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

March 15, 2011

Mr. Dennis R. Madison
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 TRIENNIAL FIRE PROTECTION REPORT 05000321/2010009 AND 05000366/2010009

Dear Mr. Madison:

On December 3, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed a triennial fire protection inspection at the Edwin I. Hatch Nuclear Plant, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on December 3, 2010, with you and other members of your staff during the exit meeting. Following completion of additional review in the Region II office, another exit meeting was held by telephone with Mr. S. Tipps and other members of your staff on February 24, 2011, to provide an update on changes to the preliminary inspection findings.

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

The report documents one NRC-identified finding of very low safety significance (Green). This finding was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because the finding was entered into your corrective action program, the NRC is treating the finding as a non-cited violation (NCV) consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest the NCV you should provide a response within 30 days of the date of the inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-001; and the NRC Resident Inspector at Hatch. In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy

of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS)component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at http://www.nrc.gov./reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Rebecca L. Nease, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos.: 50-321, 50-366
License Nos.: DPR-57, NPF-5

Enclosure: Inspection Report 05000321/2010009 and 05000366/2010009
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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ADAMS: x ☐ Yes ACCESSION NUMBER:_ml110740776_____ x☐ SUNSI REVIEW COMPLETE - **FE**

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cc w/encl:
B. D. McKinney, Jr.
Regulatory Response Manager
Southern Nuclear Operating Company, Inc.
Electronic Mail Distribution

Jeffrey T. Gasser
Chief Nuclear Officer
Southern Nuclear Operating Company, Inc.
Electronic Mail Distribution

M. J. Ajluni
Nuclear Licensing Director
Southern Nuclear Operating Company, Inc.
Electronic Mail Distribution

T. D. Honeycutt
Regulatory Response Supervisor
Southern Nuclear Operating Company, Inc.
Electronic Mail Distribution

L. Mike Stinson
Vice President
Fleet Operations Support
Southern Nuclear Operating Company, Inc.
Electronic Mail Distribution

R. D. Baker
Licensing Supervisor
Southern Nuclear Operating Company, Inc.
Electronic Mail Distribution

E. G. Anners
Licensing Engineer
Southern Nuclear Operating Company, Inc.
Electronic Mail Distribution

Paula Marino
Vice President
Engineering
Southern Nuclear Operating Company, Inc.
Electronic Mail Distribution

R. E. Varnadore
Site Support Manager
Edwin I. Hatch Nuclear Plant
Electronic Mail Distribution

Moanica Caston
Vice President and General Counsel
Southern Nuclear Operating Company, Inc.
Electronic Mail Distribution

Steven B. Tipps
Hatch Principal Engineer - Licensing
Edwin I. Hatch Nuclear Plant
Electronic Mail Distribution

Mr. Ken Rosanski
Resident Manager
Edwin I. Hatch Nuclear Plant
Oglethorpe Power Corporation
Electronic Mail Distribution

Chris Clark
Commissioner
Georgia Department of Natural Resources
Electronic Mail Distribution

Lee Foley
Manager of Contracts Generation
Oglethorpe Power Corporation
Electronic Mail Distribution

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Edwin I. Hatch Nuclear Plant
U.S. NRC
11030 Hatch Parkway N
Baxley, GA 30334

Arthur H. Domby, Esq.
Troutman Sanders
Electronic Mail Distribution

James C. Hardeman
Environmental Radiation Program Manager
Environmental Protection Division
Georgia Department of Natural Resources
Electronic Mail Distribution

(w/encl cont'd – See page 4)

(cc w/encl cont'd)
Ted V. Jackson
Emergency Response and Radiation
Program Manager
Environmental Protection Division
Georgia Department of Natural Resources
Electronic Mail Distribution

F. Allen Barnes
Director
Environmental Protection Division
Georgia Department of Natural Resources
Electronic Mail Distribution

Cynthia A. Sanders
Radioactive Materials Program Manager
Environmental Protection Division
Georgia Department of Natural Resources
Electronic Mail Distribution

James A. Sommerville
Program Coordination Branch Chief
Environmental Protection Division
Georgia Department of Natural Resources
Electronic Mail Distribution

Mr. Steven M. Jackson
Senior Engineer - Power Supply
Municipal Electric Authority of Georgia
Electronic Mail Distribution

Mr. Reece McAlister
Executive Secretary
Georgia Public Service Commission
Electronic Mail Distribution

Chairman
Appling County Commissioners
County Courthouse
69 Tippins Street, Suite 201
Baxley, GA 31513

Letter to Dennis R. Madison from Rebecca L. Nease dated March 15, 2011.

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT – NRC TRIENNIAL FIRE PROTECTION REPORT 05000321/2010009 AND 05000366/2010009

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-321, 50-366
License Nos.:	DPR-57, NPF-5
Report Nos.:	05000321/2010009 and 05000366/2010009
Licensee:	Southern Nuclear Operating Company, Inc. (SNC)
Facility:	Edwin I. Hatch Nuclear Plant, Units 1 and 2
Location:	Baxley, GA 31515
Dates:	November 15 – November 19, 2010 (Week 1) November 29 – December 3, 2010 (Week 2)
Inspectors:	P. Braxton, Reactor Inspector J. Dymek, Reactor Inspector F. Ehrhardt, Senior Reactor Inspector (Lead Inspector) P. Fillion, Senior Reactor Inspector M. Thomas, Senior Reactor Inspector
Accompanying Personnel:	G. Wiseman, Senior Reactor Inspector (Week 1 only)
Approved by:	R. Nease, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000321/2010-009, 05000366/2010-009; 11/15 - 19/2010 and 11/29 – 12/3/2010; Edwin I. Hatch Nuclear Plant, Units 1 and 2; Fire Protection.

This report covers an announced two-week triennial fire protection inspection by a team of five regional inspectors, from the U. S. Nuclear Regulatory Commission's (NRC's) Region II office located in Atlanta, Georgia.

The significance of most findings is indicated by their color (Green, White, Yellow, 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 NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

Green. The team identified a non-cited violation of Hatch Unit 1 License Condition 2.C.3 and Unit 2 License Condition 2.C.3 (a) for the failure to take timely corrective actions to restore emergency lighting to be in compliance with 10 CFR Part 50, Appendix R, Section III.J. Specifically, during a 2006 triennial fire protection inspection, a total of ten Unit 1 and Unit 2 indicating instruments, credited for alternative post-fire safe shutdown, were identified in condition reports written in 2006, as not having dedicated emergency lighting units installed to illuminate the instruments. The licensee subsequently closed the 2006 condition reports to design change packages and, at the time of this inspection, had not implemented the modifications to restore compliance. The licensee entered the current non-compliance into their corrective action program as condition report CR 2010115127.

The licensee's failure to take timely corrective actions to address non-compliances with 10 CFR Part 50, Appendix R, Section III.J, as required by the licensee's fire protection program, is a performance deficiency. The finding is more than minor because it affects the human performance attribute of the Mitigating Systems cornerstone and the objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, the finding affected the ability of operators to shutdown the reactor from outside the control room in the event of a fire. The team evaluated this finding using Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," Phase 1 Qualitative Screening Approach. The finding affects post-fire safe shutdown and was assigned a low degradation rating because operators had a high likelihood of completing tasks requiring use of the affected indicators using hand-held portable lights. The finding is characterized as Green, a finding of very low safety significance. The finding has a cross-cutting aspect in the Human Performance Area, Resources component, because the licensee failed to ensure that equipment was available and adequate to assure nuclear safety. Specifically, the licensee did not ensure that emergency lighting units were adequate to support post-fire safe shutdown actions (H.2 (d)). (Section 1R05.08)

B. Licensee-Identified Violations

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R05 Fire Protection

This report documents the results of a triennial fire protection inspection (TFPI) of the Edwin I. Hatch Nuclear Plant, Units 1 and 2. The inspection was conducted in accordance with NRC Inspection Procedure (IP) 71111.05T, "Fire Protection (Triennial)," dated December 24, 2009. The objective of the inspection was to verify implementation of the fire protection program (FPP) by reviewing a minimum sample of three risk-significant fire areas and to verify site specific implementation of at least one B.5.b mitigating strategy including the storage, maintenance, and testing of B.5.b mitigating equipment.

The three fire areas (FAs) were selected after reviewing available risk information (as analyzed by a senior reactor analyst from Region II), previous inspection results, the relationship between combustible material and targets, location of equipment needed to achieve and maintain safe shutdown (SSD) of the reactor, and performing plant walk downs of fire areas. The B.5.b mitigating strategy was selected after reviewing licensee submittal letters, safety evaluation reports (SERs), licensee commitments, B.5.b implementing procedures, and previous NRC inspection reports.

Section 71111.05-05 of the IP specifies a minimum sample size of three fire areas and one B.5.b implementing strategy for addressing large fires and explosions. This inspection fulfilled the requirements of the IP by selecting three fire areas, and one B.5.b mitigating strategy. The following specific fire areas were inspected:

- Diesel Generator Building Switchgear Room 2G (FA 2409)
- E 600V Switchgear Room 2D (FA 2017)
- Cable Spreading Room (FA 0024A)

For each of the selected fire areas, the inspection team evaluated the licensee's FPP against the applicable NRC requirements. The specific documents reviewed by the team are listed in the Attachment.

.01 Protection of SSD Capabilities

a. Inspection Scope

Methodology

The team reviewed the licensee's FPP referenced in Updated Final Safety Analysis Report (UFSAR) Section 9.5.1, the licensee's safe shutdown analysis report (SSAR), plant procedures, piping and instrumentation diagrams (P&IDs), electrical drawings, and other supporting documents. The team performed the review to verify that hot and cold shutdown could be achieved and maintained from the main control room (MCR) for

postulated fires in FAs 2017 and 2409. The review included verification that shutdown from the MCR could be performed both with and without the availability of offsite power. The team performed in-plant inspections to verify that the plant configuration was consistent with that described in the fire hazards analysis (FHA) and SSAR. The team reviewed the licensee's shutdown methodology to verify that it properly identified the components and systems necessary to achieve and maintain SSD conditions for postulated fires resulting in shutdown from the MCR. The team focused their inspection activities on systems specified in the SSAR for reactivity control, reactor coolant makeup, and decay heat removal, as well as process monitoring instrumentation and necessary support systems.

Operational Implementation

The team reviewed and performed a walkthrough of procedure steps used for post-fire SSD to ensure the technical and human factors adequacy of the procedures. The team verified the licensee personnel credited for performance of procedures were available in the event a fire occurred, had procedures available, and were trained on implementation. The team also verified that operators could reasonably be expected to perform the procedure actions in order to maintain plant parameters within specified limits.

The team reviewed and walked down applicable sections of Abnormal Operating Procedure 34AB-X43-001-2, Fire Procedure, for Unit 2 FAs 2017 and 2409. The team reviewed operator actions to ensure these actions could be implemented in accordance with plant procedures in a manner necessary to support the SSD method for the applicable fire area.

b. Findings

No findings of significance were identified.

.02 Passive Fire Protection

a. Inspection Scope

For the selected fire areas, the team evaluated the adequacy of fire barrier walls, ceilings, floors, mechanical and electrical penetration seals, fire doors and fire dampers. The team walked down accessible portions of the selected fire areas to observe the material condition of fire barriers. The team also reviewed fire endurance testing and the configuration of the installed fire features, as well as construction detail drawings and design change records. The team reviewed calculations contained in the Fire Protection Combustible Loading Data System to verify that the plant fire loading used by the licensee was appropriate for the stated fire resistance rating of the fire barrier enclosures. The team reviewed the Fire Protection Penetration Seal Deviation Analysis for non-standard installation of penetration seals and fire dampers in FA 2017 and FA 2019. The team also reviewed procedures describing the installation, maintenance and repair of electrical raceway fire barriers, silicone foam seals, fire dampers and fire doors. The team reviewed licensing basis documentation to verify that passive fire protection features met license commitments.

b. Findings

Introduction: The team identified an unresolved item (URI) involving the requirements for the installation of high-voltage liquid insulated transformers installed indoors. This item is unresolved pending receipt and review of additional documentation.

Description: FA 2017 and adjacent FA 2019 contained liquid insulated 4160-600 V transformers. The insulating liquid in these transformers was Dow Corning PMX-561, which is a combustible silicone based liquid with an ignition temperature of 460 ^{o}F. The team identified that the equipment in the FAs did not appear to be consistent with the requirements described in NRC Position D.1.g of Appendix A to Branch Technical Position (BTP) APCSB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants," dated August 23, 1976, in that the FAs contained both high-voltage-high-current transformers insulated with combustible liquid, and safety-related equipment, without enclosure in a three-hour barrier and installing automatic fire suppression. The north and west walls of FA 2017 and the north, east, and west walls of FA 2019 are credited as two-hour fire rated fire barriers. Additionally, the room comprising FA 2019 did not have a three-hour rated wall, and had a leakage path under the door such that transformer insulating fluid could spread to the adjacent FA. The Hatch FHA contained exemptions from certain requirements of 10 CFR Part 50, Appendix R for the above stated requirements, obtained at the time that 10 CFR Part 50, Appendix R became effective, but the exemptions were based on having negligible fuel loading in the FAs. The team determined that the exemption request was based on the licensee's belief that the original transformer insulating liquid represented negligible combustible loading, which was not the case at the time of the inspection.

During the inspection, the team attempted to determine the actual fire endurance capabilities of the walls surrounding FAs 2017 and 2019 as well as the fire rating of various masonry block wall penetrations. However, this information could not be ascertained during the inspection. The licensee initiated condition reports (CRs) 201000869, 2010115004, 2010115915, and 2010115986 to address these issues in their corrective action program. The matter is unresolved pending receipt and analysis of information from the licensee necessary to determine whether FAs 2017 and 2019 meet the requirements of Position D.1.g of Appendix A to BTP APCSB 9.5-1 and the licensee's fire protection program licensing basis. An unresolved item, URI 05000366/2010009-01, "Acceptability of Liquid Filled Transformers in Fire Areas 2017 and 2019," is being opened pending receipt and review of this information.

.03 Active Fire Protection

a. Inspection Scope

The team reviewed the fire detection, fire protection water supply system, automatic water and carbon dioxide fire suppression systems, and manual fire hose and standpipe systems in each of the selected fire areas. The team reviewed the fire detection and suppression methods for the types of fire hazards existing in the selected FAs. The team compared the configuration of the fire detection and fire suppression systems to the applicable National Fire Protection Association (NFPA) Standard for the selected FAs by reviewing documents and performing in-plant walkdowns. The team compared the testing and maintenance program for the fire detection and suppression systems to the testing and maintenance requirements of the Hatch Nuclear Plant (HNP) FPP. The

team inspected the material condition and operational lineup of the fire detection and suppression systems by reviewing test records, by conducting observations of system surveillance testing of sprinkler systems in the east cableway and south corridor control building (elevation 130'), and through in-plant walkdowns.

For the selected fire areas, the team compared fire fighting pre-plan strategies to existing plant layout and equipment configuration and to the fire response procedures. The team assessed the condition of fire fighting and smoke control equipment by inspecting equipment located at fire brigade staging and dress out areas. The team evaluated fire brigade staffing, qualification and training, and conduct through a review of records and procedures and by observing an unannounced fire drill. Specific attributes of fire brigade conduct evaluated by the team included selection and implementation of appropriate strategy and tactics, command and control, communications, and use of fire brigade equipment.

b. Findings

No findings of significance were identified.

.04 Protection From Damage From Fire Suppression Activities

a. Inspection Scope

The team evaluated whether the installed automatic pre-action sprinkler systems or manual fire fighting activities for FA 0024A, the Cable Spreading Room (CSR) located at elevation 147'-0" of the Control Building, could adversely affect equipment credited for SSD, inhibit access to alternate shutdown equipment, or adversely affect local operator actions required for SSD. The team considered the consequences of a pipe break, failure of a system isolation valve, failure of a system alarm check valve, and sprinkler system actuation concurrent with manual fire fighting activities as could result from an actual fire in the CSR. The team reviewed the design change records and supporting hydraulic calculations for the water supply piping feeding the Unit Nos. 1 and 2 automatic pre-action sprinkler systems as well as floor drain systems located within the CSR and in those areas in the vicinity of water supply piping.

b. Findings

Introduction: The team identified a URI concerning protection of equipment in the CSR and adjacent to the CSR from damage from fire suppression activities. During the on-site inspection, the licensee did not present sufficient documentation to demonstrate that a failure, mal-operation, or actuation of the automatic pre-action sprinkler systems or manual fire fighting activities would not significantly impair structures, systems and components considered important to safety. This item is unresolved pending receipt and review of additional documentation.

Description: The licensee originally documented its evaluation of compliance to BTP APCSB 9.5-1 in the "Evaluation of the Hatch Nuclear Plant Fire Protection Program". The NRC approved the Hatch FPP in an SER dated October 4, 1978, based on this evaluation.

As part of the above referenced SER, the licensee committed to install sprinklers and additional smoke detection in the CSR during the next plant refueling outage. The licensee subsequently installed two separate 6-inch pre-action sprinkler systems connected to an 8-inch line tied back to the turbine and control building fire loop. This loop is fed by three large fire pumps taking suction from redundant 300,000 gallon water supply tanks. Each of the pre-action sprinkler systems feeds a series of branch lines within the CSR. These branch lines are normally dry. Alarm check and isolation valves, and associated 8-inch and 6-inch water supply piping, are located in FAs outside the CSR.

The SER referenced above also incorporated an operating license condition requiring the licensee to "maintain in effect and fully implement all provisions of the approved fire protection plan." The HNP FHA Appendix D, “BTP APCSB 9.5-1 Compliance”, Section IV.B.1.i states, “Floor drains are provided throughout the plant to remove water from normal sources. Fires are not normal events and water from some deluge or sprinkler system and from hose streams might temporarily exceed the capacity of the drain system in some areas. However, analyses have shown that these the occurrences would not jeopardize any safety-related systems.” Section 3.0 of the HNP FHA, entitled “Methodology’” Subsection 3.7, “Flooding/Inadvertent Actuation” states, “The fire hazard analysis does not specifically address the effects of flooding or water spray due to the rupture or inadvertent actuation of fire suppression systems. Rupture of moderate energy systems is described in Chapter 3 of the FSAR.” These two statements in the FHA appear to be inconsistent. Furthermore, the team reviewed HNP Unit 1 and HNP Unit 2 UFSARs and found that neither contained an analysis or calculation demonstrating that rupture of fire suppression systems would not jeopardize safety related systems. Specifically, in the Unit 1 UFSAR, HNP-1-FSAR-15, Table 15A-1, “Moderate and High Energy Lines,” states systems with service pressure less than 275 psig and temperature less than 200 ^{o}F are excluded. Since suppression systems are less than 275 psig and 200 ^{o}F, they were excluded for Unit 1. Additionally, the team found that in the Unit 2 UFSAR, HNP-2-FSAR-15A.A.4, “Additional Moderate-Energy Lines Needed to be Analyzed,” specifically lists the fire protection system. However, the licensee could not locate the analysis for Unit 2.

The rupture of fire suppression systems and valves was the subject of Information Notice IN 98-31, “Fire Protection System Design Deficiencies and Common Mode Flooding of Emergency Core Cooling System Rooms at Washington Nuclear Project Unit 2.” The licensee did not provide documentation that they had addressed this information notice in their operating experience program.

The licensee entered this issue into their corrective action program as CR 2010115119. After the on-site inspection, the licensee developed a document based on engineering judgment and transmitted it to the team. This document provides an analysis of installed drain capacity in the CSR and an estimate of expected flow from the pre-action sprinkler system in the event of a fire.

Additional review by the NRC will be performed when the remaining documentation and/or analyses have been provided by the licensee that demonstrates that failure, mal-operation, or actuation of the automatic pre-action sprinkler systems, or manual fire fighting activities, would not impair structures, systems, and components important to safety in the CSR and adjacent to the CSR. An unresolved item, URI 05000321; 05000366/2010009-02, “Protection of Systems Structures and Components from

Damage as a Result of Fire Suppression Activities," is being opened pending receipt and review of this documentation. This URI applies to both Unit 1 and Unit 2.

.05 Alternative Shutdown Capability

a. Inspection Scope

Methodology

The team reviewed the licensee's FPP referenced in UFSAR Section 9.5.1, the licensee's SSAR, plant procedures, P&IDs, electrical drawings, and other supporting documents for postulated fires in FA 0024A. The team performed the review to ensure that the required functions for post-fire SSD, and the corresponding equipment necessary to perform those functions, were included in the procedures. The team assessed whether transfer of control from the MCR to the remote shutdown panels (RSDPs), as well as hot and cold shutdown from outside the MCR, could be successfully accomplished. The review included verification that shutdown from outside the MCR could be performed both with and without the availability of offsite power.

The team selected the reactor core isolation cooling (RCIC) system for a detailed review. This review included a comparison of the components comprising the RCIC flow path, as indicated on the RCIC flow diagram, with the RCIC components included in the SSD equipment list. The team also reviewed all RCIC power operated valve control circuits to determine whether transfer/isolation switches were provided to ensure operation of the valves from the remote shutdown panel.

The team performed in-plant inspections to verify that the plant configuration was consistent with that described in the SSAR. The team focused their inspection activities on systems specified in the SSAR for reactivity control, reactor coolant makeup, and decay heat removal, as well as process monitoring instrumentation and necessary support systems.

Operational Implementation

The team reviewed shift attendance records to verify that personnel required to accomplish SSD, exclusive of those assigned as fire brigade members, were available onsite. The team also verified that licensee personnel had SSD procedures available and were trained on implementation. The team reviewed training lesson plans, job performance measures, and simulator scenarios for licensed and non-licensed operators to verify that the training included the shutdown methodology of the SSAR and the SSD procedures required to be used for a fire in FA 0024A.

The team reviewed and walked down selected applicable steps of Unit 2 Emergency Operating Procedure 31RS-OPS-001-2, "Shutdown from Outside Control Room, for FA 0024A," in order to assess technical and human factors adequacy of the procedure. The team also verified that operators could reasonably be expected to perform the procedure actions in order to maintain plant parameters within specified limits.

The team reviewed periodic test procedures and test records of alternate shutdown transfer capability and instrumentation and control functions to ensure that the tests were adequate to verify the functionality of alternative shutdown capability.

b. Findings

No findings of significance were identified.

.06. Circuit Analysis

a. Inspection Scope

The team reviewed the structures, systems, and components (SSCs) required for post-fire SSD as well as the SSCs important to SSD, contained in the licensee's SSAR. The team performed this review to identify scenarios which could adversely affect the capability to achieve and maintain hot shutdown, such as process flow diversions.

The team also reviewed P&IDs, control circuit diagrams and cable routing information. The team performed this review to ensure the following criteria were met for each fire area selected for inspection:

- The SSD equipment list was complete and accurate and indicated the normal and required SSD mode of operation each component.
- The licensee's analysis identified one set of credited systems/components sufficient to achieve SSD.
- The licensee had either protected cables important to credited systems/components from fire damage or, if vulnerable to damage, provided a resolution consistent with requirements and guidance.
- The licensee documented the routing, with respect to fire areas, of each cable important to SSD

b. Findings

No findings of significance were identified.

.07 Communications

a. Inspection Scope

The team verified, through inspection of the contents of designated emergency storage lockers and review of alternative shutdown procedures, that the portable communication equipment was available, operable, and adequate for alternative shutdown procedure performance. The inspection considered ambient noise levels, clarity of reception, reliability, and coverage patterns. The team also reviewed condition reports and fire drill critiques to assess the effectiveness of the plant radio system. Problems and corrective actions were discussed with the licensee communications system engineers. Specific documents reviewed by the team are listed in the Attachment.

b. Findings

No findings of significance were identified.

.08 Emergency Lighting

a. Inspection Scope

The team inspected the licensee's emergency lighting systems to verify that 8-hour emergency lighting was provided, as required by 10 CFR 50, Appendix R, Section III.J, to support local manual operator actions required for post-fire operation of SSD equipment. The team performed in-plant walkdowns of the selected fire areas to verify that emergency lighting units were installed and lamp heads were aimed to adequately illuminate SSD equipment as well as access and egress routes.

The team reviewed surveillance test data to verify that individual battery-operated lighting units were capable of supplying sufficient illumination for 8 hours. The team compared the testing and maintenance practices for the emergency lighting units to accepted industry practice and the manufacturer's recommendations. The team verified that emergency exit lighting was provided for personnel evacuation pathways as identified in NFPA 101, "Life Safety Code, and Occupational Safety and Health Administration," Part 1910, "Occupational Safety and Health Standards." The team also verified that backup emergency lighting was provided for the primary and secondary fire emergency equipment storage locker locations and dress-out areas in support of fire brigade operations should power fail during a fire emergency. Specific documents reviewed by the team are listed in the Attachment.

b. Findings

Introduction: The team identified a Green non-cited violation (NCV) of Hatch Unit 1 License Condition 2.C.3 and Unit 2 License Condition 2.C.3 (a) for the licensee's failure to take timely corrective actions to restore emergency lighting to be in compliance with 10 CFR Part 50, Appendix R, Section III.J, as identified during the 2006 NRC triennial fire protection inspection.

Description: The team reviewed issues resulting from the 2006 TFPI that had been entered into the licensee's corrective action program. Condition reports, CR 2006104628 and CR 2006104663, dated April 19, 2006, and April 20, 2006, respectively, identified a total of ten Unit 1 and Unit 2 indicating instruments (e.g. reactor pressure vessel water level, pressure and shroud water level indications) credited for post-fire safe shutdown shutdown that did not have dedicated emergency lighting units (ELUs) installed to illuminate the instruments. The licensee subsequently closed the condition reports to design change packages (DCPs) 1081131101 and 2081131201. At the time of this inspection, the licensee had not implemented the modifications associated with these DCPs. The team concluded that the licensee's corrective actions to address the non-compliance was untimely, given that for approximately 5 years the issue had not been corrected.

The team observed that operators have access to emergency operating procedure storage boxes, containing hand-held portable lights, located at the remote shutdown

panels. The hand-held portable lights are included in the licensee's surveillance testing program and could be used as a compensatory measure to provide the necessary lighting to illuminate the indicating instruments, until the fixed ELUs were installed. However, the team determined that use of these flashlights was not identified as a compensatory measure as required by procedures NMP-ES-035-005 and 31GO-OPS-011-0 and discussed the issue with the licensee. The licensee subsequently entered this issue into their corrective action program (CR 2010115120) to formally establish the use of flashlights as a compensatory measure until the ELU deficiencies are corrected.

Analysis: The licensee's failure to take timely corrective actions to address non-compliances with 10 CFR Part 50, Appendix R, Section III.J, as required by the licensee's fire protection program, is a performance deficiency.

The finding is more than minor because it affects the human performance attribute of the Mitigating Systems cornerstone and the objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, the finding affected the ability of operators to shutdown the reactor from outside the control room in the event of a fire.

The team evaluated this finding using with IMC-0609, Appendix F, "Fire Protection Significance Determination Process," Phase 1 Qualitative Screening Approach. The finding affects post-fire safe shutdown and was assigned a low degradation rating because operators had a high likelihood of completing tasks requiring use of the affected indicators using hand-held portable lighting. The finding is characterized as Green, a finding of very low safety significance.

The finding has a cross-cutting aspect in the Human Performance Area, Resources component because the licensee failed to ensure that equipment is available and adequate to assure nuclear safety. Specifically, the licensee did not ensure that emergency lighting units were adequate to support alternative post-fire safe shutdown actions (H.2 (d)).

Enforcement:

Edwin I. Hatch License Conditions 2.C.3 and 2.C. (3) (a) for Units 1 and 2 respectively, state, in part, that "the licensee shall implement and maintain in effect all the provisions of fire protection program, which is referenced in the Updated Final Safety Analysis for the facility, as contained in the updated Fire Hazard Analysis and Fire Protection Program." Appendix A of the updated FHA requires, in part, that the FPP meet Appendix A to Branch Technical Position (BTP) APCSB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976," dated August 23, 1976." Section C.8 of Appendix A to BTP APCSB 9.5-1 requires, in part, that measures be established to assure conditions adverse to fire protection, such as failures, malfunctions, and deficiencies, are promptly identified, reported, and corrected.

Contrary to the above, for the period of time between April 2006 and December 2010, the licensee failed to correct the deficiencies with the Appendix R ELUs associated with ten alternate shutdown indicating instruments. Because this issue is of very low safety significance and has been entered into the licensee's corrective action program as CR 2010115127, the violation is being treated as a non-cited violation (NCV) consistent with Section 2.3.2 of the NRC Enforcement Policy, and is designated as NCV

05000321;05000366/2010009-03, “Untimely Corrective Action for Installing Appendix R Emergency Lights.”

.09 Cold Shutdown Repairs

a. Inspection Scope

Per the licensee’s FHA, no repairs are necessary to achieve cold shutdown conditions following a fire event. The team verified that a fire in the selected fire areas would not prevent a controlled cold shutdown to be achieved within the time frame specified by their design and licensing basis.

b. Findings

No findings of significance were identified.

.10 Compensatory Measures

a. Inspection scope

The team reviewed the administrative controls for out-of-service, degraded and/or inoperable fire protection features (e.g. detection and suppression systems and passive fire barriers). The team reviewed selected items from the impairment list and compared them to the FAs selected for the inspection. The team also observed performance of a fire protection surveillance activity, including implementation of compensatory measures.

b. Findings

No findings of significance were identified.

.11 B.5.b Mitigating Strategy

a. Inspection Scope

The team reviewed, on a sample basis, the licensee’s spent fuel pool external makeup mitigation measures for large fires and explosions to verify that the measures were feasible, personnel were trained to implement the strategies, and equipment was properly staged and maintained. The team requested and reviewed inventory, surveillance testing, and maintenance records of required equipment. Through discussions with plant staff, review of documentation, and plant walk-downs, the team verified the engineering basis to establish reasonable assurance that the makeup capacity could be provided using the specified equipment and water sources. The team reviewed the licensee’s capability to provide a reliable and available water source and the ability to provide the minimum fuel supply. The team performed a walk-down of the storage and staging areas for the B.5.b equipment to verify that equipment identified for use in the current procedures were available, calibrated and maintained. In the presence of licensee staff, the team conducted an independent audit and inventory of required equipment and a visual inspection of the dedicated credited power and water source. The team reviewed training records of the licensee’s staff to verify that operations and security personnel training/familiarity with the strategy objectives and

implementing guidelines were accomplished according to the established training procedures.

The team verified, by review of records and physical inspection, that B.5.b equipment was currently being properly stored, maintained, and tested in accordance with the licensee's B.5.b program procedures. It was noted that at the time of the inspection testing and maintenance records for this equipment were current.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

a. Inspection Scope

The team reviewed recent independent licensee audits for thoroughness, completeness and conformance to requirements. Requirements for the independent audits are contained in Generic Letter 82-21 "Technical Specifications for Fire Protection Audits" and the licensee's Quality Assurance Manual, as well as Appendix A to BTP APCSB 9.5-1 "Guidelines for Fire Protection for Nuclear Power Plants," Section C.10, Audits. The team reviewed other corrective action program documents, including completed corrective actions documented in selected CRs, and operating experience program documents to verify that industry-identified fire protection problems potentially or actually affecting the plant were appropriately entered into and resolved by the corrective action program process. The team included NRC Regulatory Issue Summaries, Information Notices, industry and vendor-generated reports of defects and noncompliance under 10 CFR Part 21, and vendor information letters in their review of operating experience program effectiveness. The team reviewed the timeliness, apparent cause determination, proposed corrective action, and other attributes associated with a sample of CRs. The CRs reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

4OA5 Other

1. (Closed) URI 05000366/2003006-01, Concerns Associated with Potential Opening of SRVs

a. Inspection Scope

In 1993, the licensee modified the analog transmitter tripping system by adding pressure transmitters and associated circuitry which would electrically open all eleven safety/relief valves (SRVs) if reactor vessel pressure reached a level above any mechanical actuation set point. The intent of this modification was to enhance plant safety by providing an independent means, redundant to the mechanical actuators, of preventing

over-pressurization of the nuclear steam supply system. The reason for making the modification was to mitigate the effects of corrosion-induced setpoint drift on Target Rock two-stage SRVs. After installing the modification, the licensee added a step to the post-fire SSD procedures to defeat the SRV electrical backup scheme should a fire start in an area containing the pressure transmitter instrumentation cables. The step, performed in the MCR, was intended to address a concern that fire-induced damage to two instrumentation cables of the same division could result in opening all eleven SRVs.

During a previous inspection, the NRC identified concerns related to the type of logic implemented by the backup high pressure actuation circuitry and the licensee's approach to preventing or minimizing the impact of potential spurious opening of all eleven SRVs. The NRC opened this URI to ensure that those concerns were subsequently reviewed and evaluated. During this inspection, the team reviewed the URI, including the instrument loop, the tripping circuit, the power supplies, the routing of instrumentation cables and the associated procedure step to disable the circuitry.

b. Findings

The team reviewed the instrumentation loop circuitry for the four pressure transmitters (2B21-N127 A, B, C & D) used for the backup high pressure actuation of the SRVs. Team determined that any credible circuit fault, such as open circuit, short-circuit, short-to-ground, or "leakage" of the 4 to 20 milliamp signal, could not result in the receipt of a false high-pressure signal by the master trip units (2B21-N697 A, B, C & D). The team concluded that there is no credible fire-induced failure mode for these instrument loops that would lead to spurious opening of all SRVs and therefore no need to defeat the backup high-pressure protection as part of the post-fire SSD procedures. This conclusion was confirmed by licensee Instrumentation and Control Engineers located in Birmingham, AL.

The team also reviewed the high pressure actuation circuitry logic. The logic utilized a total of four channels; two channels in "DIV I" and two channels in "DIV II." The SRVs will open if any of the following combinations of channels are actuated due to high pressure:

- DIV I channel 1 and DIV I channel 2
- DIV II channel 1 and DIV II channel 2
- DIV I channel 1 and DIV II channel 2
- DIV I channel 2 and DIV II channel 1

The team determined that neither a single channel failure nor failure of a division power supply would result in spurious opening of the SRVs. The team also determined that neither a single channel failure nor failure of a division power supply would prevent opening the SRVs. The team concluded that the logic implemented by the high pressure actuation circuitry would not result in a common cause failure of SRVs

This URI is closed.

.2 (Open) Unresolved Item (URI) 05000321; 05000366/2006006-001, Local Operator Actions in Lieu of Cable Protection for a Fire Area Subject to the Requirements of III.G.2

a. Inspection Scope

This URI was opened during the 2006 TFPI at Hatch to monitor the licensee's resolution of the operator manual action (OMA) issue and to determine whether enforcement discretion could be applied. Team identified three examples involving reliance on OMAs in lieu of cable protection required by Appendix R, Section III.G.2, in this URI. These examples were applicable to FA 0014K, which was one of the fire areas selected for review during the 2006 Hatch TFPI. The licensee's strategy for accomplishing post fire SSD for a postulated fire in FA 0014K included three OMAs outside of the MCR which were not approved by the NRC. The three OMAs were:

- Restoring power to Division II battery chargers
- Restoring power to intake structure ventilation
- Manually opening the residual heat removal (RHR) low pressure coolant injection inboard discharge valve (1E11-F015B), and closing the RHR pump minimum flow valve (1E11-F018B)

The extent of the OMA issue at Hatch went beyond the FAs selected for the 2006 Hatch TFPI. The use of OMAs is a generic industry issue discussed in *Federal Register Notice 71 FR 11169*, dated March 6, 2006. This Federal Register Notice provided for enforcement discretion if certain conditions were met. In this federal register notice, which withdrew the proposed rulemaking on OMAs, the NRC stated that, for cases involving feasible OMAs, licensees would be eligible for enforcement discretion if they initiated corrective actions within six months of the issue date of the notice and completed all corrective actions within 3 years (March 6, 2009). During the 2006 Hatch TFPI, the NRC concluded that the unapproved OMA examples in this URI met the feasibility criteria of IP 71111.05T. Additionally, the licensee entered the URI examples into their corrective action program as CR 2006100755 and indicated that they planned to require that all manual actions identified in the SSAR be re-evaluated for compliance with 10 CFR 50 Appendix R, Section III.G.2. The licensee further indicated during the 2006 TFPI that they planned to either submit exemption requests to 10 CFR 50, Appendix R, for any unapproved OMAs or implement modifications to eliminate the need for the OMAs. Subsequent to the 2006 TFPI, the licensee decided to implement modifications to resolve the unapproved OMA issue for Hatch Units 1 and 2. In a letter to the NRC dated March 20, 2009 (ADAMS Accession Number ML090790852) the licensee updated the status of modifications being made to eliminate the unapproved OMAs. In that letter, the licensee stated that the Unit 2 modifications would be completed during the Unit 2 refueling outage that was in progress at that time. The letter further stated that the Unit 1 modifications would not be completed until the Unit 1 refueling outage in the spring of 2010.

During this 2010 TFPI, the team reviewed the corrective actions taken by the licensee and other documentation related to this URI. While reviewing the abnormal operating procedures for plant fires (Unit 1 Fire Procedure 34AB-X43-001-1 and Unit 2 Fire Procedure 34AB-X43-001-2), the team noted that the procedures included some of the previous OMA steps as contingency actions even though modifications had been implemented to eliminate the need for the OMAs. The team questioned why

the OMA steps were still included in the procedures. Licensee personnel stated that the OMA steps were not needed but the plant operations staff wanted to keep some of the OMAs in the procedures as contingency actions. Near the end of the onsite inspection, the licensee provided the team with additional information regarding all the modifications which were implemented to eliminate the OMAs. The team reviewed this information, and requested additional information from the licensee subsequent to the onsite inspection. This URI remains open pending receipt and review of the additional modification information.

4OA6 Meetings, Including Exit

On December 3, 2010, the lead inspector presented the inspection results to D. Madison and other members of his staff. The licensee acknowledged the findings. Proprietary information is not included in this report. On January 6, 2011, the lead inspector provided updated inspection results, by telephone, to M. Ajluni. On February 24, 2011, the lead inspector conducted a final exit meeting with S. Tipps and other members of the licensee's staff.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

M. Ajluni, Nuclear Licensing Director
S. Bargeron, Plant Manager
M. Crosby, Manager, Engineering Programs
M. Dean, Maintenance
D. Edenfield, PRA Engineer
J. Giles, Fire Protection, SNC Corporate
C. Goodman, Operations
B. Hulett, Engineering Design Manager
P. Long, Supervisor, Fire Protection, SNC Corporate
D. Madison, Site Vice President
T. Monroe, Senior Engineer, Fire Protection, SNC Corporate
J. Moser, Fire Brigade Instructor
A. Owens, System Engineer for Emergency Lighting
S. Tipps, Principal Engineer - Licensing
J. Vance, Fire Protection, SNC Corporate
J. Westberry, Operations

NRC personnel

C Christensen, Deputy Division Director, Division of Reactor Safety (DRS), Region II
D. Hartage, Resident Inspector
E. Morris, Senior Resident Inspector
R. Nease, Chief, Engineering Branch 2, DRS, Region II

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed		
NCV 05000321; 05000366/ 2010009-03	URI	Untimely Corrective Actions for Installing Appendix R Emergency Lights. (Section 1R05.08)
Closed		
URI 05000366/2003006-01	URI	Concerns Associated with Potential Opening of SRVs. (Section 4OA5.1)
Opened		
URI 05000366/2010009-01	URI	Acceptability of Liquid Filled Transformers in Fire Areas 2017 and 2019. (Section 1R05.02)
URI 05000321; 05000366/ 2010009-02	URI	Protection of Systems Structures and Components from Damage as a Result of Fire Suppression Activities. (Section 1R05.04)
Discussed		
URI 05000321; 05000366/ 2006006-01	URI	Local Operator Actions in Lieu of Cable Protection for a Fire Area Subject to the Requirements of III.G.2. (Section 4OA5.2)

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NFPA 72E, Standard on Automatic Fire Detectors, 1974 Edition
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34IT-EOP-001-0, EOP Equipment Checks, June 19, 2009
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34SV-C82-003-2, Remote Shutdown Panel Function Checks, August 19, 2010
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34SV-C82-003-2, Remote Shutdown Panel Function Checks, October 18, 2010
34SV-C82-003-2, Remote Shutdown Panel Function Checks, November 7, 2010
42SV-FPX-037-0, Fire Detection Instrument Surveillance, Rev. No.5.4
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1091902601, Emergency Lighting 8-Hr Discharge-Group 4, 4/1/10
1082334201, Emergency Lighting 8-Hr Discharge-Group 5, 5/8/09
1092083301, Emergency Lighting 8-Hr Discharge-Group 5, 5/7/10

1082742101, Emergency Lighting 8-Hr Discharge-Group 6, 6/4/09
1092309601, Emergency Lighting 8-Hr Discharge-Group 6, 6/9/10
1090052101, Emergency Lighting 8-Hr Discharge-Group 7, 7/7/09
1092486301, Emergency Lighting 8-Hr Discharge-Group 7, 7/8/10
1090228501, Emergency Lighting 8-Hr Discharge-Group 8, 8/11/09
1092545001, Emergency Lighting 8-Hr Discharge-Group 8, 8/3/10
1090538201, Emergency Lighting 8-Hr Discharge-Group 9, 9/16/09
1092593301, Emergency Lighting 8-Hr Discharge-Group 9, 9/9/10
1090704601, Emergency Lighting 8-Hr Discharge-Group 10, 10/5/09
1092651401, Emergency Lighting 8-Hr Discharge-Group 10, 10/20/10
1081584001, Emergency Lighting 8-Hr Discharge-Group 11, 11/11/08
1090926101, Emergency Lighting 8-Hr Discharge-Group 11, 11/11/09
1081948201, Emergency Lighting 8-Hr Discharge-Group 12, 1/15/09
1091187501, Emergency Lighting 8-Hr Discharge-Group 12, 12/1/09
2061226002, RCIC Flow Control Inverter, 6/13/06

Other Documents

Communication System (1R51-2R51) Health Report, 2nd Qtr 2010
Emergency Lighting System (1R42-2R42) Health Report, 2nd Qtr 2010
Letter NL-03-2037, from Southern Nuclear Operating Co. to NRC, on subject of "Response to Inspection Report 50-321, 366/2003006," dated October 1, 2003
OPS-1958, Shift Sign-in Sheets, Night and Day shifts, July 2, 2010
OPS-1958, Shift Sign-in Sheets, Night and Day shifts, July 4, 2010
OPS-1958, Shift Sign-in Sheets, Night and Day shifts, September 6, 2010
OSHA Occupation Safety and Health Standard 1910.162 – Fixed Extinguishing Systems, Gaseous Agent
Routing by fire area for cables 2ABE019C08, 2ABE019C09, 2ABE019C10, 2ABE916C08, 2ABE916C09 & 2ABE916C10
SNC-1, Quality Assurance Topical Report, Rev. 8.0

Condition Reports Generated as a Result of the Inspection

2010100841, SMNH 03-011 has an error in height of installed curb for FA 2017.
2010100869, Change SMNH 94-060 to include replacement silicone transformer oil.
2010114600, 34AB-X43-001-2, Fire Procedure, table of contents page numbers incorrect.
2010114663, 34AB-X43-001-2 step 5.16.4.12 - verify correct breaker/component.
2010114671, Enhancement to 34AB-X43-001-2 step 5.16.2.
2010114672, 34AB-X43-001-1/2 step 5.16.2 directs chemistry and HP to perform the same task.
2010114675, Change 34AB-X43-001-2, step 5.16.3 to incorporate guidance in the RS procedure for taking manual control of RCIC.
2010114676, Enhancement to 34AB-X43-001-2, step 5.16.4.1.
2010114690, Change 34AB-X43-001-2 step 5.16.7.6.
2010114705, Align SSAR with steps in 34AB-X43-001-2.
2010114707, Enhancement to 34AB-X43-001-2.
2010114718, Align FHA section 9.5 with the exemption regarding room cooler 2T41-B002B.
2010114731, Revise FHA section 9.5 regarding breaker 19 on 2R25-S064 per BH2-M-0524.
2010114736, Enhancement to 31EO-TSG-001-0.
2010114745, B.5.b fire pump storage shelter
2010114782, Evaluate rust on CO2 tank located at 147' outside Unit 1 cable spreading room.

2010114796, Enhancement to 34AB-X43-001-1/2.
2010114797, Enhancement to 34AB-X43-001-2, and 31RS-T41-001-2.
2010114800, Include location of keys for 2E11-F015A/B in 34AB-X43-001-2.
2010115023, Potential Chemetron CO2 tank discharge without a local alarm.
2010115036, System Operators report problems with radios.
2010115061, Compensatory Measures for insufficient lighting during 31RS-OPS-001-1/2.
2010115065, Change SMNH 94-060 to include specific combustible loading values due to replacement silicone transformer oil.
2010115104, Discrepancy between Bechtel installation details and Air Balance Corp installation instructions for 2Z41-FD-F126.
2010115119, Flooding effects analysis for Cable Spreading Room fire sprinkler system.
2010115120, Compensatory action using lights in EOP equipment boxes.
2010115127, Untimely corrective actions to address emergency lighting issues.
2010115128, Responses to questions did not meet NRC expectations.
2010115131, Determine if NFPA Code No. 251 and UL Standard No. 555 should be incorporated in SMNH98-023.
2010115141, Make the electronic version of the FHA equivalent to the hard copy version.
2010115915, Use of Silicone oil in transformer in FA 2019 and hourly fire watch.
2010115986, Use of Silicone oil in transformer in FA 1019 hourly fire watch.

LIST OF ACRONYMS

APCSB	Auxiliary and Power Conversion Systems Branch
B.5.b	Refers to a section of Interim Compensatory Measures Order, EA-02-026
BTP	Branch Technical Position
CFR	Code of Federal Regulations
CMEB	Chemical Engineering Branch
CR	Condition Report
DCP	Design Change Package
DCR	Design Change Record
FA	Fire Area
FHA	Fire Hazards Analysis
FPP	Fire Protection Program
FZ	Fire Zone
GPC	Georgia Power Company
HNP	Hatch Nuclear Plant
HPCI	High Pressure Coolant Injection
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
MCR	Main Control Room
NCV	Non-Cited Violation
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
NUREG	An explanatory document published by the NRC
OMA	Operator Manual Action
P&ID	Piping and Instrumentation Drawing
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
RSDP	Remote Shutdown Panel
SDP	Significance Determination Process
SER	Safety Evaluation Report
SNC	Southern Nuclear Operating Company
SRV	Safety/Relief Valves
SSC	Structures, Systems and Components
SSD	Safe Shut Down
SSAR	Safe Shutdown Analysis Report
SSER	Supplemental Safety Evaluation Report
TFPI	NRC Triennial Fire Protection Inspection
UFSAR	Updated Final Safety Evaluation Report
URI	Unresolved Item
V	Volts