



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

October 31, 2008

NOED NO.08-2-01

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

SUBJECT: SEQUOYAH NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT
05000327/2008004 AND 05000328/2008004

Dear Mr. Campbell:

On September 30, 2008, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Sequoyah Nuclear Plant, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on October 3, 2008, with Mr. Timothy Cleary and other members of your staff.

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

Based on the results of this inspection, no findings of significance were identified. However, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. Because of the very low safety significance of the violation and because it was entered into your corrective action program, the NRC is treating this finding as a non-cited violation (NCV) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the United States 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 Sequoyah Nuclear Plant.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the

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NRC Public Document Room or from the Publically 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/

Eugene F. Guthrie, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket Nos.: 50-327, 50-328
License Nos.: DPR-77, DPR-79

Enclosure: Inspection Report 05000327/2008004 and 05000328/2008004
w/Attachment: Supplemental Information

cc: w/encl.: (See page 3)

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Letter to William R. Campbell, Jr. from Eugene Guthrie dated October 31, 2008

SUBJECT: SEQUOYAH NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT
05000327/2008004 AND 05000328/2008004

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-327, 50-328

License Nos.: DPR-77, DPR-79

Report Nos.: 05000327/2008004 and 05000328/2008004

Licensee: Tennessee Valley Authority (TVA)

Facility: Sequoyah Nuclear Plant, Units 1 and 2

Location: Sequoyah Access Road
Soddy-Daisy, TN 37379

Dates: July 1, 2008 – September 30, 2008

Inspectors: C. Young, Senior Resident Inspector
M. Speck, Resident Inspector
Eric Michel, Senior Reactor Inspector (Section 4OA5.2)

Approved by: Eugene F. Guthrie, Chief
Reactor Projects Branch 6
Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000327/2008-004, 05000328/2008-004; 07/01/2008 - 09/30/2008; Sequoyah Nuclear Plant, Units 1 and 2; Routine quarterly integrated report.

The report covered a three-month period of inspection by resident inspectors and an announced inspection by a regional senior reactor inspector. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee-Identified Violations

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

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REPORT DETAILS

Summary of Plant Status:

Unit 1 operated at or near 100 percent rated thermal power (RTP) the entire inspection period.

Unit 2 operated at or near 100 percent RTP until August 31, 2008, when Unit 2 was shut down to Mode 3 to facilitate the investigation of reactor coolant pump oil leakage. Following repairs to the reactor coolant pump lower oil reservoir sight glasses, Unit 2 achieved criticality on September 1, 2008, and reached 100 percent RTP on September 2, 2008, where it operated for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

The inspectors performed one external flood protection measures review, listed below, to assess the licensee's readiness prior to the onset of adverse weather that poses a risk of flooding. Specifically, the inspectors reviewed the turbine building external flood protection design to assess the susceptibility to heavy rain and its potential to result in an initiating event (e.g. plant trip). The inspectors reviewed flood analysis and design documents including the Updated Final Safety Analysis Report (UFSAR) Sections 2.3, 2.4, and Appendix 2.4A, Flood Protection Plan. The inspectors walked down flood protection barriers around the 6.9 kV Unit Boards to verify their proper installation and examined gutter drains, conduits and hydrostatic concrete seals which could possibly provide a bypass around the installed barriers. The inspectors also walked down the building exterior and nearby yard drainage to verify that pooled water following heavy rains would not enter the building. The inspectors also reviewed previous Problem Evaluation Reports (PERs) to verify that the corrective actions previously taken remained adequate and that procedures were in place to cope with external flooding associated with rainfall. Documents reviewed are listed in the Attachment to this report.

- September 16, 2008, Turbine Building External Flood Protection to Prevent Unit Board Flooding

b. Findings

No findings of significance were identified.

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1R04 Equipment Alignment

a. Inspection Scope

Partial System Walkdowns: The inspectors performed a partial walkdown of the following four systems to verify the operability of redundant or diverse trains and components when safety equipment was inoperable. The inspectors focused on identification of discrepancies that could impact the function of the system, and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, walked down control system components and determined whether selected breakers, valves, and support equipment were in the correct position to support system operation. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program. Documents reviewed are listed in the Attachment to this report.

- Unit 2 A and B Trains of the Motor Driven Auxiliary Feedwater (MDAFW) System During Turbine Driven Auxiliary Feedwater (TDAFW) Pump Maintenance
- A Train Auxiliary Air Compressor and Attendant Equipment During B Train maintenance
- Unit 2 A Train Emergency Core Cooling System (ECCS) During B Train Residual Heat Removal (RHR) Pump Mechanical Seal Heat Exchanger (HX) Repair
- Emergency Diesel Generators (EDGs) 1A, 2A, 2B, During Maintenance on EDG 1B

b. Findings

No findings of significance were identified.

1R05 Fire Protection

Quarterly Fire Protection Inspection

a. Inspection Scope

The inspectors conducted a tour of the six areas listed below to assess the material condition and operational status of fire protection features. The inspectors evaluated whether: combustibles and ignition sources were controlled in accordance with the licensee's administrative procedures; fire detection and suppression equipment was available for use; passive fire barriers were maintained in good material condition; and, compensatory measures for out-of-service, degraded, or inoperable fire protection equipment were implemented in accordance with the licensee's fire plan. Documents reviewed are listed in the Attachment to this report.

- Control Building Elevation 732 (Mechanical Equipment Room and Relay Room)
- Control Building Elevation 669 (Mechanical Equipment Room, 250 VDC Battery and Battery Board Rooms)
- Control Building Elevation 685 (Auxiliary Instrument Rooms)
- Auxiliary Building Elevation 714 (Corridor)
- Control Building Elevation 706 (Cable Spreading Room)
- Unit 2 Reactor Building: Reactor Coolant Pump Oil Collection Systems

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b. Findings

No findings of significance were identified.

Annual Fire Drill

a. Inspection Scope

The inspectors completed the annual fire drill inspection. The inspectors observed the performance of the site fire brigade during an unannounced drill on September 18, 2008, to evaluate the readiness of the fire brigade to fight fires and to assess the drill against the requirements of the Sequoyah Nuclear Plant Fire Protection Report. The observed drill simulated a fire in the Emergency Diesel Generator building. The inspectors reviewed various aspects of the drill such as: use of protective clothing, use of breathing apparatus, proper use of fire hoses, and control of the drill scenario.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Regualification Program

a. Inspection Scope

The inspectors performed one licensed operator regualification program review. The inspectors observed simulator training on August 25, 2008. The training involved an anticipated transient without scram (ATWS) when reactor trip breakers failed to open following a loss of condenser vacuum and turbine trip. Operators manually tripped the control rod drive motor generator sets and established emergency boration flow. Anomalies included a failed turbine impulse pressure transmitter, the depressurization of one cold leg accumulator, main and auxiliary feedwater system failures, and a failed open pressurizer power operated relief valve (PORV). The inspectors observed crew performance in terms of: communications; ability to take timely and proper actions; prioritizing, interpreting and verifying alarms; correct use and implementation of procedures, including the alarm response procedures; timely control board operation and manipulation, including high risk operator actions; oversight and direction provided by shift manager, including the ability to identify and implement appropriate Technical Specification (TS) action; and, group dynamics involved in crew performance. The inspectors also observed the evaluators' critique and reviewed simulator fidelity to verify that it matched actual plant response. Documents reviewed are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the two maintenance activities listed below to verify the effectiveness of the activities in terms of: appropriate work practices; identifying and addressing common cause failures; scoping in accordance with 10 CFR 50.65 (b); characterizing reliability issues for performance; trending key parameters for condition monitoring; charging unavailability for performance; classification in accordance with 10 CFR 50.65(a)(1) or (a)(2); appropriateness of performance criteria for structure, system, or components (SSCs) and functions classified as (a)(2); and, appropriateness of goals and corrective actions for SSCs and functions classified as (a)(1). Documents reviewed are listed in the Attachment to this report.

- Main Control Room Air Conditioning and Chiller Function
- PER 149002, 1B-B Centrifugal Charging Pump Main Control Room (MCR) Hand switch Failure

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the following three activities to determine whether appropriate risk assessments were performed prior to removing equipment from service for maintenance. The inspectors evaluated whether risk assessments were performed as required by 10 CFR 50.65 (a)(4), and were accurate and complete. When emergent work was performed, the inspectors reviewed whether plant risk was promptly reassessed and managed. The inspectors also assessed whether the licensee's risk assessment tool use and risk categories were in accordance with Standard Programs and Processes Procedure (SPP)-7.1, On-Line Work Management, and Instruction 0-TI-DSM-000-007.1, Risk Assessment Guidelines. Documents reviewed are listed in the Attachment to this report.

- Unit 2 Elevated Risk Due to Component Cooling Water (CCS) System Pump C-S Check Valve Testing
- Unit 2 Yellow Risk Due to TDAFWP Scheduled Maintenance and Testing
- Unit 2 Yellow Risk During 2A MDAFW Pump Planned Maintenance

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

For the four operability evaluations described in the PERs listed below, the inspectors evaluated the technical adequacy of the evaluations to ensure that TS operability was properly justified and the subject component or system remained available, such that no unrecognized increase in risk occurred. The inspectors compared the operability evaluations to UFSAR descriptions to determine if the system or component's intended function(s) were adversely impacted. In addition, the inspectors reviewed compensatory measures implemented to determine whether the compensatory measures worked as stated and the measures were adequately controlled. The inspectors also reviewed a sampling of PERs to assess whether the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment to this report.

- PER 147427, Mobile battery load bank placed adjacent to safety-related equipment
- PER 141955, EDG 7-Day Tank Volume
- PER 148828, Oil Leak on 2A1 EDG Engine
- PER 150625, MCR Pressure Boundary Leak - Seal on Door C36 Leaking

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed the seven post-maintenance tests associated with the WOs listed below to assess whether procedures and test activities ensured system operability and functional capability. The inspectors reviewed the licensee's test procedure evaluate whether: the procedure adequately tested the safety function(s) that may have been affected by the maintenance activity; the acceptance criteria in the procedure were consistent with information in the applicable licensing basis and/or design basis documents; and the procedure had been properly reviewed and approved. The inspectors also witnessed the test or reviewed the test data, to determine whether test results adequately demonstrated restoration of the affected safety function(s). Documents reviewed are listed in the Attachment to this report.

- WO 08-774038-000, On-line Replace Cooling Fans in Eagle 21 Protection Set II Rack 8
- WO 08-722500-000, Repair Leak on Unit 2 TDAFW Pump Discharge Flange
- WO 08-775191-000, RHR Pump 2A-A Mechanical Seal Heat Exchanger Leak
- WO 08-772106-000, MCR Chiller B Digital Control Cards Replacement
- WO 08-777704-000, Unit 1 Eagle 21 Protection Set III Eagle Partial Trip (EPT) Card Troubleshoot/Replace
- WO 08-778024-000, Repair Feedwater Isolation Solid State Protection System (SSPS) B-train Trip Solenoid for Main Feed Pump 2A

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- WO 08-778015-000, Emergency Raw Cooling Water (ERCW) B-Train Supply to Unit 1 TDAFW Pump Piping Replacement

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Outage Activities

a. Inspection Scope

For the Unit 2 planned outage that began on August 31, 2008, to investigate reactor coolant pump oil leakage, the inspectors evaluated licensee activities to review whether the licensee: considered risk in developing outage schedules; followed risk reduction methods developed to control plant configuration; developed mitigation strategies for the loss of key safety functions; and, adhered to operating license and TS requirements that ensure defense-in-depth. The inspectors also walked down portions of Unit not normally accessible during at-power operations to evaluate if safety-related and risk-significant SSCs were maintained in an operable condition. Specifically, between August 31, 2008, and September 2, 2008, the inspectors performed inspections and reviews of the following outage activities. Documents reviewed are listed in the Attachment to this report.

- **Outage Plan.** The inspectors reviewed the outage safety plan and contingency plans to determine if the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth.
- **Reactor Shutdown.** The inspectors observed the reactor shutdown in the control room. The inspectors also toured the lower containment as soon as practicable after reactor shutdown to observe the general condition of the RCS and emergency core cooling system components and to look for indications of previously unidentified leakage inside the polar crane wall. The inspectors examined the condition of the reactor coolant pump motor oil collection systems, as well as, the sources of the oil leakage, the lower oil reservoir sight glasses, which were replaced.
- **Heatup and Startup Activities.** The inspectors observed containment entry controls and reviewed Procedure 0-SI-OPS-000-011.0, "Containment Access Control During Modes 1-4," to determine whether all items which entered containment were removed so nothing would be left that could affect performance of the containment sump. The inspectors toured the containment prior to reactor startup to identify, if any, debris that could affect the performance of the containment sump. The inspectors reviewed the licensee's mode change checklists to assess whether appropriate prerequisites were met prior to changing TS modes. To evaluate RCS integrity and containment integrity, the inspectors further reviewed the licensee's RCS leakage calculations and containment isolation valve lineups. To assess whether core operating limit parameters were consistent with core design, the inspectors observed portions of the low power physics testing, including reactor criticality.

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b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the five surveillance tests identified below, the inspectors assessed whether the SSCs involved in these tests satisfied the requirements described in the TS surveillance requirements, the UFSAR, applicable licensee procedures, and the tests demonstrated that the SSCs were capable of performing their intended safety functions. This was accomplished by witnessing testing and/or reviewing the test data. Documents reviewed are listed in the Attachment to the report.

Routine Surveillance Tests:

- 2-SI-IFT-099-90.8B, Reactor Trip Instrumentation Monthly Functional Test (SSPS) Train B
- 2-SI-OPS-082-007.B, Electrical Power System Diesel Generator 2B-B

In-Service Tests:

- 1-SI-SXP-003.201.S, Turbine Driven Auxiliary Feedwater Pump 1A-S Performance Test
- 2-SI-SXP-003-201.S, Turbine Driven Auxiliary Feedwater Pump 2A-S Performance Test

Ice Condenser System Tests:

- 2-SI-MIN-061-108.0, Ice Condenser Intermediate Deck Doors Weekly Inspection

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

Resident inspectors evaluated the conduct of one routine licensee emergency drill on September 10, 2008, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulated control room to determine if event classification and notifications were done in accordance with Emergency Plan Implementing Procedure (EPIP)-1, Emergency Plan Classification Matrix. The inspectors also attended the licensee critique of the drill to compare any inspector-observed weaknesses with those identified by the licensee in order to verify whether the licensee was properly identifying failures.

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b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verificationa. Inspection Scope

The inspectors sampled licensee submittals for the three PIs listed below for the period from July 1, 2007, through June 30, 2008, for both Unit 1 and Unit 2. Definitions and guidance contained in NEI 99-02, Regulatory Assessment Indicator Guideline, were used to determine the basis in reporting for each data element.

Cornerstone: Initiating Events

- Unplanned Scrams per 7000 Critical Hours
- Unplanned Scrams With Complications
- Unplanned Power Changes per 7000 Critical Hours

The inspectors reviewed selected Licensee Event Reports (LERs) and portions of operator logs to verify whether the licensee had accurately identified the number of scrams and unplanned power changes that occurred during the previous four quarters for both units. The inspectors also reviewed the accuracy of the number of critical hours reported and the licensee's basis for addressing the criteria for complications for each of the reported scrams.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems.1 Daily Review

As required by Inspection Procedure 71152, Identification and Resolution of Problems, and in order to help identify repetitive equipment failures or specific human performance issues for followup, the inspectors performed a daily screening of items entered into the licensee's corrective action program. This was accomplished by reviewing the description of each new PER and attending daily management review committee meetings.

.2 Annual Sample Review of Valve Failure that Resulted in an Unplanned Entry into TS 3.0.3a. Inspection Scope

In July 2007, the licensee was performing periodic biocide treatment of the ERCW System. During system restoration, the 2B-B 714' Penetration Room Cooler ERCW

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Supply valve, 2-FCV-067-356, failed shut and rendered the cooler inoperable along with the 2B Containment Spray system. Since the 2A Containment Spray Pump was already inoperable for scheduled maintenance, the actions of TS 3.6.2.1 could not be satisfied, and Unit 2 entered TS Limiting Condition for Operation (LCO) 3.0.3 for both trains of Containment Spray being inoperable. The valve was manually placed in the "failed-open" position approximately 18 minutes later, returning the cooler to operable status. Performing operations on equipment associated with different trains of safety-related equipment can result in neither train being available when demanded. While in this case the safety function was never lost as the Train A room cooler was always operable. Loss of equipment status control could develop into a significant issue. Therefore, in order to understand the cause and evaluate the work week control process, the inspectors reviewed licensee actions to resolve this issue. The inspectors reviewed the PERs dealing with this event, PERs 128207 and 128340, interviewed operations and work control personnel, and reviewed several of the corrective actions. Documents reviewed are listed in the Attachment to this report.

b. Findings and Observations

There were no findings of significance identified during this review. The inspectors reviewed the apparent cause evaluation of the valve failure and agreed with the licensee determination that it was likely due to random failure. The inspectors reviewed the root cause analysis of the work control process which allowed operation of train-related components during a work week dedicated to the opposite train. The inspectors determined that the analysis was thorough and that immediate and long term corrective actions appeared to be adequate to prevent recurrence of the specific event. The root cause team performed a barrier analysis and an event and causal factor analysis, and determined that vague wording in plant procedures resulted in low risk activities being allowed to be performed out of their normal train work weeks. They also concluded that the procedure for performing ERCW biocide treatment required revision to better separate Train-A and Train-B valve manipulations. The licensee developed several actions to address these causes and implemented them beginning in December 2007. These included revising several procedures, incorporating schedule revisions, strengthening the protected equipment process, and conducting training on the changes. The inspectors reviewed these actions and verified that they addressed the causes and were actually implemented.

The inspectors noted that corrective action to revise wording in the work scheduling process was intended to express the licensee philosophy of rigorously maintaining train work separation in strong terms. The actual revision incorporated a procedural step for planners to be mindful to maintain proper train week designations when developing a detailed schedule. This observation was entered into the licensee's corrective action program as PER 153285.

4OA3 Event Followup

.1 Notice of Enforcement Discretion (NOED) 08-2-01

On September 26, 2008, TVA requested the NRC exercise discretion to not enforce compliance with the actions required in Sequoyah Nuclear Plant, Units 1 and 2, TS LCO 3.0.5. The NRC granted the request to exercise discretion. On September 25, 2008, at

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10:55 p.m., a failure of the motor for the B train MCR air handling unit (AHU) caused the B train of control room air conditioning system (CRACS) to be inoperable. TS LCO 3.7.15 required two independent CRACS trains to be operable. Due to scheduled maintenance on the 1A EDG, the A train of CRACS was also inoperable at this time solely due to its emergency backup power supply being inoperable. Under these conditions, TS LCO 3.0.5 required that action be initiated within 2 hours to place both Units 1 and 2 in hot standby within the next 6 hours. On September 26, 2008, at 4:04 a.m., the NRC verbally granted the request to extend the 6 hour time requirement to be in hot standby by an additional 36 hours, based in part on the 1A EDG being in a functional condition pending the verification of the parameters required for TS operability. At 2:00 p.m. on September 26, 2008, the 1A EDG was declared operable, and the NOED was exited. In response to this issue, the inspectors verified that the licensee protected equipment, as discussed with the NRC, and that the functional determination of the 1A EDG was valid.

The licensee entered this condition into their corrective action program as PER 153304. Pending the licensee's completion of the apparent cause evaluation, LER submittal, and the NRC's review of the circumstances and the evaluation, this issue is considered as Unresolved Item (URI) 05000327,328/2008004-01, "Notice of Enforcement Discretion 08-2-001 for Both Control Room Air Conditioning System Trains Inoperable."

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings of significance were identified.

.2 (Discussed) NRC Temporary Instruction (TI) 2515/172, Reactor Coolant System Dissimilar Metal Butt Welds (DMBW's)

a. Inspection Scope

During the period September 8 - 11, 2008, the inspectors reviewed the licensee's activities related to the inspection and mitigation of dissimilar metal butt welds in the Reactor Coolant System (RCS) to ensure that the licensee's activities were consistent with industry requirements established in the Materials and Reliability Program (MRP) document MRP-139, "Primary System Piping Butt Weld Inspection and Evaluation

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Guidelines," July 2005.

The inspectors reviewed documentation of overlay and nondestructive examination (NDE) activities covering mitigation of pressurizer dissimilar metal (DM) full structural weld overlays (FSWOL) from the fall of 2007 (Unit 1) and fall of 2006 (Unit 2) outages. Inspection activities covered the following: a) documentation review of the weld overlay process on the Unit 1 pressurizer (PZR) surge line nozzle FSWOL RC-35A-OL, b) documentation review of the volumetric examination of the Unit 2 PZR safety nozzle FSWOL RCF-36A-OL, and c) review of MRP-139 program documentation.

b. Findings and Observations

No findings of significance were identified. Inspection results for each question listed in the TI is provided below.

MRP-139 Baseline Inspections

- 1) Have the baseline inspections been performed or are they scheduled to be performed in accordance with MRP-139 guidance? Were the baseline inspections of the pressurizer temperature DMBWs of the nine plants listed in TI 2515/172, 03.01.b completed during the spring 2008 outages?

Yes, all baseline volumetric inspection activities required to be completed per MRP-139 Section 1.2 at the time of this report have been completed.

The licensee has completed FSWOLs on all 12 PZR nozzles (six per unit), and completed the accompanying baseline volumetric inspections as per mandatory MRP-139 Section 1.2. Butt welds associated with the pressurizer were required to receive a baseline inspection by December 31, 2007. Unit 1 baseline inspections were completed during the fall 2007 outage and Unit 2 baseline inspections were completed during the fall 2006 outage.

Prior to installing the PZR FSWOLs the licensee conducted an informational ultrasonic test (UT) of all 12 nozzles. Only the surge line examinations (both Units 1 and 2) obtained greater than 90 percent coverage and therefore met the requirements of MRP-139, Section 5.1. The remaining 10 welds achieved less than 90 percent coverage due to geometry constraints.

Baseline inspections of typical DM butt weld locations were not required as follows: The steam generators have been replaced and use non-susceptible Alloy 690 in the DM nozzle-to-safe end weld. The reactor coolant pump bowl material is cast stainless steel, therefore there is no DM butt weld associated with the reactor coolant pumps. The reactor vessel inlet and outlet nozzle-to-safe end DM welds are constructed with stainless steel and have no Alloy 82/182 filler metal.

- 2) Is the licensee planning to take any deviations from MRP-139 requirements?

No, the licensee has not submitted any requests for deviation from MRP-139 requirements.

Enclosure

Volumetric Examinations

- 1) For each examination inspected, was the activity performed in accordance with the examination guidelines in MRP-139, Section 5.1, for unmitigated welds or mechanical stress improved welds and consistent with NRC staff relief request authorization for overlaid welds?

Unit 2 PZR Safety Nozzle FSWOL RCF-36A-OL

Yes, the volumetric examination of the Unit 2 PZR safety nozzle was performed in accordance with the requirements of the proposed alternative authorization (Safety Evaluation for Sequoyah Nuclear Plants 1 and 2, Request for Relief G-RR-1, Full Structural Preemptive Weld Overlays (TAC Nos. MD2381 and MD2382), dated February 22, 2007). The UT procedure (N-UT-66, Rev 5) was qualified in accordance with ASME Section XI, Appendix VIII, as implemented by the Electrical Power Research Institute (EPRI) Performance Demonstration Initiative (PDI) Program, with specific reliefs having been granted by the safety evaluation report (SER). The required pre-service inspection volumes indicated by ASME Section XI, Non-Mandatory Appendix Q, Figures Q-4100-1 and Q-4300-1, were examined with 99.7 percent coverage for Figure Q-4100-1 and 100 percent coverage for Figure Q-4300-1. The inspectors reviewed the licensee's procedure, equipment and personnel certifications, transducer selection documentation, and conducted interviews with plant personnel.

- 2) For each examination inspected, was the activity performed by qualified personnel?

Unit 2 PZR Safety Nozzle FSWOL RCF-36A-OL

Yes, personnel involved in the UT examinations of the Unit 2 PZR safety nozzle were qualified in accordance with MRP-139 requirements and the previously noted proposed alternative authorization. The examiners were qualified UT Level II as required by the UT procedure and in accordance with the vendor's written practice for NDE personnel. The UT examiners were also PDI qualified for the specific UT procedure they implemented. The final examination report was reviewed by a vendor's UT Level III, a licensee's UT Level III, and the Authorized Nuclear Inservice Inspector (ANII).

- 3) For each examination inspected, was the activity performed such that deficiencies were identified, dispositioned, and resolved?

Unit 2 PZR Safety Nozzle FSWOL RCF-36A-OL

Yes, the inspectors reviewed documentation and conducted interviews with plant personnel to verify that deficiencies were identified, dispositioned, and resolved. Based on the inspection activities, the inspectors determined that the examination was conducted in a manner such that deficiencies were identified, dispositioned, and resolved.

Enclosure

Weld Overlays

- 1) For each weld overlay inspected, was the activity performed in accordance with ASME Code welding requirements and consistent with NRC staff relief requests authorizations? Has the licensee submitted a relief request and obtained NRR staff authorization to install weld overlays?

Unit 1 PZR Surge Line Nozzle FSWOL RC-35A-OL

Yes, the licensee installed Unit 1 PZR surge nozzle DMBW FSWOL in accordance with ASME Code Section XI, Code Case N504-2, Code Case N638-1, and the proposed alternative authorization (Safety Evaluation for Sequoyah Nuclear Plants 1 and 2, Request for Relief G-RR-1, Full Structural Preemptive Weld Overlays (TAC Nos. MD2381 and MD2382), dated February 22, 2007). The inspectors reviewed welding procedure specifications, procedure qualification records, weld wire certifications, and the in-process welding process control sheets for compliance to ASME Section IX requirements and adherence to the SER. The inspectors also evaluated corrective action program documents, and third party contractor corrective action process issue reports regarding weld overlay quality issues.

- 2) For each weld overlay inspected, was the activity performed by qualified personnel?

Unit 1 PZR Surge Line Nozzle FSWOL RC-35A-OL

Yes, welding personnel were qualified in accordance with the requirements identified in ASME Code Section IX. The inspectors reviewed the welder performance qualification test records and compared them with the requirements of QW-300. The in-process welding process control sheets were reviewed for compliance with the proposed alternative and ASME Code Section IX requirements.

- 3) For each weld overlay inspected, was the activity performed such that deficiencies were identified, dispositioned, and resolved?

Unit 1 PZR Surge Line Nozzle FSWOL RC-35A-OL

Yes, the inspectors reviewed documentation and directly observed field work to verify that deficiencies were identified, dispositioned, and resolved. Based on inspection activities, the inspectors determined that the installation of the FSWOL was conducted in a manner such that deficiencies were identified, dispositioned, and resolved.

Mechanical Stress Improvement (Not Applicable)

The licensee has not implemented Mechanical Stress Improvement as a mitigation method for DMBWs.

Enclosure

In-service Inspection Program

- 1) Has the licensee prepared an MRP-139 in-service inspection program?

No, the licensee did not have a stand alone MRP-139 in-service inspection program document. The licensee incorporated MRP-139 program requirements into BP-257, "Integrated Material Issues Management Plan," as part of Appendix A to that document; and O-SI-DXI-000-114.3 for Augmented Examinations. The inspectors reviewed these documents and interviewed appropriate licensee representatives.

- 2) Are welds appropriately categorized?

The inspectors reviewed all welds categorized at the time of the inspection for appropriate categorization in accordance with MRP-139, Section 6. With the following exceptions, welds were appropriately categorized.

The PZR surge lines were examined prior to application of the FSWOL and met the requirements of MRP-139, Section 5.1. These welds were inappropriately categorized as Category C, and then revised to Category D.

The ten other PZR welds were inappropriately categorized as Category B, and then revised to Category F.

There were no consequences resulting from these inaccurate categorizations.

- 3) Are inspection frequencies consistent with the requirements of MRP-139?

Yes, with the exception of the comment below, planned inspection frequencies for welds in the MRP-139 program are consistent with the requirements of MRP-139.

Future scheduled inspections of the PZR weld overlays were not scheduled in accordance with the requirements of ASME Section XI Nonmandatory Appendix Q, Q-4300(a) which requires the volume of Figure Q-4300-1 be examined within two outages of the refueling outage following application as required by the proposed alternative SER authorization. The licensee subsequently scheduled the inspections such that they will be performed before the two refueling outage period ends. This issue was entered into the licensee's corrective action program as PERs 152348 and 152349.

- 4) What is the licensee's basis for categorizing welds as H or I and plans for addressing potential PWSCC?

No welds were categorized as Categories H or I after application of a FSWOL.

- 5) What deviations has the licensee incorporated and what approval process was used?

No deviations to MRP-139 have been incorporated by the licensee.

Enclosure

4OA6 Meetings, Including Exit

On October 3, 2008, the resident inspectors presented the inspection results to Mr. Timothy Cleary and other members of his staff, who acknowledged the findings. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

4OA7 Licensee-Identified Violations

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

- Technical Specification 3.0.4.a required that when an LCO is not met, entry into a Mode or other specified condition in the applicability shall only be made when the associated actions to be entered permit continued operation in the Mode to be entered for an unlimited period of time. Contrary to this, from initial power operations until August 2008, the licensee had entered Modes 2 and 1 with one main feedwater pump trip channel for the AFW automatic start function inoperable when the associated actions of TS 3.3.2 did not permit operation for an unlimited period of time in this condition. The licensee entered this issue into their corrective action program as PER 150982. The licensee subsequently requested and received a license amendment that revised the applicability of TS 3.3.2. This finding is of very low safety significance because it did not represent an actual loss of safety function since other initiation signals remained available to automatically start the AFW pumps if needed.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

D. Bodine, Chemistry/Environmental Manager
D. Boone, Radiation Protection Manager
M. Button, Maintenance and Modifications Manager
C. Church, Plant Manager
T. Cleary, Site Vice President
L. Cross, Acting Maintenance Manager
D. Jaquith, Licensing Engineer
K. Jones, Engineering Manager
Z. Kitts, Licensing Engineer
A. Little, Acting Site Security Manager
T. Marshall, Outage and Site Scheduling Manager
J. Proffitt, Licensing Engineer
P. Simmons, Operations Manager
J. Smith, Licensing and Industry Affairs Manager
N. Thomas, Licensing Engineer
R. Thompson, Emergency Preparedness Manager
K. Dietrich, Corporate Welding Engineer
J. Whitaker, Inspection Services

NRC personnel:

R. Bernhard, Region II, Senior Reactor Analyst
B. Moroney, Project Manager, Office of Nuclear Reactor Regulation

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000327, 328/2008004-01	URI	Notice of Enforcement Discretion 08-2-001 For Both Control Room Air Conditioning System Trains Inoperable (Section 4OA3.1)
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Closed

None

Discussed

2515/172	TI	Reactor Coolant System Dissimilar Metal Butt Welds (Section 4OA3.2)
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LIST OF DOCUMENTS REVIEWED

Section R01: Adverse Weather Protection

Drawing 48N814, Miscellaneous Steel Curbs, Grating, and Railing Sections and Details, Revision 2
Sequoyah Nuclear Plant Units 1,2 – Probabilistic Safety Assessment Individual Plant Examination, Volume 3, Revision 1
WO 99-010152-000, Install Unit Board Flood Curbing In Turbine Building

Section R04: Equipment Alignment

Tagout Clearance 2-74-1527, RHR Pump 2A-A
1,2-47W810-1, Flow Diagram Residual Heat Removal System, Revision 51
2-47W811-1, Flow Diagram Safety Injection System, Revision 60
1,2-47W812-1, Flow Diagram Containment Spray System, Revision 43

Section R05: Fire Protection

SPP-10.9, Control of Fire Protection Impairments, Revision 2
Sequoyah Nuclear Plant Fire Protection Report, Revision 22
SQN Fire Drill Evaluation Manual, Revision 4
Fire Drill Critique Report, Revision 4
0-PI-FPU-000-900.Q, Periodic Fire Brigade Training, Revision 6

Section R11: Licensed Operator Regualification

Simulator Exam Guide: ATWS (from ~75% reactor power), Revision 10
EPIP-1, Emergency Plan Classification Matrix, Revision 40

Section R12: Maintenance Rule Implementation

TI-4, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting – 10CFR50.65, Revision 21
System Status Reports-Unit 1&2 System 030 - A/C & Chillers, 2007 through 2008

Section R13: Maintenance Risk Assessments and Emergent Work Evaluation

Sentinel Run July 7, 2008 to July 20, 2008 dated July 9, 2008
Maintenance Shift Supervisor 24 Hour Look-ahead dated July 8, 2008
Sentinel Run July 21, 2008 to August 10, 2008 dated July 29, 2008
Maintenance Shift Supervisor 24 Hour Look-ahead dated July 28, 2008
Sentinel Run August 22, 2008 to September 7, 2008 dated August 25, 2008
Clearance 2-3-1501, Motor Driven Auxiliary Feedwater Pump 2A-A, dated 8/25/08
SPP-7.1, On Line Work Management, Revision 10

Section R15: Operability Evaluations

FE 42550, DG 7 Day Tank Level, Revision 0
 FE Addressing Temporary Equipment Placement Adjacent to Safety-Related Components (PER 147427)
 FE 42767, Oil Leak on 2A1 Diesel Generator Engine, Revision 0
 0-TI-DXX-000-013.0, Temporary Equipment Control, Revision 4
 FSAR Section 8.3, Onsite Power Systems
 Diesel Generator Design Criteria SQN-DC-V-11.8
 18D053EPMDDP072189, SQN Diesel Generator Fuel Consumption 7 Day Supply Calculation, Revision 2
 WO 07-772859-000, Diesel Oil Storage 1A-A Level Loop Calibration
 WO 04-778234-000, Diesel Oil Storage 2A-A Level Loop Calibration
 WO 03-004882-000, Diesel Oil Storage 1B-B Level Loop Calibration
 WO 05-783126-000, Diesel Oil Storage 2B-B Level Loop Calibration
 0-TI-SXX-000-016.0, Breaching the Shield Building, ABSCE, or Control Room Boundaries, Revision 19
 NEDP-22, Functional Evaluations, Revision 5

Section R19: Post Maintenance Testing

0-MI-IPM-099-001.0, Replacement of Eagle 21 Loop Calculation Processor (LCP), LCP NVRAM Module, and Test Sequence Processor (TSP), Revision 26
 1-SI-IFT-001.09B.2, Functional Test of Steam Generator Loop 2 Steam Pressure Channel II Rack 8 Loop P-1-9B (P-525), Revision 11
 1-PI-ICC-001.10B.2, Calibration of Steam Generator Loop 2 Steam Flow/Feed Flow Mismatch Channel II Rack 8 Loops F-1-10B (F-523) and F-3-48B (F-521), Revision 10
 1-PI-ICC-001.28B.2, Calibration of Steam Generator Loop 4 Steam Flow/Feed Flow Mismatch Channel II Rack 8 Loops F-1-28B (F-543) and F-3-103B (F-541), Revision 12
 1-SI-IFT-001-27B.2, Functional Test of Steam Generator Loop 4 Steam Pressure Channel II Rack 8 Loop P-1-27B (P-545), Revision 11
 1-SI-ICC-001-072.2, Channel Calibration of Turbine Impulse Chamber Pressure Channel II Rack 8 and 16 Loop P-1-72 (P-506), Revision 9
 SPP-6.5, Foreign Material Control, Revision 13
 1,2-47W432-2, Mechanical Residual Heat Removal System Piping, Revision 10
 0-SI-OPS-074-128.A, RHR Pump A-A Casing Vent, Revision 12
 SQN-VTD-MI17-0120, Vendor Technical Manual for Micro Control Systems MCS Digital Control System Specifications and Schematics-Attachment E, Revision 4
 0-SI-SFT-311-001.B, Control Room Air-Conditioning System Train B, System Functional Test. Performance dated 11/15/2006
 AOP-I.11, Eagle 21 Malfunction, Revision 9
 1-SI-IFT-001-012.3, Functional Test of Steam Generator Loop 2 Steam Pressure Channel III Rack 11 Loop P-1-12 (P-526), Revision 11
 1-SI-IFT-001-023.3, Functional Test of Steam Generator Loop 3 Steam Pressure Channel III Rack 11 Loop P-1-23 (P-536), Revision 10
 FSAR Section 10.4.7.1.3, Main Feedwater
 SQN-DC-V-4.2, Design Calculation Attachment A, Feedwater Isolation Scheme and Regulatory Acceptance, Revision 11
 0-SI-SXI-000-201.0, ASME Section XI Inservice Pressure Test, Revision 19
 1,2-47W845-2, Mechanical Flow Diagram Essential Raw Cooling Water, Revision 94

Section R20: Refueling and Outage Activities

0-SI-OPS-000-011.0, Containment Access Control During Modes 1-4, Revision 33

Section R22: Surveillance Testing

2-SI-IFT-099-90.8B, Reactor Trip Instrumentation Monthly Functional Test (SSPS) Train B, Revision 15

2-SI-OPS-082-007.B, Electrical Power System Diesel Generator 2B-B, Revision 45

1-SI-SXP-003.201.S, Turbine Driven Auxiliary Feedwater Pump 1A-S Performance Test, Revision 17

2-SI-SXP-003-201.S, Turbine Driven Auxiliary Feedwater Pump 2A-S Performance Test, Revision 22

2-SI-MIN-061-108.0, Ice Condenser Intermediate Deck Doors Weekly Inspection, Revision 2

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EPIP-1, Emergency Plan Classification Matrix, Revision 40

Section 40A1: Performance Indicator Verification

NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 5

Section 40A2: Identification and Resolution of Problems

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OPDP-1, Conduct of Operations, Revision 9

Operations Directive Manual Appendix D, Protected Equipment, Revision 4

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Section 40A3: Event Followup

WO 07-771425-000, Replace EDG Battery Bank 1A-A

0-PI-EBT-082-238.4, Modified Performance Testing of 125 VDC Diesel Generator Batteries, Revision 16

0-SI-EBT-082-238.2, Diesel Generator Battery Quarterly Operability, Revision 15

Calculation SQN-CPS-007, Diesel Generator Battery Capacity Evaluation, Revision 5

Section 40A5: Other Activities – TI 2515/172

WO #06-775288-002, Unit 2 Pressurizer Overlays, Rev. 2

DCN22061A, Design Change for U2 Pressurizer Overlays, Rev. A

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PQR-43-43-T-001, Procedure Qualification Record – WPS03-08-T-801-103804 Support Document, Rev. 0
WPS 08-08-T-001-103804, Weld Procedure Specification for Unit 2 Overlay Buffer Layer, Rev. 0
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BP-257, Integrated Material Issues Management Plan, Rev 8
TVA Letter to NRC, Sequoyah Nuclear Plant (SQN) Units 1 and 2 and Watts Bar Nuclear Plant (WBN) Unit 1 – American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI – Preemptive Weld Overlays on Alloy 600 Pressurizer Nozzle-to-Pipe Welds and Associated Alternative Repair Techniques – Generic Request for Relief G-RR-1, June 16, 2006
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*PERs created as a result of this inspection.