



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

June 22, 2005

EA-03-145
EA-04-115

Duke Energy Corporation
ATTN: Mr. R. A. Jones
Site Vice President
Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: OCONEE NUCLEAR STATION - NRC SUPPLEMENTAL INSPECTION
REPORT 05000269/2005006, 05000270/2005006, AND 05000287/2005006

Dear Mr. Jones:

On June 8, 2004, the U. S. Nuclear Regulatory Commission (NRC) completed a supplemental inspection at your Oconee Nuclear Station. The enclosed report documents the inspection results which were discussed on that date with you and other members of your staff.

This supplemental inspection was an examination of your problem identification, root cause evaluation, extent of condition and extent of cause determinations, and corrective actions associated with two White findings. This inspection also included an independent extent of condition and extent of cause review of issues related to the White findings. The two findings, which were in the Mitigating Systems Cornerstone, placed the performance of Oconee Units 1, 2, and 3 in the Degraded Cornerstone Column of the NRC's Action Matrix for the third quarter 2004. The first White finding involved pressurizer ambient heat losses in all three Oconee units exceeding the capacity of the pressurizer heaters powered from the standby shutdown facility (SSF). That White finding was evaluated and closed in Supplemental Inspection Report 05000269,270,287/2004011. Consequently, this inspection focused primarily on the second White finding and the combined assessment of the two White findings. The second White finding involved delayed manning of the SSF during a fire in certain plant areas.

Based on the results of this inspection, no findings of significance were identified. The NRC determined that there are opportunities for improvement in your processes for determining root and contributing causes, extent of cause, and corrective actions. However, your corrective actions (both planned and already completed) are adequate to resolve the deficiencies related to the second White finding and the Degraded Mitigating Systems Cornerstone. As such, the inspection objectives of Inspection Procedure 95002, "Inspection for One Degraded Cornerstone or any Three White Inputs in a Strategic Performance Area," have been satisfied. Accordingly, the remaining open White finding involving delayed manning of the SSF during a fire in certain plant areas (including associated violation 5000269,270,287/2004013-01) is considered closed.

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 Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

\RA

Victor M. McCree, Director
Division of Reactor Safety

Docket Nos.: 50-269, 50-270, 50-287
License Nos.: DPR-38, DPR-47, DPR-55

Enclosure: NRC Supplemental Inspection Report 05000269,270,287/2005006
w/Attachment - Supplemental Information

cc w/encl:

B. G. Davenport
Compliance Manager (ONS)
Duke Energy Corporation
Electronic Mail Distribution

Lisa Vaughn
Legal Department (PB05E)
Duke Energy Corporation
422 South Church Street
P. O. Box 1244
Charlotte, NC 28201-1244

Anne Cottingham
Winston & Strawn LLP
Electronic Mail Distribution

Beverly Hall, Acting Director
Division of Radiation Protection
N. C. Department of Environmental
Health & Natural Resources
Electronic Mail Distribution

Henry J. Porter, Assistant Director
Div. of Radioactive Waste Mgmt.
S. C. Department of Health and
Environmental Control
Electronic Mail Distribution

R. Mike Gandy
Division of Radioactive Waste Mgmt.
S. C. Department of Health and
Environmental Control
Electronic Mail Distribution

County Supervisor of
Oconee County
415 S. Pine Street
Walhalla, SC 29691-2145

cc w/encl: - (See page 3)

DEC

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(cc w/encl:)

Lyle Graber, LIS
NUS Corporation
Electronic Mail Distribution

R. L. Gill, Jr., Manager
Nuclear Regulatory Issues
and Industry Affairs
Duke Energy Corporation
526 S. Church Street
Charlotte, NC 28201-0006

Peggy Force
Assistant Attorney General
N. C. Department of Justice
Electronic Mail Distribution

DEC

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Distribution w/encl:

L. Olshan, NRR
L. Slack, RII EICS
OEMAIL
RIDSNNRRDIPMLIPB
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| E-MAIL COPY? | YES NO | YES NO | YES NO | YES NO | YES NO | YES NO | YES NO |

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-269, 50-270, 50-287

License Nos.: DPR-38, DPR-47, DPR-55

Report No.: 05000269/2005006, 05000270/2005006, 05000287/2005006

Licensee: Duke Energy Corporation

Facility: Oconee Nuclear Station, Units 1, 2, and 3

Location: 7800 Rochester Highway
Seneca, SC 29672

Dates: May 23 - 27, 2005 (on site)
May 31 - June 2, 2005 (in office)

Inspectors: R. Schin, Senior Reactor Inspector (lead inspector)
R. Bernhard, Senior Reactor Analyst
R. Fanner, Reactor Inspector

Approved by: V. McCree, Director
Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000269/2005006, 05000270/2005006, 05000287/2005006; 05/23-27/2005 and 05/31-06/02/2005; Oconee Nuclear Station; Supplemental Inspection for Degraded Mitigating Systems Cornerstone.

This inspection was conducted by a senior reactor inspector, a senior reactor analyst, and a reactor inspector. No findings of significance were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

Cornerstone: Mitigating Systems

This supplemental inspection was performed by the NRC to assess the licensee's problem identification, root cause evaluation, extent of condition and extent of cause determinations, and corrective actions associated with two White findings. This inspection also included an independent extent of condition and extent of cause review of issues related to the White findings. The two findings, which were in the Mitigating Systems Cornerstone, placed the performance of Oconee Units 1, 2, and 3 in the Degraded Cornerstone Column of the NRC's Action Matrix for the third quarter 2004. The first White finding involved pressurizer ambient heat losses in all three Oconee units which exceeded the capacity of the pressurizer heaters powered from the standby shutdown facility (SSF). This finding was evaluated and closed in Supplemental Inspection Report 05000269,270,287/2004011. The second White finding involved delayed manning of the SSF during a fire in certain plant areas. The performance issues associated with these two findings were previously characterized as having low to moderate risk significance (White) in NRC "Final Significance Determination" letters dated December 30, 2003, and September 24, 2004, respectively.

This supplemental inspection was performed in accordance with Inspection Procedure 95002, "Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area." During this inspection, the inspectors relied on the results from Supplemental Inspection Report 05000269,270,287/2004011 to address the pressurizer heater White finding. This inspection focused primarily on the White finding related to delayed manning of the SSF during a fire and the combined assessment of the two White findings that resulted in the Degraded Mitigating Systems Cornerstone.

Prior to this inspection, the licensee performed a root cause analysis of the White finding related to delayed manning of the SSF during a fire in certain plant areas. Additionally, the licensee performed an assessment of the extent of cause and extent of condition for the issues associated with the two White findings that were the subject of this inspection. The team found the licensee's root cause evaluation to be generally systematic and thorough. However, the team did observe opportunities for improvement in the licensee's processes for determining root and contributing causes, extent of cause, and corrective actions. Overall, the team concluded that the licensee's corrective actions were adequate. No findings of significance were

identified during this inspection. Accordingly, the White finding related to delayed manning of the SSF during a fire (including associated violation 05000269,270,287/2004013-01) is considered closed.

A. Inspector Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee Identified Violations

None.

Report Details

01 Inspection Scope

This supplemental inspection was performed in accordance with U. S. Nuclear Regulatory Commission (NRC) Inspection Procedure 95002, "Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area." The inspection was performed by the NRC in response to Oconee Units 1, 2, and 3 third quarter 2004 performance being in the Degraded Cornerstone Column of the NRC's Action Matrix as a result of: (1) a third quarter 2003 White finding involving inadequate Standby Shutdown Facility (SSF) pressurizer heater capacity; and (2) a third quarter 2004 White finding involving procedural criteria for manning the SSF during a fire in certain areas. Both of the White findings were in the Action Matrix during the third quarter of 2004, resulting in a degraded mitigating systems cornerstone. The two White findings were previously described in NRC "Final Significance Determination" letters dated December 30, 2003, (NRC Inspection Report 05000269,270,287/2003012) and September 24, 2004, (NRC Inspection Report 05000269,270,287/2004013), respectively.

This 95002 supplemental inspection involved a review of the licensee's problem identification, root cause evaluation, extent of condition and extent of cause evaluations, and corrective actions. It also involved an independent NRC team review of the extent of condition and extent of cause for the two White findings. The SSF pressurizer heater capacity White finding was previously evaluated and closed in Inspection Report 05000269,270,287/2004011. Consequently, the results of that inspection were relied on during this inspection and the SSF pressurizer heater capacity White finding was not a primary focus of this inspection. This inspection focused primarily on the White finding related to delayed manning of the SSF during a fire and the combined assessment of the two White findings that resulted in the Degraded Mitigating Systems Cornerstone.

02 Evaluation of Inspection Requirements

02.01 Problem Identification

- a. Determination of who (i.e., licensee, self-revealing, or NRC) identified the issues and under what conditions

(1) SSF Manning During a Fire Finding

During an NRC triennial fire protection inspection that ended on February 8, 2002, the NRC team identified this issue as an apparent violation. The team identified that an operator action that was described in the fire protection licensing basis was not appropriately implemented in procedures. Specifically, in a letter to the NRC dated September 20, 1982, the licensee stated: "Upon confirmation of a fire in the plant, operating personnel will be dispatched to the SSF." However, from a review of the procedure the team noted that operating personnel may not be dispatched to the SSF until the fire has caused a prescribed level of damage: loss of both high pressure injection and component cooling systems or loss of all feedwater. The April 28, 1983, NRC Safety Evaluation Report (SER) approving the Oconee SSF was based, in part, on

the licensee's letter of September 20, 1982. This issue was described in NRC Inspection Reports 05000269,270,287/2002003; 05000269,270,287/2004012; and 05000269,270,287/2004013.

(2) SSF Pressurizer Heater Finding

[From Supplemental Inspection Report 05000269,270,287/2004011] The licensee discovered this issue on March 7, 2002, during testing development.

b. Determination of how long the issues existed, and prior opportunities for identification

(1) SSF Manning During a Fire Finding

This issue existed from the time the SSF was put into service in 1983, when licensee personnel incorrectly interpreted the licensing basis while writing the operating procedure, until the licensee revised the SSF operating procedure in October 2003. The SSF Emergency Operating Procedure was revised in 2003 to include manning the SSF on a confirmed active fire in the main control room, cable room, equipment room, or turbine building. A confirmed active fire was defined as a locally observed fire with smoke and either radiant heat or visible flame.

The licensee's Root Cause Failure Analysis Report identified the following prior opportunities for identification:

- In 1983, the 50.59 review of the original SSF procedure missed an opportunity for identification.
- In 1986, licensee design engineering personnel performed an Associated Circuits Study, which accurately documented the commitment to man the SSF within 10 minutes of confirmation of a fire. However, this was performed as a study rather than an official calculation and did not confirm that the action was appropriately implemented in the SSF operating procedure. The calculation program missed this opportunity for identification.
- In 1987, an NRC inspection identified not activating the SSF within 10 minutes of a fire as a potential problem in Unresolved Item (URI) 87-02-03. NRC focus was on main steam isolation and letdown isolation. The Duke rebuttal focused on prior acceptance of a 10-minute window rather than on justification for when the 10-minute window began. The Problem Investigation Process (PIP) Program and Regulatory Compliance review of the NRC Inspection Report missed opportunities for identification.
- In 1999, a McGuire fire protection functional audit identified the 10-minute rule as an issue in PIP report M-99-1123. The Duke Operating Experience Program and Three Site Consistency Program missed this opportunity for identification of the issue at Oconee.

- In 2000, an NRC Triennial Fire Protection Inspection at McGuire identified the 10-minute rule as an issue in URI 00-09-02. Again, the Duke Operating Experience Program and Three Site Consistency Program missed an opportunity for identification of the issue at Oconee.
- In 2001, an Oconee fire protection audit identified the 10-minute rule as an area for improvement. The PIP Program missed an opportunity for identification prior to the NRC Triennial Fire Protection Inspection in 2002.

(2) SSF Pressurizer Heater Finding

[From Supplemental Inspection Report 05000269,270,287/2004011] The licensee had prior opportunities to identify the pressurizer heater finding in 1992, 1996, and 1999.

- c. Determination of the plant-specific risk consequences (as applicable) and compliance concerns associated with the issues

(1) SSF Manning During a Fire Finding

The licensee restored compliance prior to this inspection by revising the SSF operating procedure to include manning the SSF on confirmation of a fire in certain areas. Licensee risk analysis stated that additional pressurizer relief valve cycles could occur due to the delayed manning of the SSF. The licensee further stated: Per the NRC letter dated July 20, 2004, the risk [change in (delta) core damage frequency (CDF)] is 3E-06/yr.

(2) SSF Pressurizer Heater Finding

[From Supplemental Inspection Report 05000269,270,287/2004011] The licensee's interim compensatory measures and planned corrective actions to restore compliance were adequate. The licensee's risk analysis results (delta CDF) were based on three different assumed pressurizer relief valve failure rates; from Duke, the NRC, and the Electrical Power Research Institute (EPRI):

| | <u>Relief Valve Failure Rate</u> | <u>delta CDF</u> |
|--------|----------------------------------|------------------|
| (Duke) | 4.8E-03 | 7.4E-07 |
| (NRC) | 1.5E-02 | 2.3E-06 |
| (EPRI) | 2.9E-03 | 4.5E-07 |

(3) Combined Risk of the Two White Findings

The licensee's analysis was that the combined risk (delta CDF) of the two White findings was the sum of the risk for each:

| | <u>Pressurizer Heater delta CDF</u> | | <u>SSF Manning delta CDF</u> | | <u>Total delta CDF</u> |
|--------|---|---|----------------------------------|---|----------------------------|
| (Duke) | 7.4E-07 | + | 3E-06 | = | 3.7E-06 |
| (NRC) | 2.3E-06 | + | 3E-06 | = | 5.3E-06 |
| (EPRI) | 4.5E-07 | + | 3E-06 | = | 3.5E-06 |

The regional Senior Risk Analyst (SRA) performed a risk analysis to determine if the combined risk of the pressurizer heater finding and the SSF manning finding exceeded the risks previously calculated when the findings were examined separately. Both findings represent conditions in which the SSF is inoperable due to stuck open safety valves relieving more water than can be made up by the SSF reactor coolant makeup pump. The SSF manning finding risk contribution is the result of not manning the SSF early enough during a fire to prevent extra cycles of the safety valves. This occurs very early in the scenario. The pressurizer heater finding's significance is related to sequences involving early success of the SSF (no early stuck open safety valves), but a valve sticking open later in the sequence, causing late failure due to lack of adequate makeup. Because of the lack of overlap on the timing, and the requirement that the SSF have early success for the pressurizer heater finding to have an increase in risk, the risk of the two events taken together will not exceed the sum of the independent risk values.

Therefore, the risk of the combined findings is equal to the sum of the independent risks, or:

| Issue | Unit 1 or 2 Risk (NRC) | Unit 3 Risk (NRC) |
|----------------------|------------------------|-------------------|
| Pressurizer heaters | 6.86E-6 | 6.56E-6 |
| SSF manning for fire | 3.1E-6 | 2.96E-6 |
| Total | 9.96E-6 | 9.52E-6 |

The SRA performed a review of Severe Accident Analysis Report File # 737, Revision 2, "Analysis of Inadequate Pressurizer Heaters powered by Oconee Nuclear Station SSF," which also contains the licensee's evaluation of the impact of the combined issues. Duke's analysis indicates that the events' results are independent of each other, and that it is appropriate just to add the risk numbers. The results were analyzed using different assumptions for relief valve fail to reclose probabilities for the pressurizer heater finding. The utility used the 3E-6 value for the impact of the SSF manning finding. The total risk for the two findings was evaluated to be in the low to mid E-6 range. The utility's evaluation of the sensitivity of the calculation to the assumed value of the failure probability showed the NRC's assumed values give the higher risk number.

d. Assessment

For both White findings, the licensee's problem identification efforts effectively addressed who identified the issue, how it was identified, how long it existed, prior identification opportunities, and compliance concerns. Also, the licensee's combined risk assessment did not differ significantly from that of the NRC.

02.02 Root Cause, Extent of Condition, and Extent of Cause Evaluation

- a. Evaluation of the use of systematic method(s) to identify root cause(s) and contributing cause(s)

(1) SSF Manning During a Fire Finding

The licensee performed a formal root cause evaluation, using systematic methods including an Event and Causal Factor Chart and a Barrier Analysis. The root causes included: 1) incorrect interpretation of the licensing basis in 1983 by the Appendix R Project Team; and 2) ineffective communication from design engineering to the Appendix R Project Team. The contributing causes included: 1) inadequate 50.59 safety evaluation in 1983; and 2) different SSF licensing basis for Oconee and McGuire. The identified root causes were consistent with the licensee's evaluation with one noted exception. The Root Cause #1 primary cause code of Q2a, "unclear regulatory guidance," with the culpable organization being the NRC, was not consistent with the evaluation. The NRC team concluded that the primary cause code should more appropriately have been M2a, "misinterpretation of design inputs (including the licensing basis)" and not Q2a, "unclear regulatory guidance." The team found that the original version of the Root Cause Failure Analysis Report had included root causes that were consistent with the evaluation; however, those had been changed in the final version of the report. Consequently, the final management approved version of the Root Cause Failure Analysis Report included a root cause that was not completely consistent with the formal analysis and was not fully consistent with the use of systematic methods. The NRC inspection team noted that regulatory guidance with respect to post-fire safe shutdown, hot shorts that can cause spurious actuations, and related operator actions has continued to evolve and at times may have seemed confusing. Also, the NRC inspection team determined that the inclusion of a primary cause which was inconsistent with the analysis did not significantly affect the licensee's planned corrective actions.

The licensee's evaluation identified many missed opportunities to identify the issue, and also identified related ineffective administrative barriers, that occurred after the Appendix R Project Team incorrectly interpreted the licensing basis in 1983. However, the licensee's root cause process did not consider the missed opportunities and ineffective barriers after 1983 to be contributing causes and did not include formal corrective actions for them. A brief NRC team review of these programmatic administrative barriers (Operating Procedure Review Process, Operating Experience Program, Calculation Program, Corrective Action Program, Commitment Tracking Program, and Process for Review of Letters to the NRC for Accuracy and Completeness) found that all had been improved in recent years and were more likely to be able to identify and correct similar issues today.

(2) SSF Pressurizer Heater Finding

[From Supplemental Inspection Report 05000269,270,287/2004011] The licensee used a formal assessment process per Nuclear System Directive (NSD) 607, "Self Assessments," to determine apparent and contributing causes.

- b. Evaluation of level of detail in the root cause evaluation being commensurate with the significance of the problem.

- (1) SSF Manning During a Fire Finding

The team found that the level of detail in the root cause evaluation was appropriate. It included review of correspondence and licensing basis documents related to manning the SSF; review of procedure changes and 10 CFR 50.59 evaluations used to implement the SSF manning time requirements; interviews with personnel involved in developing procedure changes, 10 CFR 50.59 evaluations, licensing basis changes, and SSF and Appendix R associated circuit analyses relative to the 10-minute time requirement; review of the fire protection program and design basis documents; and review of operating experience to determine if other licensees have received similar feedback from the NRC.

- (2) SSF Pressurizer Heater Finding

[From Supplemental Inspection Report 05000269,270,287/2004011] The licensee's Level II assessment was reasonably independent, thorough, and consistent with the prescribed charter. However, it lacked thoroughness in addressing potential broader implications relative to inadequate design control measures.

- c. Evaluation of the root cause evaluation including a consideration of prior occurrences of the problem and knowledge of prior operating experience.

- (1) SSF Manning During a Fire Finding

The root cause evaluation considered prior occurrences and operating experience. The Oconee SSF was a new installation in 1983 and was only the second SSF in the country (following the McGuire SSF).

- (2) SSF Pressurizer Heater Finding

[From Supplemental Inspection Report 05000269,270,287/2004011] The licensee's Level II assessment considered prior occurrences and operating experience from a material degradation standpoint, but failed to consider past calculation inadequacies.

- d. Evaluation of whether the root cause evaluation addressed the extent of condition and the extent of cause of the problem.

- (1) SSF Manning During a Fire Finding

The licensee's Root Cause Failure Analysis Report included a recurring event determination, which looked for other similar events that occurred within two years of the SSF manning during a fire finding. The licensee's root cause team searched the PIP database for other events that had the same cause codes as those identified for the root causes of this finding and that occurred within two years of 2002, when this finding was identified by the NRC. This search identified several events, which the root cause team then reviewed for similarities. Based on their review, the licensee's root cause team

identified three other events with similar causes. However, they concluded that none of those events was recurring because the root causes for those three events all occurred recently and not within two years of 1983, when the root cause of the White finding (Appendix R team incorrectly interpreted the licensing basis) occurred. The NRC inspection team noted that the licensee's methodology was apparently flawed, in that a search for events that occurred during 2000 to 2004 was not likely to find events whose root cause occurred during 1981 to 1985.

The licensee performed a separate assessment for extent of cause and extent of condition related to the two White findings that were the focus of this inspection. The licensee reviewed PIPs for other events that occurred during 2002 through March 2005 and had the same cause codes as the root causes of the two White findings. (Generally, only more significant issues were given cause codes.) In addition, licensee personnel reviewed other White findings that occurred during the same time period. Overall, licensee personnel reviewed 73 PIPs. Based on that review, licensee personnel concluded that none of the 73 PIPs described events that involved extent of cause or extent of condition for the two White findings that were the focus of this inspection. The NRC inspection team noted that the licensee's assessment report did not state criteria that were used or individual reasons for concluding that each of the 73 PIPs did not represent an extent of cause or extent of condition for the two White findings.

(2) SSF Pressurizer Heater Finding

[From Supplemental Inspection Report 05000269,270,287/2004011] Initially, the licensee had not performed an appropriate extent of condition and cause assessment. Consequently, the NRC 95002 supplemental inspection was postponed and rescheduled to allow the licensee to develop a more comprehensive assessment. Subsequent NRC review of the more comprehensive assessment identified some deficiencies.

e. Assessment

The NRC inspection team observed that the licensee had assessed extent of condition and extent of cause and had identified no extent of condition or extent of cause. However, some of the licensee's methods appeared to be flawed (in the Root Cause Failure Analysis Report) and others were not well documented (in the extent of cause and extent of condition assessment). Further, the licensee's conclusions with respect to extent of cause differed from those of the NRC team's independent assessment. However, the NRC inspection team's review of the current administrative barriers found that they had been improved during the last few years and should be better able to identify a similar issue today. (See Section 02.04.)

02.03 Corrective Actions

- a. Evaluation of appropriate corrective action(s) being specified for each root/contributing cause or that there is an evaluation that no actions are necessary.

(1) SSF Manning During a Fire Finding

The licensee's corrective actions for this finding were captured in PIP O-04-06342. In addition, planned corrective actions in PIPs O-04-2808 and O-04-0518 were relied upon for two of the identified causes for this finding. The immediate corrective actions included revising abnormal procedure (AP)/O/A/1700/25, "Standby Shutdown Facility Emergency Operating Procedure," to ensure that an operator would man the SSF upon confirmation of a fire. The NRC team verified that the procedure had been changed. In addition, the licensee planned nine other corrective actions (CAs), including two corrective actions to prevent recurrence (CAPRs). Further, the licensee credited six CAs in other PIPs, without stating that fact in the other PIPs. The NRC team noted, and licensee personnel confirmed, that the process of relying on CAs in other PIPs could risk subsequent revision or cancellation of those CAs without consideration of the affect on correcting this issue. However, the licensee's process did not allow changing or closing any CAPRs without special senior management approval. The NRC team noted that there were corrective actions specified for each identified root and contributing cause and concluded that the corrective actions were appropriate. The planned corrective actions were:

- PIP O-04-06342, CA #1: Validate that the SSF is manned in a manner that is consistent with the intent of the licensing basis and its relationship to the defense-in-depth philosophy for other event mitigation strategies by researching the design and licensing basis for the SSF and comparing the design and licensing basis with the existing operating procedures.
- PIP O-04-06342, CA #2: Provide training to all plant engineers, modification engineers, and senior licensed operators on the post-fire safe shutdown analysis; including design assumptions, NRC requirements, and Duke specific interpretations.
- PIP O-04-06342, CA #3: Complete an Appendix R Reconstitution Project for Oconee as committed to in PIPs O-02-1357, CA #4 and O-03-3708, CA #8. Also, develop an updated Appendix R Design Basis Document. This CA is considered a CAPR.
- PIP O-04-06342, CA #4: Transition the ONS Fire Protection Program from the current existing licensing basis based upon 10 CFR 50, Appendix R, to the new performance based standard, National Fire Protection Association (NFPA)-805, "Performance Based Standard for Fire Protection of Light Water Reactor Electric Generating Plants." The transition is considered a CAPR since it will assess the risk of any existing licensing basis interpretations.
- PIP O-04-06342, CA #5: Assess the collective risk of the current SSF manning during a fire finding in conjunction with the previous White finding associated with pressurizer ambient heat loss. (NOTE: Licensee collective risk results are in Section 02.01.c. of this report.)
- PIP O-04-06342, CA #6: Include in this PIP the assessment and corrective actions associated with the two White findings and the degraded cornerstone.

Also, perform a Level II assessment per NSD 607 to validate the effectiveness of the overall corrective actions.

- PIP O-04-06342, CA #7: Utilize representatives of the Training Group to perform a training needs assessment to determine the need for and the appropriate level of training to be provided to plant engineers, modification engineers, general office (GO) support personnel, and senior reactor operators. This training will be associated with the post-fire safe shutdown analysis (Appendix R) and NFPA-805.
- PIP O-04-06342, CA #8: Include recommendations from the Corrective Action Review Board (CARB) in the Root Cause Failure Analysis Report for the 10-minute SSF staffing issue.
- PIP O-04-06342, CA #9: Review the current procedures and processes in place for tracking commitments made to the NRC, to identify any vulnerabilities.
- PIP O-04-2808, CA #5: In engineering team meetings, discuss the importance of clear communications between site and GO groups regarding calculations and design inputs. This CA is considered a CAPR.
- PIP O-04-2808, CA #8: Conduct an assessment of the effectiveness of the communication processes that facilitate technical information exchanges between the GO and the sites relative to analysis and licensing information. This CA is considered a CAPR.
- PIP O-04-0518, CA #5: Develop training to improve the ability of individuals to research, construct, understand, and apply the licensing basis for a given structure, system, or component. This CA is considered a CAPR.
- PIP O-04-0518, CA #6: Add a tutorial component to the 50.59 automation project being developed to provide training on each 50.59 question. This CA is considered a CAPR.
- PIP O-04-0518, CA #7: Establish a committee to review all 50.59 evaluations. This CA is considered a CAPR.
- PIP O-04-0518, CA #20: Conduct training as required by CA #5. This CA is considered a CAPR.

(2) SSF Pressurizer Heater Finding

[From Supplemental Inspection Report 05000269,270,287/2004011] The licensee's corrective actions for the SSF pressurizer heater finding were appropriate and were captured in PIP O-02-01066.

- b. Evaluation of whether corrective actions have been prioritized with consideration of the risk significance and regulatory compliance.

(1) SSF Manning During a Fire Finding

The NRC inspection team concluded that the licensee's corrective actions were properly prioritized to address the risk for the White finding.

(2) SSF Pressurizer Heater Finding

[From Supplemental Inspection Report 05000269,270,287/2004011] The licensee's corrective actions were appropriately prioritized with consideration of risk significance of the issue and/or regulatory compliance.

c. Determination that a schedule has been established for implementing and completing the corrective actions.

(1) SSF Manning During a Fire Finding

The licensee's PIP corrective actions identified assigned individuals, completion dates, and reference numbers to facilitate tracking of corrective actions to ensure the corrective actions would be completed commensurate with the assigned priority code.

(2) SSF Pressurizer Heater Finding

[From Supplemental Inspection Report 05000269,270,287/2004011] After revision, the licensee's schedule for completing the planned corrective actions was considered adequate.

d. Determination that quantitative or qualitative measures of success have been established for determining the effectiveness of the corrective actions to prevent recurrence.

(1) SSF Manning During a Fire Finding

The licensee's CA #6 in PIP O-04-06342 describes plans to perform a Level II assessment to validate the effectiveness of the corrective actions for this finding.

(2) SSF Pressurizer Heater Finding

[From Supplemental Inspection Report 05000269,270,287/2004011] The licensee generated CA #103 in PIP O-02-01066 to perform a Level II assessment to validate the effectiveness of the overall corrective action plan.

e. Assessment

The corrective action of revising the SSF operating procedure effectively restored compliance with the licensing basis for manning the SSF during a fire. Planned corrective actions to address the root and contributing causes of the White finding related to SSF manning during a fire were adequate. The licensee did not have formal corrective actions to address the identified missed opportunities and ineffective barriers. However, NRC inspection team review of the current administrative barriers found that

they had been improved during the last few years and should be better able to identify a similar issue today.

02.04 Independent Assessment of Extent of Condition and Extent of Cause

To independently review extent of condition, the NRC inspection team selected five time-critical operator actions that had risk importance. The team then compared the proceduralized actions against the related licensing and design basis information. Based on this review, the team verified that the five operator actions were consistent with their related licensing and design bases. The team did not identify any additional extent of condition. The licensee also had determined that there was no extent of condition.

To independently review extent of cause for the delayed SSF manning during a fire White finding, the team selected eleven other events that had occurred during the past six years, including eight NRC White findings or escalated enforcement issues, one additional event whose corrective actions were relied on for the delayed SSF manning during a fire White finding, and two additional events that the licensee's root cause evaluation had identified as having potentially similar causes. Based on this review, the NRC team determined that there was some extent of cause related to 'misinterpretation of design inputs'. Four of the eleven other events reviewed by the team appeared to involve similar causes. Two of these four events had corrective actions that were directly relied upon as corrective actions for the delayed SSF manning during a fire White finding ('High Energy Line Break 50.59' and 'Automatic Feedwater Isolation System'). The other two events were 'SSF Cables in the Turbine Building' and 'High Pressure Injection Suction from the Spent Fuel Pool'. The team further reviewed these four events to see if any of them also had similar causes to the SSF pressurizer heater White finding. Based on this review, the team determined that two events had similar causes to both of the White findings ('SSF Cables in the Turbine Building' and 'Automatic Feedwater Isolation System').

The five operator actions and the eleven other events that were reviewed by the NRC inspection team for the independent extent of condition and extent of cause assessments are listed in the attachment.

Comparison with Licensee Efforts

The results of the NRC extent of cause review differed from the licensee's extent of cause review in that the licensee had determined that there was no extent of cause. Had the licensee determined that there was extent of cause, they should have considered expanding their root cause evaluation and corrective actions. Also, the NRC team observed that the licensee's root cause evaluation had identified several missed opportunities and ineffective administrative barriers, but did not include formal corrective actions to address them. However, the NRC inspection team's review of the current administrative barriers found that they had been improved during the last few years and should be better able to identify a similar issue today. No findings of significance were identified during this inspection. Accordingly, the remaining open White finding involving delayed manning of the SSF during a fire in certain plant areas (including associated violation (VIO) 05000269,270,287/2004013-01) is considered closed.

03 Exit Meeting

The lead inspector presented the inspection results to Mr. Ron Jones, Oconee Site Vice President, and other members of licensee management by telephone on June 8, 2005. Licensee personnel acknowledged the inspection results. Proprietary information was reviewed during this inspection, but is not included in this inspection report.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

L. Azzarello, Modifications Engineering Manager
H. Barrett, Appendix R Design Basis Engineer
D. Baxter, Site Engineering Manager
N. Clarkson, Regulatory Compliance
G. Davenport, Regulatory Compliance Manager
D. Garland, Operations Procedure Group
K. Grayson, Standby Shutdown Facility System Engineer
R. Jones, Oconee Site Vice President
G. McAnich, Design Basis Group Supervisor
S. Nader, PRA Group Corporate Engineering
L. Nicholson, Safety Assurance Manager
J. Smith, Regulatory Compliance
P. Stovall, Safety Review Group Manager
J. Weast, Regulatory Compliance

NRC

C. Casto, Director, Division of Reactor Projects (DRP), Region II (RII)
M. Ernstes, Chief, Reactor Projects Branch 1, DRP, RII
A. Hutto, Resident Inspector at Oconee
V. McCree, Director, Division of Reactor Safety (DRS), RII
C. Payne, Chief, Engineering Branch 2, DRS, RII

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

| | | |
|-----------------------------|-----|---|
| 05000269,270,287/2004013-01 | VIO | Failure to Meet Licensing Basis for Staffing the SSF in the Event of a Confirmed Plant Fire (Section 02.04) |
|-----------------------------|-----|---|

Discussed

| | | |
|-----------------------------|-----|--|
| 05000269,270,287/2004012-01 | VIO | Failure to Promptly Identify and Correct Insufficient Pressurizer Heater Capacity (Sections 02.01, 02.02, and 02.03) |
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Attachment

LIST OF ACRONYMS

| | | |
|-------|---|---|
| ADAMS | - | NRC's document system |
| AP | - | Abnormal Procedure |
| CA | - | Corrective Action |
| CAPR | - | Corrective Action to Prevent Recurrence |
| CARB | - | Corrective Action Review Board |
| CDF | - | Core Damage Frequency |
| delta | - | change in |
| DRP | - | Division of Reactor Projects |
| DRS | - | Division of Reactor Safety |
| EFW | - | Emergency Feedwater |
| EPRI | - | Electric Power Research Institute |
| GO | - | General Office |
| HPI | - | High Pressure Injection |
| NFPA | - | National Fire Protection Association |
| NRC | - | Nuclear Regulatory Commission |
| NSD | - | Nuclear System Directive |
| PARS | - | Publicly Available Records |
| PIP | - | Problem Investigation Process (report) |
| RII | - | Region II |
| Rev. | - | Revision |
| SER | - | Safety Evaluation Report |
| SRA | - | Senior Reactor Analyst |
| SSF | - | Standby Shutdown Facility |
| URI | - | Unresolved Item |
| VIO | - | Violation |

FIVE OPERATOR ACTIONS AND ELEVEN OTHER EVENTS REVIEWED FOR EXTENT OF CONDITION AND EXTENT OF CAUSE (SECTION 02.04)

Five Time Critical Operator Actions Reviewed

1. Provide long term source of suction for emergency feedwater (EFW) pumps. Transfer EFW pumps' suction to hotwells.
2. Secure low pressure injection pumps if a flow demand (other than minimum flow) is not established within 30 minutes.
3. Throttle high pressure injection (HPI) flow within 10 minutes to prevent pump runout.
4. Cross connect second train of HPI within 10 minutes.
5. Control Auxiliary Building flooding within 10 minutes.

Eleven Other Events Reviewed

1. PIPs O-01-01225 and O-00-00363, Inability to align auxiliary service water within 40 minutes
2. PIPs O-01-02791 and O-98-00148, HPI suction from the spent fuel pool

3. PIP O-01-00455, Removed words from Updated Final Safety Analysis Report concerning HPI suction from spent fuel pool
4. PIP O-01-00093, Containment closure
5. PIP O-98-03017, Mitigation of Auxiliary Building flooding
6. PIP O-01-01402, Water in motor driven feedwater pump oil
7. PIP O-02-02972, HPI cable connector
8. PIP O-04000518, High energy line break 50.59
9. PIP O-04-02808, Automatic feedwater isolation system
10. PIP O-03-03708, SSF cables in turbine building
11. PIP O-02-03709, Emergency operating procedure revision with post-Loss Of Coolant Accident boron dilution flowpath

OTHER DOCUMENTS REVIEWED

Design Basis Documents

- OSS-0254.00-00-1002, Design Basis Specification for the High Pressure Service Water System, Revision (Rev.) 23
- OSS-0254.00-00-1004, Design Basis Specification for the SSF Reactor Coolant Makeup System, Rev. 22
- OSS-0254.00-00-1005, Design Basis Specification for the Standby Shutdown Facility Auxiliary Service Water System, Rev. 20
- OSS-0254.00-00-4005, Design Basis Specification for the Design Basis Event, Appendix C, Time Critical Operator Actions, Rev. 14

Miscellaneous

- Engineering Directives Manual 170, Design Specifications, Rev. 11
- Engineering Manual 4.21 - Technical Guidelines for Creating and Maintaining Design Basis Document Test Matrices, Rev. 0
- Extent of Cause / Extent of Condition Review, SSF Pressurizer Ambient Loss and SSF Staffing Time, undated
- Root Cause Failure Analysis Report, 10 Minute SSF White Finding Root Cause, Rev. 0

Nuclear System Directives

- NSD 110, Technical Review and Control, Rev. 8
- NSD 203, Operability, Rev. 16
- NSD 208, Problem Investigation Process (PIP), Rev. 13
- NSD 209, 10 CFR 50.59 Process, Rev. 9
- NSD 210, Corrective Action Program, Rev. 4
- NSD 212, Cause Analysis, Rev. 14
- NSD 227, Communicating With The Nuclear Regulatory Commission, Rev. 2
- NSD 514, Control of Time Critical Tasks, Rev. 0
- NSD 607, Self Assessments, Rev. 8
- NSD 703, Administrative Instructions for Technical Procedures, Rev. 26

PIPs

PIP O-02-01066, Pressurizer ambient heat losses are greater than calculated in OSC-3144
PIP O-04-06342, White finding for the Appendix R procedure response time
PIP O-04-02995, Oconee not fully prepared for 95002 NRC inspection
PIP O-05-02468, Level II assessment: Extent of condition and extent of cause review of
Pressurizer ambient heat loss (O-02-1066) and SSF staffing following a fire (O-04-6342)

PIPs Generated or Revised During This Inspection

PIP O-04-06342, White finding for the Appendix R procedure response time - CA #9 was
added during this inspection
PIP O-05-03725, Level 2 assessment (PIP 05-02468) did not adhere to NSD 607,
Self-Assessments
PIP O-05-03734, Root Cause report for PIP 04-6342 (SSF staffing following a fire) was not
properly updated following final CARB review

Procedures

AP/0/A/1700/025, Standby Shutdown Facility Emergency Operating Procedure, Rev. 26
OMP 1-09, Administrative Control of Operations Procedures, Rev. 48
OMP 4-02, Verification and Validation Process for APs, EOPs, and Support Procedures,
Rev. 13
OP/0/A/1600/11, Standby Shutdown Facility Emergency Operating Procedure, Rev. 0

Technical Specifications

TS 3.4.9 and Bases, Pressurizer
TS 3.10.1 and Bases, Standby Shutdown Facility