



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

August 1, 2016

Mr. David R. Vineyard
Vice President
Southern Nuclear Operating Company, Inc.
Edwin I. Hatch Nuclear Plant
11028 Hatch Parkway North
Baxley, GA 31513

**SUBJECT: EDWIN I. HATCH NUCLEAR PLANT - NRC EVALUATION OF CHANGES, TESTS,
AND EXPERIMENTS AND PERMANENT PLANT MODIFICATIONS INSPECTION
REPORT 05000321/2016008 AND 05000366/2016008**

Dear Mr. Vineyard:

On June 23, 2016, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Edwin I. Hatch Nuclear Plant, Units 1 and 2, and discussed the results of this inspection with you and other members of your staff. The inspection team documented the results in the enclosed inspection report.

NRC inspectors documented three findings of very low safety significance (Green) in this report. These findings involved violations of NRC requirements. If you contest any of these violations or significance of any of these violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC resident inspector at the Hatch Nuclear Plant.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II; and the NRC resident inspector at the Hatch Nuclear Plant.

In accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if any, will be available electronically for public inspection in the

NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Documents Access and Management 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/

Jonathan H. Bartley, Chief
Engineering Branch 1
Division of Reactor Safety

Docket Nos.: 05000321, 05000366
License Nos.: DPR-57, NPF-5

Enclosure: Inspection Report 05000321/2016008
and 05000366/2016008 w/Attachment:
Supplementary Information

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NAME	FANELLI	STAMM	GREENLEAF	BLAMEY		
DATE	.7/28/2016	7/29/2016	7/29/2016	7/29/2016		
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-321, 50-366

License Nos.: DPR-57, NPF-5

Report Nos.: 05000321/2016008, 05000366/2016008

Licensee: Southern Nuclear Operating Company, Inc.

Facility: Edwin I. Hatch Nuclear Plant

Location: 11028 Hatch Parkway North, Baxley, GA 31513

Dates: June 6 to 23, 2016

Inspectors: T. Fanelli, Sr. Reactor Inspector (Team Leader)
E. Stamm, Sr. Reactor Inspector
M. Greenleaf, Reactor Inspector

Approved by: Jonathan H. Bartley, Chief
Engineering Branch 1
Division of Reactor Safety

Enclosure

SUMMARY

Inspection Report (IR) 05000321/2016008, 05000366/2016008; 06/6-23/16; Edwin I. Hatch Nuclear Plant Units 1 & 2; NRC Evaluations of Changes, Tests, and Experiments and Permanent Plant Modifications.

This report covers a two-week inspection by three regional inspectors. Three Green non-cited violations (NCV) were identified. The significance of inspection findings is indicated by their color (Green, White, Yellow, Red) using the NRC Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Components Within the Cross Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 4, 2015. The Nuclear Regulatory Commission's (NRC's) program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

Cornerstone: Mitigating Systems

- Green: The inspectors identified a non-cited violation of Title 10 Code of Federal Regulations (CFR) Part 50 Appendix B, Criterion III, "Design Control," for the failure to verify adequate design and qualification of Class 1E buses in accordance with Institute for Electronics and Electrical Engineering (IEEE) 279-1971, "Standard Criteria for Protection Systems for Nuclear Power Generating Stations." The licensee entered this issue into the licensee's corrective action program as CR10240030. The licensee planned to correct the issue prior to installing new transformers.

The performance deficiency was determined to be more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern. The finding determined to be of very low safety significance (Green) because the system, structure, or component maintained its operability or functionality. The finding was assigned a cross-cutting aspect of Training [H.9], in the Human Performance area because the organization did not provide training and ensure knowledge transfer to maintain a knowledgeable, technically competent workforce to adequately complete a modification of the Class 1E buses (Section 1R17.b.1).

- Green The inspectors identified a non-cited violation of 10 CFR 50 Appendix B, Criterion XVI, "Corrective Action," for failing to identify the applicability of US NRC Part 21 Report 2016-20-01 to the 1B emergency diesel generator's (EDG's) motor control center (MCC 1B). The licensee entered this issue into the corrective action program for resolution as CR 10240007. For corrective actions, the licensee performed an immediate operability determination and established compensatory measures to reset the breaker linkage in the event that it malfunctions.

The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of Equipment Performance and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of the systems that respond to initiating events to prevent undesirable consequences. The inspectors determined the finding to be of very low safety significance (Green) because the structure, system, or component maintained its operability or

functionality. The finding was assigned a cross-cutting aspect of Evaluation [P.2], in the Problem Identification and Resolution area because the organization did not thoroughly evaluate the Masterpact breaker Part 21 to ensure that resolutions addressed the causes (Section 1R17.b.2).

- Green: The inspectors identified two examples of a non-cited violation of 10 CFR 50 Appendix B, Criterion VII, "Control of Purchased Material, Equipment, and Services," for failing to assure that vendors met the quality standards specified in procurement documents (IEEE 323-1974, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations"). The licensee entered this issue into the licensee's corrective action program as CR10240023 and CR102399929. The licensee planned to ensure the adequate qualification of Class 1E components.

The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of Design Control and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of the systems that respond to initiating events to prevent undesirable consequences. The inspectors determined the finding to be of very low safety significance (Green) because the structure, system, or component maintained its operability or functionality. The finding was assigned a cross-cutting aspect of Field Presence [H.2], in the Human Performance area because senior managers did not ensure supervisory and management oversight of contractors (Section 1R17.b.3).

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R17 Evaluations of Changes, Tests, Experiments and Permanent Plant Modifications (71111.17T)

a. Inspection Scope

Evaluations of Changes, Tests, and Experiments: The inspectors reviewed seven safety evaluations performed pursuant to Title 10, *Code of Federal Regulations* (CFR) 50.59, "Changes, tests, and experiments," to determine if the evaluations were adequate and that prior NRC approval was obtained as appropriate. The inspectors also reviewed 22 screenings where licensee personnel had determined that a 10 CFR 50.59 evaluation was not necessary. The inspectors reviewed these documents to determine if:

- the changes, tests, or experiments performed were evaluated in accordance with 10 CFR 50.59 and that sufficient documentation existed to confirm that a license amendment was not required;
- the safety issues requiring the changes, tests or experiments were resolved;
- the licensee conclusions for evaluations of changes, tests, or experiments were correct and consistent with 10 CFR 50.59; and
- the design and licensing basis documentation used to support the change was updated to reflect the change.

The inspectors used, in part, Nuclear Energy Institute (NEI) 96-07, "Guidelines for 10 CFR 50.59 Implementation," Revision 1, to determine acceptability of the completed evaluations and screenings. The NEI document was endorsed by the NRC in Regulatory Guide 1.187, "Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments," dated November 2000.

This inspection constituted seven evaluation samples and 22 screening and/or applicability determination samples as defined in Inspection Procedure (IP) 71111.17-04.

Permanent Plant Modifications: The inspectors reviewed nine permanent plant modifications that had been installed during the last three years. The modifications reviewed are listed in the Attachment.

The modifications were selected based upon risk significance, safety significance, and complexity. The inspectors reviewed the modifications selected to determine if:

- the supporting design and licensing basis documentation was updated;
- the changes were in accordance with the specified design requirements;
- the procedures and training plans affected by the modification had been adequately updated;
- the test documentation as required by the applicable test programs had been updated; and
- post-modification testing adequately verified system operability and/or functionality.

The inspectors also used applicable industry standards to evaluate acceptability of the modifications and performed walkdowns of accessible portions of the modifications. Documents reviewed are listed in the Attachment.

b. Findings

b.1 Failure to Verify Adequate Design of Class 1E¹ 4160V Buses

Introduction: The inspectors identified a Green non-cited violation (NCV) of 10CFR 50 Appendix B, Criterion III, "Design Control," for the failure to verify adequate design and qualification of Class 1E buses in accordance with Institute for Electronics and Electrical Engineering (IEEE) 279-1971, "Standard Criteria for Protection Systems for Nuclear Power Generating Stations."

Description: The licensee determined that the planned installation of new switchyard transformers would increase the short circuit performance ratings at the 4160-volt (V) Class 1E buses from 250 million-volt-amperes (MVA) to 350MVA. The licensee modified the buses to accommodate the increased short circuit currents. The modifications were made in accordance with design change packages (DCPs) SNC489852 for Unit 1 and SNC489860 for Unit 2, "Safety Related (1E) Bus Upgrade" respectively. These were stand alone modification packages. The licensee completed modifications to the Class 1E buses to increase the bus ratings and closed the modification packages as complete on April 19, 2016, and June 12, 2015, respectively.

The Updated Final Safety Analysis Reports (UFSAR) Chapters 7 and 8 specified protection system conformance with IEEE 279-1971. For Class 1E components, IEEE 279-1971, Section 4.3 required, in part, the specification of quality requirements for design, manufacturing, and testing. For this, the DCPs stipulated the use of IEEE C37.20.2 "Metal-Clad and Station-Type Cubicle Switchgear." Section 4.4 of IEEE 279-1971 required, in part, that qualification must be based on type test data or reasonable engineering extrapolations of test data and that the data must represent the range of transient conditions of both the energy supply and the environment throughout which the system must perform. For this, the DCPs stipulated the use IEEE 323-1974 "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations."

The design to increase the short circuit performance of the buses used two pieces of Micarta composite material (~9" X 6" X 1") that were loosely fit over the bus bars connecting the bus phases together (A to B and B to C). Gravity and DOW 732 caulking along the edges held the Micarta in place. The manufacture data sheet specifically warned against applying the caulk on or near copper in confined spaces because of possible corrosion. The data sheet also warned that the caulk would not adhere well to the polymers widely used in electrical insulations (e.g. polyethylene). The bus bars appeared to be coated with a type of polyethylene epoxy. The inspectors noted that standard IEEE C37.20.2 required in Sections 4, "Ratings," and 5, "Tests," that design tests shall be re-performed if the design is changed so as to modify performance. Instead, the licensee only performed engineering calculations, which assumed the Micarta pieces would remain in place and restrain the bus bars rigidly. The inspectors

¹ **Class 1E.** The safety classification of the electric equipment and systems that are essential to emergency reactor shutdown, containment isolation, reactor core cooling, and containment and reactor heat removal, or otherwise are essential in preventing significant release of radioactive material to the environment.

were concerned that the bus could not meet the required short circuit performance ratings with an unproven design. For instance, the forces could overcome the gravity and caulking that held the Micarta in place. The licensee did not perform the required design tests to demonstrate adequate bus performance to the required ratings (Sections, 5.2.3 "Short-Time Current Withstand Tests" and 5.2.4 "Momentary Current Tests"). Further, IEEE 323-1974 Section 5 specified that for qualification, Class 1E equipment, including interfaces shall be demonstrated to perform its required function preferably by type test on actual equipment. The inspectors determined that the Class 1E buses were not designed and qualified to perform their safety function as required by IEEE 279-1971, Sections 4.3 and 4.4, and thus was in noncompliance with the plant licensing basis. Although the bus modifications were already completed and no reasonable process would have identified this noncompliance, the noncompliance was not an immediate safety concern because the new transformers would not be installed until the next outage.

Analysis: The failure to assure that Class 1E buses were designed, manufactured, inspected, calibrated, tested, and qualified in accordance with IEEE 279-1971 was a performance deficiency. The performance deficiency was determined to be more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, when the new transformers are installed, transients could cause the unrecoverable loss of Class 1E buses. Using IMC 0609, Att. 4, "Initial Characterization of Findings," issued June 19, 2012, for Mitigating Systems, and IMC 0609, App. A, "The Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012, the inspectors determined the finding to be of very low safety significance (Green) because the finding was a deficiency affecting the qualification of a mitigating system, structure, or component (SSC) and the SSC maintained its operability or functionality. The finding was assigned a cross-cutting aspect of Training [H.9], in the Human Performance area because the organization did not provide training and ensure knowledge transfer to maintain a knowledgeable, technically competent workforce to adequately complete a modification of the Class 1E buses.

Enforcement: Title 10 CFR Part 50 Appendix B, Criterion III, "Design Control," stated, in part that, design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. Contrary to the above, since April 2016, the licensee failed to assure that design control measures provided for verifying or checking the adequacy of design of the Class 1E 4160V buses, such as by the performance of a suitable testing program. The licensee failed to assure that these Class 1E 4160V buses were designed and qualified to withstand a 350MVA short circuit under all design conditions. This violation is being treated as a non-cited violation (NCV) consistent with section 2.3.2 of the NRC Enforcement Policy. The violation was entered into the licensee's corrective action program as condition report (CR) 10240030. The licensee planned to correct the issue prior to installing new transformers. The violation is identified as NCV 05000321/2016008-01 and 05000366/2016008-01, Failure to Verify Adequate Design of Class 1E 4160V Buses.

b.2 Failure to Identify a Condition Adverse to Quality for Masterpact 600V Breakers

Introduction: The inspectors identified a Green NCV of 10 CFR 50 Appendix B, Criterion XVI, "Corrective Action," for the failure to identify the applicability of US NRC Part 21 Report 2016-20-01 to the 1B emergency diesel generator's (EDG's) motor control center (MCC 1B).

Description: United States NRC Part 21 Report 2016-20-01 notified licensees of a failure mechanism where the internal linkages of the Masterpact NW breakers may bind preventing the breaker from re-closing. This condition could create a substantial safety hazard or a Technical Specification Safety Limit violation.

Licensees that used Masterpact breakers were required to evaluate their breakers to determine if the condition could have an impact to their plant operation. The licensee used these Masterpact breakers in the 600V safety-related electrical system required to support the 1B EDG. The licensee documented their review of the report in CR10189509 and concluded that the failure mechanism did not affect their Masterpact 600V breakers. When inspectors questioned the licensee's conclusion, the licensee determined that these breakers were susceptible to the identified failure mechanism and that plant operation could be adversely affected. The licensee declared the breakers as operable but degraded or non-conforming (OBDN). In addition, the licensee established compensatory measures to reset the breaker linkage in the event that it malfunctions. The potential failure of these breakers to re-close during applicable design basis accidents could have prevented the 1B EDG's support systems from receiving power, thus preventing the EDG from performing its safety function.

Analysis: The failure to promptly identify a condition adverse to quality by not properly evaluating the applicability of USNRC Part 21 Report 2016-20-01 was a performance deficiency. The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of Equipment Performance and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of the systems that respond to initiating events to prevent undesirable consequences. The failure to identify a condition adverse to quality resulted in reducing the reliability and capability of the 1B EDG to perform its specified safety function. Using IMC 0609, Att. 4, "Initial Characterization of Findings," issued June 19, 2012, for Mitigating Systems, and IMC 0609, App. A, "The Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012, the inspectors determined the finding to be of very low safety significance (Green) because the finding was a deficiency affecting the design of a mitigating structure, system, or component (SSC), and the SSC maintained its operability or functionality. The finding was assigned a cross-cutting aspect of Evaluation [P.2], in the Problem Identification and Resolution area because the organization did not thoroughly evaluate the Masterpact breaker Part 21 to ensure that resolutions addressed the causes.

Enforcement: Title 10 CFR Part 50 Appendix B, Criterion XVI, "Corrective Action," stated in part that, measures shall be established to assure that conditions adverse to quality such as defective equipment are promptly identified. Contrary to the above, since April 4, 2016, the licensee failed to assure that defective Masterpact breakers as described in Part 21 Report 2016-20-01 were promptly identified. Specifically, defects in Masterpact NW breakers could prevent the availability of the 1B EDG. The licensee entered this violation into the corrective action program as CR 10240007. For corrective

actions, the licensee performed an immediate operability determination and established compensatory measures to reset the breaker linkage in the event that it malfunctions. This violation is being treated as a NCV consistent with section 2.3.2 of the NRC Enforcement Policy and is identified as NCV 05000321/2016008-02 and 05000366/2016008-02, Failure to Identify a Condition Adverse to Quality for Masterpact 600V Breakers.

b.3 Failure to Control Qualification of Purchased 1E Components in Accordance to IEEE 323-1974

Introduction: The inspectors identified two examples of a Green NCV of 10 CFR 50 Appendix B, Criterion VII, "Control of Purchased Material, Equipment, and Services," for failing to assure that vendors met the quality standards specified in procurement documents (IEEE 323-1974, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations").

Description: The licensee's design change packages and purchase specifications, (SNC114879 - Unit 2 EDG LOCA/LOSP Timer Replacement and SNC101510 - Class 1E 400 Amp Battery Charger Replacements) required the vendor to qualify Class 1E components to IEEE 323-1974. Standard IEEE 323-1974, Section 5, specified that "It is preferred that the demonstration be done by type test on actual equipment. Operating experience and analysis may be used to supplement type tests." If augmenting the type test with analysis, then the representative portions (analysis and type test, respectively) must meet the requirements of their respective test procedures (Section 6.3 for type tests and Section 6.5 for analysis).

Section 6.3, "Type Test Procedures," specified that "a type test that shall be designed to demonstrate equipment performance meets or exceeds the requirements of the equipment specifications for the plant." The type test required, in part, that equipment be aged in such a way as to simulate the expected end-of-life condition of the equipment, prior to being subjected to simulated seismic vibration in accordance to IEEE 344 and the design basis event and post-accident conditions.

Section 6.5, "Analysis," required "a mathematical or logical proof that the Class 1E performance, of the equipment to be qualified, meets or exceeds its specified performance when subjected to its specified normal and design basis environments." Furthermore, this section stated that "all assumptions, including extrapolations that are made in proof, shall be justified by established principles or by verifiable test data; and the analysis shall be of a form that is readily understood and verified."

Lastly, Section 8, "Documentation," required, in part, that a qualification file be maintained in an auditable form which contains the test procedures, test setup, test results, test data (and accuracy), supporting data, assumptions, and analytical methods used.

Example 1: Loss of offsite power / loss of coolant accident (LOSP/LOCA) timer cards for EDGs 2A, 2C, and 1B.

The licensee required Class 1E qualification of the timing cards used for loading the LOSP/LOCA EDG. The licensee specified this must be in accordance with IEEE 323-1974 in purchasing documents. The vendor did not determine a qualified life for the

cards, and did not provide any justification or base qualification upon which the known limits of the extrapolation method could be computed for component life expectancy. Specifically, while not providing a qualified or design life explicitly, the vendor provided an aggregated mean time to failure (MTTF) of the cards at 38.25 years. The use of MTTF provides some measurement of reliability but does not provide a qualified life without justification of the methods of analysis, assumptions, or extrapolations. Environmental and seismic testing was performed on these cards without first applying thermal and non-thermal aging effects. The vendor did not provide justification that omission would not adversely affect the results of the type tests. The inspectors determined that the tests did not assure that the Class 1E components could meet their design functions throughout their required qualified lives as required by the licensing basis for Plant Hatch.

Example 2: Station service battery chargers for Unit 1 divisions 1 and 2 and Unit 2 division 2.

The vendor failed to qualify the station service battery chargers in accordance with IEEE 323-1974 per the licensee's purchase specifications. The qualified life (40 years) under normal conditions was performed by analysis. The qualification for abnormal and accident design conditions (electrical and environmental including seismic) was performed by type test.

The qualified life was determined by the analysis of the life expectancy of individual sub-components (diodes, terminal blocks, capacitors, etc.). If the individual sub-components were shown to have a life expectancy in excess of 120 years, the vendor determined that adequate margin existed to qualify the chargers for 40 years (the vendor called this a safety factor of three). This analysis did not consider the limitations of their extrapolation methods as required by IEEE 323-1974. Having known limitations, the Arrhenius method was used in many cases. As examples, Mylar coil tape was determined to have a life expectancy of 1.17×10^9 years, varnished Kraft paper was determined to have a life expectancy of 3.65×10^5 years, and Teflon tubing to have a life expectancy of 3.03×10^{11} years. Since these values were not verified by test data, did not have confidence limits determined, or uncertainties evaluated, the inspectors determined that the analysis did not support the qualified life of the battery chargers.

To qualify the chargers for their abnormal and accident design conditions, the vendor used a newly constructed prototype for a type test. The prototype charger was tested without first being aged to end of life condition as required by IEEE 323-1974. The prototype charger was subjected to the design basis temperature of near 58°C for 4 hours (temperature was not uniformly controlled during the test). The testing methodology was not described, discussed, or justified in the qualification report. Section 8 of IEEE 323-1974 required the discussion of test data, test setup, accuracy, margins, and test procedure to provide the proof needed to support the adequacy of the complete equipment qualification. The inspectors determined that type testing new equipment did not adequately replicate end of life conditions and did not support the qualification life of the battery chargers.

Analysis: The failure to assure that the LOSP/LOCA EDG timer cards and station service battery chargers were qualified in accordance with purchase specifications was a performance deficiency. The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of

Design Control and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of the systems that respond to initiating events to prevent undesirable consequences. The lack of qualification of the Unit 2A, 2C and 1B EDG LOSP/LOCA timer cards, and Unit 1 division 1 and 2, and Unit 2 division 2 station service battery chargers eroded confidence in these Class 1E components from being able to perform their specified safety functions over the course of their designed and installed lives. Using IMC 0609, Att. 4, "Initial Characterization of Findings," issued June 19, 2012, for Mitigating Systems, and IMC 0609, App. A, "The Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012, the inspectors determined the finding to be of very low safety significance (Green) because the finding was a deficiency affecting the design of a mitigating structure, system, or component (SSC), and the SSC maintained its operability or functionality. The finding was assigned a cross-cutting aspect of Field Presence [H.2], in the Human Performance area because senior managers did not ensure supervisory and management oversight of contractors.

Enforcement: Title 10 CFR Part 50 Appendix B, Criterion VII, "Control of Purchased Material, Equipment, and Services," stated in part that, measures shall be established to assure that purchased equipment conforms to the procurement documents. Contrary to the above, since October 2013 for the chargers and February 2015 for the LOCA/LOSP timer cards, the licensee did not assure that the LOSP/LOCA timer cards and station service battery chargers conformed to their purchase specification which included qualifying these Class 1E SSCs in accordance with IEEE 323-1974. The licensee failed to assure that these Class 1E SSCs were qualified to their purchase specification and that the qualification that was performed on these SSCs was performed in such a way as to give confidence that these SSCs will be able to perform their specified safety function at the end of their qualified life. This violation is being treated as a non-cited violation (NCV) consistent with section 2.3.2 of the NRC Enforcement Policy. The violation was entered into the licensee's corrective action program as CR10240023 and CR102399929. The licensee planned to ensure the adequate qualification of Class 1E components. The violation is identified as NCV 05000321/2016008-03 and 05000366/2016008-03, Failure to Control Qualification of Purchased 1E Components in Accordance to IEEE 323-1974.

b.4 (Opened) Unresolved Item (URI), Potential Departure from Protection System Design Basis

Introduction: The inspectors identified a URI regarding the licensee's compliance with the design bases for the Analog Transmitter Trip System (ATTS).

Description: On April 16, 2010, Unit 1 received an invalid emergency core cooling system (ECCS) LOCA signal on high drywell pressure due to a failed ATTS slave card that caused a voltage perturbation within a single panel. The licensee's root cause identified that the ATTS panel design did not comply with channel independence (IEEE 279-1971 Section 4.6). A design change (SNC116736) separated the specific cards that caused the false trip. During the review of design change, the inspectors identified that the ATTS panel design for other cards also do not comply with channel independence. A single failure within the ATTS panels could result in an interaction that can cause a failure of two channels. The licensee has provided documentation related to the original submittal of the design to the NRC and the NRC's acceptance of the design.

In addition, the UFSAR section 7.3.1.2, "System Descriptions," for the ECCS stated, in part, Instrumentation and control are designed to establish that the following functions are met:

- A. Each instrument channel functions independently of all others.
- B. Sensing devices respond to process variables and provide channel trips at correct values.
- C. Sensors and associated instrument channels respond to both steady-state and transient changes in the process variable within specified accuracy and time limitations, and they provide channel trips at correct values even when affected by process variations that may extend grossly beyond the expected trip setpoint.
- D. Paralleled circuit elements can perform their intended function independently.
- E. Series circuit elements are free from shorts that can abrogate their function.
- F. Redundant instruments of logic channels are free from interconnecting shorts that could violate independence if a single malfunction should occur.

There is not an immediate safety concern because no specific examples have been identified that would prevent an actuation from occurring. This URI is being opened to determine whether a performance deficiency exists and is identified as URI 05000321/2016008-04 and 05000366/2016008-04, Potential Departure from Protection System Design Basis.

40A6 Meetings, Including Exit

On June 23, 2016, the inspectors presented inspection results to Mr. Vineyard and other members of your licensee's staff. The inspectors verified that any proprietary information retained by the inspectors in order to resolve any violations or unresolved items would be disposed of properly upon resolution of the issues.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

A. Giancatarino, Engineering Director
B. Anderson, Health Physics Manager
B. Wainwright, Operations Training Manager
C. Vonier, Shift Operations Manager
D. Vineyard, Vice President
G. Johnson, Regulatory Affairs Manager
J. Collins, Principal Licensing Supervisor
J. Rathod, Site Projects Manager
K. Long, Work Management Director
M. Torrance, Design Manager
T. Lynn, Engineering Supervisor
T. Spring, Plant Manager

NRC personnel

J. Bartley, Branch Chief, Engineering Branch 1

LIST OF REPORT ITEMS

Opened and Closed

05000321, 05000366/2016008-01	NCV Closed	Failure to Adequately Qualify Modifications to Class 1E 4160V Buses (Section 1R17.b.1)
05000321, 05000366/2016008-02	NCV Closed	Failure to identify a condition adverse to quality for Masterpact 600V breakers (Section 1R17.b.2)
05000321, 05000366/2016008-03	NCV Closed	Failure to Control Qualification of Purchased 1E Components in Accordance to IEEE 323-1974 (Section 1R17.b.3)

Opened

05000321, 05000366/2016008-04	URI Opened	Unresolved Item, Potential departure from protection system design basis (Section 1R17.b.4)
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LIST OF DOCUMENTS REVIEWED

Permanent Plant Modifications

SNC98165, Replacement of Allis Chalmers LA-600 Breakers
SNC101510, Class 1E 400 Amp Battery Charger Replacements 1R42-S029, 1R42-S030 and 1R42-S031
SNC116736, Move Cards to Prevent False ECCS LOCA Initiation
SNC345308, Unit 1 Panel 1H11-P602 and 1H11-P603 Recorder Replacement
SNC360304, U1 HPCI Main Pump Mechanical Seal Replacement
SNC394670, U2 Main Steam Isolation Valve Retrofit
SNC429939, U2 Modified 3 Stage Safety Relief Valve Replacement
SNC473170, U2 ASD E-Stop Wiring Correction
SNC621043, Plant Service Water CCE for Cable Repair for Conduits 2E13288 & 2E13291

10 CFR 50.59 Evaluations

MDC1101735601, HPCI Turbine Exhaust Drain Line Removal
SNC110501, GE 600V Load Center Breaker Replacement
SNC114879, Unit 2 EDG LOCA/LOSP Timer Replacement
SNC116367, Unit 2 Reactor Feed Pump Turbine Controls Upgrade
SNC367415, U1 Mark V Upgrade to Mark Vie (RFPT)
SNC581096, U1 Vital AC Inverter Replacement (1R44-S001)
TE 320565, Unit 1 SRM/IRM Detector Not Full In Function (TE 320565)

10 CFR 50.59 Screenings

SNC98714, Replace Control Room Meters (Watts/Vars/Amps)
SNC116359, Replacement of Hatch Units 2A and 2C EDG Exciter Panels
SNC116369, Coordination Enhancement for 250 VDC MCC 2R24-S022 Cubicles 2B & 7B
SNC315666, Recirculation Pump Interference Removal
SNC341671, Replace U1 Div 1 Station Service Battery Charger (1R42-S026, S027, S028)
SNC345253, Unit 1 Panel 1H11-P650 Recorder 1N21-R912
SNC345309, U2 Non-Outage Replace Recorders in Panels 2N62-P600 (2N62-R602, 2N62-R604, & 2N62-R613)
SNC426796, Installation of Ball Check Indicator Valves on EDG 1R43S001A Cylinders
SNC434893, Installation of Ball Check Indicator Valves on EDG 2R43S001C Cylinders
SNC439362, Drywell Cooling & Chilled Water System 2P64-B006A/B Drywell Chiller Motor Current Monitoring Circuit Rework
SNC467488, Unit 2 FLEX Core Cooling
SNC489852/ SNC489860, Degraded Grid - U1 Safety Related (Class 1E) Bus Upgrade
SNC548379, Replace RF Bridge Breaker 1R24S015 2CL.
SNC568126, Establish Setpoints for 2E11-N021B
SNC595830, Unit 2 Div 2 SS Battery Charger Replacement
SNC619793, Diesel Generator Room Fan Motor Replacement
SNC641773, Replace SAT 2C Fault Pressure Trip Bypass Switch
SNC650091, ED for using an HMCP015E0 type breaker in place of FB10 type breaker
SNC687790, CCE for U1 HPCI Barometric Condenser Condensate Piping
SNC727212, Create ED for replacing HFB 10A breakers with HMCP 7A breakers
SNG10073570/ SCM-CGDP-074, CGD TRANSISTOR SILICON NPN TO-39 CASE
SNG10074507/ SCM-CGDP-052, CGD CIRCUIT MICRO DUAL TYPE D FLIP-FLOP

Licensing Bases Documents

30-100006, Standard Test Procedure for Chargers & Rectifiers
 DCP 1092172701, Replacement of Battery Chargers 1R42-S029, S030, & S031, Rev. 3
 HE-S-10-001, Specification for Battery Chargers for Edwin I Hatch Nuclear Power Plant Units 1 & 2, Rev. 6
 HNP-1-FSAR, Unit 1 Updated Final Safety Analysis Report, Rev. 31
 HNP-2-FSAR, Unit 2 Updated Final Safety Analysis Report, Rev. 34
 Procedure No. C102225, Ametek Solidstate Controls Electrical Test Procedure Addendum 400 AMP Battery Chargers for SCI Project C102225 Georgia Power / Southern Co. Hatch Nuclear Generating Station
 Report No. 56776R09, Mild Environment Aging Analysis Report for a 400A Battery Charger Manufactured by Ametek Solidstate Controls, Inc. for Use by Southern Nuclear Operating Company, Inc. Vogtle Electric Generating Plant Unit No. A
 S44268, NLI Qualification Report for Westinghouse Motor Control Center Components and Buckets, Rev. 1.0
 SN9604-002, EMI Qualification Requirements for Southern Nuclear Power Plant Equipment, Rev. 2
 SS-6915-2, Heating, Ventilating and Air Conditioning of Edwin I Hatch Nuclear Plant Unit 1, Rev. 1
 Technical Requirements Manual, Edwin I Hatch Nuclear Plant, Unit 1 and 2, Rev. 102
 Technical Specifications, Edwin I Hatch Nuclear Plant, Unit 1 and 2, Amendment No. 276
 TR-0380-0040-221, Hatch Nuclear Plant Unit 2 EDG LOSP/LOCA Loading Digital Timing Module Nuclear Qualification Project Environmental Test Report, Rev. 0, Specification No. HJ-S-10-001, Specification for Emergency Diesel Generator LOSP/LOCA, Loading Digital Timing Modules for Edwin I. Hatch Nuclear Plant – Unit No. 2.

Calculations

BH1-E-0104, Heat Load Generated by HNP Units 1&2 Electrical Equipment in the Main Control Room (MCR), Rev. 6
 BH1-M-V003-B001-0025, Control Building Ventilation, Rev. 3
 BH2-M-0210, Turbine Building HVAC – Summer Heat Gains, Rev. 4
 BH2-M-0576, MCR Heatup Due to Station Blackout, Rev. 3.7
 BH2-M-0578, HNP – 1,2 Control Building Heat-up due to Station Blackout (SBO Temp Profile), Rev. 1
 MCC-H-14-0011, Control Building Ventilation, Rev. 2
 MC-H-12-0066, Heat Load Generated by HNP Units 1&2 Electrical Equipment in the Main Control Room (MCR), Rev. 1
 MC-H-12-0067, Loading for Vital AC Panel 1R25-S063, Rev. 1
 MC-H-12-0183, ADS Valve Accumulator Leakage, Rev. 2
 MC-H-12-0184, ADS Check Valve Leakage Criteria, Rev. 2
 S64307, Hatch EDG Sequencer Module MTTF Calculation, Rev. 1
 SENH-00-009, Loading for Vital AC Panel 1R25-S063, Rev. 7
 SENH-13-007, Unit 1 Station Auxiliary System Load and Fault Study, Rev. 2
 SENH-13-010, Unit 2 Station Auxiliary System Load and Fault Study, Rev. 2
 SINH-14-006, Calculate Uncertainty and the Setpoint for RHR Discharge Header Flow DPIS 2E11-N021B, Rev. 1
 SMNH-70-012, Diesel Generator Bldg Heating & Ventilating, Rev. 0
 SMNH-70-012, Diesel Generator Bldg Heating & Ventilating, Rev. 2

Corrective Action Documents

386750	10041031	10189509	2001011349
591262	10091513	10189509	2007107001
656424	10140486	10231711	
783752	10140486	10236158	
799748	10148537	10240007	
10034715	10169986	1999003879	

Procedures

34AB-R22-003-1, Station Blackout, Rev. 9.1
 34AB-R22-003-2, Station Blackout, Rev. 8.2
 34AR-603-122-2, Safety/Blowdown VLV Pilot Seat Leaking ARP, Rev. 8.1
 34SO-B21-002-0, Safety/Blowdown Valve Leaking Annunciator Setpoint Change, Rev. 4.1
 34SO-R23-001-1
 34SO-U41-001-1, Turbine Building Ventilation System, Rev. 10.3
 34SO-U41-001-2, Turbine Building Ventilation System, Rev. 7
 51GM-MNT-043-0
 52CM-B21-001-2, MSIV Corrective Maintenance, Rev. 12.2
 52PM-E41-002-0, HPCI Turbine and Auxiliaries Major Inspection, Rev. 19.0
 52PM-R24-001-0
 57SV-SUV-011-2, ATTS Panel 2H11-P925 Channel FT&C, performed 12/4/13
 57SV-SUV-012-2, ATTS Panel 2H11-P926 Channel FT&C, performed 3/8/16
 57SV-SUV-012-2, ATTS Panel 2H11-P926 Channel FT&C, performed 9/10/13
 NMP-AD-012-GL03, Immediate Determination of Operability Guideline, Rev. 2.1
 NMP-AD-028, 10 CFR 21 Evaluations and Reporting Requirements, Rev. 3
 NMP-ES-039-002, Documentation of Engineering Judgment, Rev. 3
 NMP-GM-002-001, Corrective Action Program Instructions, Rev. 16.0

Drawings

H-12618, Diesel Generator Bldg, Heating & Ventilation, Rev. 5.0
 H-12619, Generator Building Heating & Ventilating General Arrangement, Rev. 12.0
 H-13396, Elementary Diagram, Diesel Generator 1B Heating & Ventilation, Rev. 18.0
 H-13648, Single Line Diagram Diesel Building 600/280V MCC – 1B and 1D MPL's 1R24-S048 and 1R25-S035, Rev. 39H-14239, Elementary Diagram Diesel Building 4160V and 600V Emergency Station Service FDR's, Rev. 16
 H-16038, Turbine Building Ventilation Process Flow Diagram SHT. – 1, Rev. 10
 H-16332, HPCI System P&ID, Sheet 1, Rev. 67.0
 H-16333, HPCI System P&ID, Sheet 2, Rev. 45.0
 H-23362, Edwin I Hatch Nuclear Power Plant Unit No.2 Single Line Diagram 600V Bus 2C & 2D, Rev. 38.0
 H-26087, Turbine Building Ventilation Process Flow Diagram, Rev. 5
 H-27648, Sheet 14, Residual Heat Removal Sys 2E11 Elementary Diagram, Rev. 39
 HB-16333, HPCI System, Sheet 2, ISI Boundary Diagram, Rev. 2.0
 S-16122B, Process Diagram – High Pressure Coolant Injection System, Rev. 2

Miscellaneous Documents

1082687901, 10 Year PM on HPCI Pump Turbine Drive, dated 8/24/10
 1995 ASHRAE Handbook, HVAC Applications, Chapter 23
 2013 ASHRAE Handbook, Fundamentals
 2042337301, 2B21F022D Failed to Open to 100%, dated 9/26/04
 2081399902, Restore MSIV Back to Factory Specs, dated 12/14/10

2110429801, 2B21F028A Failed to Meet Acceptance Criteria, dated 3/31/14
 2110432501, 2B21F022C Failed to Meet Acceptance Criteria, dated 10/19/11
 2110486501, 2B21F022B Loss of Back Seating Force Applied to Main Plug, dated 4/10/11
 B21-ADS-LP-03801, Automatic Depressurization System Lesson Plan, Rev. 5.0
 B21-SLLS-LP-01401, Main Steam and Low Set Lesson Plan, Rev. 11.0
 CAR 254954, 2B21-F028A and 2B21-F028C Had Excessive Stroke Times, dated 4/16/15
 DOEJ-HDSNC345253, Evaluation of Additional Load on Distribution Panel 1R25-S024 Due to Recorder 1N21-R912 Replacement, Rev. 1
 DOEJ-HDSNC345308-E001, Evaluation of Load on Distribution Panels 1R25-S063, 1R25-S064 and 1R25-S120 Due to Replacement of Recorders 1C32-R607, 1C32-R608, 1C32-R609, 1B21-R613 and 1P33-R603, Rev. 1
 DOEJ-HXSNC687790-S001, Pipe Stress Evaluation of Hatch Unit 1 HPCI Barometric Condenser Condensate Pump Piping, Rev. 1.0
 Hatch MSPI Basis Document, Rev. 7.0
 HL-1011, Plant Hatch – Units 1, 2 NRC Dockets 50-321, 50-366 Operating Licenses DPR-57, NPF-5, Supplemental Response to Station Blackout, dated 3/27/90.
 HL-1588, Plant Hatch – Units 1, 2 NRC Dockets 50-321, 50-366 Operating Licenses DPR-57, NPF-5, Supplemental Response to Station Blackout, dated 5/3/91
 HL-1959, Plant Hatch – Units 1, 2 NRC Dockets 50-321, 50-366 Operating Licenses DPR-57, NPF-5, Response to Supplemental Safety Evaluation of Station Blackout, dated 12/4/91
 HL-2401, Plant Hatch – Units 1, 2 NRC Dockets 50-321, 50-366 Operating Licenses DPR-57, NPF-5, Supplemental Information Concerning Station Blackout Calculations NRC TAC Nos. M68553 and M68554, dated 9/1/92
 HL-3309, Edwin I. Hatch Nuclear Plant Completion of Station Blackout Actions, dated 5/24/93
 HL-396, Plant Hatch – Units 1, 2 NRC Dockets 50-321, 50-366 Operating Licenses DPR-57, NPF-5, Response to Station Blackout Rule, dated 4/12/89.
 HM-S-09-001, Specification for Nuclear Safety Related Dual Function Safety/Relief Valves, Rev. 6.0
 HM-S-12-001, Specification for MSIV Internals Replacement, Rev. 2.0
 Inquiry No. SS-6915-2, Heating, Ventilating and Air Conditioning of Edwin I. Hatch Nuclear Plant Unit 1, Rev. 1
 LDCR 2004-042, Station Blackout Coping Analysis, Rev. 1
 License Amendment number 104, Edwin I. Hatch Nuclear Plant, Unit 1 Amendment to Facility Operating License, dated 12/27/84
 NID-10047, Letter from Target Rock to Bechtel, Hatch 3-Stage Upgrade, dated 2/17/10
 NL-16-0020, Edwin I Hatch Nuclear Plant 10 CFR 21 Evaluation 16-002 MPR Timing Module Capacitor Failure
 NL-16-0517, 10 CFR 21 Evaluation 16-006 NLI Masterpact Replacement Circuit Breakers, dated 4/18/16.
 Part 21 Report 2016-20-01, Masterpact NT and NW Style Circuit Breakers Failed to Electrically Close Following an Anti-Pump Condition (Updated)
 RER SNC741986, Evaluation of Diesel Gen Bldg. Switchgear Room Ventilation System Capacity, dated 10/19/15
 S-16788, HPCI Pump Instruction Manual GE VPF-2789-46, Rev. 4.0
 S-2016-1, Standing Order for SRV As-Found Testing Failures, Rev. 1.0
 S-25826, RHR Pump Performance Curve
 SER, Safety Evaluation of Station Blackout – E.I. Hatch Nuclear Plant, Units 1 and 2, dated 3/5/91
 SNC476653, Unit 1 FLEX Core Cooling, dated 2/25/16
 SNC489852, Degraded Grid – U1 Safety Related (1E) Bus Upgrade DCP, dated 4/19/16
 SNG10022647, Target Rock 2 Stage Base/Body Assemblies, dated 12/13/11

SNG10031201, SRV Pilots + Main Valve Body, dated 4/30/12
 SNG10080123, Rework of 12 Relief Valves, 2 Stage Mains Will Be Converted to 3 Stage Mains, dated 2/3/15
 SSE, Supplemental Safety Evaluation Hatch Units 1 and 2, Station Blackout Rule, dated 10/4/91
 SSE, Supplemental Safety Evaluation of Station Blackout – E. I. Hatch Nuclear Plant, Units 1 and 2, dated 11/1/91
 TR-FSDB-16402-001-00, Target Rock Field Service Data Book, dated 5/10/16
 TR-FSDB-16402-002-00, Target Rock Field Service Data Book, dated 5/12/16
 TR-FSDB-16402-003-00, Target Rock Field Service Data Book, dated 5/17/16
 Unit 2 MSIV Stroke Time and LLRT Trend Data, dated 6/7/16

Work Orders

SNC113986	SNC474716	SNC566810	WO114227788
SNC370771	SNC476393	SNC682903	WO115065173
SNC370772	SNC493706	SNC689813	WO115065174
SNC370773	SNC493707	SNC751911	
SNC428197	SNC520526	WO111848065	
SNC430192	SNC520698	WO112729648	

Condition Reports generated as a result of the inspection

CR10240030, Class 1E Bus Supports
 CR10238648, Calculation Procedure Enhancement
 CR10239929, NRC 50.59/Modifications Inspection – LOCA/LOSP Timer Cards (DCP SNC114879)
 CR10240007, Part 21 for Masterpact NT and NW breakers (Update)
 CR10240023, NRC 50.59/Modifications Inspection – Station Service Battery Chargers Not Qualified per IEEE 323-1974
 CR10238914, FSAR not Updated per 50.71(e)
 CR10238804, Cable/Raceway Installation
 CR10236158, 34SO-B21-002-0 Procedure Revision
 CR10233795, RER SNC714986
 CR10233114, BH2-M-0576
 CR10231711, DCP SNC345308 Recorders
 CR10231549, MDC 110735601
 CR10238537, Procedure 34SO-R23-001-1 Editorial Change
 CR10234124, U1 HPCI housekeeping issues, dated 6/9/16
 CR10236158, 34SO-B21-002-0 Procedure Revision, dated 6/15/16