriction to wear corrective lenses.

Because this issue affected the NRC's ability to perform its regulatory function, it was evaluated using the traditional enforcement process. This finding is of very low safety significance because there was no evidence that the operator endangered plant operations as a result of impaired visual acuity while performing licensed duties since the original issuance of his license. However, the regulatory significance was important because the incorrect information was provided under sworn statement to the NRC and impacted a licensing decision for the individual. The facility licensee took prompt corrective action and submitted NRC Form 396 requesting to have the operator's license amended with the appropriate restriction. This issue is documented in the facility licensee's corrective action program as Problem Evaluation Report (PER) 72386. (Section 1R11.1)

- Green. The inspectors identified a non-cited violation of Technical Specification (TS) 5.7.1, which requires that written procedures be implemented covering the activities in the applicable procedures recommended by Regulatory Guide 1.33, including procedures for surveillances. The surveillance procedure for remote

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shutdown system instrumentation was inadequate because it failed to give guidance for determining instrument operability when an instrument was at the top of scale and at the maximum allowed channel deviation. The performance deficiency resulted in an unexpected TS Limiting Condition for Operation entry.

This finding is greater than minor because it affects the ability of the licensee to monitor the status of the reactor following a control room evacuation and is associated with the Mitigating Systems cornerstone and the respective attribute of procedure quality. This finding is of very low safety significance because it did not result in a loss of function per Generic Letter 91-18, did not represent an actual loss of safety function, and is not potentially risk-significant due to external events. A contributing cause of the finding is related to the cross-cutting element of human performance. (Section 1R22)

- TBD. The inspectors identified an apparent violation of 10 CFR 50, Appendix B, Criterion XVI, having a potential safety significance greater than very low safety significance. The licensee's corrective actions for occurrences of silt blockage in essential raw cooling water (ERCW) lines were inadequate and resulted in not promptly identifying and correcting a complete blockage in the backup cooling water line to a high head injection pump. In addition, the inspectors identified that the licensee's corrective actions for the blockage of the backup cooling water line were inadequate.

This finding is unresolved pending completion of a significance determination. The finding is more than minor because it adversely affected the Mitigating System and Barrier Integrity cornerstones by causing a loss of high head injection and reactor coolant pump seal cooling during a loss of component cooling system (CCS) event. The finding was determined to have potential safety significance greater than very low safety significance because of the importance of the backup ERCW cooling to the 1A-A centrifugal charging pump (CCP) during a loss of CCS event and the low probability of operator action successfully restoring the backup cooling water. The cause of the finding is related to the cross-cutting element of problem identification and resolution. (Section 4OA2.3)

B. Licensee-Identified Violations

None.

## 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 deferred construction status.

## **1. REACTOR SAFETY**

### **Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

#### 1R01 Adverse Weather Protection

##### a. Inspection Scope

The inspectors reviewed licensee actions taken in preparation for low temperature weather conditions to limit the risk of freeze-related initiating events and to adequately protect mitigating systems from its effects. The inspectors walked down selected components associated with the two areas listed below to evaluate implementation of plant freeze protection. In addition, the material condition of insulation on selected freeze-protected components was inspected for damage. Corrective actions for items identified in relevant problem evaluation reports (PERs), work orders (WOs), and a self-assessment of freeze protection practices and procedures were assessed for effectiveness and timeliness.

- Intake pumping station (IPS)
- Refueling water storage tank (RWST)

On December 14, 2004, the inspectors reviewed the licensee's preparations for impending cold weather conditions to verify compliance with associated procedures. The inspectors toured plant facilities exposed to freezing temperatures to verify installation and adequacy of additional freeze protection features.

##### b. Findings

No findings of significance were identified.

#### 1R04 Equipment Alignment

##### a. Inspection Scope

Partial System Walkdown: 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 (TSs) to determine correct system lineups for the current plant conditions. In addition, the inspectors reviewed associated corrective action documents. The inspectors performed

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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.

- B train auxiliary feedwater (AFW) with A train AFW out of service
- 1B-B centrifugal charging pump (CCP) and 1B safety injection pump (SIP) with 1A-A CCP out-of-service
- A train control room emergency air temperature control system (CREATCS) with B train main control room (MCR) chiller out of service for condenser tube replacement

Complete System Walkdown: The inspectors performed a complete system walkdown of the vital 480-VAC systems including 480-V shutdown power system, reactor motor-operated valve (MOV) power system, and the control & auxiliary ventilation power system to verify proper equipment alignment and identify any discrepancies that could impact the function of the system and increase risk. The inspectors reviewed the UFSAR, system procedures, system drawings, and system design documents to determine the correct lineup and then examined system components and their configuration to identify any discrepancies between the existing lineup and the correct lineup. The inspectors reviewed the licensee's corrective action system documents, WOs, and the respective engineering system health report cards to determine whether issues related to the systems were being appropriately addressed. The documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Fire Protection - Tours

a. Inspection Scope

The inspectors conducted tours of ten 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; and 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.

- Cable spreading room
- 480-V RX MOV Board Room 1A
- 480-V RX MOV Board Room 1B

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- 480-V RX MOV Board Room 2A (PER 70835)
- 480 V RX MOV Board Room 2B
- Vital Battery Room I
- Vital Battery Room II
- Vital Battery Room III
- Vital Battery Room IV
- Vital Battery Room V

b. Findings

No findings of significance were identified.

.2 Fire Protection - Drill Observation

a. Inspection Scope

The inspectors observed three fire drills conducted in the emergency diesel generator building and turbine building on October 15<sup>th</sup>, November 15<sup>th</sup>, and December 15<sup>th</sup>. The drills were observed to evaluate the readiness of the plant fire brigade to fight fires. These additional drills were observed to verify that the fire brigade deficiencies documented in IR 05000390,391/200404, Section 1R04, were promptly corrected. The inspectors verified that the licensee staff identified deficiencies, openly discussed them in a self-critical manner at the drill debrief, and took appropriate corrective actions. Specific attributes evaluated were: (1) proper wearing of turnout gear and self-contained breathing apparatus; (2) proper use and layout of fire hoses; (3) employment of appropriate fire fighting techniques; (4) sufficient fire fighting equipment brought to the scene; (5) effectiveness of fire brigade leader communications, command, and control; (6) search for victims and propagation of the fire into other plant areas; (7) smoke removal operations; (8) utilization of pre-planned strategies; (9) adherence to the pre-planned drill scenario; and (10) drill objectives.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors reviewed internal flood protection barriers associated with an essential raw cooling water (ERCW) strainer room pipe break to verify that the flood protection barriers and equipment were being maintained consistent with the UFSAR. The licensee's corrective action documents were reviewed to verify that corrective actions with respect to flood-related items identified in PERs were adequately addressed. The inspectors also reviewed the maintenance history and current open work orders for the flood mode level switches. The inspectors walked down the selected area to evaluate the adequacy of flood barriers, doors, floor drains, sump level switches, and sump

pumps to protect the equipment, as well as their overall material condition. Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed the licensee's program for maintenance and testing of risk-important heat exchangers in the ERCW system. Specifically, the review included the program for testing and analysis of the B MCR chiller condenser (heat exchanger) which was cleaned, inspected, and evaluated by WO 04-812811-000 in parallel with WO 02-017913-000 to replace the condenser tubes. The inspectors observed the physical condition of the heat exchanger during the cleaning activities and verified that the frequency of inspection was sufficient to detect degradation prior to loss of heat removal capabilities below design requirements; that the inspection results were appropriately categorized against pre-established engineering acceptance criteria, including the impact of tubes plugged on the heat exchanger performance; and that the licensee had developed adequate acceptance criteria for bio-fouling controls. Additional documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

.1 Biennial Review

a. Inspection Scope

The inspectors reviewed the facility operating history and associated documents in preparation for this inspection. During the week of November 15-19, 2004, the inspectors reviewed documentation, interviewed licensee personnel, and observed the administration of simulator operating tests associated with the licensee's operator requalification program. Each of the activities performed by the inspectors was done to assess the effectiveness of the licensee in implementing requalification requirements identified in 10 CFR 55, Operators' Licenses. The evaluations were also performed to determine if the licensee effectively implemented operator requalification guidelines established in NUREG-1021, Operator Licensing Examination Standards for Power Reactors, and Inspection Procedure 71111.11, Licensed Operator Requalification Program. The inspectors also reviewed and evaluated the licensee's simulation facility for adequacy and for use in operator licensing examinations. The inspectors observed one operator crew during the performance of the operating tests. Documentation reviewed included written examinations, job performance

measures (JPMs), simulator scenarios, licensee procedures, on-shift records, licensed operator qualification records, watch standing and medical records, simulator modification request records and performance test records, the feedback process, and remediation plans. The records were inspected against the criteria listed in Procedure 71111.11. Documents reviewed during the inspection are listed in the attachment.

Following the completion of the annual operating examination testing cycle, which ended on December 11, 2004, the inspectors reviewed the overall pass/fail results of the biennial written examination, the individual JPM operating tests, and the simulator operating tests administered by the licensee during the operator licensing requalification cycle. These results were compared to the thresholds established in Manual Chapter 609, Appendix I, Operator Requalification Human Performance Significance Determination Process.

b. Findings

Introduction: The inspectors identified a Green (Severity Level IV) non-cited violation (NCV) of 10 CFR 50.9 for failure to provide complete and accurate information for one licensed operator on his initial license application.

Description: The NRC's requirements related to the conduct and documentation of medical examinations for operators are contained in Subpart C, Medical Requirements, of 10 CFR Part 55, Operators' Licenses. Specifically, Section 55.21, Medical Examination, requires every operator to be examined by a physician when he or she first applies for a license. The physician must determine whether the operator meets the requirements of Section 55.33(a)(1), i.e., the operator's medical condition and general health will not adversely affect the performance of assigned operator duties or cause operational errors that endanger public health and safety.

Every time an operator applies for a license pursuant to Section 55.31, How to Apply, or Section 55.57, Renewal of Licenses, an authorized representative of the facility licensee must complete and sign NRC Form 396, Certification of Medical Examination by Facility Licensee, attesting, pursuant to Section 55.23, Certification, that a physician has conducted the required medical examination and determined that the operator's medical condition and general health meet the requirements of Section 55.33(a)(1). The facility licensee must also certify which industry standard (i.e., the 1983 or 1996 version of ANSI/ANS-3.4, Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants, or other NRC-approved method) was used in making the fitness determination.

The ANSI standards describe a number of specific operator health requirements and disqualifying conditions. If an operator's health does not meet the minimum standards, the facility licensee must request a conditional license in accordance with Section 55.23(b) by submitting the appropriate medical evidence with NRC Form 396. Pursuant to Section 55.33, Disposition of an Initial Application, and Section 55.57, as applicable, the Commission will review the license application based on the facility's licensee certification and include any conditions in the license that might be necessary based on the supporting medical evidence.

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During the medical records review of the inspection on November 17, 2004, the inspectors determined that this operator's record indicated a need to wear corrective lenses to meet the ANSI/ANS 3.4 1983 visual acuity requirements. The facility licensee was informed that the individual required an amendment to his license that required him to wear corrective lenses while performing licensed duties. The inspectors also determined that the original NRC Form 396 submitted with his application for a license did not contain a recommendation for the no-solo license restriction that the NRC had placed on the license. In addition, a review of other medical records indicated that some operators had not taken vision tests with their corrective lenses removed and, therefore, no real baseline information existed for the actual need for corrective lenses to meet the visual acuity standard.

The inspectors reviewed the operator's docket file and determined that the facility licensee had submitted his application for a reactor operator license on November 5, 2002, which contained an NRC Form 396 signed by the site vice president certifying that the information on the document was true and correct. The form was sent with the recommendation of no restrictions on the applicant's license but had an attachment which listed prescribed medications that the applicant was taking. Region II examiners completed the administration of an initial license examination at the Watts Bar Nuclear Plant in December 2002, and a license was issued on January 9, 2003, with a no-solo restriction. This restriction was imposed by the NRC and was not based on the facility licensee's certification of NRC Form 396 but on the medical information concerning prescribed medications that had been submitted as supplemental information with the NRC Form 396. Additional amplifying medical information was submitted to the NRC in a letter dated February 27, 2003, in response to the imposed no-solo condition, providing more information for the NRC medical doctor to review. The NRC then issued an amendment on March 31, 2003, which changed the wording of the no-solo restriction on his license. No information regarding the need for corrective lenses had been communicated in any of the submitted documents.

Analysis: The inspectors determined that the licensee's failure to provide complete and accurate information to the NRC, which resulted in an incorrect licensing action, is a performance deficiency because the licensee is expected to comply with 10 CFR 50.9 and because it was within the licensee's ability to foresee and prevent. Because violations of 10 CFR 50.9 are considered to be violations that potentially impede or impact the regulatory process, they are dispositioned using the traditional enforcement process. The finding was more than minor because information was provided to the NRC signed under oath by the site vice president which erroneously impacted an NRC licensing decision. The finding is of very low safety significance because there was no evidence that the operator endangered plant operations as a result of impaired visual acuity while performing licensed duties since the original issuance of his license in January 2002.

The licensee took prompt corrective action and submitted a letter dated November 19, 2004, requesting a corrective lens restriction for the operator's license. The licensee entered this issue into their corrective action program, PER 72386, and conducted a 100 percent review of all operator medical records to ensure no other discrepancies existed. No other discrepancies were found.

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Enforcement: 10 CFR 50.9 states, in part, "Information provided to the Commission by an applicant for a license or by a licensee or information required by statute or by the Commission's regulations, orders, or license conditions to be maintained by the applicant or the licensee shall be complete and accurate in all material respects. 10 CFR 55.23 requires that an authorized representative of the facility licensee shall certify the medical fitness of an applicant by completing and signing an NRC Form 396. NRC Form 396, when signed by an authorized representative of the facility licensee, certifies that a physician conducted a medical examination of the applicant as required in 10 CFR 55.21, and that the guidance contained in ANSI/ANS 3.4-1983 was followed in conducting the examination and making the determination of medical qualification. Contrary to this, on November 5, 2002, a senior licensee representative submitted NRC Form 396 for one individual applying for a reactor operator license that certified that the applicant met the medical requirements of ANSI/ANS 3.4-1983 and that the applicant would not require any restrictions to his license. In fact, the applicant had a pre-existing medical condition and an additional requirement of corrective lenses to meet the medical standards, both of which required restrictions on his license. This information was material to the NRC because the NRC relied on this certification to determine whether the applicant met the requirements to operate the controls of a nuclear power plant pursuant to 10 CFR Part 55. The finding is not suitable for significance determination process (SDP) evaluation, but has been reviewed by NRC management and is determined to be a green finding of very low safety significance. Because the failure to provide the information requesting appropriate restrictions on the operator's license was of very low safety significance and has been entered into the corrective action program as PER 72386, this violation is being treated as a Severity Level IV non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000390/2004005-01, Failure to Provide Complete and Accurate Information to the NRC which Impacted a Licensing Decision.

.2 Resident Inspector Quarterly Review

a. Inspection Scope

On December 10, 2004, the inspectors observed operators in the plant's simulator during licensed operator annual requalification examinations to verify that 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. The inspectors observed a shift crew's response to the two scenarios listed below:

- 3-OT-SRE0005, Main Steamline Break Inside Containment/Steam Generator Tube Rupture
- 3-OT-SRE0002, Reactor Trip with Steam Generator Safety Valve Failed Open

b. Findings

No findings of significance were identified.

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## 1R12 Maintenance Effectiveness

### a. Inspection Scope

The inspectors reviewed two areas of maintenance effectiveness: (1) the licensee's actions for the steam generator blowdown isolation valves being placed in maintenance rule a(1) status, and (2) a performance-based problem relating to breaker failures associated with the 1A-A CCP room cooler fan. The focus of the reviews was to assess 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 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.

### 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 four 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.

- Train B auxiliary building gas treatment system SI failure extended out-of-service time into Train B control room emergency ventilation system work window
- A train AFW unavailable and A train control room chiller unavailable with emergent vibration problem on standby main feedwater pump
- C-A and E-B ERCW pumps out-of-service coincident with standby main feedwater pump outage, 2A 480-V board room heating, ventilation, and air conditioning work and 2A diesel generator (DG) starting air compressor work
- B main control room (MCR) chiller outage coincident with 1B CCP component outage

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b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutionsa. Inspection Scope

The inspectors reviewed the personnel performance in response to a large ERCW leak (approximately 30 gallons per minute) in the auxiliary building. The leak was due to a rubber gasket failure on an eight-inch ERCW pipe flange. The inspectors verified that the licensee entered and took appropriate actions directed by Abnormal Operating Instruction (AOI) 13, Loss of ERCW, and the TS. The inspectors toured the auxiliary building and verified that the licensee took adequate actions to protect plant equipment from the water spray and the water on the floor. The inspectors reviewed WO 04-827057-000, Replace gasket on ERCW flow element flange, to verify that repairs were made in accordance with the ASME code. In addition, because the repair efforts required isolating ERCW flow to several coolers inside the reactor building, the inspectors verified that the licensee adequately identified which component temperatures to monitor, established conservative action limits before isolating ERCW flow, and developed written guidance to control the evolution.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluationsa. Inspection Scope

The inspectors reviewed four 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.

- PER 69787, Sixty percent blockage upstream of 1-FCV-67-125, ERCW to 1A containment spray (CS) heat exchanger (Hx)
- PER 69541, No PM to change pneumatic positions or I/P press regulator of turbine-driven auxiliary feedwater (TDAFW) level control valves (LCVs)
- PER 66826, FSAR describes administrative parking lot area as a drainage area to protect plant from flood; area was filled in
- PER 68534, Temporary gauge on discharge of 1A-A RHR pump leaked



b. Findings

No findings of significance were identified.

1R16 Operator Workaroundsa. Inspection Scope

The inspectors reviewed the cumulative effects of operator workarounds to assess: (1) the effect on the reliability, availability, and potential for misoperation of a system; (2) the potential for increasing an initiating event frequency or affecting multiple mitigating systems; and (3) the cumulative effects on the ability of the operators to respond in a correct and timely manner to plant transients and accidents. The inspectors reviewed the current operator workarounds as defined by Operations Department Procedure (OPDP)-1, Conduct of Operations, and interviewed operators to determine if there were other conditions which would require actions to compensate for equipment problems or deficiencies. The operator workarounds reviewed for their cumulative effect were:

- Waste gas vent header leakage requires manually maintaining spent resin storage tank nitrogen pressure
- Primary water storage tank must be frequently drained and filled to maintain dissolved oxygen within specification

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modificationsb. Inspection Scope

The inspectors reviewed two permanent plant modifications accomplished by the design change notices (DCNs) listed below. The inspectors verified that installed materials and components met the required design requirements, that affected operational procedures were identified and revised accordingly, and that post-maintenance testing was adequate. Additional documents reviewed are listed in the attachment.

- DCN 51653, Apply coating to the Unit 1 fuel transfer canal to eliminate leakage
- DCN 51383-A, Revise setpoints to temperature switches that control DG exhaust fan operation

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testinga. Inspection Scope

The inspectors reviewed five post-maintenance testing (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. Additional documents reviewed are listed in the attachment.

- WO 03-005058-000, 1A-A motor-driven auxiliary feedwater (MDAFW) motor outboard bearing leaking oil while system in service
- WO 04-825391-000, Replace #2 SG steam pressure transmitter
- WO 04-810592-000, Limitorque maintenance on 1-MJOP-067-0295-A containment isolation valve
- WO 03-017874-000, Repair shaft for EGTS modulation damper 1-PCO-065-0080 to prevent slipping
- WO 04-825793-000, Remove blockage in ERCW to 1A-A CCP lube oil cooler piping

b. Findings

No findings of significance were identified.

1R22 Surveillance Testinga. Inspection Scope

The inspectors witnessed six 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. Additional documents reviewed are listed in the attachment.

- WO 04-815559-000, 0-SI-65-8-B, Emergency gas treatment system filter Train B test

- WO 04-815564-000, 0-SI-30-9-B, Auxiliary building gas treatment system filter Train B test
- WO 04-818471-000, Perform 0-SI-82-12-B, Monthly diesel generator start and load test DG 2B-B
- WO 04-817480-000, Perform 1-SI-3-901-B, Motor-driven auxiliary feedwater pump 1B-B quarterly performance test
- WO 04-819346-000, Perform 1-SI-3-902, Turbine-driven auxiliary feedwater pump 1A-S quarterly performance test
- 1-SI-0-4, Monthly Surveillances

b. Findings

Introduction: A Green NCV was identified by the NRC regarding an inadequate procedure for surveillance of remote shutdown system instrumentation.

Description: On September 15, 2004, the inspectors identified that remote shutdown instrumentation, 1-TI-68-65C (hot leg loop 4 temperature) exceeded the maximum channel deviation (MCD) in that the instrument was at top-of-scale (650 degrees Fahrenheit (EF) and apparently failed high. TS 3.3.4, Remote Shutdown System (RSS), identifies required instrumentation for unit shutdown in the event of conditions forcing the evacuation of the normal control room and is considered to be an important contributor to the reduction of unit risk to accidents. TS Surveillance Requirement (SR) 3.3.4.1 requires an instrument channel check every 31 days. This is implemented by 1-SI-0-4, Monthly Surveillances, and consists of a comparison of the instrument located in the auxiliary control room to the equivalent instrument in the main control room to determine if the difference between channels is within a band defined as the MCD, e.g., 30 EF for the reactor coolant hot legs temperature instrumentation. Any deviation beyond this results in a declaration of inoperability of the affected instrument channel.

The licensee evaluated the condition, declared the instrument inoperable, and entered a 30-day action statement. The inspectors reviewed the previous performance of 1-SI-0-4 on September 4, 2004, and observed that 1-TI-68-65C was recorded as 650 EF versus a control room reading (1-TI-68-65) of 620 EF with no corrective action initiated. The inspectors also determined that 1-SI-0-4 did not have instructions for operator response when the MCD encompasses the top-of-scale or a failed-high indication for a particular instrument. Therefore, a condition of undetected inoperability is possible and did exist on September 15, 2004, as discovered by the inspectors. The inadequate establishment and maintenance of this procedure is contrary to TS 5.7.1.1.a, which requires that written procedures be established, implemented, and maintained as specified in RG 1.33, Revision 2, of which Appendix A, Item 8b, states that implementing procedures are required for each surveillance test listed in the TS. A contributing cause of the finding is related to the cross-cutting element of human performance, in that operators did not identify that the instrument was recorded as being at its maximum channel deviation when the TS surveillance was performed 10 days earlier.

Analysis: The inspectors referred to MC 0612 and determined that the finding is greater than minor in that it affected the ability of the licensee to monitor the status of the reactor following a control room evacuation and is associated with the Mitigating Systems cornerstone and the respective attribute of procedure quality. The inspectors evaluated this finding using MC 0609 and determined that it was of very low safety significance (Green) because it did not result in a loss of function per Generic Letter (GL) 91-18, did not represent an actual loss of safety function, and was not potentially risk-significant due to possible external events.

Enforcement: TS 5.7.1.1.a requires that written procedures be established, implemented, and maintained for the activities specified in RG 1.33, Revision 2, Appendix A. Item 8b of RG 1.33 states that implementing procedures are required for each surveillance test listed in the TS. Contrary to this, 1-SI-0-4, Monthly Surveillances, was not adequately established or maintained and, consequently on September 4, 2004, the inoperability of 1-TI-68-65C (hot leg loop 4 temperature) was not identified. Because this finding is of very low safety significance and because it was entered into the licensee's corrective action program as PER 68838, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000390/2004005-02, Inadequate Procedure for Surveillance of Remote Shutdown System Instrumentation.

#### 1R23 Temporary Plant Modifications

##### a. Inspection Scope

The inspectors reviewed temporary alteration 1-04-05-62 R0, Install gag on 1-RFV-62-505 to reduce PRT in leakage, against the requirements of SPP-9.5, Temporary Alterations, and SPP-9.4, 10 CFR 50.59 Evaluation of Changes, Test, and Experiments. The inspectors verified that the modification did not affect system operability or availability as described by the TS and UFSAR. In addition, the inspectors verified that the installation of the temporary modification was in accordance with the work package, that adequate configuration control was in place, procedures and drawings were updated, and post-installation tests verified operability of the affected systems.

##### b. Findings

No findings of significance were identified.

## Cornerstone: Emergency Preparedness

### 1EP6 Drill Evaluation

#### a. Inspection Scope

The inspectors observed a licensee-evaluated emergency preparedness drill conducted on November 3, 2004, and a licensed operator annual requalification examination on December 10, 2004, 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.

#### b. Findings

No findings of significance were identified.

## 2. RADIATION SAFETY

### Cornerstone: Occupational Radiation Safety

#### 2OS1 Access Control To Radiologically-Significant Areas

##### a. Inspection Scope

Access Controls Licensee program activities for monitoring workers and controlling access to radiologically significant areas and tasks were inspected. The inspectors evaluated procedural guidance; directly observed implementation of administrative and established physical controls; assessed worker exposures to radiation and radioactive material; and appraised radiation worker and technician knowledge of, and proficiency in implementing radiation protection program activities.

During the inspection, radiological controls for ongoing maintenance activities were observed and discussed. Reviewed on-going tasks included the application of coating to the fuel transfer canal; maintenance associated with the clogged transfer line from the spent resin storage tank; and at-power containment surveillance activities. In addition, licensee controls for selected tasks conducted during the previous Unit 1 Cycle 5 Refueling outage were assessed. The evaluations included, as applicable, Radiation Work Permit (RWP) details; use and placement of dosimetry and air sampling equipment; electronic dosimeter (ED) set-points; and monitoring and assessment of worker dose from direct radiation and airborne radioactivity source terms. Effectiveness of established controls

was assessed against area radiation and contamination survey results, and occupational doses received. Physical and administrative controls and their implementation for locked-high radiation area (LHRA) locations and for storage of highly activated material within the spent fuel pool (SFP) areas were evaluated through discussions with licensee representatives, direct field observations, and record reviews.

Occupational workers' adherence to selected RWPs and Health Physics Technician (HPT) proficiency in providing job coverage were evaluated through direct observations of staff performance during job coverage and routine surveillance activities, review of selected exposure records and investigations, and interviews with licensee staff. Radiological postings and physical controls for access to designated high radiation (HRA) and LHRA locations within Auxiliary Building and Refuel Floor areas were evaluated during facility tours. In addition, the inspectors independently measured radiation dose rates and evaluated established posting and access controls for selected Auxiliary Building and Refuel Floor locations. Occupational exposures associated with direct radiation, potential radioactive material intakes, and from discrete radioactive particle (DRP) or dispersed skin contamination events for calendar year (CY) 2004 were reviewed and discussed.

Radiation protection program activities were evaluated against 10 CFR 19.12; 10 CFR 20, Subparts B, C, F, G, H, and J; Updated Final Safety Analysis Report (UFSAR) details in Section 12, Radiation Protection; Technical Specification (TS) Sections 5.7, Procedures and Programs and 5.11, High Radiation Area; and approved licensee procedures. Licensee guidance documents, records, and data reviewed within this inspection area are listed in Section 2OS1 of the report attachment.

Problem Identification and Resolution Licensee Corrective Action Program (CAP) documents associated with access controls to radiologically significant areas were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with Standard Programs and Processes (SPP)- 3.1, Corrective Action Program, Revision (Rev.) 7. Licensee self-assessments and PER documents related to access controls that were reviewed and evaluated in detail during inspection of this program area are identified in Sections 2OS1 and 4OA1 of the report attachment.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation and Protective Equipment

a. Inspection Scope

Area Radiation Monitoring Instrumentation and Post-Accident Sampling Systems The operability, availability and reliability of selected direct area radiation monitor (ARM) and continuous air monitor (CAM) equipment used for routine monitoring activities were reviewed and evaluated. The inspectors observed material condition, installed configuration, where accessible, and the results of performance checks and calibrations for



selected ARMs and CAMs listed in Section 2OS3 of the report Attachment. The inspectors observed the licensee's Post-Accident Sampling System (PASS) equipment for general material condition and discussed current operability/availability with responsible licensee personnel.

Licensee program activities in this area were reviewed against requirements specified in applicable procedures and in Section 12 of the UFSAR. Licensee guidance documents, records and data reviewed are listed in Section 2OS3 of the report attachment.

Personnel Survey Instrumentation Current program guidance and its implementation to maintain operability, accuracy, and availability of selected portable survey instruments were reviewed and evaluated. The inspectors observed licensee personnel selecting, inspecting, functional testing, and subsequently using portable survey instruments for routine surveillances and job coverage. Availability of portable instruments for licensee use was evaluated through observation of instruments staged for issue and discussion with licensee personnel. Portable instrument calibration data was evaluated for those instruments recently used by HPTs during coverage of selected HRA/LHRA tasks. The instrument calibration data reviewed are listed in Section 2OS3 of the report attachment.

Operability and detection capabilities of personnel monitoring equipment used to survey individuals exiting the radiologically controlled area (RCA) for external and internal contamination were evaluated. The inspectors reviewed calibration records and discussed the functional testing and testing intervals for personnel contamination monitor (PCM) and portal monitor equipment located at the RCA and protected area exits. PCM equipment detection capabilities were demonstrated using a low level mixed source, approximate activity of 5000 disintegrations per minute per 100 square centimeters, that was passed through the equipment while taped to the inspectors. The operability and analysis capabilities of the whole body counting (WBC) equipment were evaluated. Recent WBC equipment quality control (QC) data were reviewed and discussed with responsible personnel. In addition, current qualitative and quantitative dry active waste stream radionuclide results were reviewed to assess current calibration practices for personnel contamination and WBC equipment.

Licensee activities associated with personnel radiation monitoring instrumentation were reviewed against 10 CFR 20.1204 and 10 CFR 20.1501, and applicable licensee procedures listed in the Section 2OS3 in the report attachment.

Respiratory Protection - Self Contained Breathing Apparatus (SCBA) The licensee's respiratory protection program guidance and its implementation for SCBA equipment and one-piece supplied air respiratory suits were evaluated. The SCBA units staged for emergency use in the Control Room and selected locations were inspected for material condition, air pressure status, and number of units available. The inspectors reviewed and evaluated selected records associated with supplied-air quality and SCBA equipment maintenance. Control room operators and radiation control personnel were interviewed and training materials were reviewed to assess availability of spectacle inserts and training effectiveness for air cylinder change out. The inspectors verified that training, medical, and fit test qualifications were current for selected operations, HP, and maintenance personnel.

The inspectors also assessed the licensee's logistics for supplying replacement air bottles to the Control Room and Operations Support Center on a sustained basis. In addition, licensee procedures were reviewed and personnel were interviewed regarding program guidance and training regarding use of one-piece atmospheric supplying respiratory suits and the requirement to have a standby rescue person for radiological work activities.

Licensee activities associated with maintenance and use of SCBA equipment were reviewed against 10 CFR 20.1703; Regulatory Guide (RG) 8.15, Acceptable Programs for Respiratory Protection, Revision 1, October 1999; American Nuclear Standards Institute (ANSI)-Z88.2-1992, American National Standard Practices for Respiratory Protection; and applicable procedures. Procedures and reviewed data are listed in Section 2OS3 of the report attachment.

Problem Identification and Resolution Selected licensee CAP documents, including audits, self-assessments, and PERs associated with ARM and CAM equipment, portable radiation detection instrumentation, and respiratory protective program activities were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with licensee procedure SPP-3.1, Corrective Action Program, Revision 7. Specific CAP documents reviewed and evaluated are listed in Section 2OS3 of the report attachment.

b. Findings

No findings of significance were identified.

**Cornerstone: Public Radiation Safety**

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

a. Inspection Scope

Effluent Monitoring and Radwaste Equipment During inspector walk-downs, accessible sections of the Unit 1 liquid radioactive waste (radwaste) system, including Waste Condensate Tanks, a Monitor Tank, system piping, and the Waste Disposal System Liquid Effluent Monitor (0-RE-90-122), were assessed for material condition and conformance with current system design diagrams. Inspected components of the gaseous effluent process and release system included Waste Gas Decay Tanks, Unit 1 Shield Building Exhaust Monitor (1-RE-90-400), Auxiliary Building Ventilation Monitor (0-RE-90-101), and associated effluent sample lines. Technical bases for modifications to liquid effluent release piping and 0-90-RE-101 compensatory sample lines were also evaluated. The inspectors interviewed chemistry supervision regarding radwaste equipment configuration, effluent monitor operation, and system modifications.

The inspectors reviewed results of calibrations and/or performance surveillances for selected process monitors, flow meters, and air filtration systems. For effluent monitors 0-RE-90-122, 0-RE-90-101, and 1-RE-90-400, the inspectors observed control room channel checks and reviewed the two most recent calibration records. The two most

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recent surveillances on the Unit 1 Shield Building Exhaust High Efficiency Particulate Air (HEPA)/charcoal air treatment system also were reviewed. The inspectors evaluated out-of-service (OOS) effluent monitors and compensatory action data for the period July, 2003 - October, 2004. In addition, Auxiliary Building and Shield Building isokinetic design documents and stack versus sample line flow rates were reviewed and discussed with chemistry and engineering staff.

Installed configuration, material condition, operability, and reliability of selected effluent sampling and monitoring equipment were reviewed against details documented in the following: 10 CFR 20, Standards for Protection against Radiation; RG 1.21, Measuring, Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials In Liquid and Gaseous Effluents from Light-Water Cooled Nuclear Power Plants, June 1974; American Nuclear Standards Institute (ANSI)-N13.1-1969, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities; TS Section 5, Administrative Controls; the Offsite Dose Calculation Manual (ODCM), Revision 13; and UFSAR, Chapter 11. Procedures and records reviewed during the inspection are listed in Section 2PS1 of the report attachment.

Effluent Release Processing and Quality Control Activities The inspectors directly observed the weekly collection of airborne effluent samples from the U1 Shield Building Exhaust Monitor and compensatory samples taken from the Auxiliary Building Ventilation Monitor. Chemistry technician proficiency in collecting, processing, and counting the samples, as well as preparing the applicable release permits were evaluated. Selected activities associated with a Monitor Tank liquid release also were observed and radwaste operators were interviewed regarding valve lineups and effluent monitor operation.

QC activities regarding gamma spectroscopy and beta-emitter detection were discussed with count room technicians and Chemistry supervision. The inspectors reviewed records of High Purity Germanium (HPGe) Detector Number 1 daily QC check data between November 5, and December 1, 2004. The inspectors also reviewed the most recent calibration records for HPGe Detector Number 3 and Liquid Scintillation Counters A and B. In addition, results of the radiochemistry cross-check program were reviewed from third quarter 2003 through the second quarter of CY 2004.

Five procedures for effluent sampling, processing, and release were evaluated for consistency with licensee actions. Two liquid and two gaseous release permits were reviewed against ODCM specifications for pre-release sampling and effluent monitor setpoints. The inspectors also reviewed the CY 2003 annual effluent report to follow-up on anomalous releases, and to review and discuss ODCM changes. The inspectors conducted independent calculations to evaluate reported doses to the public from airborne radionuclides for the third quarter of CY 2003.

Observed task evolutions, count room activities, and offsite dose results were evaluated against details and guidance documented in the following: 10 CFR 20 and Appendix I to 10 CFR 50; ODCM; RG 1.21; RG 1.109, Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR 50,

Appendix I, October 1977; and TS Section 5. Procedures and records reviewed during the inspection are listed in Section 2PS1 of the report attachment.

Problem Identification and Resolution Three licensee PERs and one audit associated with effluent release activities were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve selected issues in accordance with procedure SPP-3.1, Corrective Action Program. Reviewed documents are listed in Sections 2PS1 and 2PS3 of the report attachment.

b. Findings

Introduction: An Unresolved Item (URI) was identified regarding adequacy of the Auxiliary Building Ventilation Monitor (0-RE-90-101) transmission calculations for the compensatory sample line configuration used to collect representative particulate samples. This is an URI pending determination if the observed sample line configuration had been previously evaluated and if it supported representative particulate sampling.

Description: During field observations of the auxiliary building air exhaust ventilation effluent monitoring system (0-RE-90-101) primary and compensatory monitoring/ sampling equipment sample line configurations, the inspectors questioned the adequacy of the sample line to provide representative particulate samples to the compensatory monitoring/sampling skid equipment. Specifically, the inspectors noted a 't' connection for taking suction from the main sample line to supply the compensatory equipment skid equipment when the primary skid is declared out-of-service. During the inspection, 0-RE-90-101 was declared out-of-service and the temporary skid was installed to obtain compensatory samples for particulate, iodine, and noble gas effluent monitoring as required by ODCM Table 1.1-2. The inspectors noted that the observed connection was not in accordance with acceptable industry practices regarding sample lines as outlined in ANSI N13.1-1969, nor in licensee sample line design documents. Specifically, licensee Design Criteria Document 40-24, specifies that for required sampling delivery lines, sharp 90 degree bends which can affect the collection of particulates should be avoided, or an evaluation of deposition (loss/transmission) of iodine and particulates in these lines should be made. Licensee representatives stated that the 't' connection originally was designed exclusively as a connection point for taking noble gas grab samples only, which are unaffected by elbows and bends in sample lines; but later was modified to collect particulate and iodine samples as well. The inspectors noted that a transmission factor is applied to effluent release permits to account for sample line losses for the primary sample line, the main radiation monitor skid, and the compensatory sample skid equipment. However, at the time of the inspection, the licensee was unable to provide documentation to demonstrate that the observed 't' connection was evaluated to determine the impact on the sample line transmission factors.

Analysis: The inspectors noted that a failure to evaluate the effect of the observed 't' connection on the sample line transmission factor would be considered a performance deficiency because the licensee is expected to establish, implement and maintain the ODCM requirements for effluent measurements. The failure to complete the required evaluation would be considered greater than minor because it would be associated with the

program and process attribute of the Public Radiation Safety Cornerstone and would affect the cornerstone objective to assure adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. The failure to maintain proper sample line configuration or conduct appropriate evaluations to assure representative sample collection from the Unit 1 plant ventilation effluent streams could result in inaccurate measurement and reporting of airborne particulate radionuclides in samples and resultant dose estimates associated with radiation protection program and process attributes of the Public Radiation Safety Cornerstone objective.

Enforcement: TS 5.7 requires the licensee to establish, implement and maintain the ODCM. Section 1.0 of the ODCM specifies effluent release methodologies to be developed using the guidance in RG 1.21, Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants. RG 1.21, Section C.6, details that the guides for sampling from ducts and stacks contained in ANSI N13.1-1969 are generally acceptable and provide adequate bases for the design and conduct of monitoring programs for airborne effluents. Furthermore, licensee System 90 Design Criteria Document, WB-DC-40-24, and Appendix B of ANSI N13.1-1969 states that for cases where sampling delivery lines are required, an evaluation should be made of deposition (loss/transmission) in these lines. The licensee is currently reviewing archived documents to determine if the necessary evaluation of line loss for the observed 't' connection in the compensatory sample line was performed prior to use of the backup sample line for collecting particulate samples. Pending completion of the licensee's search of archived design documents, the finding will be identified as an Unresolved Item (URI): URI 05000390/2004005-03, Review Plant Ventilation Compensatory Sample Line Particulate Transmission Factor Calculations to Determine if 'T' Connection Configuration Data Were Included.

2PS3 Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program

a. Inspection Scope

REMP Implementation The inspectors evaluated the radiological environmental monitoring program guidance and implementing activities. The evaluation consisted of direct observation of sample stations, sample collection, sample preparation, documentation review, and interviews with licensee personnel.

The inspectors directly observed equipment material condition and operational characteristics, i.e., flow rate determinations, airborne sampling equipment, and assessed technician proficiency in collecting weekly airborne particulate filter and iodine cartridge samples at ODCM-specified monitoring location numbers (Nos.), Local Monitor (LM)-1, LM-2, Perimeter Monitor (PM)-2, and Remote Monitor (RM)-3. Collection of monthly rain water samples was observed at the airborne monitoring stations. In addition, the inspectors observed and discussed material condition, sample sizes collected, and initial field preparation of monthly composite ground water samples for Well Water Station

Nos. 1, 5, B, and D. Technician proficiency in collection and initial preparation of the samples was evaluated against established procedures. Environmental thermoluminescent dosimeters (TLDs) located in the vicinity of the air sampling stations, were checked for material condition and appropriate identification. The inspectors independently corroborated selected environmental sampling locations using NRC global positioning system (GPS) instrumentation against the current ODCM descriptors.

Results documented in the CY 2003 Annual REMP Report and selected QC control activities were discussed with licensee representatives. The inspectors reviewed and discussed results of REMP inter-laboratory comparisons for CY 2002 and CY 2003 and calibration records were reviewed for the current airborne flow rate sampling equipment. The most recent land use census, maximally exposed nearest resident, and applicable dose calculation assumptions were discussed with responsible staff. In addition, licensee program guidance and records regarding documentation of missed environmental samples were discussed with licensee personnel.

The inspectors reviewed and discussed selected tritium concentration data for samples collected from sumps located within the protected area and from ground water monitoring wells located within the owner-controlled property boundary. Licensee corrective actions to identify and correct potential areas and/or equipment identified by the licensee as tritium source terms were discussed, including the radioactive liquid waste discharge piping project, the Unit 1 and Unit 2 transfer canal and SFP liners, SFP drain system maintenance, and the Unit 2 transfer canal tube bellows design modifications. Proposed and completed design changes and maintenance actions regarding the temporary waste discharge line and its proposed permanent replacement, installation of a flange on the Unit 2 transfer tube, sealing of the the Unit 1/Unit 2 transfer canal liner, and evaluation of the SFP liner drain blockage were discussed and evaluated in detail with responsible licensee representatives.

License procedures and activities related to environmental monitoring were evaluated against UFSAR specifications, ODCM Revision 13 details, and applicable sections of 10 CFR Parts 20 and 50. Licensee environmental monitoring-related procedures, reports and records reviewed during the inspection are listed in Section 2PS3 of the report attachment.

Meteorological Monitoring Program The licensee's meteorological monitoring program guidance and its implementation were reviewed and evaluated. The inspectors toured the meteorological tower facilities, equipment, and supporting instrumentation. The inspectors observed the equipment material condition and compared system-generated data with qualitative observations of wind direction and speed. The inspectors assessed and discussed system reliability and data recovery. Meteorological tower siting was evaluated based on near-field obstructions, ground cover, proximity to the plant, and distance from terrain that could affect the representativeness of the measurements. The inspectors reviewed the calibrations and discussed out-of-service equipment for selected meteorological tower instrument sensors used during the current year.

License procedures and activities related to meteorological monitoring were evaluated for consistency with ODCM Section 1.2.1.3, Revision 13; and ANS/ANSI 3.11-2000, Determining Meteorological Information at Nuclear Facilities. The licensee's meteorological monitoring-related procedures, reports, and records reviewed during the inspection are listed in Section 2PS3 of the report attachment.

Unrestricted Release of Materials from the Radiologically Controlled Area (RCA) Radiation protection program activities associated with the unconditional release of potentially contaminated materials from the RCA were reviewed and evaluated. The inspectors directly observed surveys of potentially contaminated materials released from the RCA using Gamma Tool Monitor (GTM) detection equipment. Current calibration and performance check data were reviewed and discussed. In addition, detection sensitivities of the GTM equipment staged at the RCA exit were assessed by direct performance checks using a low-level radioactive source, approximately 5000 dpm of mixed fission and activation product radionuclides.

The licensee practices and implementation of monitoring for unconditional release of materials from the RCA were evaluated against 10 CFR 20; TS; UFSAR, Section 12; IE Circular 81-07, Control of Radioactively Contaminated Material, May 14, 1981; and applicable licensee procedures. The applicable licensee guidance, calibration records, and performance data are documented in Section 2PS3 of the report attachment.

Problem Identification and Resolution Licensee corrective action program (CAP) documents associated with the licensee meteorological and environmental sampling programs were reviewed. Licensee documents identified in Section 2PS1 of the report attachment were reviewed and evaluated in detail. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with licensee procedure SSP-3.1, Corrective Action Program.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES**

4OA1 Performance Indicator Verifications

.1 Initiating Events Cornerstone

a. Inspection Scope

The inspectors reviewed operating logs and monthly operating reports for the period of October 1, 2003, through September 31, 2004, to verify the accuracy and completeness of the two performance indicators (PIs) listed below. The inspectors also independently calculated the reported values to verify their accuracy. Performance indicator definitions and guidance contained in NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 2, were used to verify the basis in reporting for each data element.

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- Unplanned Scrams Per 7000 Critical Hours
- Scrams with Loss of Normal Heat Removal

b. Findings

No findings of significance were identified.

.2 Radiation Safety Cornerstones

a. Inspection Scope

The inspectors sampled licensee data for the PIs listed below. To verify the accuracy of the PI data reported during that period, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Indicator Guideline," Rev. 2, were used to verify the basis in report for each data element.

Occupational Radiation Safety Cornerstone

For the period July, 2003 through September, 2004, the inspectors assessed CAP documents to determine whether HRA, VHRA, or unplanned exposures, resulting in TS or 10 CFR 20 non-conformances, had occurred. For the specified period, the inspectors evaluated data reported to the NRC, and subsequently sampled and assessed applicable CAP documents and selected Health Physics Program records. The reviewed records included personnel exposure investigation reports. Reviewed documents relative to this PI are listed in Sections 2OS1 and 4OA1 of the report attachment.

Public Radiation Safety Cornerstone

The inspectors reviewed the Radiological Control Effluent Release Occurrences PI results for the Public Radiation Safety Cornerstone from July, 2003 through September, 2004. For the assessment period, the inspectors reviewed selected OOS effluent radiation monitor and compensatory sampling data, abnormal release results as reported in the 2003 Annual Effluent Report, procedural guidance for reporting PI information, and three PERs related to RETS/ODCM issues. In addition, the inspectors reviewed cumulative and projected doses to the public for the period September - November, 2004. Documents reviewed are listed in sections 2PS1 and 4OA1 of the report attachment.

b. Findings

No findings of significance were identified.



## 4OA2 Identification & Resolution of Problems

### .1 Daily Reviews

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 repetitive equipment and corrective maintenance issues but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.1. The review also included issues documented outside the normal CAP in system health reports, corrective maintenance WOs, component status reports, site monthly meeting reports and maintenance rule assessments. The inspectors' review nominally considered the six-month period of June through December 2004, 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. Corrective actions associated with a sample of the issues identified in the licensee's trend report were reviewed for adequacy. The inspectors also evaluated the trend report against the requirements of the licensee's CAP as specified in SPP-3.1, Corrective Action Program, and 10 CFR 50, Appendix B. Specific documents reviewed are listed in the attachment.

#### b. Assessment and Observations

No findings of significance were identified. The inspectors reviewed the licensee's trending methodology, scope and implementation including a change to move their group-integrated assessments from at least a quarterly frequency to a semiannual frequency. The inspectors noted that some groups, such as Operations, will remain on a quarterly frequency. The inspectors reviewed results of their daily PER screening process and other baseline inspection modules and noted three areas of concern, listed below:

- Procedure adequacy and implementation issues
- Locked valve issues
- ERCW piping blockage issues

A comparison with the licensee's trending results was completed by the inspectors with the following observations:

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- The licensee (Nuclear Assurance) had previously identified the procedure adequacy and implementation issues and increased their management response to a corporate level through the implementation of corporate PER 72474.
- During the period of July-September, 2004, the inspectors identified four issues and the licensee identified one issue (respective PERs are listed in the attachment) with locked valves. The licensee's guidance for locking methodology is identified in OPDP-6, Locked Valve/Breaker Program, which states that the locking device should be fastened in a manner that resists movement. The issues varied from inadequately locked to not locked, contrary to the licensee's guidance. While the licensee initiated corrective actions to verify that valves outside of radiological dose intensive areas are adequately locked, as noted in O-PI-OPS-17.0, 18-Month Locked Valve Verification, the licensee did not note that the issues constituted an apparent trend in order to initiate a trend PER or denote an existing PER as a trend PER to capture all of the appropriate corrective actions. Through the remaining inspection period, an additional three issues were identified by the inspectors and one issue by the licensee. The licensee's response to the inspectors regarding trending documentation was that the associated group had not yet completed its quarterly trend assessment. The licensee subsequently initiated trend PER 74361 on January 5, 2004. The licensee used business practice procedure, BP-250, Corrective Action Handbook, to complement their administrative procedure, SPP-3.1, Corrective Action Program. The charter for the licensee's management review committee resides in BP-250 which requires in part "consideration of trends or recurring conditions." The inspectors determined that this is the only guidance in BP-250 regarding trending, other than the integrated assessments done on at least a semiannual basis. The licensee is evaluating changes to their handbook regarding guidance for trending of obvious issues as opposed to more subtle issues identified by a rigorous examination during the integrated assessment.
- The inspectors identified a trend relating to silt accumulation in ERCW piping while reviewing an issue associated with blockage in ERCW backup cooling to the 1A CCP lube oil cooler. The inspectors determined that the licensee had not identified this trend nor taken appropriate corrective actions. This issue is discussed in detail in the following section, Annual Sample Review.

### .3 Annual Sample Focused Review

#### a. Inspection Scope

The inspectors reviewed the licensee's corrective actions associated with PER 72620, which was associated with finding the ERCW line, which provides a backup cooling to the 1A-A CCP lube oil coolers, completely blocked with silt. The report was reviewed to ensure that the full extent of the issue was identified, an appropriate evaluation was performed, and appropriate corrective actions were specified, prioritized, and completed. The inspectors also evaluated the report against the requirements of the licensee's corrective action program as specified in SPP-3.1, Corrective Action Program, and 10 CFR 50, Appendix B. Additional documents reviewed are listed in the attachment.

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b. Findings

Introduction: The inspectors identified a finding for inadequate corrective actions associated with the occurrences of silt blockage in ERCW lines. The inadequate corrective actions resulted in a complete blockage of the ERCW line which provides backup cooling to the 1A-A CCP lube oil coolers in the event that component cooling water is lost. This finding has a potential safety significance of greater than very low significance and is an apparent violation (AV) pending completion of the SDP.

Description: In early 2004, the licensee began to identify significant debris and silt buildup in ERCW lines. The buildups were identified during inspections using Technical Instruction (TI) 67.003, Component Flow Blockage Testing Utilizing Ultrasonics Essential Raw Cooling Water - (Train A), and TI-67.004, Component Flow Blockage Testing Utilizing Ultrasonics Essential Raw Cooling Water - (Train B). These inspections were being conducted as a result of previous issues with clams in the ERCW piping. The licensee initiated 10 PERs between February 1 and October 4, 2004, listed in the attachment, on blockages identified in emergency makeup lines to component cooling system (CCS) surge tanks, safety-related water supply to the AFW pumps, cooling water lines to service air compressors, and flood mode return lines. Several of these had repeat instances of blockage identified. In all of these cases, the blockages were determined not to affect operability because the lines were only partially blocked or the blockage cleared when flow was initiated through the line. On November 22, 2004, while performing TI-50.030, Manual Valve Exercising (System 67), the licensee identified that the 1A-A CCP backup cooling line was completely blocked with silt. Approximately 2.5 gallons of muddy paste passed through the one-inch drain valve before the valve became blocked. The line had to be cleared mechanically. This line is significant in that the 1A-A CCP is the only high head pump provided with a backup source of cooling water. The licensee cleared the line and initiated PER 72620. This PER was assigned the lowest significance level (D) and closed to the corrective actions which were to clear the line and check it again in six months.

The inspectors determined that the licensee's corrective actions for the blockage of the 1A-A CCP backup cooling line and the previous occurrences of silt buildup were inadequate. The licensee's corrective actions for the previous instances of silt buildup included clearing the blockage and determining operability of affected components, effectiveness reviews of programs and processes for controlling macrofouling (clams), and increasing frequency of monitoring to every three months. These incidents were all treated separately, and a trend PER for silt accumulation was not generated. Several of the PERs referenced PER 33308 for additional corrective actions. PER 33308 was an A level (highest) PER to deal with macrofouling (clam) issues. It did not have any corrective actions to address the significant silt accumulations other than increasing the frequency of TI-67.003 and TI-67.004. The licensee left the frequency of monitoring the ERCW line to the 1A-A CCP at once every 18 months.

The licensee's maintenance rule expert panel discussed the monitoring frequency of this line at a meeting on April 30, 2004, and decided 18 months was adequate based on four previous successful flushes of this line and their understanding that the line had negligible risk significance. TI-119, Maintenance Rule Performance Indicator Monitoring, Trending,

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and Reporting 10CFR50.65, identified the function to provide backup cooling water as a non-risk, standby function. The expert panel discounted finding this line blocked in April 1999 because they did not know what caused the blockage. The inspectors determined that basing the decision on the four previous successful flushes did not take into account that the last successful test of this line was July 2003, which was before the significant silt intrusion in early 2004. The decision also assumed that mud/silt was not identified during the four successful flushes because there were no comments in the test logs with respect to the quality of water during the initial flush of the line. The corrective actions for PER 72620, ERCW line to 1A-A CCP lube oil cooler, were to clean the line and check the line in six months. No corrective actions were initiated to do an extent of condition review to verify adequate frequency of monitoring for other ERCW lines that may be subject to blockage that were not covered by TI-67.003 and TI-67.004. The cause of this finding impacts the problem identification and resolution cross-cutting area.

Analysis: The finding adversely affected the availability of high head injection and reactor coolant pump seal cooling during loss of CCS events. The inspectors referred to MC 0612 and determined that the finding is more than minor because it affected the availability attribute of the Mitigating System cornerstone and the reactor coolant system (RCS) barrier performance attribute of the Barrier Integrity cornerstone. The inspectors evaluated the finding using MC 0609, Significance Determination Process, and the Risk-Informed Inspection Notebook for Watts Bar Nuclear Plant Unit 1, Revision 1. A Phase 2 SDP analysis was required because the finding affected the Mitigating System cornerstone (availability of high head safety injection) and the RCS loss of coolant accident (LOCA) mitigation boundary (RCP seal LOCA due to loss of cooling to RCP seals). The Phase 2 analysis determined that the finding was potentially greater than Green due to the significance of the backup ERCW cooling to the 1A-A CCP during a loss of CCS event and the low probability of operator action successfully restoring the backup cooling water.

Enforcement: 10 CFR, Part 50, Appendix B, Criterion XVI, Correction Action, states, in part, "Measures shall be established to assure that conditions adverse to quality... are promptly identified and corrected." Contrary to this, on November 22, 2004, the licensee's failure to identify adequate corrective actions for PERs 8201, 9825, 14816, 14821, 34055, 34321, 34374, 64127, 65043, 69136, and 69787 (all related to significant silt intrusion into the ERCW system from March through October 2004) resulted in the failure to promptly identify and correct a complete blockage of the ERCW line, which provided backup cooling water to the 1A-A CCP. In addition, on December 8, 2004, the licensee's corrective actions for the blockage of the ERCW line to the 1A-A CCP (PER 72620) failed to take additional corrective actions to determine if there were other ERCW lines requiring increased frequency monitoring that were not included in TI-67.003 and TI-67.004. This finding does not present an immediate safety concern because the normal source of cooling water is available and the blockage in the ERCW line was cleared. Pending determination of the finding's safety significance, this finding is identified as AV 05000390/2004005-04, Inadequate Corrective Action to Identify and Correct Silt Blockage of ERCW Piping.

4OA3 Event Followup

- .1 (Closed) LER 05000390/2003-004-02: Emergency Core Cooling System Surveillance Requirement 3.5.2.3 - Verify Piping is Full of Water

On August 28, 2003, the licensee identified 5.2 cubic feet of gas in the B train residual heat removal discharge piping to the suction of the safety injection pumps and centrifugal charging pumps. The inspectors' review of this event was documented in Inspection Report (IR) 05000390,391/2003004, Section 4OA2. The closure of LERs 05000390/2003-004-00 and 05000390/2003-004-01 and enforcement aspects were documented in IR 05000390,391/2004002, Section 4OA3. No additional information of significance was provided in this revision. This LER is closed.

- .2 (Closed) LER 05000390/2004-002-00: Manual Reactor Trip Due to Dropped Rods

On September 19, 2004, the reactor was manually tripped due to the four rod control cluster assemblies (RCCA) of control bank B group 2 dropping into the core. The inspectors review of this event and enforcement aspects were documented in IR 05000390,391/2004004, Section 1R14. No additional findings of significance were identified during the LER review. This LER is closed.

4OA4 Cross-cutting Issues

Section 1R22 describes a finding associated with an inadequate procedure. The inspectors identified that a human performance error contributed to the instrument becoming inoperable in that shift personnel failed to identify that the instrument was recorded as being at it's maximum channel deviation when the TS surveillance was performed 10 days earlier.

4OA5 Other

- .1 Temporary Instruction 2515/159, Generic Letter 89-13 Recommendation Implementation Verification

- a. Inspection Scope

Utilizing Temporary Instruction (TI) 2515/159, the inspectors reviewed the licensee's implementation of six recommendations of GL 89-13, Service Water System Problems Affecting Safety-Related Equipment. Inspectors were to verify that the actions implemented in response to GL 89-13 are programmatically controlled and have been effectively maintained. GL 89-13 and the licensee responses to the GL were used as the technical guidance for this inspection.

On a sampling basis, the inspectors were to complete the following:

- 1) For open-cycle ERCW, the generic service water system for this site, verify the implementation of an ongoing program of surveillance and control techniques to significantly reduce the incidence of flow blockage problems as a result of biofouling.
- 2) Verify the implementation of a test program for the heat transfer capability of all safety-related heat exchangers cooled by the ERCW; for Watts Bar that includes the ERCW side of CCS, safety-related room coolers, containment spray and emergency diesel generators.
- 3) Verify the implementation of a routine inspection and maintenance program for open-cycle ERCW system piping and components which ensure that corrosion, erosion, protective coating failure, silting, and biofouling cannot degrade the performance of the safety-related systems supplied by service water.
- 4) Verify that the ERCW will perform its intended function in accordance with the design basis for the plant.
- 5) Verify that maintenance practices, operating and emergency procedures, and training that involve the ERCW are adequate to ensure that safety-related equipment cooled by the ERCW will function as intended and that the operators of this equipment will perform effectively.
- 6) Using service water operating experience that relates to GL 89-13, verify that the licensee procedure(s) will assess applicability, distribute information to appropriate staff, and perform technical reviews.

The inspectors reviewed the licensee's operational experience program, corrective action program, test and inspection data, WO information, trend information, visual inspection records, tubesheet plugging records, modification installation records, operator training guidance, flow diagrams, coat repair records, operational procedures, and discussed plant specific problems with the licensee to determine the implementation of the GL recommendations.

b. Findings on Program Effectiveness and Maintenance

- 1) The inspectors reviewed the program for surveillance and control of flow blockage problems as a result of biofouling.  
  
For open-cycle ERCW, review of two year's of operational history revealed some minor degraded system performance with respect to plugging or flow blockage. Operability determinations, condition reports, licensee event reports, system health reports, and WOs reviewed related mostly to component wear and/or degraded material conditions. Corrective actions taken to address these issues such as replaced piping and/or components, increased preventive maintenance, and review of the extent of condition were examined.

The intake structure was visually inspected per the commitments of the licensee's response to GL 89-13. On a yearly basis, the licensee has divers inspect their intake structure pump bays/pits. These results indicated that a silt build-up and conditions in the pits had not changed over the years. The licensee is trending the material found in the pits and in the area in front of the pits. The area in front of the pits is profiled every two years. To date there has been no need to dredge or clean either area.

Redundant and infrequently used cooling loops, including fire protection piping, treated with biocides and/or flushing, normally mitigated the potential clogging and microbiologically-induced corrosion (MIC) in those loops. Fire protection piping layup is coordinated with ERCW chemistry treatments. The fire protection piping is identified in the commitment letter and the licensee's action met its intent.

In 1999-2000 and then in the 2002-2003 time frame, clams were found in the ERCW system. The clams were found in large numbers in 1999-2000 while in the 2002-2003 time frame the incursion was a much milder occurrence. Both occurrences were a result of missing biocide treatments. These were captured in corrective action documents.

Due primarily to the initial clam episode, the licensee developed non-destructive procedures to detect blockages in piping and installed modifications for room cooler flow measuring and trending. Chemistry program changes have greatly reduced the occurrence of new clams. The 2002-2003 second missed injection was not severe enough to warrant any equipment operability evaluations, but the occurrence did cause the licensee to review their chemistry program again, via the corrective action program. Subsequently, the licensee implemented changes to the chemistry program and introduced a more potent non-oxidizing chemical that is neutralized at the plant's discharge. In the near future, additional high velocity flushes of ERCW side of CCS are planned.

Aside from the above, treatment of the ERCW water and the licensee's trending of the biocide effects indicate that Asiatic clams and micro-biologically influenced corrosion levels have been kept at satisfactory/acceptable levels. Two biocide treatments are scheduled via site procedures; one to treat almost continuously and the second to treat in a series of additions for clams in their peak growth periods. The more recent opening and inspection of ERCW components had revealed very few clams and at infrequent times. Annual sampling for clams is performed as stipulated in the commitment letter.

Microbiological attack of the metals in the system is occurring at a low rate. The site chemistry department programmatically injects a dispersant, corrosion inhibitors for several metals, and biocides. Water conditions and chemistry treatment appear to be keeping the attack in a less aggressive mode. The inspectors reviewed piping radiographic inspection results and corrective action documents in this area. Sampled radiographic results taken in repetitive years indicated that the pipe wall thinning changes were minimal.

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Seasonal mud gets into the ERCW/plant particularly in the spring or whenever heavy rains cause the Tennessee River to have a heavy silt cross section. During this inspection, the licensee was evaluating a recent partial blockage at the flow control valve to the 1A CS heat exchanger (See section 4OA2.3). The blockage was discovered by the now-routine ultrasonic test program. The supply pipe for the heat exchanger has a vertical drop off of the main line and is in the lower levels of the auxiliary building; this configuration makes the pipe section (before the shut valve) a natural gravity debris catch in the non-flow dead leg below the main flow path. The mud that does get into the plant is generally composed of "fines," which are not very adhesive. The inspectors discussed the inspection of ERCW components with the raw water system engineers and craft personnel who had "as-found" inspected the components, and they indicated that generally mud, if found, was a transient problem. In addition, the inspectors reviewed pictures of heat exchangers in their "just-opened" state, finding little mud and few clams. The inspection program has been recently changed to insure that the system engineers were called and were expected to promptly view the opened heat exchangers.

The original licensee's response to the GL indicated that sodium hypochlorite would be used for macrofouling. A supplemental Agency Safety Evaluation (August 1992) indicated that bromine/chlorine biocide injection system would be used on the ERCW and fire protection systems. The licensee has continued to use the bromine/chlorine compounds in conjunction with non-oxidizing compounds and, due to recent fouling problems, has enhanced the process further.

- 2) The inspectors performed a review of the implemented test program for the heat transfer capability of all safety-related heat exchangers cooled by the ERCW.

The inspectors reviewed the program for assuring that the CCS heat exchangers can remove their design heat load under accident conditions. A test program for the CCS heat exchangers was established in response to GL 89-13, which included thermal performance of the CCS heat exchangers. After three pre-cleaning thermal performance tests, the utility changed the requirement to inspection of each refueling outage, in lieu of testing. No engineering evaluation was performed to show that inspection could provide assurance of thermal performance. The inspection interval was lengthened between performance tests then lengthened to once every third refueling outage, with the idea that this would allow one heat exchanger to be inspected during each outage. There was no engineering evaluation to show that the increased interval would provide assurance of thermal performance. In 1999, the interval was adjusted to every two outages for the A and C exchanger, after clams, sludge, and shells were found; and the B exchanger, which is not relied upon for safety-related purposes, was to be inspected online every five years. The heat exchangers were originally provided to perform the heat removal requirements for two units. Even after the tube material change-out to stainless steel prior to startup, a large thermal margin remained between the clean and dirty design fouling factors, because only one unit is being operated. After four years of operation of the "A" CCS exchanger, the "as-tested" performance results in the dirty condition with shells and mud (after two fuel cycles) barely exceeded the



acceptance criteria; the heat exchanger was fouled slightly less than its design limit and was capable of performing its intended safety function. Cleaning intervals can be established that would assure that the intent of the GL is met, but the licensee did not provide an engineering justification for the decision or for choosing an appropriate interval. The licensee entered the fact that there was no formal evaluation performed on this condition in their corrective action program.

Due to the apparent thermal margin involved, the surplus of ERCW flow, and the lack of plugged heat exchanger tubes, the inspectors did not identify an operability concern.

- 3) The inspectors performed a review of the service water piping periodic inspection and maintenance program.

The maintenance program for removal and repair of ERCW piping and interface system components due to silting, biofouling, corrosion, erosion, and failure of protective coating was effective. Although Unit 1 was licensed in the mid-1990s, the ERCW system has been in operation since the mid-1970s. Prior to power operation, the CCS and CS heat exchangers were re-tubed with corrosion-resistant material. Components such as heat exchangers that have been opened and inspected revealed little damage or silting. Eddy current inspection of the major heat exchangers has shown little to no damage.

Siltation and MIC does occur in localized spots in the system, requiring pipe flushing, pipe replacement, and monitoring for reduction in cross-section and microbe-induced wall thinning. The current inspection program detects and quantifies the extent of loss-of-pipe wall thickness and pitting for ERCW and fire protection piping, and for butt-welded stainless steel to stainless steel and stainless steel to carbon steel piping. Selected points are periodically examined via a combination of radiographic testing (for welds) and ultrasonic testing (for selected ERCW piping). Piping selection criteria, acceptance criteria, test results, and structural evaluations were used to determine scheduling of repairs, replacements, future re-inspections, and continued operation. Various points identified to be degraded due to trending or leaks were verified to have been repaired via piping replacements. The current inspection program also detects and quantifies ERCW component flow blockages through the use of ultrasonic testing. Selected ERCW deadlegs and low flow areas are examined to determine blockages due to silt, clams, etc. Degraded conditions are captured under the corrective action program. Corrective actions include pipe opening and/or flushing.

- 4) The inspectors reviewed the testing program used to verify that the ERCW will perform its intended function in accordance with the design basis for the plant.

A review was performed of the ERCW pump ASME Code test program. The acceptance criteria for pump degradation were based on a 7.5% developed head degradation at a constant flow, because of the difficulty in performing a test at a constant head. This acceptance criteria, because of the characteristics of the pump flow/head performance, will allow greater than the flow degradation that

would be allowed by a criteria for a flow at constant head test, but the results are checked against the system requirements for flow. The results were trended. The inspectors identified, from a review of the trending data, that some pumps indicated performance was improving with time. The utility has created a corrective action document to determine the reason for this trend, to ensure that it is not an indication of previously identified pump degradation. Investigation of the pumps' history revealed that the utility had replaced the pump shafts in some of the pumps with a material that had a thermal expansion coefficient that was significantly different than the pump column's material. This led to changing clearances between the rotating elements and the pump bowl, which could impact pump performance as the water temperature changes throughout the year. Because of the significant flow margin that the two-unit design has above the single unit's flow requirements, the licensee has been able to meet system design requirements with pumps performing below their original design specifications.

A review of three modifications implemented on the ERCW revealed that changes had not compromised the system design bases or introduced single active failure vulnerabilities. The DCNs reviewed included the installation of three clean-out ports in the ERCW piping to the 1A-A and 1B-B containment spray heat exchangers. The modification provided access to locations known to be susceptible to blockages due to clams and silt. For example, a non-isolable branch off the main ERCW "A" train leads to the 1A CS heat exchanger. The modification port was a pipe stub with a bolted blind flange that was welded on the vertical run of ERCW supply piping in front of the horizontal flow control valve to the 1A containment spray heat exchanger. The blind flange cap could only be removed during ERCW train tag out and drainage. The inspectors noted that the modification was not fully effective in providing a method of inspection or clean out due to the location of the port. Other locations could have been selected that allowed flooded train piping clean out or flushing with short or no limiting condition of operation times entries.

The second DCN reviewed installed flow monitoring instrumentation on the ERCW piping to the room coolers for the emergency core cooling system (ECCS) pumps. The ECCS pump's room coolers affected were the CCPs, safety injection pumps (SIPs), containment spray pumps (CSPs), and residual heat removal pumps (RHRPs). The modification provides operations personnel continuous flow measurement information that can be used to identify degraded flow conditions. The third DCN reviewed replaced the four temperature elements on the ERCW supply header temperature loops with more accurate equipment. These instruments measure the ultimate heat sink temperature. The modification increases the accuracy of the instrumentation loops and reduces the potential of entering the respective TS LCO 3.7.9. All design change packages reviewed included 50.59 evaluations and post-modification testing. In addition, the DCNs revised drawings, applicable UFSAR sections, and procedures as necessary.

Review of design features installed to minimize silting and biofouling of piping and components revealed that the features do generally what was required. Two design features that reduce the possibility that silt enters the ERCW system are the



plant ERCW intake is on the inside of a river bend, and, there is a long channel normal to river bend radius that leads to the intake. High river flows that stir up the silt impact silt entry, particularly in the spring. Also, the licensee modified the piping in front of the CS heat exchangers to facilitate cleaning as discussed above. Prior to power operation, the licensee re-tubed several heat exchangers with corrosion-resistant materials that improved their biological and chemical attack survivability. The licensee's GL response indicated that the CS loops upstream of the flow control valves are laid up with corrosion-preventive chemicals; the inspectors reviewed the existing program that performed this process. Lay up of the exchangers maintain the ERCW side free of corrosion products. The plant has its normal complement of traveling water screens and ERCW strainers that can reduce biofouling.

The inspectors reviewed the current flow balance calculation for ERCW. The flow balance calculation uses an internally developed computer program and was created before the plant started up. The program 'plugs' the minimum required flows into the required loads, and lets the other loads float, instead of modeling all system resistances and pump heads, and then letting the program determine the load's flows. A pre-operational test was run on the service water system from December 1994 until May 1995 and resulted in the initial system flow balance that validated acceptable flows through the loads for different system configurations. The flow and pressure measurements from the tests were not used to validate the design model, or to improve the performance of the design model for the system. The inspectors checked selected system pressures for the operating mode against the predicted pressures in the design model, and there was not agreement, even if compensation was made for pump performance assumptions. This indicates that the current design model does not accurately model current plant conditions. The licensee entered this information into their corrective action program.

The ERCW flow balance is maintained through throttle valve position configuration control. Several throttle valve positions have changed since the pre-operational test data was taken. These valves were primarily room coolers with flows below 30 gallons per minute (gpm). Due to available flow margin, these changes will have a negligible effect on normal system or accident flow rates.

The flows through the ECCS loads are monitored by performance of procedure TI-67.001. The test instruction has acceptance criteria for each load on the data sheets. The acceptance criteria is based on minimum flows during accident conditions; however, the data is collected at the plant conditions that exist at the time of the test. The ERCW system configuration for accident alignment, and for day-to-day operation is very different. If the data collected is to be used to validate the adequacy of the system alignment for accident conditions, the flow design model, after it is validated to show that it reflects the system as built, can be used to calculate the acceptance criteria for minimum day-to-day flows. The current acceptance criteria do not provide assurance that, under accident conditions, the flows are adequate. The data gathered shows, for most loads, a large flow margin above their current acceptance criteria; therefore, loss-of-function concern is

probably not an issue for the important loads with the current flows. The licensee entered the above information into the corrective action program.

A system walkdown found the ERCW system material condition to be acceptable and its configuration to be consistent with design drawings. The inspectors walked down most major ERCW locations (auxiliary building, main and auxiliary control rooms, and ERCW intake building), finding the areas well lit with appropriate emergency lighting. The control areas (and possible manual action areas) were not in radiation areas and were accessible.

- 5) The inspectors reviewed the licensee's operating and ERCW maintenance procedures used to assure the system is operated within design basis.

The inspectors reviewed the ERCW alarm response procedures and operating procedures for normal, abnormal, and emergency system operations to assure that the system is operated within design basis. The inspectors verified procedures to be consistent with system piping and instrument diagrams. The procedures and drawings clearly represented the plant configuration. Assessment of ERCW flow instrumentation and operating logs relied upon during accident conditions revealed that the flow instrumentation was functional and readable. The operator logs were checked for consistency, correct span readings, and historical availability.

Reviews of local and remote equipment required for operation during an accident and normal conditions were performed. The indications to operate the necessary equipment in accordance with procedures were available. The environmental conditions were adequate for remote operation of equipment. Review of the proper implementation of procedures for verifying periodic and post-maintenance alignments of valves in the ERCW, especially those valves that isolate flow to safety-related components, revealed that the procedures were adequate.

A walk-through of the system operating procedure, abnormal operating procedures, emergency operating procedures, and system piping and instrument diagrams with engineering and operations staff revealed that lesson plans adequately addressed the current piping and electrical configuration, all system modifications and that this information was included in required operator training. The training was of sufficient depth and provided an appropriate level of technical detail about normal and emergency system operations.

The walk-through also revealed that while all heat exchangers did not have flow indication, the licensee had installed ultrasonic flow monitoring equipment on many of the small heat exchangers and room coolers. While this special equipment was not required for the abnormal or emergency operating procedures, it would provide supplemental information about ERCW flow.

A walkdown of the MCR and the simulator, combined with a review of operator training and interviews with plant operators, revealed that the operators are knowledgeable and understand ERCW and CCS operation. In addition, adequate

instrumentation was in the control room to provide indications of ERCW and CCS problems. The annunciator response procedures provided adequate instructions for annunciators associated with ERCW and CCS problems. Review of training and procedures revealed some minor typos and errors. The licensee placed the errors in the corrective action program.

Review of ERCW maintenance procedures indicated that these were adequate and sufficient to perform the task indicated. The procedure and maintenance activities were discussed with maintenance personnel about specific activities such as heat exchanger open and inspection, eddy current, and tube plugging.

Review of the vendors' manuals for components revealed that manuals contained reasonable instructions, and had been updated through the modification process, when necessary.

Review of maintenance staff training revealed that the material covered basic system layout and an overview of the system operations. The inspectors discussed maintenance activities with the training and craft personnel. The training material covered changes to the system and FME cautions. Maintenance supervisors were given additional training for ERCW and CCS maintenance.

- 6) Using ERCW operating experience that relates to GL 89-13, the inspectors reviewed the licensee's program for generic operating experience to determine its effectiveness with respect to ERCW.

The inspectors determined that the operating experience program reviewed service water- and GL 89-13-related information, distributed the information to appropriate staff, assessed applicability, performed technical reviews, and had corrective actions in place, as necessary. Sources of operating experience information reviewed by the licensee included NRC information notices, Institute of Nuclear Power Operations (INPO) notices, and vendor information. Information was disseminated to the appropriate system engineers and evaluated at a raw water operating experience review board for applicability. The evaluations applicable to the station had corrective actions in place and revised procedures, as necessary.

c. Conclusions on the Inspection Findings as Identified by the TI 159 Review

1. The effectiveness of GL 89-13 in communicating information.

The effectiveness of GL 89-13 in communicating information was judged to be adequate, in that the licensee had implemented the initial program to assess the facility's vulnerability to the service water issues described in the commitment documents. Although the licensee had missed biocide treatments, the corrective actions had been positive ERCW system improvements.

2. Licensee actions that are being implemented for the five recommended actions of GL 89-13.

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As stated in the responses to the GL, the inspectors determined that the licensee had mostly implemented the GL programs.

The inspectors observed (Section b.2) short comings in the license decision to transition from heat exchanger performance testing to inspection cleaning. There was no formal evaluation for this decision. The licensee response to the GL indicated that "WBN has an existing program for heat exchanger performance testing. This program will be revised to ensure that either the steps of Enclosure 2 of GL 89-13 or an equally effective course of action to satisfy the heat removal requirements of the SWS are implemented."

3. Effective programmatic maintenance of the actions in response to GL 89-13.

For the most part, the licensee has maintained the status of the GL programs. Based on some clam infestation episodes, they have improved their base program and adjusted it beyond the initial implementation in the areas of chemistry, inspections, and non-destructive evaluation. Modifications have been implemented to improve the evaluation of ERCW flow blockage.

As indicated in Section b.1 above, there have been historical problem areas where the licensee has had problems in chemistry program implementation. After several episodes of infestation, the last year's clam treatment regimen and the lack of missed treatments appear to have kept the ERCW system free of clams. The licensee's historical OE is having a positive effect on the system operation.

As indicated in Section b.2, the licensee was not clear in the transition from heat exchanger performance testing to opening and inspecting the heat exchanger. There was no formal evaluation available on the transition. Similarly, in Section b.4, the licensee had not validated the system flow model to actual plant flows. The licensee has a system that was built to handle two plants' heat loads and its extensive capabilities are available for the single operating unit.

The practice of opening and inspecting has generally found the major heat exchangers to be free of macrofouling, and microfouling has not been an issue.

d. Findings

No findings of significance were identified.

.2 Unit 2 Layup Inspection (IP 92050)

a. Inspection Scope

The inspectors observed the condition of Unit 2 equipment in layup condition, inspected preservation and FME practices, and observed the general condition of the steel containment and concrete shield building as well as Unit 2 areas inside the auxiliary building. The inspectors reviewed work control, maintenance, housekeeping and

preservation procedures; reviewed identification and status lists of equipment maintained in layup; and reviewed records of maintenance performed on several components. The inspectors also reviewed the licensee's decision to further reduce the number of SSCs in the active layup program to a total of 49, which includes 14 quality-related SSCs and 35 nonquality-related SSCs. These remaining SSCs consist of large capacity pumps and associated motors. The specific documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

.3 (Closed) TVA Corporate Employee Discrimination, VIO 05000390,391/2001002-02

On February 7, 2000, a Severity Level II violation with civil penalty was issued to the licensee. The violation was not site-specific and involved employment discrimination contrary to the requirements of 10 CFR 50.7, "Employee Protection," in that TVA did not select a former employee to a competitive position in a corporate organization in 1996, due, at least in part, to his engagement in protected activities. In addition two Severity Level II violations of 10 CFR 50.5, Deliberate Misconduct, were issued to the individual TVA managers involved in the employment discrimination. On January 22, 2001, TVA denied the violation. On May 4, 2001, an Order was issued sustaining the violation and imposing the civil penalty. On June 1, 2001, TVA appealed the case to the Atomic Safety and Licensing Board (ASLB). From April to September, 2002, a hearing was held before the ASLB. On June 26, 2003, the ASLB upheld the Nuclear Regulatory Commission (NRC) staff's finding that TVA discriminated against its former employee. The decision of the ASLB was appealed to the Commission by TVA. On August 18, 2004, the Commission affirmed in part and reversed in part the ASLB decision and remanded the case back to the ASLB. On October 29, 2004, a Settlement Agreement was signed by TVA and the NRC staff. In the Agreement, the NRC withdrew the two individual violations, dropped the civil penalty, and agreed not to pursue a related individual case, while TVA agreed not to further contest the violation against the company and submit to a review by the NRC of recently completed TVA audits in the area of safety conscious work environment (SCWE) and the training of managers. The Settlement Agreement was subsequently signed by the ASLB on November 10, 2004. On November 30, 2004, the NRC Office of Enforcement (OE) conducted a review at the TVA Nuclear (TVAN) offices in Chattanooga, Tennessee, and at TVA's Sequoyah Nuclear Power Plant to verify TVA's corrective actions relative to the Settlement Agreement. In a letter dated January 12, 2005, OE concluded that the corrective actions were appropriate and adequately implemented and that TVA appears to actively support a SCWE. On December 20, 2004, the Commission declined to review the ASLB's decision; thereby, making the ASLB's decision the final agency action. This violation is therefore closed.

40A6 Meetings, including Exit

The inspectors presented the inspection results to Mr. William Lagergren and other members of licensee management on January 4, 2005. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

**SUPPLEMENTAL INFORMATION**  
**PARTIAL LIST OF PERSONS CONTACTED**

Licensee

J. Roden, Training Manager  
L.. Bryant, Plant Manager  
W. Lagergren, Site Vice President  
N. Moon, Engineering and Site Support Manager  
D. Nelson, Business and Work Performance Manager  
P. Pace, Licensing and Industry Affairs Manager  
A. Hinson, Maintenance and Modifications Manager  
R. O'Rear, Operations Superintendent  
T. Wallace, Operations Manager  
M. DeRoche, Site Nuclear Assurance Manager

**ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened

05000390/2004005-04	AV	Inadequate Corrective Action to Identify and Correct Silt Blockage of ERCW Piping. (Section 4OA2.3)
05000390/2004005-03	URI	Review Plant Ventilation Compensatory Sample Line Particulate Transmission Factor Calculations to Determine if 'T' Connection Configuration Data Were Included. (Section 2PS1)

Opened and Closed

05000390/2004005-01	NCV	Failure to Provide Complete and Accurate Information to the NRC which Impacted a Licensing Decision. (Section 1R11.1)
05000390/2004005-02	NCV	Inadequate Procedure for Surveillance of Remote Shutdown System Instrumentation. (Section 1R22)

Closed

05000390/2003004-02	LER	Emergency Core Cooling System Surveillance Requirement 3.5.2.3 - Verify Piping Is Full of Water. (Section 4OA3.1)
05000390/2004002-00	LER	Manual Reactor Trip Due to Dropped Rods. (Section 4OA3.2)
05000390,391/200102-02	VIO	TVA Corporate Employee Discrimination. (Section 4OA5.3)



## LIST OF DOCUMENTS REVIEWED

### Section 1R01

- PER 73891, NRC identified problem concerning a procedure revision to insulation enhancements for RWST instrumentation that was processed as a non-intent change
- 1-PI-OPS-1-FP, Freeze Protection
- TI-10.17, Freeze Protection Program

### Section 1R05

- PER 70835, NRC identified problem regarding cable tray penetration seal not installed per drawing

### Section 1R06

- WBN PM 1-LS-040-0024, Functional Check and Calibration of Flood Mode Switches for Train A Associated Equipment
- WBN-VTD-R290-0070, Instruction Manual for RobertShaw Conductivity Switch Model 352
- WO 03-014681-000, Function Check and Calibration of Flood Mode Switches for Train A
- WO 03-014680-000, Function Check and Calibration of Flood Mode Switches for Train B

### Section 1R07

- WBN-VTD-D270-0130, Dunham-Bush PCX Package Chillers

### Section 1R11

- Nuclear assurance - audit report no. SSA0305 – Browns Berry (BFN), Sequoyah (SQN), and
- Watts Bar (WBN) Self- Assessment Report SA-TRN-03-002
- Watts Bar (WBN) Nuclear Plants and corporate (coc) - TVAN-wide - operations
- Functional area audit (including nuclear fuels and reactor engineering)
- Scenarios 3-OT-SRE 022 Large Break LOCA, 3-OT-SRE-007 SGTR with loss of 6.9KV SDB
- Badge Access Transaction Reports for Reactivation of Licenses (3)
- Licensed Operator Medical Records (12)
- Remedial Training Records:
  - Inspectors reviewed two remedial training records, one for a written exam failure, and one for a JPM exam failure.
- Written Exams Reviewed:
  - RO 2002/2003 Exams, # 4, 5, and 7
  - SRO 2002/2003 Exams, # 5, and 7
- Simulator Fidelity Documents:
  - Malfunction Tests:
    - IA02 "Loss of Non-Essential Control Air."
    - RD07 "Dropped Rod."
    - ED15 "Loss of 250VDC Battery Board."
    - FW05/06/07/22 "Loss of All Feedwater."



- Transient Tests:
  - Transient Test # 9 “Maximum Size Main Steam Line Break, TT-9.”
  - Transient Test # 4 “Simultaneous Four Loop Reactor Coolant Pump Trip, TT-4.”
  - Transient Test # 10 “Primary System Depressurization Using PZR Relief Valve, TT-10.”
- Simulator Problem Reports Reviewed:
  - 2561 CERPI Indication On A Dropped Rod.
  - 2532 CERPI Shows Rod Demand Speed In Manual.
  - 2498 Adjust PRT Pressure To More Closely Match the Plant.
  - 2486 Investigate RCS Temperature Change in TT1.

#### Section 1R12

- PER 9435, SG blowdown system placed in a(1) status
- PER 62837, Breaker for 1A-A CCP room cooler fan failed to remain closed.
- WO 04-818031-000, WBN-1-BKR-030-0183 tripped when attempting to start the fan, repair as needed
- WO 04-818031-001, Implement DCN-51736 for 1-BKR-030-0183

#### Section 1R17

- N3-82-4002, Standby Diesel Generator System description
- N3-30DB-4002, Diesel Generator Building Ventilation System description
- WO 03-011112-000, Implement DCN 51383-A Stage 1 for DG Fan 1A-A temp switches
- PER 71968, Licensee identified problem of DG exhaust fans not auto-starting during performance of the 1B-B DG start and load test.
- TI-215, Work Permits, Appendix C, Painting, Cleaning, Sealing and Other Volatile Hydrocarbon Use Permit
- WO 04-810947-000, Implement DCN to apply proprietary coating to the Unit 1 fuel transfer canal to eliminate leakage
- Test report for high temperature testing of seven specimens of blue polyurea material. Schenectady Material and Processes Laboratory, Inc., Lab No. KR-0407 for Purchase Order No. DS-498, dated March 31, 2000,

#### Section 1R19

- MI-57.036, Electric Motor/Generator Replacement and Bearing Maintenance, page 45 of 61
- N3-3B-4002, Auxiliary Feedwater System, Section 4.14
- WBN-VTD-P076-0030, Vendor manual for auxiliary feedwater pump motors, page 32
- PER 72003, NRC identified problem regarding lack of motor run time to complete an adequate PMT for WO 03-005058-000 and long term effects of oil contamination of motor internals
- PER 73372, NRC identified problem regarding failure to use MMDP-1 during implementation of WO 03-017874-000
- PER 73611, NRC identified problem regarding failure to perform a technical review of WO 03-017874-000
- PER 71776, NRC identified that the technical reviewer for WO 04-825391-000 was actually the preparer of the PMT procedure and the PMT did not receive an independent technical review

Section 1R22

- 1-SI-0-4, Appendix C, Page 7 of 11 completed on the following dates: 9/4/04, 8/7/04, 7/9/04, 6/12/04, 5/14/04, 4/17/04, 3/20/04, 2/21/04, 1/24/04, 12/27/03, 11/28/03, 11/1/03, 10/17/03
- SSD-1-LPT-68-65C-S, Rev. 2, Scaling and Setpoint Document for RCS Loop 4 Hot Leg Temp
- PER 68838, NRC identified that Loop 4 hot leg temp indicator was outside of its MCD resulting in an unplanned entry into LCO 3.3.4 Action A.
- PER 70638, NRC identified that Loop 4 hot leg temp indicator was outside of its MCD resulting in an unplanned entry into LCO 3.3.4 Action A.
- WO 04-822471-000, repair 1-LPT-68-0065C, Loop 4 hot leg temp indicator outside of its MCD (calibrations performed)
- WO 04-822570-000, repair 1-LPT-68-0065C, Loop 4 hot leg temp indicator outside of its MCD (modifier replaced)
- SPP-2.2, Administration of Site Technical Procedures
- PER 72202, NRC identified problem regarding procedure 1-SI-3-901-B steps signed N/A contrary to requirements
- PER 71291, NRC identified the steps in continuous use procedure 1-SI-30-9-B were not being signed off when completed
- Instrument Maintenance Instruction (IMI) - 99.060, Transmitter Bench Response Time Test

Section 2OS1Procedures, Instructions, Guidance Documents, and Operating Manuals

- Standard Programs and Processes (SPP)- 3.1, Corrective Action Program, Revision 7
- SPP-5.1, Radiological Controls, Revision 5
- Radiation Control Instruction (RCI)-100, Control of Radiological Work, Revision 23
- RCI-101, Radiation, Contamination, and Airborne Surveys, Revision 20
- RCI-103, Radioactive Material Control, Revision 22
- Radiation Control Departmental Procedure (RCDP)-3, Administration of Radiation Work Permits (RWPs), Revision 2
- Technical Instruction (TI)-7.005, Storage of Material in the Spent Fuel Pool, Cask Pit, and New Fuel Vault, Revision 18

Records and Data Reviewed

- Radiation Work Permit (RWP) 03006040, U1C5 Eddy Current Testing, Revision 3
- RWP 03006041, U1C5 Eddy Current Testing, Revision 0
- RWP 03006043, U1C5 Steam Generator Tube Pulling, Revision 0
- RWP 03008180, U1C5 Activities in Keyway, Revision 0
- RWP 04000321, Leak Rate Testing in High Radiation Areas, Revision 1
- RWP 04001024, Spent Resin Storage Tank Line Maintenance, Revision 0
- RWP 04001112, Transfer Canal Work - Setup for Canal Coating, Revision 0
- RWP 04001114, Transfer CANAL WORK - COATING APPLICATION, Revision 0
- RWP 04004060, Surveillance Testing Inside Containment, Revision 0
- RWP 04005070, Maintenance and Surveillances in U1 Upper Ice Condenser, Revision 0
- RWP 04005200, General Access to U1 Upper Containment, Revision 0
- RWP 04005300, Preventive Maintenance and Surveillances in U1 Upper Containment, Revision 0
- Radiological Survey (RS) 030502-25, Waste Packaging Area-West 729 foot (') elevation
- RS 030502-37, U1 Excess L/D & Regen Ht. Ex. Room 716'

- RS 030802-15, U1 Volume Control Tank Room 713'
- RS 031302-24, U1 Containment Bldg. Equip. Pit 713'
- RS 032702-19, Tritiated Drain Coll. Tk. Rm. 676'
- RS 051602-19, General Area-737'
- RS 031303-1, U1 Keyway 674'
- RS 041803-18, U1 Letdown Ht. Ex. Room 737'
- RS 053003-14, Filter Cubical
- RS 061703-11, Transfer Canal Area 757'
- RS 061803-22, U1 Fan Room #2 716'
- RS 061903-17, Transfer Canal Area 757'
- RS 062303-19, U1 Fan Room #1 716'
- RS 102504-17, 1A RHR/CS Hx. Room 713'
- RS 102804-5, U1 Access Room & Airlock 713'
- RS 102804-6, U1 Access Room & Airlock 757'
- RS 110904-16, Spent Resin Tank Valve Gallery 692'
- RS 112904-21, Spent Resin Vault 729'
- RS 112904-23, Refuel Floor - North General Area 757'
- RS 113004-15, Transfer Canal 757'
- RS 102104-14, Waste Packaging Area, 729'

#### Corrective Action Program (CAP) Documents

- Assessment No. WBN-RP-04-001, Personnel contaminations from WBN RFO5, May 17-21, 2004
- Assessment No. WBN-RP-04-002, Electronic Dosimeter Use, August 23 -27, 2004 Problem Evaluation Report (PER) 9048, Worker Entered Lower Containment on an RWP for the Aux. Bldg, 10/13/03
- PER 9265, Radcon Technician Allowed Individuals to Continue Working after Electronic Dosimeter (ED) Dose Alarm occurred, 11/9/03
- PER 14848, 3 of 15 Workers Unaware of ED Alarm Settings, 9/27/03
- PER 34051, Operations Personnel Entered Annulus on Wrong RWP, 4/7/04
- PER 63897, Post Job Critique for Filter Removal and Transfer Job - Filters Were Totally Dry which Is a Precursor to an Airborne Situation, 6/24/04
- PER 66626, Personnel Entered a High Radiation Area on the Wrong RWP, 8/6/04
- PER 66812, Individual Entered a High Radiation Area on the Wrong RWP, 8/10/04
- PER 66998, Trend PER to Document 5 Occurrences During the past Six Months of Entry into High Radiation Areas on the Wrong RWP, 8/12/04
- PER 67815, Individual Entered a High Radiation Area on the Wrong RWP, 8/25/04
- PER 68529, Individual Entered a High Radiation Area on the Wrong RWP, 9/9/04

## Section 2OS3

### Procedures, Guidance Documents and Manuals

- RCI-107, Respiratory Protective Equipment Inspection, Maintenance, Issuance, and Accountability, Revision 7
- RCI-109, Radiological Control Portable Instrumentation, Revision 13
- RCI-112, WBC Operation and Calibration, Revision 10
- RCI-121, Calibration and Operation of Eberline Contamination Monitors, Revision 8
- RCI-124, Calibration of Portable Air Samplers, Revision 12
- RCI-132. Calibration and Operation of the Eberline Personnel Monitor (PM)-7, Revision 3
- Lesson Plan HPT063.002, Self Contained Breathing Apparatus Training, Revision 7
- 0-Fire Protection Surveillance (FPS)-510, File 0, Cleaning/Sanitizing, Maintenance, Inspection, Storage, and Inventory of Positive Pressure MSA Ultralites and 4500 SCBA'S, Revision 14
- SSP-5.10, Radiological Respiratory Protection Program, Revision 2
- Scaling and Setpoint Document (SSD)-0-LPR-90-3-S, Waste Package Area Monitor, Revision 6
- SSD -0-LPR-90-12-S, Spent Fuel Pit Area Particulate Monitor, Revision 12

### Records and Data

- Fast Scan Whole Body Counter (WBC) No. 1 and No. 2, Selected Quality Control Data for July 1, through September 30, 2004
- Fast Scan No. 2, QC Re-analysis Data, 08/12/04
- Watts Bar Nuclear WBN Radiological Control RADCON Air Quality Data Sheets, Compressors A & D, and C & D, conducted 02/19/04; and High Pressure SCBA Compressor, conducted 02/20/04
- WBN RADCON Air Quality Data Sheets, Compressors A & D, B & D, C & D, conducted 10/19/04; and High Pressure SCBA Compressor, conducted 10/21/04
- Work Order (WO) 03-008552-000, WBN-0-FPS-510-SCBA, Clean, Maintain, Inspect, Inventory, and Storage, completed 01/06/04
- WO 03-012178-000, WBN-0-FPS-510-SCBA Clean, Maintain, Inspect, Inventory, and Storage, completed 06/23/04
- Personnel Monitor (PM) -7 Calibration Data Sheets for TVA Instrument No. 842442, conducted 2/26/04 and 8/23/04; Instrument No 842445, conducted 04/01/04 and 09/08/04
- Personnel Contamination Monitor (PCM)-2 Data Sheets for Instrument No. 842389, conducted 05/05/04 and 11/01/04; Instrument No. 842408, conducted 04/23/04 and 10/15/04
- PCM -1B Data Sheets, Instrument No. 842361, conducted 07/26/04 and 11/01/04
- Calibration Data Sheet for Bicon/Survey 50 TVA No. 841773, conducted 11/19/04
- Calibration Data Sheet for Bicon/RSO-5, TVA No. 550938, conducted 08/20/04,
- Calibration Data Sheet for Bicon/RSO 50 TVA No. 530300, conducted 08/02/04,
- Calibration Data Sheet for Eberline Teletector, TVA No. 523335, conducted 10/20/04,
- Calibration Data Sheet for Ludlum 12-4 Neutron, TVA No 841776, conducted 06/07/04
- Periodic Calibration (PC) Work Order (WO) No. 03-006111-000, Watts Bar Nuclear (WBN) LPR-090-0003, Waste Packaging Area Monitor Loop, completed 12/16/03
- PC WO No. 02-014789-000, WBN-1-LPR-090-0001, Spent Fuel Pit Area Monitor, completed 07/11/03
- PC WO No. 03-008371-000, WBN-0-LPR-090-0015, Holdup Valve Gallery Particulate Monitor Loop, completed 03/16/04

- PC WO No. 02-15072-00, 1-Surveillance Instruction (SI)-90-3, 18 Month Channel Calibration (Source Cal) of Train A Containment Lower Compartment High Range Post Accident Area Radiation Monitor Loop, 1-LPR-90-273, completed 10/14/03
- PC WO No. 04-813209-000, 1-SI-90-2, 18 Month Channel Calibration (Source Cal) of Train B Containment Upper Compartment High Range Post Accident Area Radiation Monitor Loop, 1-LPR-90-272, completed 09/16/04
- 10CFR61 Analysis Reports; WBN 03-090 DAW Smears, 10/11/03

#### Corrective Action Program Documents

- Problem Evaluation Report (PER) 66581, TVA Generic Response to Eberline Gamma Tool Monitor (GTM) Did Not Pass Source Check When Personnel In Close Proximity, 8/10/04
- RADCON Files; 11.20, Gamma Tool Monitor 'Shadow Effects' Test and PER 03-012887-000 Response
- PER 61382, Rad Monitor (RM)-90-133, Entered Alarm Without Reaching Setpoint, 05/14/04
- PER 8084, Establish 1-RE-90-119 CVE Radiation Monitor Alarm Setpoint Corresponding to 5 Gallons Per Day Primary to Secondary Leak Rate, 07/17/03
- PER 9828, Unit 1 Entered Into LCO Action B due to RM-90-106 Low Background, 02/19/04
- PER 12656, 1-RM-90-106B Containment Lower Compartment Air Monitor Gas Detector Alarmed, 07/14/03

#### Section 2PS1

##### Procedures, Guidance Documents and Manuals

- Chemistry Manual (CM) -9.02, Chemistry Countroom Quality Assurance and Control Program, Revision 8
- CM-9.7.101, Auxiliary Building Exhaust Effluent Monitor Grab Sampling and Filter Replacement, Revision 4
- CM-9.33, I.G. Detector Quality Control Data Collection, Revision 10
- CM-9.35, Application of Transmission Factors, Revision 3
- Watts Bar Design Criteria (WB DC) Document - 40-24, Radiation Monitoring, Revision 14
- 0-Offsite Dose Instruction (ODI)-90-1, Liquid Radwaste Tank Release, Revision 24
- 0-ODI-90-22, Weekly Auxiliary Building Exhaust Release, Revision 18
- OPDP-6, Locked Valve/Breaker Program, Revision 1
- SPP-3.1, Corrective Action Program, Revision 7

### Records and Data

- Waste Disposal System Liquid Effluent Monitor (0-RE-90-122) calibrations, 7/16/02 and 3/17/04
- U1 Shield Building Exhaust Monitor (1-RE-90-400) calibrations, 8/18/02 and 2/9/04  
Auxiliary Building Ventilation Monitor (0-RE-90-101B) calibrations, 4/4/02 and 11/11/03  
Containment Purge Air Cleanup System Train-A and Train-B Tests, 10/4/03
- Liquid Effluent Release Permit Nos. 2004052.030.008.L (7/26/04) and 2004071.011.043.L(9/14/04)
- Gaseous Effluent Release Permit Nos. 2004147.050.034.G (8/3/2004) and 2004150.093.003.G (8/7/04)
- Drawing No. 1361D7001, Kurz Instruments, Inc. System Outline Drawing Watts Bar, Revision H
- Drawing No. 1361D7012, Kurz Instruments, Inc. Sample Flow Splitter Assy, Model 450-08-MMC-4-HT-SP-NU, Revision G
- Design Change Notice (DCN) No. 51229, On-line Tritium Sampling, Revision A
- DCN No. 51690, Replacement of Liquid Effluent Line to Cooling Tower Blowdown, Revision A
- TACF No. 0-04-002-077 R1, Temporary Alteration of Liquid Effluent Line to Cooling Tower Blowdown, Revision 1
- Germanium Detector No. 1 Daily Source Check Data, 11/05/04 - 12/1/04
- Germanium Detector No. 3 Calibrations, 4/22/03 - 5/2/03
- Liquid Scintillation Counter Equipment A and B, Calibrations, 10/13/04
- Radiochemistry Cross-Check Program Results, 3rd Quarter 2003 - 2nd Quarter 2004
- Out-of-Service Effluent Monitor Logs, July 2003 - October 2004
- Compensatory Sampling Data: 1-RE-90-120, 4/8/04 - 4/11/04; 0-RE-90-101, 11/8/03-11/11/03; 1-RE-90-400, 12/4/03 - 12/5/03

### Annual Reports

- Watts Bar Nuclear Plant - Unit 1- 2002 Annual Radioactive Effluent Release Report, dated April 30, 2003

### Corrective Action Program Documents

- PER No. 8155, High Radiation Alarm on 1-RM-90-120 Control Room Indication, 7/25/03
- PER No. 65882, Flow Indicator 0-FI-90-300/1B Was Found Out of Service, 7/27/04
- PER No. 9679, Particulate Sample Filter for 1-RE-90-400 Was Found Misaligned, 01/29/04

### Section 2PS3

#### Procedures, Guidance Documents and Manuals

- Sample Collection (SC) Procedure - 01, Collection of Environmental Monitoring Samples, Revision R18
- SC - 03, Calibration Procedure for Radiological Environmental Monitoring Air Sampler Gas Meter, Revision R4
- RCI - 134, Calibration and Operation of Eberline Gamma Tool Monitor (GTM), Revision 3



- Tennessee Valley Authority Nuclear (TVAN) Emergency Preparedness Field Support (EPFS) Procedure - 4, Environmental Data Station, Meteorological Sensor Exchange, Revision 12
- TVAN Emergency Preparedness Field Support (EPFS) Procedure - 6, Calibration of Environmental Data Station Logger and Sonic Channels, Revision 10
- 0-Offsite Dose Instruction (ODI) - 10-22, Six Month Channel Calibration Meteorological Monitoring Instrumentation, Revision 4

#### Records and Data

- Annual Environmental Radiological Operating Report, Watts Bar Nuclear Plant 2003, dated May 14, 2003
- EPFS - 4 Data Sheet 4, Meteorological Sensor Exchange Form, 09/17/03; Data Sheet 1, Air Temperature Sensor Exchange Form, dated 09/17/03; Meteorological Monitoring Instrumentation Report of Calibration for 100 ohm Platinum RTD S/N 28700, S/N 28703, and S/N 28707 conducted 03/31/03
- EPFS - 4 Data Sheet 4, Meteorological Sensor Exchange Form, 09/24/03; Data Sheet 3, DMM/DASU Exchange Form, 09/17/03; Meteorological Monitoring Instrumentation Report of Calibration for Ultrasonic Wind Sensor S/N 819 conducted 09/10/03; S/N 405 conducted 07/10/03, and S/N 397 conducted 04/03
- EPFS - 4 Data Sheet 4, Meteorological Sensor Exchange Form, 03/17/04; Data Sheet 1, Air Temperature Sensor Exchange Form, dated 03/17/04; Meteorological Monitoring Instrumentation Report of Calibration for 100 ohm Platinum RTD S/N 47165, S/N 47179, and S/N 47183 conducted 02/19/04
- EPFS - 4 Data Sheet 4, Meteorological Sensor Exchange Form, Data Sheet 1, Air Temperature Sensor Exchange Form, dated 03/26/04; Meteorological Monitoring Instrumentation Report of Calibration for Ultrasonic Wind Sensor S/N 573 and S/N 392, dated 10/15/03; and S/N 867 dated 10/23/03
- EPFS - 4 Data Sheet 4, Meteorological Sensor Exchange Form, 06/22/04; Data Sheet 5, Sonic Wind Sensor Exchange Form, conducted 06/22/04
- EPFS - 4 Data Sheet 4, Meteorological Sensor Exchange Form, 09/15/04; Data Sheet 5, Sonic Wind Sensor Exchange Form, 09/15/04; and Meteorological Monitoring Instrumentation Report of Calibration for Ultrasonic Wind Sensor S/N 394 conducted 5/20/04 and S/N 324 conducted 07/23/04
- EPFS - 4 Data Sheet 4, Meteorological Sensor Exchange Form, 06/24/04; Data Sheet 1, Air Temperature Sensor Exchange Form, dated 06/24/04; Meteorological Monitoring Instrumentation Report of Calibration for 100 ohm Platinum RTD S/N 28694, S/N 47175, and S/N 47184 conducted 05/13/04
- EPFS - 4 Data Sheet 4, Meteorological Sensor Exchange Form, 11/08/04; Data Sheet 1, Air Temperature Sensor Exchange Form, dated 11/08/04; Meteorological Monitoring Instrumentation Report of Calibration for 100 ohm Platinum RTD S/N 47170, S/N 47174, and S/N 47190 conducted 05/27/04
- EPFS - 6, Calibration of Environmental Data Station Data Logger and Sonic Channels, Data Sheet 1, Air Temperature System Calibration Sheet, conducted 07/09/03, 0109/04, 03/11/04, 05/03/04, and 06/03/04
- Gamma Tool Monitor (GTM) Calibration Data Sheets: GTM Instrument No. 842439, conducted 04/30/04 and 10/27/04; No. 842440, conducted 03/25/04 and 09/09/04; Instrument No. 842441, conducted 03/03/04 and 08/18/04
- Bag Waste Monitor (BWM) - 10 Calibration Data Package Sheets: BWM TVA No. 842399, conducted 02/04/04 and 07/30/04



- Radiological Environmental Monitoring Air Sampler Gas Meter Calibration Data Sheets for Gas Meter Serial Number (S/N) 1030575, S/N 1030576, S/N 1030599, S/N 1030606, S/N 1040327, and 1030594, conducted 06/15/04; S/N 1027113, S/N 1030606, and S/N 1027112, conducted 06/16/04; and S/N 1030605 and S/N 1030599 conducted 06/24/04
- Calendar Year External Environmental Laboratory Cross-Check Data
- Work Order (WO) 03-1720400, 0-Offside Dose Instruction (ODI)-10-22, Six Month Channel Calibration Meteorological Monitoring Instrumentation, completed 01/09/04; and Tennessee Valley Authority Nuclear (TVAN) Emergency Preparedness Field Support (EPFS) Procedure - 6, Calibration of Environmental Data Station Data Logger and Sonic Channels, Data Sheet 1, Air Temperature System Calibration Sheet, Data Sheet 2, Sonic Wind Speed Calibration Sheet; and Data Sheet 3, Sonic Wind Direction Calibration Sheet
- WO 04-81410400, ODI-10-22, Six Month Channel Calibration Meteorological Monitoring Instrumentation, completed 06/30/04

#### CAP Documents

- Assessment Number CRP-ERMI-04-001, Effectiveness of Environmental Radiological Monitoring and Instrumentation (ERM&I) Laboratory Quality Control (QC) Program, Conducted February 16-27, 2004
- Nuclear Assurance (NA) - TVAN-Wide-Audit Report No. SSA0302-Radiological Protection and Control Audit, dated 12/19/03
- Corporate NA Observation Identification Numbers 28514, 28515, and 28689 conducted 06/09/03
- PER 03-001929, Three of Four Ground Water Samples Taken from Recently Drilled Onsite Wells Had Detectable Levels of Tritium, 01/30/03
- PER 918, Insufficient Air Volume Sampled at Watts Bar Nuclear (WBN) REMP Perimeter Monitor-3 Sampling Station, 07/01/03
- PER 1165, As Found Calibration for Ultrasonic Wind Sensor Number 299 Found Out of Calibration during Surveillance, 06/05/03
- PER 1173, Address Self Assessment Findings Regarding Meteorological Towers, 07/11/03
- PER 1454, Insufficient Air Volume Sampled at WBN REMP Local Monitor-1 Sampling Station, 01/27/04
- PER 64150, Loss of WBN Meteorological Monitoring Capabilities Due to Lightning Strike, 06/21/04
- PER 68897, Insufficient Surface Water Sampler Volume at WBN Tennessee River Mile (TRM) 523.1 Sampling Station, 9/14/04

Section 4OA1Procedures, Guidance Documents and Manuals

- SPP-3.4, Performance Indicator and MOR Submittal Using INPO Consolidated Data Entry, Revision 2
- Desktop Guide for Chemistry Reporting

Records and Data

- Monthly Dose Reports, September, October, November, 2004
- Monthly RCA Exit Transaction Reports of Exposures Greater than 100 mrem/hr for CY 2004

Corrective Action Program Documents

- PER No. 64888, 0-RE-90-101 Compensatory Sample Cart Was Found Turned Off, 7/9/04
- PER No. 14792, 0-RE-90-101 Compensatory Sample Cart Pump Was Found with Blown Fuse, 2/2/04
- PER No. 12937, U1 Shield Building Exhaust Sample Was Missed and Will Be Reported in the 2004 Effluent Report, 01/23/04
- PER 9048, Worker Entered Lower Containment on an RWP for the Aux. Bldg, 10/13/03
- PER 9265, Radcon Technician Allowed Individuals to Continue Working after Electronic Dosimeter (ED) Dose Alarm Occurred, 11/9/03
- PER 14848, 3 of 15 Workers Unaware of ED Alarm Settings, 9/27/03
- PER 34051, Operations Personnel Entered Annulus on Wrong RWP, 4/7/04
- PER 63897, Post Job Critique for Filter Removal and Transfer Job - Filters Were Totally Dry Which Is a Precursor to an Airborne Situation, 6/24/04
- PER 66626, Personnel Entered a High Radiation Area on the Wrong RWP, 8/6/04
- PER 66812, Individual Entered a High Radiation Area on the Wrong RWP, 8/10/04
- PER 66998, Trend PER to Document 5 Occurrences During the past 6 Months of Entry into High Radiation Areas on the Wrong RWP, 8/12/04
- PER 67815, Individual Entered a High Radiation Area on the Wrong RWP, 8/25/04
- PER 68529, Individual Entered a High Radiation Area on the Wrong RWP, 9/9/04

Section 4OA2

- PER 64619, NRC identified issue with 1-ISV-76-600A not adequately locked
- PER 65619, Licensee identified issue with 2-ISV-50-505A not locked contrary to 0-PI-OPS-17
- PER 67791, NRC identified issue with 1-ISV-70-567A not adequately locked
- PER 68813, NRC identified issue with 1-THV-67-609B not adequately locked
- PER 68814, NRC identified issue with 1-ISV-67-613A not locked contrary to 0-PI-OPS-17
- PER 70746, Licensee identified issue with 0-SPV-25-530 not locked contrary to 0-PI-OPS-17
- PER 70934, NRC identified issue with 1-FCV-67-67 not adequately locked
- PER 72924, NRC identified issue with 0-ISV-77-660 not adequately locked
- PER 72929, NRC identified issue with 1-ISV-67-602A not adequately locked
- PER 8201, 5-10% buildup of silt/debris in the B train ERCW supply to the TDAFW pump (7/29/2003)

- PER 9825, ERCW supply to the A, B, and C Station Air Compressors are approximately 50 - 100% blocked (2/19/2004)
- PER 14816, 50% blockage identified in A train ERCW supply to the TDAFW pump (2/23/2004)
- PER 14821, 50% blockage identified in A train ERCW supply to the TDAFW pump (2/27/2004)
- PER 33308, Design and implementation of the macrofouling program were ineffective (3/16/2004)
- PER 34055, Blockage found in the 1B ERCW supply to the A CCS surge tank (4/7/2004)
- PER 34321, Blockage found in the 2A ERCW supply to the B CCS surge tank (4/19/2004)
- PER 34374, 50% blockage identified in the ERCW flood mode return line (4/21/2004)
- PER 64127, Blockages found in CCS Surge Tank B ERCW emergency makeup supply header (6/28/2004)
- PER 65043, Blockage found in CCS Surge Tank A ERCW emergency makeup supply header (7/13/2004)
- PER 69136, 5% buildup of silt/debris in the B train ERCW supply to the TDAFW pump (9/30/2004)
- PER 69787, 60% blockage identified in ERCW supply to 1A containment spray heat exchanger (10/4/2004)
- PER 72620, ERCW backup cooling line to the 1A-A CCP lube oil cooler completely blocked (11/22/04)
- Maintenance Rule Expert Panel - Meeting Minutes April 30, 2004
- TI-67.003, Component Flow Blockage Testing Using Ultrasonics Essential Raw Cooling Water - (Train A)
- TI-67.004, Component Flow Blockage Testing Using Ultrasonics Essential Raw Cooling Water - (Train B)
- TI-50.030, Manual Valve Exercising (System 67)
- WO 98-08272-000, Perform TI-50.030 (March 1999)
- WO 99-05221-000, Re-perform TI-50.030 section 6.10 (ERCW to 1A-A CCP) after repair(April 1999)
- WO 00-00587-000, Perform TI-50.030 (August 2000)
- WO 01-11252-000, Perform TI-50.030 (March 2002)
- WO 03-06593-000, Perform TI-50.030 (July 2003)
- WO 04-819456-000, Perform TI-50.030 (November 2004)

Section 4OA5.2

- TI-273, Preventative Maintenance for Non-Transferred Features, Appendix A, WBNP Unit 2 PM Maintenance Records for the following components:
- 2-PMP-062-108, Centrifugal Charging Pump 2A-A
- 2-PMP-063-010-A, Safety Injection Pump 2A-A
- 2-PMP-068-050, Reactor Coolant Pump 2-3
- 2-PMP-003-118, Auxiliary Feedwater Motor Driven Pump 2A-A
- TVA-NQA-PLN89-A, Nuclear Quality Assurance Plan
- Site-Specific Engineering Specification, N3M-935, Plant Layup/Equipment Preservation
- Maintenance Requirements Code Book, Unit 2
- WBN NA Observation ID: 33520