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

May 4, 2000

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

SUBJECT: NRC SPECIAL INSPECTION REPORT 50-269/00-04, 50-270/00-04, AND 50-287/00-04

Dear Mr. McCollum:

This refers to the special inspection conducted from April 3 to 7, 2000, at your Oconee 1, 2, and 3 reactor facilities. The inspection focused upon the progress being made by your staff in reviewing the accuracy and implementing corrective actions to ensure your Emergency Operating Procedures are adequate. The enclosed report presents the results of this inspection.

Based on the results of this inspection, one potentially safety significant issue was identified. The issue was the lack of reasonable assurance that a High Pressure Injection pump could operate for the necessary time frame using the Spent Fuel Pool as the suction source. This function would be necessary following a tornado of F3, 4, or 5 severity. This issue will be reviewed under the NRC Significance Determination Process. Upon completion of our review, we will inform you of our risk determination of this issue and any associated enforcement action.

The NRC also identified a violation of NRC requirements of very low safety significance (Green). This violation is being treated as a Non-Cited Violation (NCV), consistent with Section VII.B.1 of the Enforcement Policy. The NCV is described in the summary of findings and in the body of the attached inspection report. If you contest the violation or severity level of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis of your denial, to the United States Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, Region II, the Resident Inspectors at the Oconee site, and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington DC 20555-0001.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and any response, will be placed in the NRC Public Document Room.

Sincerely,

/RA/

Charles A. Casto, Director
Division of Reactor Safety

Docket Nos. 50-269, 50-270, 50-287, 72-04
License Nos. DPR-38, DPR-47, DPR-55, SNM-2503

Enclosure: Inspection Report 50-269/00-04,
50-270/00-04, 50-287/00-04

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos:	50-269, 50-270, 50-287, 72-04
License Nos:	DPR-38, DPR-47, DPR-55, SNM-2503
Report Nos:	50-269/00-04, 50-270/00-04, 50-287/00-04
Licensee:	Duke Energy Corporation
Facility:	Oconee Nuclear Station, Units 1, 2, and 3
Location:	7800 Rochester Highway Seneca, SC 29672
Dates:	April 3 - 7, 2000
Inspectors:	W. Rogers, Senior Reactor Analyst R. Schin, Senior Reactor Inspector
Approved by:	E. Girard, Acting Chief, Engineering Branch Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

Oconee Nuclear Station, Units 1, 2, and 3
NRC Inspection Report 50-269/00-04,
50-270/00-04, and 50-287/00-04

The report covers a one week special, region-based inspection to determine whether selected, critical aspects of the licensee's Emergency Operating Procedure (EOP) Corrective Action Program were adequately progressing. The significance of issues is indicated by their color (green, white, yellow, red) as determined by the Significance Determination Process in NRC Manual Chapter 0609.

Cornerstone: Mitigating Systems

- Potential Safety Significance. There was a lack of reasonable assurance that a High Pressure Injection (HPI) pump could operate for the necessary time frame using the Spent Fuel Pool as the suction source (Section 4OA1.5). This function would be necessary following a tornado of F3, 4, or 5 severity. This conclusion was based upon:

  1) the lack of an approved calculation supporting this mode of HPI operation,

  2) the current draft calculation indicated pump operation could not last beyond 6 to 7 hours,

  3) the lack of testing being performed for this configuration, and

  4) exclusion of this function from the EOP Corrective Action Program.

- Green. A non-cited violation was identified for failure to be able to open Low Pressure Injection valves LP-17 and 18 within the required time constraints necessary to meet Technical Specification 4.6.1.k. (Section 4OA1.6).

Report Details

Introduction

Following the identification of deficiencies associated with implementing Emergency Operating Procedure (EOP) actions, the licensee began extensive reviews of the technical adequacy of the EOPs and the engineering, training and administrative controls associated with maintaining the viability of the EOP actions. From those reviews programmatic and individual corrective actions have been implemented or planned to improve the licensee's ability to maintain EOP action viability. For simplicity and ease in communication, these licensee reviews and corrective actions are collectively termed the "EOP Corrective Action Program." The objective of this one week, special inspection was to ascertain whether selected, critical aspects of the EOP Corrective Action Program were adequate at this time. The inspectors recognized that portions of the Program are still to be implemented and this inspection was an "in process" review.

4. OTHER ACTIVITIES

OA1 Identification and Resolution of Problems

1. Walk-down of EOP Actions Outside of the Control Room (42001)

a. Inspection Scope

The inspectors walked down EOP operator actions outside of the control room associated with manually starting a turbine driven emergency feedwater pump, providing makeup water to the borated water storage tank, manually operating the low pressure injection valves and the containment spray suction valves, manually starting the diesel driven instrument air compressor, using the emergency feedwater unit cross tie valves, using the low pressure service water unit cross tie valves, and accessing the standby shutdown facility. These actions were selected based upon their high risk significance in the licensee's Rev. 2 Probabilistic Risk Assessment. The walk down evaluation included a review for accessibility, procedure actions provided adequate direction to accomplish the necessary function, lighting, and presence of tools, if needed. The intent of the walk-downs was to gain a level of confidence about the adequacy of the newly revised EOP validation and verification procedure used as part of the EOP Corrective Action Program.

b. Observations and Findings

There were no observations or findings.

2. The Writer's Guide (42001)

a. Inspection Scope

The inspectors reviewed selected portions of the licensee's recently revised EOPs and verified that they were written clearly and followed the EOP Writer's Guide. The EOP sections reviewed involved manually starting a turbine driven emergency feedwater pump, providing makeup water to the borated water storage tank, manually operating

the low pressure injection valves and the containment spray suction valves, manually starting the diesel driven instrument air compressor, using the emergency feedwater unit cross tie valves, using the low pressure service water unit cross tie valves, and accessing the standby shutdown facility. The guide was revised under the EOP Corrective Action Program.

b. Observations and Findings

There were no observations or findings.

3. Administrative Controls (42001)

a. Inspection Scope

The inspectors interviewed select licensee personnel involved in the EOP Corrective Action Program to determine if the newly revised administrative controls associated with EOPs were comprehensive.

b. Observations and Findings

There were no observations or findings.

4. EOP Setpoint Calculations (42001)

a. Inspection Scope

The inspectors reviewed eight EOP setpoint calculations that the licensee had recently reviewed and had found acceptable under their EOP Corrective Action Program. Inspectors checked calculation format and selected assumptions, inputs, analytical methods, and mathematics for reasonableness, accuracy, and conformance to procedures and standards. Inspectors also reviewed the licensee's review process comments on each of the eight calculations. The calculations reviewed were:

OSC-3189 Borated Water Storage Tank Level Uncertainty, Rev. 3, dated 11/13/98

OSC-6827 Emergency Sump Operability Evaluation, Rev. 3, dated 3/30/99

OSC-4263 Pressurizer Level and Temperature Indication Uncertainties Evaluation, Rev. 2, dated 12/3/99

OSC-0619 Analysis for Use of Spent Fuel Pool Inventory for Standby Shutdown Facility, Rev. 11, dated 5/30/96

OSC-2759 Wide Range Reactor Coolant System Pressure Uncertainty, Rev. 1, dated 6/22/98

OSC-2746 Standby Shutdown Facility Pressurizer Level Loop Instrument Accuracy Calc LT-72, Rev. 3, dated 8/30/98

OSC-2322 Standby Shutdown Facility Suction Supply Availability, Rev. 6, dated 8/4/99

OSC-6780 Low Pressure Injection Decay Heat Cooler Discharge Temperature Instrumentation Loop Uncertainty 1/2/3 Low Pressure Injection TE 0209 & 0210, Rev. 3, dated 10/18/99

The inspectors reviewed the present status of the calculation upgrade portion of the EOP Corrective Action Program.

b. Observations and Findings

There were no observations or findings.

5. Corrective Action Documents Associated with the EOP Corrective Action Program (42001)

a. Inspection Scope

The inspectors reviewed a sampling of the condition adverse to quality reports, called Problem Investigation Process (PIPs) reports, initiated by the licensee through the EOP Corrective Action Program. The review was conducted to determine whether the issues were being dispositioned commensurate with safety.

b. Observations and Findings

PIP O-99-00115 identified the lack of testing associated with operation of a High Pressure Injection (HPI) pump using the Spent Fuel Pool (SFP) as the suction source. Subsequent discussions with the licensee identified that another PIP, O-98-00148, had identified non-conservative assumptions associated with the calculation that supported HPI operation in this mode. A new calculation had been performed addressing the non-conservatisms, although not yet issued, indicating a loss of suction to the HPI pump at 6 (for Unit 1/2 SFP) or 7 (for Unit 3 SFP) hours. The calculation results indicated that the combined reduction in level of the pool and the increasing temperature of the remaining water in the pool would eventually steam bind the HPI pump. This mode of HPI operation was directed by Step 5.4 of AP/1/A/1700/006, Natural Disaster, and AP/1/A/1700/10, Uncontrollable Flooding of Turbine Building. These procedures were currently active and in place on April 1, 2000. However, in AP/1/A/1700/10, Uncontrollable Flooding of Turbine Building, there were optional steps to re-fill the borated water storage tank, the primary HPI suction source, eliminating the need to transfer the suction source to the SFP. The procedure for re-filling the borated water storage tank contained eight possible flow paths to accomplish the re-fill. However, following tornados of F3, 4, or 5 intensity, the borated water storage tank is assumed to be damaged and not available. Also, the results of an interview with the head of the validation portion of the EOP Corrective Action Program indicated that this mode of operation was not included within the Program's scope. Therefore, based upon the information above, there was a lack of reasonable assurance that a HPI pump could operate for the necessary time frame using the SFP as the suction source following a tornado of F3, 4, or 5 severity.

The licensee's probabilistic risk assessment exclusively credited the HPI/SFP mode of operation for both tornado and turbine building flood. Upon comparing the dominant accident sequences (after crediting for re-fill of the borated water storage tank following a turbine building flood) with and without the HPI/SFP mode available, there was an approximately 5E-6 change in the baseline core damage frequency. Due to the resulting core damage frequency change, this is a potentially risk significant finding. However, further information regarding the underlying regulatory requirements affected by this potentially risk significant finding is needed and is identified as Unresolved Item 50-269,270,287/00-04-01: Lack of reasonable assurance that a HPI pump could operate for the necessary time frame using the SFP as the suction source following a tornado.

6. (Closed) Licensee Event Report (LER) 50-269,270,287/99-002: Technical Specification Requirement not met due to an Inadequate Process

This LER described a failure to meet Technical Specification 6.4.1.k associated with the Low Pressure Injection discharge valves, LP-17 and 18. Technical Specification 6.4.1.k required in part that operators be able to establish Low Pressure Injection flow to both discharge headers, both remotely and locally, within 15 minutes following a loss of coolant accident. During EOP verification activities on March 17, 1999, associated with violations EA98-552-01014, "Inadequate Procedure for Emergency Power to HPI Pump," and EA98-552-02014, "Inadequate 50.59 Safety Evaluations," the licensee determined that local operation to open the discharge valves could be performed in a 20 minute time frame. Failure to meet the 15 minute requirement is a violation of Technical Specification 6.4.1.k. This violation screened out as green when performing the Phase One Screening because there was not an actual loss of safety function or of a train of a safety function as determined by the licensee's engineering analysis. It would be more appropriately be classified as a design deficiency not affecting operability per Generic Letter 91-18. The violation existed from initial licensing until the engineering evaluation was completed on March 19, 1999. Therefore, this violation is being treated as an NCV consistent with Section VII.B.1 of the NRC Enforcement Policy and is identified as NCV 50-269,270,287/00-04-02: Failure to be able to open valves LP-15 and 16 within 15 minutes following a LOCA. The licensee corrective actions, as documented in the LER and condition adverse to quality document PIP O-099-1029, included:

a. Performing an engineering analysis indicating that ample emergency core cooling could be provided within the 20 minute time frame.

b. To complete a review of operator actions for emergency operating procedures and abnormal operating procedures.

c. To revise the licensing basis to indicate that the broader regulatory requirement of ample emergency core cooling flow must be maintained.

The inspector verified that a review of emergency operating procedure and abnormal operating procedure operator actions was performed, including confirmation that time critical operator actions could be performed within the necessary time frame. Also, the licensee was establishing an engineering calculation for time critical operator actions.

Under the Improved Technical Specification program the licensee requested and the NRC approved a relocation of the ample emergency core cooling requirement, both locally and remotely, to section 16.13.7.b of the Select Licensee Commitments. The inspector confirmed that EOPs directed appropriate actions to provide emergency core cooling via piggyback, even if the valves were not opened within the 15 minute time frame. Also, the inspector confirmed through interviews with engineering management and review of the PIP that a license amendment would be pursued. Therefore, the LER is closed and the PIP corrective actions were sufficient to address the violation.

7. (Closed) Inspector Followup Item (IFI) 50-269,270,287/99-02-05: AP/0/A/1700/25 Guidance for Establishing Flow to the RCP Seals and to a Dry OTSG From the SSF

This IFI described two inspector concerns with the procedure for operating the standby shutdown facility (SSF). The procedure gave instructions for starting the SSF reactor coolant (RC) makeup pump and initiating reactor coolant pump (RCP) seal injection within 10 minutes after a loss of RCP seal cooling. It also gave instructions for starting the SSF auxiliary service water (ASW) pump and initiating secondary cooling flow to a once-through steam generator (OTSG) within 15 minutes of a loss of main feedwater and emergency feedwater (EFW). One concern was that the SSF procedure initiated full ASW flow to a dry OTSG without following precautions similar to those described in the EOP for initiating EFW flow to a dry OTSG. Another concern was that the SSF procedure included no guidance or prohibition for initiating RCP seal injection if greater than 10 minutes had elapsed, allowing the seal temperature to increase to that of the reactor coolant system (RCS) temperature.

In response to the first inspector concern, the licensee added instructions to throttle back ASW flow to an OTSG to less that full flow upon establishing adequate RCS heat removal in the SSF procedure. The inspectors reviewed the revised procedure and noted that it still provided more flow to a dry OTSG than the EOP procedure for initiating EFW to a dry OTSG; however, the licensee concluded it was acceptable based on information from the vendor that the OTSG would not be damaged and the inspectors did not have information to contradicting the licensee's position.

In response to the second inspector concern, the licensee contacted the vendors for the Unit 1 RCP seals (Westinghouse) and the Units 2 and 3 RCP seals (Bingham). The inspectors reviewed information from the vendors which indicated that late initiation of RCP seal injection could damage the Westinghouse seals but would not damage the Bingham seals. However, due to performance problems with the Westinghouse seals, the licensee had recently initiated plans to replace them during the next refueling outage with Bingham type seals. This RCP seal replacement will resolve the concern and is documented in PIP O-99-01903 as Corrective Action 6. This IFI is closed.

8. (Closed) Inspector Followup Item (IFI) 50-269,270,287/99-10-04: Emergency Operating Procedure (EOP) Steps Not Written Clearly or in a Consistent Manner

This IFI described an inspector concern with two EOP action steps that were not written clearly. The two steps only alerted operators to take actions on which they had been trained but which were not stated in the EOP. EOP step 4.1.3, stated "Verify seal

injection or CC available," instead of directing operators to immediately go the SSF and start the RC makeup pump within 10 minutes (preventing a seal LOCA), if there was no RCP seal cooling. The other example step did not clearly direct operators to trip RCPs within two minutes after a loss of RCS sub-cooling margin. A failure to accomplish either of these actions within the short time limits could defeat the accident mitigation strategy.

The inspectors verified that the licensee had rewritten these two steps in a clear manner, consistent with the EOP Writers Guide. This IFI is closed.

9. (Closed) Inspector Followup Item (IFI) 50-269,270,287/99-10-05: Ability to Throttle EFW Within Three Minutes

This IFI described an inspector concern with an EOP action that required operators to perform a complex action in a very short time. The inspectors verified that the licensee had included this operator action in their recent EOP verification and validation program. The licensee provided documentation that, during recent simulator scenarios, operators had satisfactorily demonstrated their ability to throttle EFW within the three minute time limit. In addition, the licensee was planning to implement an Automatic Feedwater Isolation System modification that may eliminate the need for this operator action. This IFI is closed.

10. (Closed) Violation (VIO) 1998-552-01014: Emergency Procedure Not Adequate to Mitigate Secondary Pipe Breaks

This violation, which had been described in IR 50-269,270,287/98-15, involved an inadequate procedure IP/O/A/0050/001, Procedure to Provide Emergency Power to an HPI Pump Motor from the ASW Switchgear. Previously, the licensee had corrected the procedure and inspectors had satisfactorily walked down the revised procedure. During this inspection, the inspectors noted that the licensee had verified and validated the time critical operator actions in all procedures that were relied upon to mitigate accidents. Also, the licensee had tabulated all of these actions into a matrix that included certain information about the actions. The licensee planned to control these operator actions in the form of an engineering calculation. Also, the licensee planned to pursue engineering solutions to reduce the number of time-critical operator actions. This violation is closed.

11. (Closed) Violation (VIO) 1998-552-02014: Inadequate 10 CFR 50.59 Safety Evaluation for Revision to Procedure

This violation, which had been described in IR 50-269,270,287/98-15, involved an Inadequate 10 CFR 50.59 safety evaluation for a change to procedure IP/O/A/0050/001, Procedure to Provide Emergency Power to an HPI Pump Motor from the ASW Switchgear. As a result of overlooking that the procedure was discussed by reference in the Updated Safety Final Analysis Report, the licensee only performed a 50.59 screening, not a safety evaluation. In addition to the corrective actions described above for VIO 1998-552-01014, the licensee had performed a 10 CFR 50.59 safety evaluation of the procedure change. Also, the licensee had performed analyses to support the increase in time required to accomplish the revised procedure and had

appropriately revised the Updated Final Safety Analysis Report. The inspector reviewed the safety evaluation and identified no deficiencies. In addition, the licensee planned to improve the technical review process for event mitigation procedures, as documented in PIP O-99-5957. This violation is closed.

12. (Closed) Licensee Event Report (LER) 98-004 (00 and 01): Emergency Core Cooling System Outside Design Basis due to Instrument Errors/Deficient Procedures

This LER described non-conservative borated water storage tank level set points used for transferring the suction source of the emergency core cooling pumps from the borated water storage tank to the containment sump following a loss of coolant accident. As documented in IR 50-269,270,287/99-07 the only item pending NRC's review was a sample of selected safety-related, risk significant historical calculations for which the licensee's review and enhancements have been completed. This review was successfully completed as documented in section 4OA1.4 above. Therefore, this LER and its revision are closed.

4OA6 Management Meetings

.1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on April 7, 2000. The licensee acknowledged the findings presented. No proprietary information was identified to the inspectors.

Partial List of Persons Contacted

Licensee

L. Azzarello, Engineering Manager, Design Basis
E. Burchfield, Engineering Supervisor II, Design Basis
D. Brewer, Engineering Supervisor II, Severe Accident Analysis Group
D. Coyle, Operations
J. Forbes, Station Manager
W. Foster, Safety Assurance Manager
D. Garland, Operations
L. Keller, Corporate Audits and Assessment Manager
W. McCollum, Site Vice President, Oconee Nuclear Station
L. Nicholson, Regulatory Compliance Manager

Other licensee employees contacted during the inspection included engineers, technicians, operators, and administrative personnel.

NRC

M. Shannon, Senior Resident Inspector

Inspection Procedures Used

IP42001	Emergency Operating Procedures
IP90712	In-Office Review of Written Reports of Nonroutine Events at Power Reactor Facilities
IP92901	Followup - Operations
IP92903	Followup - Engineering

Items Opened, Closed, and Discussed

Closed

50-269,270,287/99-02-05	IFI	AP/0/A/1700/25 Guidance for Establishing Flow to the RCP Seals and to a Dry OTSG From the SSF (4OA1.7)
50-269,270,287/99-10-04	IFI	EOP Steps Not Written Clearly or in a Consistent Manner (4OA1.8)
50-269,270,287/99-10-05	IFI	Ability to Throttle EFW Within Three Minutes (4OA1.9)
1998-552-01014	VIO	Emergency Procedure Not Adequate to Mitigate Secondary Pipe Breaks (4OA1.10)
1998-552-02014	VIO	Inadequate 10 CFR 50.59 Safety Evaluation for Revision to Procedure (4OA1.11)
50-269,270,287/98-004	LER	Emergency Core Cooling System Outside Design Basis due to Instrument Errors/Deficient Procedures (4OA1.12)
50-269,270,287/98-004 rev.1	LER	Emergency Core Cooling System Outside Design Basis due to Instrument Errors/Deficient Procedures (4OA1.12)
50-269,270,287/99-002	LER	Technical Specification Requirement not met due to an Inadequate Process (4OA1.6)

Opened and Closed

50-269,270,287/00-04-01	NCV	Failure to be able to open valves LP-15 and 16 within 15 minutes following a LOCA (4OA1.6)

Opened

50-269,270,287/00-04-01	URI	Lack of reasonable assurance that a HPI pump could operate for the necessary time frame using the SFP as the suction source following a tornado (4OA1.5)

List of Acronyms

AP	Abnormal Procedure
ASW	Auxiliary Service Water
EFW	Emergency Feedwater
EOP	Emergency Operating Procedure
HPI	High Pressure Injection
IFI	Inspector Followup Item
IR	Inspection Report
LER	Licensee Event Report
LOCA	Loss of Coolant Accident
LP	Low Pressure
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
OTSG	Once Through Steam Generator
PIP	Problem Investigation Process
RC	Reactor Coolant
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
SSF	Standby Shutdown Facility