



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

October 30, 2006

Southern Nuclear Operating Company, Inc.
ATTN: Mr. D. E. Grissette,
Vice President - Vogtle Project
P. O. Box 1295
Birmingham, AL 35201-1295

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT - NRC INTEGRATED INSPECTION
REPORT 05000424/2006004 AND 05000425/2006004

Dear Mr. Grissette:

On September 30, 2006, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Vogtle Electric Generating Plant, Units 1 and 2. The enclosed integrated inspection report documents the inspection results, which were discussed on October 6, 2006, with Mr. Tom Tynan and other members of your staff.

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

This report documents one NRC-identified finding of very low safety significance (Green) which was determined to involve a violation of NRC requirements and one self-revealing finding. However, because the violation is of very low safety significance and because it is entered into your corrective action program, the NRC is treating this violation as a non-cited violation (NCV) consistent with Section VI.A 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 Vogtle Electric Generating Plant.

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

Sincerely,

/RA/

Scott M. Shaeffer, Chief
Reactor Projects Branch 2
Division of Reactor Projects

Docket Nos.: 50-424, 50-425
License Nos.: NPF-68, NPF-81

Enclosure: Inspection Report 05000424/2006004
and 05000425/2006004
w/Attachment: Supplemental Information

cc w/encl: (See page 2)

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Letter to D. E. Grissette from Scott M. Shaeffer dated October 30, 2006.

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT - NRC INTEGRATED INSPECTION
REPORT 05000424/2006004 AND 05000425/2006004

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-424, 50-425

License Nos.: NPF-68, NPF-81

Report Nos.: 05000424/2006004 and 05000425/2006004

Licensee: Southern Nuclear Operating Company, Inc.

Facility: Vogtle Electric Generating Plant, Units 1 and 2

Location: Waynesboro, GA 30830

Dates: July 1, 2006 through September 30, 2006

Inspectors: G. McCoy, Senior Resident Inspector
P. O'Bryan, Acting Senior Resident Inspector
B. Anderson, Resident Inspector
R. Taylor, Reactor Inspector (Section 1R07)
J. Rivera-Ortiz, Reactor Inspector (Section 1R07)
M. Scott, Senior Reactor Inspector (Section 1R12)
E. Michel, Reactor Inspector (Section 1R12)

Accompanying Personnel: M. Lewis, Coop

Approved by: Scott M. Shaeffer, Chief
Reactor Projects Branch 2
Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000424/2006-004, 05000425/2006-004; 07/01/2006 - 09/30/2006; Vogtle Electric Generating Plant, Units 1 and 2; Identification and Resolution of Problems, Event Followup.

The report covered a three-month period of inspection by three resident inspectors and four regional reactor inspectors. One Green non-cited violation (NCV) and one Green finding were identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Initiating Events

- Green. A self-revealing finding was identified for inadequate work instructions and poor work practices associated with the installation of a surge arrestor design change on the Unit 2 loop 4 reactor coolant pump (RCP). This condition resulted in short circuiting in the surge arrestor cable which resulted in a trip of the loop 4 RCP and subsequent reactor trip.

The inspectors determined that the cause of this finding was related to the work practices aspect of the human performance cross-cutting area because the work instructions did not contain adequate detail to properly install the surge arrestor cable. This finding is greater than minor because it affected the human performance and procedure quality attributes of the Initiating Event cornerstone in that the installed loop 4 surge arrestor cable was incorrect in type and size and was incorrectly installed. The finding was determined to be of very low safety significance (Green) because it did not increase the likelihood that mitigation equipment or functions would not be available. (Section 4OA3)

Cornerstone: Mitigating Systems

- Green. The inspectors identified an NCV of 10CFR50, Appendix B, Criterion XVI, for a failure to promptly identify and correct a condition adverse to quality. During an environmental qualification (EQ) self-assessment in June, 2005, the licensee discovered that two Rosemount differential pressure transmitters with potentially damaged environmental seals between the electronics and the pressure sensing sections of the instrument. This violation has been entered in the licensee corrective action program as CR 2006109187

The finding is of more than minor significance because it affects the equipment availability and reliability attribute of the Mitigating Systems cornerstone objective in that the damaged seals reduced the reliability of safety-related systems. The NRC Region II Senior Reactor Analyst (SRA) determined that the Phase 2 significance evaluation process does not properly address this finding. Therefore, a Phase 3 significance determination evaluation was performed. The dominant accident

sequence involved a Medium Break Loss of Coolant Accident followed by the failure of three channels of the Engineered Safety Features Actuation System, one due to a failed EQ seal and the other two via random failure. The Phase 3 results were that the finding was of very low safety significance (Green) since only one pressurizer pressure transmitter was affected. (Section 4OA2.2)

B. Licensee-Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Unit 1 started the inspection period at full rated thermal power (RTP). The unit operated at essentially full RTP until September 18 when the reactor was shutdown for a planned refueling outage.

Unit 2 operated at essentially full RTP until August 27 when the unit tripped due to a trip of the loop 4 RCP. The unit was restarted on September 1 and attained full RTP on September 2. The unit operated at full RTP for the remainder of this report period.

1. **REACTOR SAFETY**

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment

a. Inspection Scope

Partial Walkdowns. The inspectors performed partial walkdowns of the following three systems to verify correct system alignment. The inspectors checked for correct valve and electrical power alignments by comparing positions of valves, switches, and breakers to the procedures and drawings listed in the Attachment. Additionally, the inspectors reviewed the condition report (CR) database to verify that equipment alignment problems were being identified and appropriately resolved.

- Unit 1 train B control room emergency filtration system (CREFS) during Unit 1 train A CREFS maintenance.
- Unit 1 train A nuclear service cooling water (NSCW) system during NSCW pump number 1 maintenance.
- Unit 1 train B residual heat removal (RHR) system with the A RHR train out of service for planned maintenance.

Complete System Walkdown. The inspectors performed a complete walkdown of the Unit 1 auxiliary feedwater (AFW) system. The inspectors performed a detailed check of valve positions, electrical breaker positions, and operating switch positions to evaluate the operability of the redundant trains or components by comparing the required position in the system operating procedure to the actual position. The inspectors also interviewed personnel, reviewed control room logs and CRs to verify that alignment and equipment discrepancies were being identified and appropriately resolved. The documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors walked down the following nine plant areas to verify the licensee was controlling combustible materials and ignition sources as required by procedures 92015-C, Use, Control, and Storage of Flammable/Combustible Materials, and 92020-C, Control of Ignition Sources. The inspectors assessed the observable condition of fire detection, suppression, and protection systems and reviewed the licensee's fire protection Limiting Condition for Operation log and CR database to verify that the corrective actions for degraded equipment were identified and appropriately prioritized. The inspectors also reviewed the licensee's fire protection program to verify the requirements of Updated Final Safety Analysis Report (UFSAR) Section 9.5.1, Fire Protection Program, and Appendix 9A, Fire Hazards Analysis, were met. Documents reviewed are listed in the Attachment.

- Unit 1 control building level A west penetration rooms
- Unit 1 rod control switchgear and motor generator rooms
- Unit 2 north main steam valve house
- Unit 1 A and C battery and switchgear rooms
- Unit 2 control building level B east penetration rooms
- Unit 2 A and C battery and switchgear rooms
- Unit 1 auxiliary component cooling water (ACCW) pump rooms
- Unit 2 containment building
- Unit 1 containment building

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

Internal Flood Review. The inspectors reviewed the UFSAR and Individual Plant Examination and walked down the following three areas which contained risk-significant structures, systems and components (SSCs) below flood level to verify flood barriers were in place. Motor controllers and terminal boxes that could become potentially submerged were inspected to ensure that the sealing gasket material was intact and undamaged. The inspectors reviewed selected licensee alarm response procedures to verify alarm setpoints and setpoints for sump pump operation were consistent with the UFSAR, the setpoint index, and Technical Specifications (TS).

- Unit 2 train A motor driven AFW pump room
- Unit 2 train B motor driven AFW pump room
- Unit 2 turbine driven AFW pump room

External Flood Review. The inspectors reviewed the licensee's external flooding mitigation procedures and equipment to verify they were consistent with the licensee's

design requirements and risk analysis assumptions. The inspectors discussed external flooding preparation with engineering personnel to verify preparation and compensatory measures met the licensee's design requirements and risk analysis assumptions. The inspectors checked selected external drain systems to verify the drains would function properly. The inspectors reviewed a sampling of CRs to verify the licensee was identifying and correcting problems associated with flood detection and protection of SSCs. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance

a. Inspection Scope

Biennial Program Inspection. The inspectors reviewed inspection records, test results, maintenance work orders, and other documentation listed in the Attachment to ensure that heat exchanger (HX) deficiencies that could mask or degrade performance were identified and corrected. The three risk significant heat exchangers reviewed were the Component Cooling Water (CCW) HXs, Emergency Diesel Generator (EDG) jacket water HXs, and Containment Spray (CS) pump motor coolers.

The inspectors reviewed completed HX inspection and cleaning procedures, inspection frequency, and tube plugging maps. In addition, the inspectors reviewed eddy current test reports for the selected HXs. These documents were reviewed to determine that: 1) selected heat exchanger test methodology was consistent with NRC Generic Letter 89-13 (Service Water System Problems Affecting Safety-Related Equipment) commitments; 2) test conditions were appropriately considered; 3) test or inspection criteria were appropriate and met; 4) test frequency was appropriate; 5) as-found results were appropriately dispositioned such that the final condition was acceptable; and 6) test results considered test instrument inaccuracies and differences.

The inspectors also reviewed the general health of the Nuclear Service Cooling Water (NSCW) system. The inspectors reviewed design basis documents and system health reports and had discussions with the NSCW system engineer to verify the design basis was being maintained and to verify adequate NSCW system performance under current preventive maintenance, inspections, and test frequencies.

CRs were reviewed for potential common cause problems and problems which could affect system performance to confirm that the licensee was entering problems into the corrective action program and initiating appropriate corrective actions. In addition, the inspectors conducted a walk down of selected HXs and major components for the NSCW system to assess general material condition and to identify any degraded conditions of selected components.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors evaluated operator performance during licensed operator simulator training described on simulator exercise guide V-RQ-SE-06502. The simulator scenario covered operator actions resulting from a loss of coolant accident inside the containment building. Procedures reviewed are listed in the Attachment. The inspectors specifically assessed the following areas:

- Correct use of the abnormal and emergency operating procedures
- Ability to identify and implement appropriate actions in accordance with the requirements of the TSs
- Clarity and formality of communications in accordance with procedure 10000-C, Conduct of Operations
- Proper control board manipulations including critical operator actions
- Quality of supervisory command and control
- Effectiveness of post-evaluation critique

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

Triennial Periodic Evaluation. The inspectors reviewed the licensee's Maintenance Rule (MR) periodic assessment, Plant Vogtle Units 1 and 2 Maintenance Rule Periodic Assessment Nov 14-18, 2005 while on-site the week of July 17, 2006. This report was issued to satisfy paragraph (a)(3) of 10 CFR 50.65, and covered the 24 month period ending November, 2005. The inspection was to determine the effectiveness of the assessment and that it was issued in accordance with the time requirement of the MR and included an evaluation of: balancing reliability and unavailability, (a)(1) activities, (a)(2) activities, and use of industry operating experience. To verify compliance with 10 CFR 50.65, the inspectors reviewed selected MR activities covered by the assessment period for the following maintenance rule component and attendant systems: RHR, Containment Penetration Conductor Electrical Protection, Reactor Coolant System (RCS), Condensate and Feed, and Process Protection and Control System. Documents reviewed are listed in the Attachment.

During the inspection, the inspectors reviewed selected plant work order data, assessments, modifications, the site guidance implementing procedures, discussed and reviewed relevant CRs, reviewed generic operations event data, Maintenance Rule Implementation Monthly Status Reports, system health reports, and discussed issues with system engineers. Operational event information was evaluated by the inspectors in its use in MR functions. The inspectors selected corrective action documents on systems recently removed from 10 CFR 50.65 a(1) status and those in a(2) status for some period to assess the justification for their status. The inspectors toured and

inspected repaired components. The documents were compared to the site's MR program criteria, and the MR a(1) evaluations and rule related data bases.

Resident Inspector Quarterly Review. The inspectors reviewed two equipment problems to evaluate the effectiveness of the licensee's handling of equipment performance problems and to verify the licensee's maintenance efforts met the requirements of 10 CFR 50.65 and licensee procedure 50028-C, Engineering Maintenance Rule Implementation. The reviews included adequacy of the licensee's failure characterization, establishment of performance criteria or 50.65 (a)(1) performance goals, and adequacy of corrective actions. Other documents reviewed during this inspection included control room logs, system health reports, the MR database, and maintenance work orders (MWOs). Also, the inspectors interviewed system engineers and the MR coordinator to assess the accuracy of identified performance deficiencies and extent of condition. Documents reviewed are listed in the Attachment.

- CR 2006108358, Unit 2 component cooling water pump #1 high bearing temperature
- CR 2006108333, Unit 2 atmospheric relief valve 2PV-3000 failed stroke time

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

The inspectors reviewed the following six risk significant and emergent MWOs to verify plant risk was properly assessed by the licensee prior to conducting the activities. The inspectors reviewed risk assessments and risk management controls implemented for these activities to verify they were completed in accordance with procedure 00354-C, Maintenance Scheduling, and 10 CFR 50.65(a)(4). The inspectors also reviewed the CR database to verify that maintenance risk assessment problems were being identified at the appropriate level, entered into the corrective action program, and appropriately resolved.

- Unit 1 train A NSCW pump outages
- Unit 2 loops 1, 2, and 4 bypass feedwater regulating valve (BFRV) I/P transducer replacement
- Unit 2 solid state protection system (SSPS) and reactor trip breaker (RTB) testing with anticipated transient without scram mitigation system actuation circuitry (AMSAC) bypassed
- Unit 1 train A RHR outage
- Unit 2 RCP #4 motor repairs
- Unit 1 and Unit 2 operations during peak grid loading conditions

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following five evaluations to verify they met the requirements of Nuclear Management Procedure (NMP)-GM-002, Corrective Action Program, and NMP-GM-002-001, Corrective Action Program Instructions. This included a review of the technical adequacy of the evaluations, the adequacy of compensatory measures, and the impact on continued plant operation.

- CR 2006107422, Unit 2 A EDG jacket cooling water leakage
- CR 2005104189, Unit 1 pressure transmitters 1PT-6161 and 1PT-6163 environmental seal damage
- CR 2005111462, Units 1 and 2 safety injection accumulators uncertainty calculation
- CR 2006108668, Unit 1 pressurizer pressure control system use of back-up heaters
- CR 2006110015, Unit 1 train B EDG fuel oil strainer high differential pressure

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

The inspectors either observed post-maintenance testing or reviewed the test results for the following five maintenance activities to verify that the testing met the requirements of procedure 29401-C, Work Order Functional Tests, for ensuring equipment operability and functional capability was restored. The inspectors also reviewed the test procedures to verify the acceptance criteria was sufficient to meet the TS operability requirements.

- MWO 20600132, Unit 2 loop 4 (BFRV) (2LV5242) I/P transducer replacement
- MWO 20402576, Unit 2 loop 1 atmospheric relief valve (ARV) (2PV3000) system outage
- MWO 20615005, Unit 2 loop 3 main feedwater regulating valve (MFRV) feedback potentiometer replacement
- MWO 10302403, Unit 1 NSCW pump # 6 motor refurbishment
- MWO 10604707, Replace transmitter 1FT0132

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

Unit 2 Forced Outage. The inspectors performed the following inspection activities described below for the Unit 2 forced outage that began on August 27, 2006, when the loop 4 RCP tripped causing a reactor trip. An electrical fault in the surge arrestor cabling was determined to be the cause of the failure and was repaired prior to restart. Documents reviewed are listed in the Attachment.

- Reviewed RCS pressure, level, and temperature instruments to verify that the instruments provided accurate indication and that allowances were made for instrumentation errors.
- Reviewed the status and configuration of electrical systems to verify that those systems met TS requirements and the licensee's outage risk control plan.
- Reviewed selected control room operations to verify that the licensee was controlling reactivity in accordance with the technical specifications.
- Reviewed the outage risk plan to verify that activities, systems, and/or components which could cause unexpected reactivity changes were identified in the outage risk plan and were controlled.

Unit 1 Refueling Outage. The inspectors performed the following inspection activities described below for the Unit 1 refueling outage that began on September 17, 2006.

- Reviewed the outage risk plan to verify that activities, systems, and/or components, which could cause unexpected reactivity changes, were identified in the outage risk plan and were controlled.
- Reviewed the licensee's plans for changing plant configurations to verify that TSs, license conditions, and other requirements, commitments, and administrative procedure prerequisites were met prior to changing plant configurations.
- Reviewed selected control room operations to verify that the licensee was controlling reactivity in accordance with the TSs.
- Reviewed the status and configuration of electrical systems to verify that those systems met TS requirements and the licensee's outage risk control plan.
- Observed decay heat removal parameters to verify that the system was properly functioning and providing cooling to the core.
- Reviewed RCS pressure, level, and temperature instruments to verify that the instruments provided accurate indication and that allowances were made for instrumentation errors.

The inspectors confirmed that, when the licensee removed equipment from service, the licensee maintained defense-in-depth commensurate with the outage risk control plan for key safety functions and applicable TSs, and that configuration changes due to emergent work and unexpected conditions were controlled in accordance with the outage risk control plan.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors reviewed the following seven surveillance test procedures and either observed the testing or reviewed test results to verify that testing was conducted in accordance with the procedures and that the acceptance criteria adequately demonstrated that the equipment was operable. Additionally, the inspectors reviewed the CR database to verify that the licensee had adequately identified and implemented appropriate corrective actions for surveillance test problems. Documents reviewed are listed in the Attachment.

Surveillance Tests

- 24565-2, RCP 2 Train A, Reactor Trip Relays Underfrequency (281 A), Undervoltage (227 A), Timing (262R A) Trip Actuating Device Operational Test and Channel Calibration
- 28820-C, 2AD1CB Battery Charger Load Test
- 28210-C, Main Steamline Code Safety Valve Setpoint Verification

In-Service Tests

- 14808-1, Train B Centrifugal Charging Pump and Check Valve Inservice Test and Response Time
- 14830-1, Quarterly Check Valve Inservice Test (Auxiliary Feedwater)
- 14804-1, Safety Injection Pump Inservice and Response Time Test

Containment Isolation Valve Tests

- 14349-1, Containment Penetration No. 49, Excess Letdown and Seal Water Leakoff Local Leak Rate Test

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors evaluated the following Temporary Modifications (TM) and associated 10 CFR 50.59 screening against the system design basis documentation and UFSAR to verify that the modification did not adversely affect the safety functions of important safety systems. Additionally, the inspectors reviewed licensee procedure 00307-C, Temporary Modifications, to assess if the modification was properly developed and implemented.

- TM 2061013201, Temporary change to the operation of Unit 2 feedwater system allowing MFRVs and BFRVs to be open at full power operation
- TM 2061300501, Temporary change to the Unit 2 feedwater system for replacement of MFRV feedback potentiometers

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluationa. Inspection Scope

The inspectors reviewed the facility activation exercise guide and observed the following emergency response activity to verify the licensee was properly classifying emergency events, making the required notifications, and making appropriate protective action recommendations in accordance with procedures 91001-C, Emergency Classifications, and 91305-C, Protective Action Guidelines.

- On August 2, the licensee conducted a simulator exercise involving a loss of reactor coolant and containment breach.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES4OA1 Performance Indicator (PI) Verificationa. Inspection Scope

The inspectors sampled licensee submittals for the PI listed below during the period from January 1, 2005 to June 30, 2006 for Unit 1 and Unit 2. The inspectors verified the licensee's basis in reporting each data element using the PI definition and guidance contained in: procedures 00163-C, NRC Performance Indicator and Monthly Operating Report Preparation and Submittal, and 50025-C, Reporting of Mitigating System Performance Indicator Unavailability; and Nuclear Energy Institute (NEI) 99-02, Revision 4, Regulatory Assessment Indicator Guideline.

Mitigating Systems Cornerstone

- Safety System Functional Failures

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems.1 Daily Screening of Corrective Action Items

As required by Inspection Procedure 71152, Identification and Resolution of Problems, and in order to help identify repetitive equipment failures or specific human performance

issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's corrective action program. This review was accomplished by either attending daily screening meetings that briefly discussed major CRs, or accessing the licensee's computerized corrective action database and reviewing each CR that was initiated.

.2 Annual Sample Review

a. Inspection Scope

The inspectors performed a detailed review of the following CR to verify the full extent of the issue was identified, an appropriate evaluation was performed, and appropriate corrective actions were specified and prioritized. The inspectors evaluated the CR against the licensee's corrective action program as delineated in licensee procedure NMP-GM-002, Corrective Action Program, and 10 CFR 50, appendix B.

- CR 2005104189, Rosemount transmitters with degraded environmental seals

b. Findings

Introduction. The inspectors identified a Green NCV of 10CFR50, Appendix B, Criterion XVI, for a failure to promptly identify and correct a condition adverse to quality. During an environmental qualification (EQ) self-assessment in June, 2005, the licensee discovered that two Rosemount differential pressure transmitters with potentially damaged environmental seals between the electronics and the pressure sensing sections of the instrument.

Description. Vendor technical guidance cautions against rotating the electronics enclosure relative to the body of the transmitter because doing so may damage the sealant which protects the electronics enclosure from potential adverse environmental conditions, such as a steam filled environment. The licensee also discovered that their installation and calibration procedures for the transmitters did not include a precaution against rotating the electronics section relative to the pressure sensing section, and that several transmitters were potentially affected by this condition. The licensee developed a plan to inspect the transmitters as the 18 month calibration came due. In December 2005, a safety-related instrument, Unit 2 pressurizer pressure instrument (2PT-0455), was discovered to have a potentially damaged seal. In July 2006, inspectors questioned the licensee's timeliness in the identification of the full scope of the problem in that several accessible safety-related instruments had yet to be inspected. The licensee subsequently completed all the inspections on August 9, 2006, and discovered that two additional safety-related transmitters were installed incorrectly. These two instruments were the Unit 1 pressurizer pressure instrument (1PT-0456) and the Unit 1 auxiliary feedwater flow to loop 1 steam generator (1FT-5152). Because these transmitters were installed in EQ required applications, the licensee declared these transmitters inoperable until they were replaced. Inspectors concluded that the extent-of-condition investigation was not timely in that over fourteen months elapsed between the time that the licensee became aware of the potential problem with the transmitter installation and the time that all the transmitters were inspected and corrected.

Analysis. The finding is of more than minor significance because it affects the equipment availability and reliability attribute of the Mitigating Systems cornerstone objective in that the damaged seals reduced the reliability of safety-related systems. The NRC Region II Senior Reactor Analyst (SRA) determined that the Phase 2 significance evaluation process does not properly address this finding. Therefore, a Phase 3 significance determination evaluation was performed. The dominant accident sequence involved a Medium Break Loss of Coolant Accident followed by the failure of three channels of the Engineered Safety Features Actuation System, one due to a failed EQ seal and the other two via random failure. The Phase 3 results were that the finding was of very low safety significance (Green) since only one pressurizer pressure transmitter was affected.

Enforcement. 10 CFR 50, Appendix B, Criterion XVI requires in part that conditions adverse to quality, such as equipment deficiencies, be promptly identified and corrected. Contrary to the above, the licensee did not promptly identify the complete population of transmitters affected by a known deficiency. Specifically, two safety-related transmitters (1-PT-0456 and 1-FT-5152) were found to be inoperable with potentially damaged environmental seals more than fourteen months after the installation deficiency was identified. Because the finding is of very low safety significance and has been entered in the licensee corrective action program as CR 2006109187, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000424/2006004-01, Failure to Promptly Identify Instruments with Environmental Qualification Deficiencies.

4OA3 Event Followup

a. Inspection Scope

Unit 2 Forced Shutdown. On August 27, 2006, the Unit 2 reactor automatically tripped from 100% RTP due to tripping of the loop 4 RCP. The inspectors reviewed the licensee's event review report and associated CR 2006109233 which included the corrective action plan. The inspectors also interviewed responsible operations and maintenance department personnel. The licensee was also conducting a root cause analysis that had not been completed at the time of this report. During the licensee's event investigation, they confirmed that the initiating event was the unexpected loss of the loop 4 RCP.

b. Findings

Introduction. A Green self-revealing finding was identified for inadequate work instructions and poor work practices associated with the installation of a surge arrestor design change on the Unit 2 loop 4 RCP. This condition resulted in short circuiting in the surge arrestor cable which resulted in a trip of the loop 4 RCP and subsequent reactor trip.

Description. On October 14, 2005, surge arrestors were installed on the loop 4 RCP as part of design change package (DCP) 98-VAN0064 to replace the surge capacitors due to failures that had occurred on other large frame pump motors. The DCP stated that a shielded, stranding class B, 15kV surge arrestor cable was appropriate for this

application. Contrary to the DCP, a shielded, stranding class B, 5kV cable was installed. The workers performing the cable installation did not question the differences between the cable being installed and the cable identified in the DCP work instructions. This was a missed opportunity to identify the error in cable size.

The licensee determined that the work instructions in the DCP were inadequate which resulted in the installation of an incorrect type and size cable. The cable in the DCP should have been an unshielded, stranding class H (or greater), 15kV cable. The licensee also determined that the surge arrestor cable was improperly installed in the RCP motor termination box. Cable shielding was discovered in contact with termination lugs and a current transformer wire was found in contact with the surge arrestor cable. Because of the improper installation, conditions were created that resulted in an electrical short circuit and subsequent trip of the loop 4 RCP.

Analysis. The inspectors determined that the cause of this finding was related to the work practices aspect of the human performance cross-cutting area because the personnel work practices did not support human performance to prevent errors in material acquisition or to prevent the failure to comply with the DCP. This finding is greater than minor because it affected the human performance and procedure quality attributes of the Initiating Event Cornerstone in that the installed loop 4 surge arrestor cable was incorrect in type and size and was incorrectly installed. The finding was determined to be of very low safety significance (Green) because it did not increase the likelihood that mitigation equipment or functions would not be available.

Enforcement. The inspectors determined that the finding did not represent a violation of regulatory requirements because it only involved non-safety related plant equipment. This finding will be tracked as FIN 05000425/2006004-02, Poor Workmanship and Inadequate Work Instructions for Maintenance on the Unit 2 Loop 4 Reactor Coolant Pump Resulted in a Reactor Trip.

4OA6 Meetings, Including Exit

On October 6, 2006, the resident inspectors presented the inspection results to Mr. T. Tynan and other members of his staff, who acknowledged the findings. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:

R. Brown, Training and Emergency Preparedness Manager
C. Buck, Chemistry Manager
R. Dedrickson, Assistant General Manager - Operations
K. Dyar, Security Manager
I. Kochery, Health Physics Manager
J. Robinson, Operations Manager
S. Swanson, Engineering Support Manager
T. Tynan, Nuclear Plant General Manager
J. Williams, Assistant General Manager - Plant Support

NRC personnel:

S. Shaeffer, Chief, Region II Reactor Project Branch 2

LIST OF ITEMS OPENED AND CLOSED

Opened and Closed

05000424/2006004-01	NCV	Failure to Promptly Identify Instruments with Environmental Qualification Deficiencies (Section 40A2)
05000425/2006004-02	FIN	Poor Workmanship and Inadequate Work Instructions for Maintenance on the Unit 2 Loop 4 Reactor Coolant Pump Resulted in a Reactor Trip (Section 40A3)

LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

Procedures

11301-1, CBCR Normal HVAC and Emergency Filtration System Alignment
54054-1, Control Room Emergency Filtration System Performance Test
13150-1, Nuclear Service Cooling Water System
11150-1, Nuclear Service Cooling Water System Alignment
11011-1, Residual Heat Removal System Alignment
13011-1, Residual Heat Removal System
11610-1, Auxiliary Feedwater System Alignment
13610-1, Auxiliary Feedwater System
13325-1, Auxiliary Feedwater Pump House and Diesel Generator Building HVAC Systems

Drawings

REA 99-VAA627, Control Room Emergency Filtration
1X4DB133-1, Nuclear Service Cooling Water System
1X4DB133-2, Nuclear Service Cooling Water System

1XDB122, Residual Heat Removal System
 1X4DB161-1, AFW System
 1X4DB161-2, AFW System
 1X4DB161-3, AFW System

Condition Reports

2006105420, 2006106484, 2005109665, 2006104510, 2006104545, 2006102035

Other Documents

Work Orders 10520045, 10533021, 10610709
 System Health Report

Section 1R05: Fire Protection

Procedures

92787-1, Zone 87 Control Building Level A Fire Fighting Preplan
 92788-1, Zone 88 Control Building Level A Fire Fighting Preplan
 92793-1, Zone 93 Control Building Level A Fire Fighting Preplan
 92858-1, Zone 158 Control Building Level A Fire Fighting Preplan
 92802-1, Zone 102 Control Building Level A Fire Fighting Preplan
 92768-1, Zone 68 Control Building Level B Fire Fighting Preplan
 92769-1, Zone 69 Control Building Level B Fire Fighting Preplan
 92775-1, Zone 75 Control Building Level B Fire Fighting Preplan
 92759-1, Zone 59 Control Building Level B Fire Fighting Preplan
 92799-1, Zone 59 Control Building Level A Fire Fighting Preplan
 92782-2, Zone 82 Control Building Level B Fire Fighting Preplan
 92776-1, Zone 76 Control Building Level B Fire Fighting Preplan
 92777A-1, Zone 77A Control Building Level B Fire Fighting Preplan
 92777B-1, Zone 77B Control Building Level B Fire Fighting Preplan
 92778A-1, Zone 78A Control Building Level B Fire Fighting Preplan
 92778B-1, Zone 78B Control Building Level B Fire Fighting Preplan
 92771-1, Zone 71 Control Building Level B Fire Fighting Preplan
 92762-2, Zone 62 Control Building Level B Fire Fighting Preplan
 92763-2, Zone 63 Control Building Level B Fire Fighting Preplan
 92782-2, Zone 82 Control Building Level B Fire Fighting Preplan
 92730-1, Zone 30 Auxiliary Building Level B Fire Fighting Preplan
 92733-1, Zone 33 Auxiliary Building Level B Fire Fighting Preplan
 92840A-2, Zone 140A Containment Building Levels A, B, 1, 2, and 3 Fire Fighting Preplan
 92840B-2, Zone 140B Containment Building Levels A, B, 1, 2, and 3 Fire Fighting Preplan
 92840C-2, Zone 140C Containment Building Levels A, B, 1, 2, and 3 Fire Fighting Preplan
 92840E-2, Zone 140E Containment Building Levels A, 1, 2, and 3 Fire Fighting Preplan
 92840A-1, Zone 140A Containment Building Levels A, B, 1, and 3 East Fire Fighting Preplan
 92840B-1, Zone 140B Containment Building Levels A, B, 1, 2, and 3 Fire Fighting Preplan
 92840C-1, Zone 140C Containment Building Levels A, B, 1 and 3 Steam Generator
 Compartment Fire Fighting Preplan
 92840E-1, Zone 140E Containment Building Levels A, 1 and 2 Fire Fighting Preplan

Section 1R06: Flood Protection Measures**Condition Reports**

2006105669, 2006108082, 2006104242, 2006107245, 2006101093, 2006104461

Other Documents

VEGP Design Manual DC 1003 - Flooding (Interdiscipline)

VEGP Design Manual DC 1218 - Auxiliary Building Flood-Retaining Rooms, Alarms, and Drains

Section 1R07: Heat Sink Performance**Procedures**

83305-C, Heat Exchanger Testing/Maintenance Program, Rev. 7.3

83310-C, Emergency Diesel Generator Jacket Water Heat Exchanger Testing, Rev. 5.2

83306-C CCW and ACCW Heat Exchanger Testing, Rev. 7

83309-C, Safety Related Heat Exchanger Inspection, Rev. 6.1

NMP-GM-002, Corrective Action Program, Version 4.0

DG Jacket Water Heat Exchanger Inspection and Performance Testing Reports

Inspection Reports per Procedure 83309-C, Heat Exchangers 1A and 1B, dated March 1993

Inspection Report per Procedure 83309-C, Heat Exchanger 2B, dated January 2006

Work Order (WO) No. 1041083401

DOEJ-AM-1051744801-001

Task Sheet Serial No. 114193, dated March 2001

Letter in response to REA 01-VAA039, dated 4/25/2001

Task Sheet Serial No. 118233, dated January 2002

Task Sheet Serial No. 118232, dated January 2002

Letter in response to REA 02-VAA012, dated 2/19/2002

CCW Heat Exchanger Inspection and Performance Testing Reports

Inspection Report per Procedure 83309-C, Heat Exchanger 2A, dated October 2002

Document No. PD04511.06, dated October 2002 (2R9)

Inspection Report per Procedure 83309-C, Heat Exchanger 2B, dated April 2001

Document No. PD04422.02, dated April 2001 (2R8)

Task Sheet Serial No. 141561, Performance Testing of 2A Heat Exchanger per Procedure 83306-C, dated April 2004

DOEJ-AM-04-0243-001

Performance Testing Results of 2B Heat Exchanger per Procedure 83306-C, dated September 1996

Letter in response to REA 96-VAA020, dated 11/27/1996

Inspection Report per Procedure 83309-C, Heat Exchanger 1B, dated October 2003

Document No. PD04574.02, Record of Eddy Current Inspection of Component Cooling Water Heat Exchanger - B at Vogtle Unit 1, October 2003 (1R11)

Inspection Report per Procedure 83309-C, Heat Exchanger 1A, dated March 2002

Document No. PD04476.02, Record of Eddy Current Inspection of Component Cooling Water Heat Exchanger - A at Vogtle Unit 1, March 2002 (1R10)

Task Sheet Serial No. 148235, dated March 2005

DOEJ-AM-1051570401-001

Other Documents

Fouling Factor Trending Charts for CCW and DG Jacket Water Heat Exchangers
As-Built Notice No. V70042, Version 1 for documents 1X4AK01-00344, 2X4AK01-00345, dated
May 12, 2006

CR 2001000967, Debris found in 2B CCW Heat Exchanger, 4/23/2001

CR 2003002918, Tubes erroneously stabilized and plugged in 1B CCW Heat Exchanger,
10/09/03

Section 1R11: Licensed Operator Requalification**Procedures**

19222-C, Response to Degraded Core Cooling

19000-C, E0 Reactor Trip or Safety Injection

19001-C, Reactor Trip Response

19010, E1 Loss of Reactor or Secondary Coolant

Westinghouse Owner Group ERG-Based Critical Tasks

1R12 (Triennial) Documents Reviewed

Engineering Maintenance Rule Implementation A1 SSC Classification / Monthly Status Report
(Procedure #50028-C, Rev 13.2), dated 5/8/2002

1. Condensate and Feedwater
2. Residual Heat Removal
3. Main Steam
4. Containment Isolation
5. Reactor Coolant System
6. Containment Penetration Conductor Electrical Protection
7. Safety Related Motor Starters

System Health Reports

- Main Steam System
- Containment Building Air Cooling System
- Control Building Control Room Heating Ventilation and AC System
- Fuel Handling Building Normal Heating, Ventilation and AC System
- Reactor Coolant System
- Residual Heat Removal
- Condensate and Feedwater
- Process Protection and Control System
- Essential Chilled Water

Monthly Maintenance Rule Reports, numerous

Engineering Maintenance Rule Implementation Procedure 50028-C, Rev 14, dated 4/28/06

Plant Vogtle Units 1 and 2 Maintenance Rule Periodic Assessment Nov 14-18, 2005

Condition Reports (CRs)

2006103794, Operation of 1NBS-07, 1HV-12646

2003001841, Operation of 2NBF15 and 2NBF54

2006106458, Testing of 1NBR14-1 and 1NBR14-2

2006104450, ESF 1B chiller purge running continuously
 2006100849, "O" ring missing from valve 1HV12975
 2006103487, SSPS slave relay failed surveillance
 2006104985, Cards 1ZY-412A and 1ZY-422B found out of tolerance
 2006105588, Breaker 1NBR14 out of timing tolerance
 2006105427, 2A ESF chiller oil temperature higher than normal
 2003003177, Coil of relay 6CR in TDAFW cabinet failed open
 2003003190, ARV 1PV3020 failed open
 2004000177, NLP card in slot 0329 failed
 2004000810, Colmonoy pieces blocked NSCW line on 2B spray pump
 2004001191, failure of system 1607-B
 2004001199, positioner feedback arm on 1PV-05007C disengaged
 2004002733, Citation series aux contact caused trip of NSCW pump 112002P4004
 2004003082, Over load relay 2NBF51 failed surveillance
 2004003091, Relay 162-1X dropped out in 2A NSCW test unexpectedly
 2004003160, NSCW flow to 1B spray motor cooler low

Calculations

Calc # X4C1204V05, Rev 6, dated 12/12/02

Miscellaneous

Southern Company Letter dated Feb. 3, 2006 (File # RER C052239201, Log: PS-06-0087),
 From: J.G. Aufden Kampe, To: S.C. Swanson, RE: LONG RANGE PROPOSAL FOR 7300
 SYSTEM

Southern Nuclear Issue Action Plan Detail MIL/ERL 7300 System Reliability
 Maintenance Rule Scoping Manual
 Southern Nuclear Issue Action Plan Detail MIL/ERL NSCW Towers Material Condition
 Major Issues List
 Operability Determination Procedure 10027-C, Rev. 2, dated 7/3/2006

Section 1R12: Maintenance Effectiveness

Condition Reports

CR 2006108358, Unit 2 component cooling water pump # 1 high bearing temperature
 CR 2006108333, Unit 2 atmospheric relief valve 2PV-3000 failed stroke time

Work Orders

20614372, Unit 2 component cooling water pump # 1 high bearing temperature
 20402576, Unit 2 atmospheric relief valve 2PV-3000 failed stroke time

Section 1R20: Refueling and Outage Activities

Procedures

12005-C, Reactor Shutdown to Hot Standby (Mode 2 to Mode 3)
 12006-C, Unit Cooldown to Cold Shutdown
 12007-C, Refueling Operations (Entry into Mode 6)
 12008-C, Midloop Operations
 93663-C, Verification of Core Loading Pattern

93300-C, Conduct of Refueling Operations

Section 1R22: Surveillance Testing

Procedures

24565-2, RCP 2 Train A, Reactor Trip Relays Underfrequency (281 A), Undervoltage (227 A), Timing (262R A) Trip Actuating Device Operational Test and Channel Calibration

14808-1, Train B Centrifugal Charging Pump and Check Valve Inservice Test and Response Time

14830-1, Quarterly Check Valve Inservice Test (Auxiliary Feedwater)

14804-1, Safety Injection Pump Inservice and Response Time Test

28820-C, Battery Charger Load Test

28210-C, Main Steamline Code Safety Valve Setpoint Verification

14349-1, Containment Penetration No. 49 Excess Letdown and Seal Water Leakoff Local Leak Rate Test