UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931

October 27, 2003

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

SUBJECT: WATTS BAR NRC INTEGRATED INSPECTION REPORT 05000390/2003004 AND 0500391/2003004

Dear Mr. Scalice:

On September 27, 2003, 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 October 1, 2003, 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 report documents two NRC-identified findings and one self-revealing finding of very low safety significance (Green) which 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 three findings as non-cited violations (NCVs) consistent with Section VI.A of the NRC Enforcement Policy. This report also documents one issue for which the potential safety significance is to be determined. Although this issue did present some immediate safety concern, your staff implemented appropriate short-term corrective measures while long-term corrective measures and consequences are being evaluated. If you contest any non-cited violation 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.

In accordance with 10 CFR 2.790 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 Website 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 05000390/2003004, 05000391/2003004
W/Attachment: Supplemental Information

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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:	05000390/2003004, 05000391/2003004
Licensee:	Tennessee Valley Authority (TVA)
Facility:	Watts Bar Nuclear Plant, Units 1 and 2
Location:	1260 Nuclear Plant Road Spring City TN 37381
Dates:	June 29 through September 27, 2003
Inspectors:	J. Reece, Acting Senior Resident Inspector (July 13-September 27, 2003) M. King, Acting Senior Resident Inspector (June 29-July 12, 2003) R. Carrion, Project Engineer T. Ross, Senior Resident Inspector, St. Lucie D. Jones, Sr. Health Physicist (Sections 2OS1, 2OS2, 2PS1, 2PS3, 4OA1) R. Hamilton, Health Physicist (Section 2OS3) G. Kuzo, Health Physicist, Team Leader (Section 2PS3) W. Bearden, Senior Resident Inspector, Browns Ferry (Section 1R08)
Approved by:	Stephen J. Cahill, Chief Reactor Projects Branch 6 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

Integrated Inspection Report 05000390/2003-04, 05000391/2003-04, Tennessee Valley Authority, 06/29/2003-09/27/2003, Watts Bar, Units 1 & 2. Maintenance Risk Assessment & Emergent Work Evaluation, Refueling & Outage Activities, Surveillance Testing, Identification & Resolution of Problems

The report covered approximately a three-month period of inspection by resident inspectors and announced inspections by regional radiation specialists, a regional Inservice Inspection Specialist, and a regional reactor inspector. The significance of issues is indicated by their 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 and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The 18-Month Loss of Offsite Power with Safety Injection Test of DG 1A-A, was not accomplished in accordance with procedure 0-SI-82-3. Consequently, the unit experienced an interruption of core cooling which resulted in the Loop 4 hot leg temperature increasing approximately 17 degrees Fahrenheit over a period of approximately 10 minutes.

  The inspectors identified a non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Section V, Instructions, Procedures, and Drawings. The finding is more than minor in that it affects the mitigating systems cornerstone objective and degrades the attribute of protection against loss of coolant for the core. The finding is of very low safety significance based on the low duration during which the flow was lost and the small increase in hot leg temperature during that period. (Section 1R22)

- Green. The use of a non-quality procedure, TI-124, with a note to implement required contingency actions for a Unit 1 diesel generator planned outage of greater than 72 hours resulted in a failure to adequately implement the contingency actions.

  The inspectors identified a NCV of 10 CFR, Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings. The finding is more than minor in that, if left uncorrected, it would become a more significant safety concern. The inspectors referred to MC 0609, Significance Determination Process (SDP), Appendix A, and determined the finding was of very low safety significance. (Section 1R13)

Cornerstone: Barrier Integrity

- Green. Technical Instruction (TI)-68.002, Containment Penetrations and Closure Control, was implemented as a contingency action during periods of elevated risk for the containment barrier during refueling outages. However, TI-68.002 was inadequately implemented in that Appendix B forms for containment penetration breaches had insufficient information to perform an evaluation for approval or were not appropriately handled per procedure.

  The inspectors identified a NCV of Technical Specifications (TS) 5.7.1 which requires that written procedures be implemented and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2. The finding is more than minor in that, if left uncorrected, a more significant safety concern involving degraded control of containment closure and consequential loss of the containment barrier could occur. The finding is of very low safety significance in that subsequent evaluation of penetration closure locations either determined that containment penetrations could be closed within the required time or were approved by the responsible operations personnel and documented as required. (Section 1R20)

Cornerstone: Identification and Resolution of Problems

- TBD. The licensee failed to identify and implement adequate corrective actions for Problem Evaluation Report (PER) 02-014475-000 which subsequently resulted in the identification of approximately 5.2 cubic feet of gas in the residual heat removal discharge piping to the safety injection pump suction piping on August 28, 2003.

  The inspectors identified an unresolved item regarding 10 CFR, Part 50, Appendix B, Criterion XVI, Correction Action. The finding is more than minor in that the inadequate corrective action(s) for PER 02-014475-000 had a credible impact on safety from the failure to detect and/or vent a significant accumulation of gas which could impact the function of safety injection system to mitigate the consequences of a design basis accident. This finding remains unresolved pending completion of risk evaluation to determine the impact on the system from the unvented air. (Section 4OA5)

B. Licensee-Identified Violations

None.

Report Details

Summary of Plant Status

Unit 1 operated at or near 100 percent power until August 25, 2003, when the unit experienced a turbine/reactor trip due to inadvertent actuation of sudden pressure relays on the 1C main transformer. Unit 1 returned to service on August 26, 2003. Due to elevated #2 reactor coolant pump (RCP) #1 seal leakoff flow Unit 1 was shut down on September 7, 2003, for an early start of the Cycle 5 refueling outage (RFO) and was off line for the remainder of the report 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 the licensee's procedure for hot weather operation, 1-PI-OPS-1-SO, Summer Operation, which is performed monthly May through September. During plant status tours the inspectors reviewed the two risk-significant areas/components listed below to verify compliance with the procedural requirements and to verify that the specified actions provided the necessary protection for the structures, systems, or components (SSCs).

- Nuclear service water intake pumping station
- Standby main feedwater pump oil cooler

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

a. Inspection Scope

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

- 1A-A, 2A-A diesel generators (DGs) while 1B-B DG is out of service for 12-year preventative maintenance (PM)
- 1B-B, 2B-B DGs while 1A-A DG is out of service for 12-year PM

- 1A auxiliary feedwater (AFW) while 1B AFW is inoperable for penetration room cooler maintenance

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

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

- Motor-driven auxiliary feedwater pumps and component cooling pumps area
- Intake pump structure
- Unit 1 auxiliary instrument room
- Unit 2 auxiliary instrument room
- 480V board room 2B
- Main control room
- 6.9KV/480V shutdown board room A
- Train A & B residual heat removal (RHR) and containment spray (CS) pump rooms

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection Activities

m. Inspection Scope

The inspectors observed in-process inservice testing (ISI) work activities and reviewed selected ISI records. The observations and records were compared to the TS and the applicable code (ASME Boiler and Pressure Vessel Code, Sections 5 and XI, 1989 Edition, with no Addenda) to verify compliance.

Portions of the ongoing ultrasonic (UT) examination of 18-inch ASME Class 2 safety injection system pipe weld SIS-200A and the augmented UT examination of the #2 RCP shaft were observed. Examination reports for completed nondestructive examinations (NDEs) were reviewed. These records included UT, liquid penetrant (PT), and magnetic particle (MT) examination reports. The records reviewed are listed in the Attachment.

Additionally, the inspectors reviewed the weld examination reports and radiographs of the following completed ASME Class 3 weld repairs:

a.	Weld 1-015A-T008-58	Four-inch steam generator blowdown piping weld
b.	Weld 1-015A-T008-60	Three-inch steam generator blowdown piping weld
c.	Weld 1-015A-T008-75	Three-inch steam generator blowdown piping weld
d.	Weld 1-015A-T003-78	Four-inch steam generator blowdown piping weld
e.	Weld 1-015A-T003-62	Four-inch steam generator blowdown piping weld
f.	Weld 1-03B-D370-033	Six-inch feedwater piping weld
g.	Weld 1-03B-D370-034	Six-inch feedwater piping weld
h.	Weld 1-03B-D370-036	Six-inch feedwater piping weld
i.	Weld 1-03B-D370-037	Six-inch feedwater piping weld

Qualification and certification records for examiners, equipment and consumables, and NDE procedures for the above ISI examination activities were reviewed. Four PERs associated with the presence of boric acid on control rod drive mechanism (CRDM) Nozzle 60, flow accelerated corrosion grid discrepancies, and administrative errors found on visual weld examination reports were reviewed by the inspectors to determine the appropriateness of corrective actions.

In addition to the above observations and reviews for the current outage, the inspectors reviewed portions of the visual inspection video tapes for the reactor vessel lower and upper head penetrations in response to NRC Bulletins 2001-01, 2002-02, 2003-02, and NRC Order EA-03-009. The inspection included review and assessment of in-process visual examinations. Additional information is provided in section 4OA5.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed operators in the plant's simulator during a licensed operator requalification exam to verify operator performance was adequate and that training was conducted in accordance with procedures TRN-1, Administering Training, and TRN-11.4, Continuing Training for Licensed Personnel as evidenced by exam performance. In addition, the inspectors verified that the training program included risk-significant operator actions, emergency plan implementation, and lessons learned from previous plant experiences.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors sampled portions of the two selected SSCs, listed below, as a result of performance-based problems, to assess the effectiveness of maintenance efforts and to verify that the licensee was following the requirements of licensee technical instruction (TI)-119, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting, 10 CFR 50.65, and SPP-6.6, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting. The inspectors focused their reviews on (1) maintenance rule application in accordance with Title 10 Code of Federal Regulations (CFR) 50.65; (2) characterization of failed SSCs; (3) safety significance classifications; (4) 10 CFR 50.65 (a)(1) or (a)(2) classifications; and (5) the appropriateness of performance criteria for SSCs classified as (a)(2) or goals and corrective actions for SSCs classified as (a)(1).

- AFW system return to A(2) status
- PER 03-015727-000, Licensee identified problem of the A main control room chiller tube sheet wastage

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

The inspectors evaluated, as appropriate, for the five selected SSCs 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 unforseen 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.

- 1A-A emergency DG emergent issue with B-train H2 analyzer out of service (reference work orders (WOs) 02-017447-001 and 03-012591-000)
- Turbine-driven AFW (TDAFW) pump emergent issue with 1B DG out of service (reference WOs 03-013046-000, 99-013144-000, and PER 03-014178-000)
- WO 03-011200-000, Repair erratic operation of 1-FCV-3-35
- WO 03-014293-000, Investigate and repair cause of load swing on 2A-A DG
- PER 03-014029-000, Licensee identified problem with entry into 12-hour LCO due to inoperable offsite power supply

b. Findings

Introduction: A Green non-cited violation (NCV) for an inadequate procedure to implement contingency actions was identified by the NRC.

Discussion: 1B diesel generator (DG) was removed from service during the week of July 20, 2003, for an approximate six-day outage to perform a 12-year PM WO. TS 3.8.1 allows outages of up to 14 days; however, as noted in the respective TS Bases for Condition B.4, "In addition, the contingency actions listed in Bases Table 3.8.1-2 must be invoked whenever the outage period will extend beyond 72 hours." The licensee uses a non-quality procedure, TI-124, Equipment to Plant Risk Matrix, to direct implementation of the detailed contingency actions. However, the inspectors determined that the instructions were inadequate due to the use of a non-quality procedure and the use of a general note (vice specific procedural steps) to implement the required actions. This resulted in the failure to implement the contingency actions as evidenced in the following two examples.

Example 1 concerns contingency actions 2 and 3, which required expected weather conditions for the outage to be established. If inclement weather was expected, the activity was to be suspended or postponed if possible. The Unit 1 control room logs indicated on July 20, 2003, that the licensee performed a 'look-ahead' for the contingency actions as opposed to 'invoking' the contingency actions by noting that possible strong to severe thunderstorms were forecast during the next 48 hours. However, rather than suspend or postpone the outage, the 1B DG was later removed from service during the same shift. On July 22, 2003 and within the 48 hour forecast, a lightning strike resulted in the loss of offsite power to the 1B and 2B 6.9 kV shutdown boards which required entry into a more restrictive 12-hour allowed outage time.

Example 2 concerns contingency action 6, which states that the TDAFW pump shall not be removed from service concurrent with an outage on a Unit 1 DG. On day shift July 23, 2003, with the 1B DG still out of service a system engineer notified an operations manager that a trunion bolt was loose on the trip and throttle (T&T) valve for the TDAFW pump turbine. However, rather than immediately declare the component inoperable, the licensee waited until the next shift and removed the component from service by isolating the corresponding steam supply lines following completion of a risk evaluation and planning of WO 03-013046-000. The inspectors found that similar, previous work on two separate occasions was performed without removing the TDAFW pump from service. The inspectors also observed that a subsequent functional evaluation of the loose trunion bolt determined that the T&T valve was fully functional upon discovery by the engineer who had initially identified the problem. Therefore, removal of the TDAFW pump from service while the 1B DG was out of service was not required. The inspectors also determined that no documentation by either operations or engineering revealed that the contingency actions were considered in their evaluations.

Analysis: The inspectors referred to Manual Chapter (MC) 0612 and determined that the finding is more than minor in that, if left uncorrected, it would become a more significant safety concern. The inspectors referred to MC 0609, Significance Determination Process (SDP), Appendix A, and determined that the finding is Green in that it did not involve a deficiency per GL 91-18, an actual loss of safety function of a system or single

train for greater than its TS AOT, an actual loss of a risk-significant, non-TS safety function, or an actual loss of safety function related to seismic, fire, flooding, or severe weather events.

Enforcement:

10 CFR, Part 50, Appendix B, Criterion V, requires, in part, that activities affecting quality shall be prescribed by documented instructions of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions. Contrary to the above, the use of a non-quality procedure, TI-124, with a note to implement required contingency actions for a Unit 1 DG planned outage of greater than 72 hours resulted in a failure to adequately implement the actions as described above. Because this violation is of very low safety significance and has been entered in the licensee's corrective action program under PER 03-014178-000, this violation is being treated as a Green NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 50-390/03-04-01, Inadequate Procedure to Implement EDG Outage Contingency Actions.

1R14 Personnel Performance During Non-routine Plant Evolutions

a. Inspection Scope

The inspectors reviewed the following for the three events listed below, (1) personnel performance during selected non-routine events and/or transient operations; (2) licensee event reports focusing on those events involving personnel response to non-routine conditions; and (3) operator response after reactor trips which required more than routine expected operator responses, or which involved operator errors. The inspectors appropriately (1) reviewed operator logs, plant computer data, or strip charts to determine what occurred and how the operators responded; (2) determined if operator responses were in accordance with the response required by procedures and training; (3) evaluated the occurrence and subsequent personnel response using the SDP; and (4) confirmed that personnel performance deficiencies were captured in the licensee's corrective action program.

- Power reduction and manual control of #1 SG level due to air regulator leak on 1-FCV-3-35 (WO 03-011200-000 to install temporary pressure regulator)
- Turbine/reactor trip on 1C main transformer sudden pressure relay actuation
- Interruption of reactor core cooling due to loss of B train component cooling to B train RHR during A train engineered safety features (ESF) testing

b. Findings

A self-revealing Green NCV associated with the interruption of reactor core cooling is documented in Section 1R22 of this report.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed five selected 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, and SPP-10.6, Engineering Evaluations for Operability Determinations.

- PER 03-011066-000, Licensee identified problem of DG jacket water heat exchanger non-conservative factors used by vendor
- PER 03-012579-000, Licensee identified problem of DG & vital batteries inter-tier connection high resistance
- PERs 03-012859-000 & 03-013238-000, NRC identified problem of loose oil bubblers on turbine-driven AFW and 1B motor-driven AFW pumps respectively
- PER 03-013373-000, Licensee identified problem of 5-10% blockage of essential raw cooling water (ERCW) supply pipe to turbine-driven AFW pump
- PER 03-015727-000, Licensee identified problem of 'A' MCR tube sheet wastage.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

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

- WO 03-001352-000, Investigate and repair oil leak at 1-CKV-82-708A1
- WO 99-013144-000, Perform 12-year PM for DG 1B-B in accordance with MI-82.078
- WO 03-014293-000, Repair load control problem on 2A DG
- WO 02-016751-000, Replace oscillator card in vital invertor 2-II
- WO 03-013269-000, Investigate and repair main control room chiller B load/unload solenoid valve cycling
- WO 03-011522-000, Repair hand switch for 1-HS-3-0136A/B-A
- WO 03-002469-000, Shutdown boardroom chiller A maintenance

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

The licensee began its Unit 1 Cycle 5 (U1C5) refueling outage RFO on September 7, 2003, prior to the scheduled date due to excessive leakage from two of the reactor coolant pump seals. From that date through the end of the report period, the inspectors observed portions of the shutdown, cooldown, refueling, and maintenance activities to verify that the licensee maintained defense-in-depth (DID) commensurate with the outage risk plan and applicable TS. The inspectors monitored licensee controls over the outage activities listed below and reviewed the licensee's response to an event involving core cooling during A train ESF testing. Documents reviewed during the inspection are listed in the attachment.

- Licensee configuration management, including daily outage reports, to evaluate defense-in-depth commensurate with the outage safety plan and compliance with the applicable TS when taking equipment out of service.
- Installation and configuration of reactor coolant instruments to provide accurate indication and an accounting for instrument error.
- Controls over the status and configuration of electrical systems and switchyard to ensure that TS and outage safety plan requirements were met.
- Licensee implementation of clearance activities to ensure equipment was appropriately configured to safely support the work or testing.
- Decay heat removal processes to verify proper operation and that steam generators, when relied upon, were a viable means of backup cooling.
- Controls to ensure that outage work was not impacting the ability to operate the spent fuel pool cooling system during and after-core offload.
- Reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss.
- Reactivity controls to verify compliance with TS and that activities which could affect reactivity were reviewed for proper control within the outage risk plan.
- Refueling activities for compliance with TS, to verify proper tracking of fuel assemblies from the spent fuel pool to the core, and to verify foreign material exclusion was maintained.

- Reduced inventory and mid-loop conditions for commitments to Generic Letter 88-17 to verify that these commitments were in place, that plant configuration was in accordance with those commitments, and that distractions from unexpected conditions or emergent work did not affect operator ability to maintain the required reactor vessel level.

b. Findings

Introduction: A Green NCV for failure to follow procedure regarding control of containment penetrations was identified by the NRC.

Discussion: During the RFO, the licensee periodically reviewed the 'time-to-core-boil' based on the loss of reactor core heat removal due to the loss of the residual heat removal (RHR) system or the loss of secondary heat removal via the steam generators. This review also involved other areas critical for reactor core protection and was referred to as the DID assessment. On September 12, 2003, based on the licensee's DID assessment and a time-to-core-boil of nine minutes, containment was declared in an Orange risk condition which required a contingency plan implemented by TI-68.002, Containment Penetrations and Closure Control. This procedure used Appendix A section to determine acceptable containment penetration closure times based on a combination of the time-to-core-boil and the time for upper or lower containment environment to reach a predetermined temperature. The Appendix B section of this procedure was used to identify status of containment penetrations including locations, personnel and time required to close the penetrations if open. This procedure also required that the responsible operations personnel compare the times identified in Appendix A to those in Appendix B for appropriate followup actions. On September 12, 2003, the inspector noted the following regarding TI-68.002:

- Appendix A was not current for plant conditions
- TI-68.002 did not identify when Appendix A should be updated to reflect actual plant conditions
- Closure time for the containment equipment hatch (noted on Appendix B) was beyond the acceptable closure time noted in Appendix A, and the required actions had not been completed
- Other Appendix B sections completed for containment penetrations did not have the appropriate location information to allow an adequate comparison to Appendix A

On the following Monday, September 15, 2003, the inspectors again reviewed TI-68.002 as Unit 1 was still in an Orange risk condition for containment. The inspectors again determined that similar problems as noted on September 12, 2003 existed regarding locations of containment penetrations. Additionally, two Appendix B forms dated September 12, 2003, and approved by required operations personnel, did not have specific dates noting the penetration status (i.e., open or closed) and penetrations associated with ice condenser work had a status of open but were one-lined and initialed. The responsible operations personnel were unaware of the current status. The inspectors determined that the failure to follow procedure for multiple days resulted in inadequate control of containment closure. The licensee entered the above problems in their corrective action program as PER 03-016237-000 on September 16, 2003.

Analysis: The inspectors referred to MC 0612 and determined that the finding was more than minor based on the pervasiveness of the problem and if left uncorrected, a more significant safety concern would occur in that inadequate control of containment closure could result in the loss of the containment barrier when called upon. The inspectors referred to MC 0609 and determined that the finding is Green in that a consequent evaluation of penetration closure locations either determined that containment penetrations could be closed within the required time or were subsequently approved by the responsible operations personnel and documented as required.

Enforcement: TS 5.7.1 requires that written procedures be implemented and maintained covering the applicable procedures recommended in Regulatory Guide (RG) 1.33, Revision 2, Appendix A, February 1978. RG 1.33, Section 6, requires procedures for combating emergencies or other significant events. TI-68.002, Containment Penetrations and Closure Control, was implemented as a contingency action during periods of elevated risk for the containment barrier during refueling outages. However, TI-68.002 was inadequately implemented in that Appendix B forms for containment penetration breaches had insufficient information to perform an evaluation for approval or were not appropriately handled as per procedure instructions. Because this violation is of very low safety significance and has been entered in the licensee's corrective action program under PER 03-016237-000, this violation is being treated as a NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 50-390/03-04-02, Inadequate Procedure for Control of Containment Penetrations.

1R22 Surveillance Testing

a. 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.

- WO-03-006590-000, Perform 1-SI-70-901-A component cooling system pump 1A-A quarterly performance test
- WO-03-006670-000, Perform 1-SI-72-901-A containment spray pump 1A-A quarterly performance test
- WO 02-011629-000, Perform 0-SI-82-18-B, 184-day fast start and load test DG 1B-B
- WO 03-006913-000, Perform TI-50-005, diesel generator 2B fuel oil tank transfer pump quarterly test
- 1-SI-63-10-A, Emergency core cooling system (ECCS) pumps and discharge pipes venting - Train A conditional performance of APP. I
- 0-SI-82-3, 18-Month Loss of Offsite Power with Safety Injection Test - DG 1A-A

b. Findings

Introduction: A self-revealing Green NCV for failure to follow procedure for ESF testing on A train was identified.

Discussion: On September 9, 2003, the licensee was conducting 0-SI-82-3, 18-Month Loss of Offsite Power with Safety Injection Test - DG 1A-A, when the unit experienced an interruption of core cooling resulting in the Loop 4 hot leg temperature increasing approximately 17 degrees Fahrenheit over a period of approximately 10 minutes. At the time of the event, the component cooling system (CCS) was aligned such that the 1A and 1B CCS pumps were providing flow to the A train essential header and the C-S CCS pump (which could be powered from either the A or the B train) was aligned to the B train essential header but powered from A train. A simulated blackout signal was introduced to the A train, thereby removing the power source for the C-S CCS pump. Therefore, the CCS flow to the B train essential header was lost which affected the B train RHR heat exchanger, 1B CCP oil cooler, and 1B RHR pump oil cooler, all of which were in service for core cooling. Upon recognition of the increase in Loop 4 hot leg temperature, operations personnel made the decision to continue the ESF test which introduced a safety injection signal that started the 2B CCS pump to restore cooling for the B train components noted above.

The inspectors reviewed the procedure used during the test and observed that there is a note in Step 4.4.1, Pre-Test Evolutions, which refers to the required system alignment. The inspectors determined that the requirement to place 2B CCS pump in service and aligned to the 'B' train essential header had not been performed.

Analysis: The inspectors referred to MC 0612 and determined that the finding was more than minor in that it is associated with the Mitigating Systems cornerstone and affected the respective objective of configuration control. The inspectors referred to MC 0609, Significance Determination Process, and determined that the finding was of very low safety significance (Green) in that the conditional core damage frequency for this scenario at the actual duration was less than 1E-6, and that the increase in core temperature was limited to a short duration.

Enforcement: TS 5.7.1, Procedures, requires that written procedures be established, implemented, and maintained covering applicable procedures recommended in Regulatory Guide (RG)1.33, Revision 2, Appendix A, February 1978, Section 8, Procedures for Control of Measuring and Test Equipment and for Surveillance Tests, Procedures, and Calibrations. Contrary to this, on September 9, 2003, procedure 0-SI-82-3 was fully implemented resulting in the interruption of core cooling. Because this violation is of very low safety significance and has been entered in the licensee's corrective action program under PER 03-015894-000, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 50-390/03-04-03, Failure to Follow Procedure for ESF Testing.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following two temporary plant modifications against the requirements of SPP-9.5, Temporary Alterations, and SPP-9.4, 10 CFR 50.59 Evaluation of Changes, Test, and Experiments, and verified that the modifications 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.

- Temporary Alteration Control Form (TACF) 1-03-6-062 R2, Install ultrasonic flow monitoring for #4 RCP seal leakoff
- TACF 1-03-09-003, Install temporary air regulator on 1-FCV-3-35, #1 MFRV

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 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 characterizing 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 (OS) and Public Radiation Safety (PS)

2OS1 Access Control to Radiologically Significant Areas

a. Inspection Scope

Access Controls

Licensee program activities for monitoring workers and controlling their access to radiologically significant areas and tasks were evaluated. The inspectors assessed adequacy of procedural guidance; directly observed implementation of administrative and established physical controls; and assessed resultant worker exposures to radiation and radioactive material. Radiation worker and Health Physics Technician (HPT) proficiency in implementing Radiation Protection (RP) program activities were appraised.

Routine work activities in specific Radiological Controlled Area (RCA) locations were observed for the current Unit 1 Refueling Outage (RFO)-5. The inspectors evaluated the adequacy of established physical and administrative controls including postings, barricades, procedural guidance, and Radiation Work Permits (RWPs) for High Radiation Area (HRA) and Locked High Radiation Area (LHRA) locations through document and record reviews, direct observation of established controls, and interviews with workers. The inspectors performed independent confirmatory radiation surveys in two Auxiliary Building (AB) LHRAs and one Radiation Area (RA). The results of these surveys were compared to current licensee survey documentation. Electronic alarming dosimeter (EAD) set points were reviewed for consistency with expected work area dose rates. Radiation worker performance with respect to procedural guidance and HPT proficiency were assessed based on interviews and work observation. The workers' knowledge of their expected response to an EAD dose or dose rate alarm was assessed through interviews.

The inspectors reviewed procedural guidance for control of access to highly radioactive irradiated materials stored in the spent fuel pool and discussed those controls with Radiological Control Supervisors and the Radiological Control Superintendent. Implementation of those controls was observed during tours of the Refuel Floor.

The inspectors evaluated the adequacy of licensee procedures for internal dose assessment. Licensee data for implementing internal dose assessments for the previous 18 months were reviewed and discussed.

License procedures and activities related to access controls were evaluated for consistency with Title 10 Code of Federal Regulations (10 CFR) 19.12; 10 CFR 20, Subparts B, C, F, G, H, and J; Technical Specifications (TS) Section 5.7, Procedures, and TS Section 5.11, High Radiation Areas. Licensee's access control related procedures, reports and records reviewed during the inspection are listed in Section 2OS1 of the Attachment to this report.

Problem Identification and Resolution

Issues identified through Problem Evaluation Report (PER) documents associated with radiological controls, personnel monitoring, and exposure assessments were reviewed and discussed with responsible licensee representatives. The inspectors assessed the licensee's ability to characterize, prioritize, and resolve the identified issues in accordance with licensee procedure Tennessee Valley Authority Nuclear (TVAN) Standard Programs and Processes (SPP)-3.1, Corrective Action Program, Revision (Rev.) 4. Specific PER documents reviewed and evaluated in detail for this inspection area are identified in Section 2OS1 of the report Attachment.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls

a. Inspection Scope

As Low As Reasonably Achievable (ALARA)

The plant collective exposure history for calendar years 2000 through 2002 was reviewed and discussed with the licensee. Implementation of the licensee's ALARA program during the Unit 1 RFO - 5 was observed and evaluated by the inspectors during the week of September 22 - 26, 2003. The inspectors reviewed ALARA planning, dose estimates, and prescribed ALARA controls for the five outage work activities expected to incur the highest collective exposures during the Unit 1 RFO - 5. Incorporation of the planning, established work controls, and expected dose and dose rates into ALARA pre-job briefings and RWPs were evaluated for consistency with the methods, practices, and philosophy delineated in the licensee's ALARA Program. The inspectors also conducted independent confirmatory radiation surveys of selected job sites and general area surveys in the AB to assess the accuracy of the dose rates recorded on survey maps for work the selected areas.

Selected elements of the licensee's source term reduction and control program were examined. Program data, radiation field monitoring and trending, temporary shielding and shutdown chemistry controls were examined by the inspectors to determine whether the program was effective in controlling and reducing exposure. The inspectors compared radiation field survey results from prior outages with current outage results to evaluate the expected radiological impact from elevated reactor coolant activity concentration during the shutdown for the current outage. The inspectors observed the additional shielding that was being used to compensate for the elevated dose-rates.

Exposure records were also reviewed for the two individuals who participated in the licensees declared pregnant worker program during the previous twelve months.

Through the above reviews and observations, the licensee's ALARA program implementation and practices were evaluated by the inspectors for consistency with 10 CFR Part 20 requirements and procedural guidance documented in Section 2OS2 of

the Attachment to this report. Incurred exposures were evaluated for consistency with 10 CFR Part 20 dose limits, and licensee administrative procedures.

Problem Identification and Resolution

Issues identified through Problem Evaluation Report (PER) documents associated with the ALARA program were evaluated against requirements specified in 10 CFR 20. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with TVAN Standard Programs and Processes, SPP-3.1, Corrective Action Program, revision 4. Reviewed documents are listed in Section 2OS2 of the Attachment to this report.

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 configurations where accessible, and the results of performance checks and calibrations for the ARMs and CAMs listed in Section 2OS3 of the Attachment. The inspectors reviewed the licensee' s post-accident sampling system (PASS) equipment for general material condition and discussed current operability/availability and future elimination plans with licensee chemistry 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 Attachment.

Personnel Survey Instrumentation

Current program guidance, including calibration and maintenance procedures, and its implementation to maintain operability, accuracy, and availability of selected portable survey instruments were reviewed and evaluated. The inspectors observed calibration checks of several ion chamber survey meters, extensible GM survey meters, portable CAMs, and hand held monitors. Ion chamber instrumentation, an Eberline RO-2 and a Bicron RSO-50, were inspected for physical condition including condition of chamber desiccant and internal electrical and mechanical connections. The inspectors observed licensee personnel selecting, inspecting, functional testing, and subsequently using portable survey instruments. Availability of portable instruments for licensee use was evaluated through observation of instruments staged for issue and discussion with licensee personnel. The inspectors observed instruments being removed from service due to physical defects and failed functional source tests. Calibration data were

evaluated for instruments used during coverage of tasks in high radiation areas. The instrument calibrations reviewed are listed in Section 2OS3 of the 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 three personnel contamination monitors (PCMs) located at the RCA exit point. The operability and analysis capabilities of the whole body counting (WBC) equipment was evaluated. The current WBC equipment radionuclide identification library was reviewed to determine if likely activated corrosion products and fission products were included. In addition, qualitative and quantitative waste stream radionuclide results were reviewed to assess calibration and detection capabilities of PCM and WBC equipment.

Licensee activities associated with personnel radiation monitoring instrumentation were reviewed against 10 CFR 20.1204 and 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, and number of units available. The inspectors reviewed and evaluated current records associated with supplied air quality and maintenance of SCBA equipment. Control room and radiation control personnel were interviewed to assess availability of spectacle inserts and training for air cylinder change out. The inspectors verified that training, medical, and fit test qualifications were current for selected individuals. 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.

Licensee activities associated with maintenance and use of SCBA equipment were reviewed against 10 CFR Part 20.1703; Regulatory Guide (RG) 8.15, Acceptable Programs for Respiratory Protection, Rev. 1, October 1999; 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 Attachment.

Problem Identification and Resolution

Selected licensee Corrective Action Program (CAP) documents, including PERs, associated with area radiation monitoring 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 the licensee's procedure

SPP-3.1. Specific CAP documents reviewed and evaluated are listed in Section 2OS3 of the Attachment.

b. Findings

No findings of significance were identified.

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

a. Inspection Scope

Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

The operability, availability, and reliability of selected effluent process sampling and detection equipment used for routine and accident monitoring activities were reviewed and evaluated. Inspection activities included record reviews and direct observation of equipment installation and operation. Current calibration data were reviewed for the selected process monitors associated with releases from the auxiliary and shield buildings and liquid radwaste effluents.

During the week of July 21, 2003, the inspectors directly observed process effluent sampling and monitoring equipment material condition, installed configurations (where accessible), and operability; evaluated selected effluent release data; and reviewed and evaluated established release set-points. In addition, three effluent release permits completed and documented during May and July 2003 were reviewed, discussed, and evaluated. The evaluation assessed effluent sample representativeness, radionuclide concentration sensitivities, achieved analyses accuracies pre-release dose calculation completeness, and adequacy of effluent radiation monitor set-point determinations.

The licensee's counting laboratory quality control (QC) program activities for liquid and airborne sample radionuclide analyses were evaluated. The inspectors discussed and reviewed laboratory QC activities including current gamma spectroscopy daily system performance results; preparation, processing and storage of composite samples; radionuclide lower limit of detection capabilities and achieved accuracies; and results of the quarterly cross-check spiked radionuclide samples.

The inspectors directly observed and evaluated chemistry staff proficiency in conducting laboratory analyses, pre-release processing, sampling, and gamma spectroscopy analyses. Interviews were conducted with counting room technicians to evaluate staff proficiency and knowledge of effluent release requirements, equipment capabilities, and procedural details.

Equipment configuration, material condition, and operation for the effluent processing, sampling, and monitoring equipment were reviewed against details documented in TS; 10 CFR Part 20; UFSAR Section 11; Offsite Dose Calculation Manual (ODCM), Revision 10; American Nuclear Standards Institute (ANSI)-N13.1-1969, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities; ANSI-N13.10-1974, American National Standard (ANS) Specification and Performance of On-Site Instrumentation for

Continuously Monitoring Radioactivity in Effluents; and approved procedures listed in Section 2PS1 of the Attachment.

Effluent sampling task evolutions, and offsite dose results were evaluated against 10 CFR Part 20 requirements, Appendix I to 10 CFR Part 50 Design Criteria, TS, UFSAR details, ODCM, and applicable procedures listed in Section 2PS1 of the Attachment. Laboratory QC activities were evaluated against 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 Plant, June 1974; and RG 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment, December 1977.

Problem Identification and Resolution

Licensee CAP documents associated with effluent processing and monitoring activities were reviewed. The PERs documented 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, Revision 4.

b. Findings

No findings of significance were identified.

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.

On July 22, 2003, the inspectors directly observed equipment material condition and operation (flow rate), and assessed technician proficiency in collecting weekly airborne particulate filter and iodine cartridge samples at ODCM-specified monitoring locations LM-1, LM-2, LM-3,and LM-4. In addition, the collection and initial preparation of surface water from the Tennessee River Mile 529.3 location and a milk sample from the Farm L location were observed. Technician proficiency in collection and initial preparation of the samples was evaluated against established procedures. Five environmental thermoluminescent dosimeters 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 instrumentation with ODCM descriptors.

Selected REMP quality control activities were reviewed and evaluated. The inspectors reviewed and discussed results of REMP inter-laboratory comparisons for the Calendar Year (CY) 2001 and CY 2002. Analytical detection capabilities for tritium and gross beta monitoring were evaluated through review of laboratory calculation sheets. Calibration records were reviewed for the current airborne flow rates and surface water equipment sampling equipment. The most recent land use census, maximally exposed nearest resident, and applicable dose calculation assumptions were discussed with responsible licensee staff. In addition, licensee program guidance and records regarding documentation of unintended spills of radioactive materials on owner-controlled property were discussed.

The inspectors reviewed and discussed selected tritium concentration data for samples collected during the period from January 1, 2001, through September 27, 2003, from sumps located within the protected area and from ground water monitoring wells and yard holdup ponds located within the owner-controlled property boundary. Potential areas and/or equipment identified by the licensee as potential tritium source terms were toured and discussed including a leaking radioactive liquid waste discharge pipe, the Unit 1 (U1) and Unit 2 (U2) transfer canal liner, the U2 transfer canal tube bellows, and in-plant valves associated with the refueling water storage tank (RWST) equipment. Completed and planned maintenance actions regarding the waste discharge line, the U1/U2 transfer canal liner, the U2 transfer tube bellows, and the RWST valves were discussed and evaluated in detail. Inspectors monitored sample well results and trends to verify any affects on required REMP wells and offsite areas.

Licensee procedures and activities related to environmental monitoring were evaluated against UFSAR specifications, ODCM Revision 10 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 Attachment.

Meteorological Monitoring Program

The licensee's meteorological monitoring program guidance and its implementation were reviewed and evaluated. On July 22, 2003, 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 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 previous two years.

Licensee procedures and activities related to meteorological monitoring were evaluated for consistency with ODCM Section 2.13, Revision 10; UFSAR Section 2.3.3, Onsite Meteorological Measurements Program; 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 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. During the week of July 21, 2003, 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 radionculides.

The licensee's practices and implementation of monitoring for unconditional release of materials from the RCA were evaluated against 10 CFR Part 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 Attachment.

Problem Identification and Resolution

Licensee CAP documents associated with the licensee's meteorological and environmental sampling programs were reviewed. Licensee documents identified in Section 2PS1 of the 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, Revision 4.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verifications

a. Inspection Scope

The inspectors sampled licensee data submitted to the NRC for the performance indicators (PIs) listed below for the period from January 1, 2002, through June 30, 2003. 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, Revision 1, were used to verify the basis in report for each data element.

High Pressure Injection and Residual Heat Removal Safety System Unavailability

The inspectors reviewed operating logs and TS limiting condition of operation (LCO) entry records for the period of July 1, 2002, through June 30, 2003, to verify the accuracy and completeness of the high pressure injection and residual heat removal safety system unavailability PIs.

Occupational Exposure Control Effectiveness PI

The inspector reviewed CAP records to determine whether High Radiation Area, Very High Radiation Area, or unplanned exposures, resulting in TS or 10 CFR 20 non-conformances, had occurred during the review period. The inspectors also reviewed individual RCA exit transaction dose records exceeding 100 mrem against Radiation Work Permit dose limits. Reviewed documents relative to this PI are listed in Section 4OA1 of the Attachment.

Radiological Control Effluent Release Occurrence PI

The inspectors reviewed and evaluated selected radiological liquid and gaseous effluent release data, out-of-service process radiation monitor and compensatory sampling data, abnormal release results, and selected PER records documented in Sections 2PS1 and 4OA1 of the Attachment.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors conducted an in-depth review of the licensee's problem identification and resolution (PI&R) activities related to PER 02-014475-000, Evaluate gas found in ECCS piping. This particular PER was reviewed to verify that the full extent of the issues was identified, an appropriate evaluation was performed, and appropriate corrective actions were specified and prioritized. The inspectors also evaluated the PER against the requirements of the licensee procedure, SPP-3.1, and 10 CFR 50, Appendix B, Criterion XVI, Corrective Action.

b. Findings

Introduction: An unresolved item (URI) for inadequate corrective actions to control ECCS venting was identified by the NRC.

Description: During a forced outage on August 25, 2003, the inspectors observed that gas had been found in the safety injection system hot leg injection ECCS piping during performance of 1-SI-63-10-A, ECCS Pumps and Discharge Pipes Venting - Train A. This procedure is performed to comply with TS surveillance 3.5.2.3 to verify ECCS piping is full of water on a 31 day frequency. This prompted the inspectors to request a status via UT of the RHR discharge piping (commonly referred as piggyback piping) to the suction of the safety injection pumps (SIPs) and centrifugal charging pumps (CCPs) after observing that 1-SI-63-10-A did not include this section of piping. Subsequent investigation by the licensee on August 28, 2003, determined that a volume of gas of approximately 5.2 cubic feet existed in a vertical section of piping below a normally closed isolation valve in the B train piping. The licensee's belief was that the source of the gas was from maintenance work on the 1B SIP which required draining of the pump

casing and associated suction piping on January 14, 2003. The inspectors determined that system operating instruction (SOI)-63.01, Safety Injection System, section 5.1, Fill & Vent SI Pumps and Piping from RWST, did not address the piggyback piping. An evaluation by the licensee of the gas volume impact on the downstream pumps was in progress via PER 03-014492-000.

The inspectors reviewed PER 02-014475-000, initiated on October 9, 2002, for gas that was found in ECCS piping after the inspectors identified a venting methodology problem. An attachment to this PER dated November 6, 2002, stated, "there are also local high points at the top of the tube bundle for each RHR heat exchanger (HX) and below the valve seats of 1-FCV-63-8 and 1-FCV-63-11 in the piggyback piping from the discharge of the RHR pumps (RHRPs) to the suction of the safety injection pumps (SIPs)." Additionally the attachment stated, "Gas could only reasonably exist at the these locations if the system piping was drained for a maintenance or inspection activity and then improperly vented during refill." The inspectors determined that PER 02-014475-000 included no corrective actions to address the potential gas accumulation in the piggyback piping. Although this PER had not yet been closed, the inspectors concluded that the time from the date of the attachment to the point of discovery was sufficient in which timely corrective actions should have been identified.

Assessment: The inadequate corrective action(s) for PER 02-014475-000 had a credible impact on safety in that the licensee failed to detect and/or vent a significant accumulation of gas which could impact the function of SI system to mitigate the consequences of a design basis accident. While this finding can be reasonably viewed as a precursor to an event, completion of a risk evaluation will occur upon the licensee's evaluation.

Enforcement: 10 CFR, Part 50, Appendix B, criterion XVI, Correction Action, states in part that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. Contrary to this on August 28, 2003, the licensee failed to identify and implement adequate corrective actions for PER 02-014475-000 which subsequently resulted in a significant amount of gas in the RHR discharge to the SIP suction piping following maintenance on the 1B SIP. This issue is in the licensee's corrective action program as PER 03-014922-000. This finding is considered an unresolved item while awaiting a final risk evaluation and is identified as URI 50-390/03-04-04, Inadequate Corrective Action to Control ECCS Venting.

4OA3 Event Followup

.1 Reactor Trip on August 25, 2003

a. Inspection Scope

The inspectors reviewed the licensee's event critique and PER 03-014782-000, which documented this event in the CAP, to verify that the cause of the reactor trip event of August 25, 2003, was identified and that corrective actions were reasonable. The reactor trip was caused by inadvertent operation of the sudden pressure relays for main

transformer bank 1C and subsequent turbine trip. The inspectors reviewed plant parameters and verified that timely notifications were made in accordance with 10 CFR 50.72, that licensee staff properly implemented the appropriate plant procedures, and that plant equipment performed as required. Actuation of the sudden pressure relays occurred when a transmission power services technician inadvertently bumped the cabinet containing the relays. Subsequent investigation determined that the hydraulic hoses connecting the pressure sensors to the relays were sensitive to movement.

b. Findings

No findings of significance were identified.

.2 (Closed) LER 50-390/2003-002, Inoperable Channel of Reactor Protection System for Greater Than TS Allowable Outage Time

The inspectors reviewed the LER to determine if the cause of this event was identified and that corrective actions were reasonable. The inspectors also reviewed the event using IP 71153, Event Followup. A licensee-identified Green NCV was previously documented for this problem in NRC Integrated Inspection Report 05000390/2003003 and 05000391/2003003.

4OA5 Other Activities

.1 NRC Temporary Instruction (TI) 2515/150, Reactor Pressure Vessel Head and Vessel Head Penetration Nozzles (NRC Bulletin 2002-02)

a. Inspection Scope (TI 2515/150 and Order 03-009)

The inspectors observed activities relative to inspection of the Unit 1 reactor pressure vessel (RPV) head penetrations in response to NRC Bulletin 2002-02 and Order 03-009. The guidelines and criteria for the inspection were provided in NRC temporary inspection (TI) procedure TI 2515/150, Reactor Pressure Vessel Head and Vessel Head Penetration Nozzles (NRC Bulletin 2002-02).

b. Findings and Observations

No findings of significance were identified, but the following questions are answered for documentation of the inspection as required by the TI:

a. For each of the examination methods used during the outage, was the examination:

1. Performed by qualified and knowledgeable personnel? (Briefly describe the personnel training/qualification process used by the licensee for this activity.)

The examination was performed by qualified and knowledgeable individuals with Certification Level III for non-destructive examinations that included Visual Testing (VT)-2 requirements.

2. Performed in accordance with demonstrated procedures?

The examination was performed per nondestructive examination procedure, N-VT-17, Revision 3, Visual Examination for Leakage of PWR Reactor Head Penetrations. The results were thoroughly documented in a report.

3. Able to identify, disposition, and resolve deficiencies?

The examination was able to adequately identify, characterize and resolve deficiencies.

4. Capable of identifying the PWSCC and/or RPV head corrosion phenomena described in Order EA-03-009?

The examination was capable of identifying the corrosion phenomena described in the order.

b. What was the physical condition of the reactor vessel head (e.g., debris, insulation, dirt, boron from other sources, physical layout, viewing obstructions)?

The upper head was generally clean with only one nozzle (#60) that exhibited boron from a previous upper canopy seal leak. This penetration was cleaned, and the licensee performed a liquid penetrant test exam with results that identified no cracks. The upper head was also coated. Any cracks in the coating were appropriately reviewed by a regional inspector who determined that no nozzle area cracks were involved. Minor dust debris was identified and removed.

c. Could small boron deposits, as described in the Bulletin 01-01, be identified and characterized?

The examination was capable of identifying small boron deposits; however, none were found that could be attributed to leaks in the areas of concern.

d. What material deficiencies (i.e., cracks, corrosion, etc.) were identified that required repair?

There were no material deficiencies requiring any immediate repairs. The boron found on nozzle #60 was documented in the licensee's corrective action program and cleaned with subsequent PT revealing no deficiencies.

e. What, if any, impediments to effective examinations, for each of the applied methods, were identified (e.g., centering rings, insulation, thermal sleeves, instrumentation, nozzle distortion)?

The licensee had to lift an insulation ring to gain access to the upper head area. While the ring limited access to some areas depending on the approach of the robotic camera, VT-2 examination for the detection of boron leakage was not limited.

f. What was the basis for the temperatures used in the susceptibility ranking calculation, were they plant-specific measurements, generic calculations (e.g., thermal hydraulic modeling, instrument uncertainties), etc.?

The Watts Bar reactor vessel head is a Westinghouse Tcold design in that nozzles at the top of the downcomer sweep Tcold water up from the downcomer and across the inside surface of the reactor vessel head. At Watts Bar, the design Tcold temperature is 557.3 degrees farenhight.

g. During non-visual examinations, was the disposition of indications consistent with the guidance provided in Appendix D of this TI? If not, was a more restrictive flaw evaluation guidance used?

The non-visual PT performed on nozzle #60 did not reveal any indications.

h. Did procedures exist to identify potential boric acid leaks from pressure-retaining components above the RPV head?

The licensee has SPP-9.7, Corrosion Control Program and Maintenance Instruction (MI)-68.001, Disassembly and Reassembly of the Reactor Pressure Vessel and Attachments, in place to identify and evaluate any borated water leakage.

i. Did the licensee perform appropriate follow-on examinations for indications of boric acid leaks from pressure-retaining components above the RPV head?

As noted above, the licensee performed PT on nozzle #60 following cleaning of boron from previous canopy seal leak. No indications of cracks were found.

.2 NRC TI 2515/152, Reactor Pressure Vessel Lower Head Penetration Nozzles (NRC Bulletin 2003-02)

a. Inspection Scope (TI 2515/152)

The inspectors observed activities relative to inspection of the Unit 1 RPV lower head penetrations in response to NRC Bulletin 2003-02. The guidelines and criteria for the inspection were provided in NRC temporary inspection (TI) procedure TI 2515/152, Reactor Pressure Vessel Lower Head Penetration Nozzles (NRC Bulletin 2002-02).

b. Findings and Observations

No findings of significance were identified, but the following documents the results of the inspectors' verification activities for each section of the TI:

a. For each of the examination methods used during the outage, was the examination:

1. Performed by qualified and knowledgeable personnel? (Briefly describe the personnel training/qualification process used by the licensee for this activity.)

The examination was performed by a qualified and knowledgeable individual with qualifications that included Visual Testing (VT)-2 requirements.

2. Performed in accordance with demonstrated procedures?

The examination was performed in accordance with procedure, N-VT-17, Revision 3.

3. Able to identify, disposition, and resolve deficiencies?

The examination was adequately completed using a robotic camera with excellent resolution. There were no deficiencies identified. The licensee retained video tapes of the examination portions of which were reviewed by the regional ISI inspector.

4. Capable of identifying pressure boundary leakage as described in the bulletin and/or RPV lower head corrosion?

The examination was capable of identifying pressure boundary leakage as described in the bulletin.

b. What was the physical condition of the RPV lower head (e.g., debris, insulation, dirt, boric acid deposits from other sources, physical layout, viewing obstructions)?

The examination revealed an amount of rust and associated stains over most of the bottom head. The licensee placed this issue in their corrective action program, and there was no immediate action required. The general physical condition of the RPV lower head area was generally clean with no indications of boric acid leaks from other sources. A platform of mirror insulation several feet below the lower head provided a level surface for the robotic camera to perform the survey. There was a minor collection of dust on the platform with a few loose 'balls' of metal wool insulation used to chink the annulus area between the incore tubes and mirror platform. Additionally, there was a loose coil of cable used for Loose Parts Monitoring.

c. Could small boric acid deposits, as described in the Bulletin 2003-02, be identified and characterized?

The examination was adequate to satisfy the Bulletin requirements, and there were no boric acid deposits identified.

d. What material deficiencies (i.e., cracks, corrosion, etc.) were identified that required repair?

The examination determined that there were no identified deficiencies requiring immediate repair. The examination did identify light to moderate staining and surface rust seen around the nozzle annular areas and on the bare head surface. The licensee determined that this condition was not the result of any boric acid leakage and documented the condition in their corrective action program.

e. What, if any, impediments to effective examinations, for each of the applied non-destructive examination methods, were identified (e.g., insulation, instrumentation, nozzle distortion)?

The licensee had to remove some mirror insulation to gain access to the lower head area for the robotic camera and to stage a stationary camera. The licensee also identified a coil of cable (used for Loose Parts Monitoring) and metal wool material (used for insulating the incore tube/mirror insulation annular gap) that presented a limited obstacle for the robotic camera. However, a full examination of the surrounding nozzles was still accomplished.

f. Did the licensee perform appropriate follow-on examinations for indications of boric acid leaks from pressure-retaining components above the RPV lower head?

There were no additional follow up examinations required due to the absence of any indications of boric acid leaks.

4OA6 Meetings, including Exit

The inspectors presented the inspection results to Mr. William Lagergren and other members of licensee management at the conclusion of the inspection on October 1, 2003. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

4OA7 Licensee-Identified Violations

None.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION
PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Boone, Radiological Control Manager
L. Bryant, Plant Manager
S. Casteel, Radiological and Chemistry Control Manager
H. Champagne, Program Manager, Radiation Control
J. Cox, Training Manager
L. Hartley, Maintenance Rule Coordinator
M. King, Chemistry Superintendent
D. Kulisek, Assistant Plant Manager
W. Lagergren, Site Vice President
D. Nelson, Business and Work Performance Manager
P. Pace, Licensing and Industry Affairs Manager
K. Parker, Maintenance and Modifications Manager
J. Roden, Operations Superintendent
T. Wallace, Operations Manager
J. West, Site Nuclear Assurance Manager
T. Wilkerson, Program Manager, Radiation Control

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-390/03-04-04	URI	Inadequate Corrective Action to Control ECCS Venting (Section 4OA2)

Closed

50-390/2003-002	LER	Inoperable Channel of Reactor Protection System for Greater Than TS Allowable Outage Time (Section 4OA3)

Opened and Closed

50-390/03-04-01	NCV	Inadequate Procedure to Implement Contingency Actions (Section 1R13)
50-390/03-04-02	NCV	Inadequate Procedure and Failure to Follow Procedure for Control of Containment Penetrations (Section 1R20)
50-390/03-04-03	NCV	Failure to Follow Procedure for ESF Testing (Section 1R22)

Attachment

LIST OF DOCUMENTS REVIEWED

Section 1R05
- Hot work permits #03-005471-001, 002, and 003
- PER 03-016566-000, NRC identified problem regarding observation of workers not in compliance with Fire Watch and Visitor Escort requirements.

Section 1R12
- SPP-6.6, Maintenance Rule Performance Indicator Monitoring, Trending and Reporting - 10CFR50.65
- TI-119, Maintenance Rule Performance Indicator Monitoring, Trending and Reporting

Section 1R14
- (8-25-03) Trip Report.pdf
- Event Critique 8-25-03.doc
- 2003.08.25 TRIP Ann Event History.doc

Section 1R19
- PER 03-013214-000, NRC identified problem regarding a locking device for 1-ISV-82-506B1 incorrectly installed
- PER 03-014550-000, NRC identified problem regarding failure to follow WO procedure steps

Section 1R20
- Outage and Site Scheduling Directive Manual 4.0, Operational Defense-In-Depth Assessment
- Unit 1 Cycle 5 Outage Safety Plan
- GO-6, Unit Shutdown from Hot Standby to Cold Shutdown
- GO-10, Reactor Coolant System Drain and Fill Operations
- GO-7, Refueling Operations
- TI-68.002, Containment Penetrations and Closure Control
- FBI-7, Fuel Handling and Movement
- 0-SI-79-1, Verification of Fuel Storage Configurations
- Clearance #0482R5067
- Clearance #0486R5067
- SOI-78.01, Spent Fuel Pool Cooling and Cleaning
- AOI-13, Loss of CCS
- AOI-14, Loss of RHR and Shutdown Cooling
- PER 03-016590-000, NRC identified problem regarding loss of spent fuel cooling not addressed directly via an AOI.

Section 1R22
- PER 03-012786-000, NRC identified problem with calculation and documentation errors
- PER 03-012840-000, Evaluation of accuracy problems noted in PER 03-012786-000
- Numerous trend graphs of RCS and RHR process temperatures from licensee's operator aid computer

Section 2OS1

Procedures, Guidance Documents and Manuals

Standard Programs and Processes (SPP)-5.1, Radiological Controls, Revision (Rev.) 4
Radiation Control Dosimetry Procedure (RCDP)-1, Conduct of Radiological Controls, Rev. 2
RCDP-4, Personnel Inprocessing and Dosimetry Administrative Process, Rev. 4
RCDP-7, Bioassay and Internal Dose Program, Rev. 0
Radiation Control Instruction (RCI)-100, Control of Radiological Work, Rev. 20
RCI-101, Radiation, Contamination, and Airborne Surveys, Rev. 19
RCI-103, Radioactive Material Control, Rev. 22

Radiation Work Permits (RWPs)

RWP 03006040, U1C5 Eddy Current Testing, Rev.5
RWP 03006070, U1C5 Steam Generator Full Jump for Installation/Removal of Nozzle Dams, Rev. 0
RWP 03007130, U1C5 Valve Maintenance, Rev. 0
RWP 03007500, U1C5 Radcon Surveillances and Job Coverage, Rev. 0
RWP 03009070, U1C5 In-Service Inspection Activities, Rev. 1
RWP 03009150, U1C5 Disassembly/Reassembly of Reactor Head, Rev. 1

Records and Data

Radiation Survey 080403-12, Spent Resin Tank Valve Gallery (8/4/03)
Radiation Survey 092003-12, U1 Letdown Heat Exchanger Room (9/20/03)
Radiation Survey 092203-14, CVCS Hold-Up Tank Room-A (9/21/03)
Radiation Survey 092403-42, Steam Generator 2 and 3 Laydown and Platform (9/24/03)
Listing of High and Locked High Radiation Areas as of 9/23/03
Plot of U1 Reactor Coolant Hard Gamma Activity Concentration (9/7 - 14/03)
Tabulation and Plot of Steam Generator Dose Rates for Refueling Outages (RFOs) 1 through 5

Corrective Action Program Documents

SPP-3.1, Corrective Action Program, Rev. 4
PER 03-014821, Examples Of Improper Or Inconsistent Posting Of Radioactive Material Noted During Audit. (8/26/03)
PER 03-014932, Scaffolding Inspector Received an Electronic Dosimeter Alarm. Dose Rate Was 22 Mrem/hr; Alarm Setpoint Was 20 Mrem/hr. (8/28/03)
PER 03-016105, Scaffolding Builder Received An Electronic Dosimeter Alarm. Dose Was 59 Mrem; Alarm Setpoint Was 50 Mrem. (9/14/03)
PER 03-016203, Contaminated Area Posting For Lower Containment Was Missing Insert. (9/16/03)
PER 03-005302, Swing Gate With High Radiation Area Posting For The Upper Containment Entry Was Defeated By Being Tied Back With A Rope. (3/13/03)

Section 2OS2

Procedures, Guidance Documents and Manuals

SPP-5.1, Radiological Controls, Rev. 4
SPP-5.2, ALARA Program, Rev. 1
RCDP-1, Conduct of Radiological Controls, Rev. 2
RCDP-4, Personnel Inprocessing and Dosimetry Administrative Process, Rev. 4
RCDP-7, Bioassay and Internal Dose Program, Rev. 0
RCI-128, ALARA Program Implementation, Rev. 3

ALARA Preplanning Reports (APR)
APR 03009, U1C5 Refueling Outage Miscellaneous Work, Rev. 1
APR 03016, Construct, Inspect, and Remove Temporary Scaffolding. Rev. 0
APR 03019, Setup Preparation and Restoration of Work Area for Steam Generator Maintenance Activities, Rev. 0
APR 03021, Eddy Current Testing, Rev. 0
APR 03023, Reactor Pressure Vessel Head Assembly and Disassembly, Rev. 0

Radiation Work Permits (RWPs)
RWP 03006000, U1C5 Radcon Coverage of Steam Generator Related Work, Rev. 0
RWP 03006040, U1C5 Eddy Current Test, Tube Plugging, Tube Sleaving and In-Situ Test, Rev. 3
RWP 03006200, U1C5 Steam Generator Scaffolding Removal/Replacement/Inspections, Rev. 0
RWP 03008301, U1C5 Lower Containment Activities Conducted in Posted Locked High Radiation Areas, Rev. 0
RWP 03009150, U1C5 Disassembly/Reassembly of Reactor Head, Rev. 1

Corrective Action Program Documents
PER 03-014940, Radcon Stopped Work on a Valve Welding Job Due to Problems Which Were Leading to the Expected Dose for the Job to Be Exceeded. (8/29/03)
PER 03-016196, High Airborne Radioactivity Levels Occurred on the Refuel Floor During Reactor Cavity Flood-up. (9/15/03)
PER 03-016346, Worker Received a Dose Rate Alarm Due to Shielding Having Been Repositioned. (9/16/03)
PER 03-016832, Estimated Dose for Nozzle Dam Installation Will Be Exceeded Due to Higher than Expected Steam Generator Dose Rates. (9/20/03)
PER 03-016407, Unauthorized Removal of Shielding from Steam Generator Hot Leg. (9/20/03)

Section 2OS3
Procedures, Guidance Documents and Manuals
Radiological Control Department Procedure, (RCDP)-1, Conduct of Radiological Controls, rev.2
Radiological Control Instruction (RCI)-101, Radiation, Contamination, & Airborne Surveys, rev. 19
RCI-103, Radioactive Material Control, Rev. 22
Standard Programs And Processes (SPP)-5.1, Radiological Controls, Section 3.7 and 3.8, Rev. 4
SPP-5.10, Radiological Respiratory Protection Program, Rev. 1
RCI-109, Radiological Control Portable Instrumentation, Rev. 11
RCI-110, Calibration of Radiological Control Laboratory Scaler/Counters, Rev. 7
Chemistry Manual (CM), Chapter (Ch) 9.31, Setup and Adjustment of Intrinsic Germanium (IG) Detector Electronics, Rev. 3
CM, Ch 9.32, I.G. Detector Efficiency Calibration, Rev. 5

Records and Data
Printout of Whole Body Counter Library, not dated
10CFR61 Analysis Reports, CNS Cation Resin, 2/22/0; CNS Mixed Bed Resin, 2/22/01; CNS Charcoal Resin (Carbon), 2/26/01; DAW Smears, 7/9/01; CVCS Resin, 10/22/01; Cation Resin PV3, 2/14/02; Mixed Bed Resin PV5, 2/14/02; DAW Smears, 3/16/02; Filter Clippings (U1C4 RCS Filter Smears), 3/10/02; CNSI PV-1 Charcoal, 5/29/02; CVCS Resin, 12/31/02

Spreadsheet Rad monitor availability, October 2001 to September 2002
Calibration Work Order (CWO): Spent Fuel Pit Particulate Monitor Loop, 1/24/03
CWO: Spent Fuel Pit Particulate Monitor Loop, 5/2/03
CWO: Spent Fuel Pit Area Monitor Loop, 12/20/02
CWO: Containment Spray RHR Pump Area Monitor Loop, 1/24/00
CWO: Containment Spray RHR Pump Area Monitor Loop, 7/20/01
CWO: Holdup Valve Gallery Particulate Monitor Loop, 10/29/02
Personnel Contamination Monitor (PCM)-2 Calibration Data Sheet: PCM-2 TVA No. 842398, 4/28/03; No. 842400, 7/22/03; No. 842408, 5/8/03
Worksheet: Determination of Contamination Threshold Value to Limit Dose to Individual to 5 mrem/yr, 7/8/03
Calibration Data Sheet: Merlin Gerin DMC-2000, TVA No. 236513, 2/20/03; No. 237097, 3/16/03; No. 170243, 6/18/03
Calibration Data Sheet: Bicron RSO-50E, TVA No. 860063, 5/12/03
Calibration Data Sheet: Bicron Surveyor M-X, TVA No. 568080, 4/21/03
Calibration Data Sheet: Bicron Surveyor 50, TVA No. 838758, 4/14/03
Calibration Data Sheet: Eberline Teletector, TVA No. 523336, 6/9/03
Calibration Data Sheet: Eberline BC-4, TVA No. 824843, 4/10/03
Calibration Data Sheet: Eberline SAC-4, TVA No. 838751, 3/10/03
Telephone Conversation: Ruben Hamilton (US NRC) and Sarah West (TVA Training Records) Regarding Training and Qualification Status of Three Senior Reactor Operators and Three Radcon Technicians, 7/24/03 11:35a.m.
Radiation Work Permit (RWP) 03001001, Transfer Canal Work To Include: Radcon Surveys, Constructability Walkdown and Decontamination, Including Water Removal. This RWP For Entry Into Auxiliary Bld Side Of Transfer Canal, 7/14/03-9/28/03
RWP 03001042, Load C -Land For Shipment To Radwaste Processing Facility, 7/16/03-12/31/03
Invoice: Samson Industrial, Chattanooga TN, Hydrostatic Testing of 29 SCBA Cylinders, 2/13/03
Computerized Full SCBA Test, SCBA Serial No. RM122032, 6/07/01; Serial No. RM145081, 7/21/01; Serial No. RM145099, 6/8/2001; Serial No. RM122024, 5/1/2001

Corrective Action Program Documents

Assessment Number: BFN-RP-02-003, WBN-RP-02-001, Dates of Assessment: 9/9/02- 9/27/02
PER 02-000940-000, Enhance RCI-109 to Include Precautions When Using Shepherd Model 89 Source Lift Rod, 1/24/02
PER 02-009432-000, on 7/11/02 a Rad Shipment Was Exiting Through the Security Port, the Dose Rate on the Load Set the Rad Alarms off on the Gamma 60 Portal Monitors Rendering Them Inoperable, 7/11/02
PER 02-014453-000, During the Performance of Self Assessment No. WBN-RP-02-001 it was determined that RCI-109 Needed Response Check Window Setting Clarification. There Was Confusion Concerning the Model and Types of Instruments That Could Be Combined for Setting The Response Check Window, 10/9/02
PER 02-014454-000, During the Performance of Self Assessment No. WBN-RP-02-001 it Was Determined 10/09/2002 That Clarification Was Needed in RCI-134 on the Technique Necessary to Verify Alarm Response When Performing Response Checks on the Gamma Tool Monitors, 10/9/02
PER 03-011310-000, The RADCON Frisker in the Secondary Chemistry Lab Was Found Out-of-Calibration During the Weekly Response Check Routine, 6/4/03

Section 2PS1

Procedures, Guidance Documents and Manuals

- Offsite Dose Instruction (ODI) 0-ODI-90-1, Liquid Radwaste Tank Release, Rev. 22
- 0-ODI-90-5, Waste Gas Decay Tank Release, Rev. 17
- 0-ODI-90-22, Weekly Auxiliary Building Exhaust Release, Rev. 16
- 0-ODI-90-26, Weekly Sampling of Shield Building Exhausts, Rev.11
- 0-ODI-90-41, 18 Month Channel Calibration (Source Cal) of the Condensate Regeneration Effluent Radiation Monitor Loop 0-LPR-90-225, Rev. 5
- 0-ODI-90-43, 18 Month Channel Calibration (Source Cal) of the Waste Disposal System Liquid Effluent Radiation Monitor Loop 0-LPR-90-122, Rev. 4
- 0-ODI-90-57, 18 Month Channel Calibration of Shield Building Vent Radiation Monitor Loop 1-LPR-90-400, Rev. 18
- 0-ODI-90-59, 18 Month Channel Calibration Test of General Atomic Auxiliary Building Vent Total Gas Radiation Monitor Loop 0-LPR-90-101B, Rev. 9
- 0-ODI-90-79, 18 Month Channel Calibration of Shield Building Vent Purge Air A Exhaust Flow 1-FE-90-400A, Rev. 9
- CM Ch 9.02, Chemistry Count Room Quality Assurance and Control Program, Rev. 6
- CM Ch 9.32, Intrinsic Germanium (IG) Detector Efficiency Calibration, Rev. 5
- CM Ch 9.33, IG Detector Quality Control Data Collection, Rev. 8
- CM Ch 9.73, Liquid Radwaste Tanks and Liquid Effluent Radiation Monitor Sampling Methods, Rev. 4

Records and Data

- 0-RE-90-122, Liquid Effluent Monitor, Calibration Records, conducted 7/16/02
- 0-RE-90-225, Condensate Demineralizer Regenerant Effluent Monitor, Calibration Records conducted 6/26/03
- 0-RE-90-101, Auxiliary Building Ventilation Effluent Monitor, Calibration records, conducted 4/4/02
- 1-RE-90-400, Shield Building Exhaust Effluent Monitor, Calibration Records, conducted 8/18/02
- 1-FE-90-400, Shield Building Exhaust Flow Rate Monitor, calibration records, conducted 4/25/03
- IG Detector Efficiency Calibration Records for Detector GSS-3286, conducted 5/5/03
- Count Room daily Quality Control records for 7/1-23/03
- Radiochemistry Cross Check Program results for 1st through 4th Quarters 2002
- Records of compensatory actions for inoperable effluent monitoring equipment including: 0-RE-90-122, Liquid Radwaste Effluent Monitor on 3/21/03; 0-RE-90-212, Turbine Building Sump on4/26/03; Unit 2 Shield Building Exhaust Isokinetic Sampler on 4/8/03; 1-90-RE-101B Auxiliary Building Ventilation Effluent Monitor on 12/9/02
- Liquid Waste Release Permit 2003045, Monitor Tank, 7/23/03
- Gaseous Waste Release Permit 2003039, “E” Waste Gas Decay Tank, 5/2/03
- Gaseous Waste Release Permit 2002069, “H” Waste Gas Decay Tank, 7/20/03
- Monthly Effluent Dose Reports for May 2002 through April 2003

Annual Reports

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

Corrective Action Program Documents

- Audit Report SSA0102 - Plant Support Functional Area Audit, 7/27/01
- PER 03-010040-000, Weekly Filter Change out of 0-RE-90-101 Revealed That the Particulate Filter Had What Appeared to Be Reverse Flow, 5/13/03
- PER 03-006889-000, Mis-communications Between Operations and Chemistry Resulted in Chemistry Not Being Aware That Effluent Monitoring Equipment 1-re-90-400 and
- FI-90-400 Had Been Declared Inoperable, 4/17/03
- PER 03-007417-000, ODCM Requirements Not Captured Correctly in 1-SI-0-2-00, 4/20/03
- PER 03-008923-000, Debris Found on 0-RE-90-101 Filter, 4/29/03
- PER 03-009212-000, Incorrectly Calculated Effluent Monitor Background Used in Waste Gas Release Permit, 4/30/03

Section 2PS3

Procedures, Guidance Documents and Manuals

- Emergency Preparedness Field Support (EPFS) Procedure 4, Environmental Data Station Meteorological Sensor Exchange, Rev. 12
- RCI-103, Radioactive Material Control, Rev. 22
- SSP-5.1, Radiological Controls, Rev. 4
- RCDP-1, Conduct of Radiological Controls, Rev. 2
- Sample Collection (SC) Procedure - 01, Collection of Environmental Monitoring Samples, Rev. R18
- SC-02, Preventative Maintenance Procedure for Radiological Environmental Monitoring Air Sampling System, Rev R3
- SC-04, Initial Calibration and Periodic Operational Checks for REMP Automatic Water samplers, Rev. R0.

Records and Data

- Annual Environmental Radiological Operating Report, Watts Bar Nuclear Plant 2002, dated April 2003
- Annual Environmental Radiological Operating Report, Watts Bar Nuclear Plant 2001, dated April 2002
- REMP Automatic Water Sampler Calibration/Operational Check Data Sheet, conducted 01/07/03
- Radiological Environmental Monitoring Air Sampler Gas Meter Calibration Data Sheets for Gas Meter Serial Number (S/N) 1030575, S/N1030599, S/N 1030605, S/N 1030576, and S/N 1027113 conducted 07/03/03
- Calibration Data Sheet 1, Air Temperature System Calibration, conducted 07/10/02, and 01/14/03
- Calibration Data Sheet 2, Sonic Wind Speed Calibration, conducted 07/10/02, 01/14/03
- Calibration Data Sheet 3, Sonic Wind Direction Calibration, conducted 07/10/02, 01/14/03
- Watts Bar Nuclear Meteorological Hourly Data, 07/07/03 through 08/21/03
- Report Number (No.) BOP 486, Examination Summary and Resolution Sheet, Fuel Transfer Canal, 08/22/00

- Work Order (WO) No. 99-006529-000, dated 05/05/99 and Closure Form dated 05/03/00 for Transfer Canal Leak Repair
- WO No. 99-013531-000, dated 10/07/99 and Closure Form dated 09/20/01 for Support Activities for NDE Inspection of Transfer Canal Welds
- Tritium Sampling Results for Well Locations B, C, D, and Ground Water Sump, 01/03/03 through 07/21/03
- Tritium Sampling Results for Yard Holding Pond 08/06/01 through 07/14/03
- Gamma Tool Monitor(GTM) Calibration Data Sheets: GTM TVA Number (No.) 842439, conducted 05/16/03; No. 842440, conducted 03/16/03; and No. 842441, conducted 03/9/03

Corrective Action Program Documents

- Air, Land & Water Sciences (AL&WS) Evaluation of Meteorological Monitoring Facilities at TVA Nuclear Plant Sites, dated 01/10/03
- Self-Assessment CRP-CRP-Environmental Radiological Monitoring and Instrumentation (ERMI)-02-002, Meteorological Monitoring - Compliance and Design, Implementation, 1/28 -02/08/2002 , by the Radiological Environmental and Meteorological Instrumentation Committee (REMIC), conducted 01/28 - 02/08/2002
- Assessment CRP- ERMI 02 - 002, Radiological Environmental Monitoring and Instrumentation, 09/26/02
- PER 02-000094-000, Watt Bar Nuclear Station (WBN) Air Filter from Sample Location RM-3 Was Found to be Damaged, 03/26/02
- PER 02-000053-000, Inadequate Sample Volume for Air Particulate and Charcoal Cartridge Samples at WBN REMP Sample Location LM-3, 02/25/02
- PER 02-000241-000, On 08/18/02 Unstable 46 - 10 meter (m), and 91 - 10 m Delta Air Temperatures Identified, 08/21/02
- PER 03-000216-000, 'As Found' Calibration Data for Wind Sensor No. 299 taken from WBN Meteorological Tower 91 Meter Elevation Found to be Out-of-Tolerance, 06/05/03
- PER 03-000545-000, Unexplained Loss of Inventory from the Refueling Water Storage Tank, 01/08/03
- PER 03-001753-000, Inspection of Unit 2 Annulus 702 Foot Elevation Identified Borated Water Leaking from Inspection Hole in Expansion Joint Between Transfer Canal and Annulus Wall, 01/21/03
- PER 03-001929-000, Three of Four Ground Water Samples Taken from Recently Drilled Onsite Wells Had Detectable Levels of Tritium, 01/30/03

Section 4OA1

Procedures, Guidance Documents and Manuals

- SPP-3.4, Performance Indicator for NRC Reactor Oversite Process, Rev. 0

Records and Data

- Licensee-generated list of Radiologically Controlled Area (RCA) exit transactions with exposures greater than 100 mrem incurred during the months of January 2002 through June 2003
- Radiation Work Permit (RWP) Number (No.) 02000746, Valve Repair/Inspection in Unit 1 Lower Containment, Rev. 1
- RWP No, 02001031, Transfer of Spent Filters from Filter Cask to High Integrity Container, Rev. 2

- RWP No. 02006040, Unit 1 Eddy Current Test, Tube Plugging and I-Situ Test, Rev. 0
- RWP No. 02006070, Installation/Removal of Steam Generator Nozzle Dams, Rev. 0
- RWP No. 02008053, Replace Diaphragm on Valves in Excess Letdown Heat Exchanger Room, Rev. 0
- RWP No. 02009151, Dissasembly/Reassembly of Reactor Head, Rev. 0
- RWP No. 02009151, Remove/Install Thermocouple on Reactor Head, Rev. 0
- RWP No. 02009152, Install/Remove Vortex Suppressors, Drain Plugs, Transfer Tube Flange in Equipment Pit/Transfer Canal, Rev. 0
- RWP No. 02009610, Cavity and Equipment Pit Decon, Rev. 0
- Monthly Effluent Dose Reports for May 2002 through April 2003

Corrective Action Program Documents

- January 1, 2002 through June 30, 2003 PERs Assigned to Radiation Control
- January 1, 2002 through June 30, 2003 PERs Related to Radioactive Effluents

Section 4OA2

- Drawing 47W435-200, System N3-63-1A Isometric - Static, Thermal and Seismic analysis for SIS pump suction
- Drawing 1-47W406-203A, Problem N3-62-01A Analysis isometric of CVCS piping
- Drawing 1-47W432-200B, Problem N3-74-01A Analysis isometric of RHR piping
- Drawing 1-47W435-200A, Problem N3-63-01A Analysis isometric of SIS piping
- Drawing 1-47W406-203B, Problem N3-62-01A Analysis isometric of CVCS piping
- Drawing 1-47W432-200D, Problem N3-74-01A Analysis isometric of RHR piping

Section 4OA5

- Drawing ISI-0427-C-02, Reactor vessel bottom head penetrations
- Drawing CHM-2684-C-01, Unit 1 closure head penetrations
- Technical Requirements Instruction, 1-TRI-0-10, ASME Section XI ISI/NDE Program
- Nondestructive Examination Procedure, N-VT-17, Visual Examination for Leakage of PWR Reactor head Penetrations
- Record of Liquid Penetrant Exam, R-R0884 of reactor vessel upper head nozzle #60
- SPP-9.7, Corrosion Control Program
- MI-68.001, Disassembly and Reassembly of the Reactor Pressure Vessel and Attachments