



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

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

September 21, 2007

Southern Nuclear Operating Company, Inc.

ATTN: Mr. J. Randy Johnson  
Vice President - Farley

Joseph M. Farley Nuclear Plant  
7388 North State Highway 95  
Columbia, AL 36319

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT - NRC PROBLEM IDENTIFICATION  
AND RESOLUTION INSPECTION REPORT 05000348/2007006 AND  
05000364/2007006

Dear Mr. Johnson:

On August 24, 2007, the U. S. Nuclear Regulatory Commission (NRC) completed a team inspection at the Joseph M. Farley Nuclear Plant. The enclosed report documents the inspection results which were discussed on August 24, 2007, with you and members of your staff.

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

Based on the sample selected for this review, the team concluded that, in general, problems were properly identified, evaluated, and corrected within the problem identification and resolution programs. However, within the selected sample, the team identified examples of inadequate broadness reviews in condition reports, documentation issues related to the closure of action items, operating experience not implemented in a timely manner, and missed opportunities in the trending of issues which could result in adverse effects on safety-related plant components. Based on interviews conducted during the inspection and the results of the site's safety-conscious work environment surveys, the inspectors determined that there is no reluctance by site personnel to identify issues.

Throughout the inspection, the team was aware of several current and historical regulatory issues regarding various equipment problems and indications that evaluation of problems needed to be more rigorous. These included a Non-Cited Violation (NCV) related to the Main Steam Isolation Valves (MSIVs), pending issues related to Residual Heat Removal (RHR) sump valve failures; and repetitive issues related to 4160-Volt breaker failures. These issues generally reflected a continuing need for improving areas of the Corrective Action Program (CAP) related to thoroughly evaluating problems in an aggregate manner such that more effective corrective actions can be developed for known equipment challenges.

One green finding was identified during this inspection; it was determined to be a violation of NRC requirements. However, because of the very low safety significance and because it is entered into your corrective action program, the NRC is treating this finding as a non-cited violation (NCV), in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you contest the NCV in this report, you should provide a response with the basis of your denial, within 30 days of the date of this inspection report, to the United States Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001, and NRC Resident Inspector at the Farley facility.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure 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 [www.nrc.gov/reading-rm/adams.html](http://www.nrc.gov/reading-rm/adams.html) (the Public Electronic Reading Room).

Sincerely,

**/RA/**

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

Docket Nos.: 50-348 and 50-364  
License Nos.: NPF-2 and NPF-8

Enclosure: Inspection Report 05000348/2007006 and  
05000364/2007006

Attachment: Supplemental Information

cc w/encl: (See page 3)

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Letter to J. Randy Johnson from Scott M. Shaeffer dated September 21, 2007

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT - NRC PROBLEM IDENTIFICATION  
AND RESOLUTION INSPECTION REPORT 05000348/2007006 AND  
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**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket Nos: 50-348, 50-364

License Nos: NPF-2, NPF-8

Report No: 05000348/2007006 and 05000364/2007006

Licensee: Southern Nuclear Operating Company, Inc.

Facility: Joseph M. Farley Nuclear Plant

Location: Columbia, AL 36319

Dates: August 6 - 10, 2007  
August 20 - 24, 2007

Inspectors: R. Carrion, Senior Reactor Inspector  
B. Anderson, Resident Inspector, Vogtle  
G. Khouri, Reactor Inspector  
S. Sandal, Resident Inspector, Farley

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

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## SUMMARY OF FINDINGS

IR 05000348/2007006 and 05000364/2007006; 8/06/2007-8/24/2007; Joseph M. Farley Nuclear Plant, Units 1 & 2; Identification and Resolution of Problems.

The inspection was conducted by a senior reactor inspector, two resident inspectors, and a reactor inspector. One finding of very low significance was identified during this inspection and was classified as a non-cited violation. The significance of most findings is indicated by its 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.

### Identification and Resolution of Problems Summary

One finding of very low safety significance (Green) was identified. The licensee was generally effective in identifying problems at a low threshold and entering them into the corrective action program. The licensee properly prioritized issues entered into the corrective action program (CAP) and routinely performed evaluations that were technically accurate and of sufficient depth to address the issue documented in the condition reports (CRs). Overall, corrective actions were effective; however, minor examples of inadequate condition report broadness reviews and documentation issues related to the closure of action items were identified. In general, operating experience was found to be used both proactively and reactively by personnel involved in the corrective action program; however, an example of industry operating experience was identified in which the licensee did not completely develop interim compensatory measures for a condition to which Farley was vulnerable. The licensee's programmatic self-assessments and audits were generally effective in identifying weaknesses in the corrective action program; however, a missed opportunity in the trending of issues which could result in adverse effects on safety-related plant components was identified. The inspectors also concluded that the workers at Farley felt free to report safety concerns.

### A. NRC-Identified and Self-Revealing Findings

#### Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, for a failure to promptly identify and correct a condition adverse to quality. In November 2004, the licensee identified that the carbon steel valves in the service water system were susceptible to corrosion which caused the valve disc to separate from the stem. The licensee did not promptly identify the complete population of valves affected by this issue. In May 2007, a service water valve failure occurred in which stem-disc separation occurred as a result of similar corrosion issues.

The finding is of more than minor significance because it affects the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and

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capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, susceptibility of the valves to corrosion reduced the reliability of safety-related systems. The finding is of very low safety significance (Green) because it was not a design or qualification deficiency, and did not represent an actual loss of safety function for greater than the allowed technical specification outage time. Section 4OA2.a.(3).

B. Licensee-Identified Violations.

None

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## REPORT DETAILS

### 4. OTHER ACTIVITIES

#### 4OA2 Problem Identification and Resolution

##### a. Assessment of the Corrective Action Program (CAP) Effectiveness

##### (1) Inspection Scope

The inspectors reviewed procedures associated with the CAP which described the administrative process for identifying, evaluating and resolving problems via condition reports (CRs). The inspectors reviewed selected CRs from the approximately 26,000 that had been issued between August 2005 and July 2007. The inspectors attended selected daily Corrective Action Program Coordinator (CAPCO) meetings where CRs were screened for significance and Management Review Meetings (MRMs) to observe management and oversight functions of the CAP. The inspectors attended a Corrective Action Review Board (CARB) meeting and reviewed selected CARB meeting minutes to assess the effectiveness of the oversight provided by the CARB. The inspectors interviewed personnel to determine whether the licensee was identifying, accurately characterizing, and entering problems into the corrective action process at an appropriate threshold. The inspectors also reviewed NRC reports that documented NRC inspections over the last two years to assess how the licensee addressed findings documented in these reports. Corrective action documents associated with Licensee Event Reports (LERs) were also reviewed to ensure that the actions contained in the LERs were appropriate, comprehensive in nature, and had been implemented.

The inspectors selected CRs for review covering the seven cornerstones of safety identified in the NRC's Reactor Oversight Process (ROP). The inspectors conducted a detailed review of Service Water (SW) system, Component Cooling Water (CCW) system, Auxiliary Feedwater (AFW) system, Emergency Core Cooling System (ECCS), and Radiation Monitor system to verify that problems were being properly identified, appropriately characterized, and processed in accordance with the licensee's established CAP procedures. These systems were selected based on risk insights from the licensee's probabilistic risk analysis. For these systems and associated components, the inspectors reviewed CRs, system health reports, the maintenance work history, and Work Orders (WOs). The inspectors conducted plant walkdowns of these systems to assess the material condition and to determine if any identified deficiencies had not been entered into the CAP. The inspectors reviewed selected industry and NRC operating experience items associated with plant systems and components to verify that these were appropriately evaluated for applicability and that issues identified were entered into the CAP.

To verify that the licensee appropriately prioritized and evaluated problems in accordance with their risk significance, the inspectors reviewed condition reports, including root and apparent cause evaluations, trend reports, and self-assessments. The inspectors verified that the licensee adequately determined the cause of the problems, including root cause analysis where appropriate, and adequately addressed operability, reportability, common cause, generic concerns, extent of condition, and

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extent of cause. In addition the inspectors' review included appropriateness of the assigned significance, timeliness of resolutions, level of effort in the investigation, and scope and depth of the causal analysis. The inspectors also verified that the licensee appropriately identified corrective actions to prevent recurrence and that these actions had been appropriately prioritized. The inspectors verified that the corrective actions were properly documented, assigned, and tracked to ensure completion. Furthermore, the inspectors reviewed selected effectiveness reviews to verify that the licensee had identified and implemented timely, appropriate, and adequate corrective actions to address problems and prevent recurrence.

The inspectors reviewed licensee audits and self-assessments, including those which focused on problem identification and resolution programs and processes, to verify that findings were entered into the CAP and to verify that these audits and assessments were consistent with the NRC's assessment of the licensee's CAP.

Documents reviewed are listed in the Attachment.

## (2) Assessment

Effectiveness of Problem Identification. The inspectors determined that the licensee was generally effective at identifying problems and entering them into the CAP. The threshold for initiating CRs was low and employees were encouraged to initiate CRs for plant issues. Equipment performance issues were routinely being identified and entered into the CAP for monitoring, follow-up, and resolution. Some minor issues, identified during the system walkdowns, had not been included in the CAP including: minor boric acid buildup on components, inconsistent use of component calibration stickers, and unofficial markings on plant components.

The inspectors also noted examples in which problem identification was not effective including:

- CR 2007102078 documents that Containment Spray Pump 2B Suction Valve MOV-8827B had packing leaks identified ten times since August 1997. It was apparent from the CR that the corrective actions have not been appropriately focused to correct the problem.
- Prior to CR 2006110689, there were at least ten condition reports written to address high flow or high differential pressure conditions through various CCW system components. Each of these presented an opportunity to identify, thoroughly evaluate, and address the aggregate condition. These condition reports include: 2005101583, 2005111830, 2005113014, 2006101121, 2006101185, 2006104497, 2006105150, 2006106453, 2006107483, and 2006108548. This issue is also discussed in Section c(2).

Effectiveness of Prioritization and Evaluation of Issues. The inspectors noted the regulatory issues regarding problems in the area of thoroughness of evaluation, including the NCV on the MSIVs, the RHR sump valve encapsulations, and repetitive

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4160-Volt breaker failures. These issues generally reflected a continuing need for improving areas of the CAP related to thoroughly evaluating problems in an aggregate manner such that more effective corrective actions can be developed for known equipment challenges. However, based on the sample reviewed during this inspection, the inspectors determined that, in general, the licensee had adequately prioritized issues entered into the CAP. With the exception of the previously identified issues, the licensee generally performed evaluations that were technically accurate and of sufficient depth to ensure that the issue was understood and that appropriate corrective actions had been developed.

The licensee generates a monthly CAP performance indicator overview containing statistics on overdue action items, action item extensions, CR age, and an overall CAP composite program assessment which was provided to station management to ensure the appropriate level of attention was maintained on the CAP.

The licensee conducts trending of condition reports based on event codes assigned during the daily CAPCO meeting and generates quarterly trend reports. For consistency, a limited number of department CAPCOs were used to assign the event codes. The identification of trends was based on a statistical screening process. Cause codes assigned to CRs following completion of Root Cause and Corrective Action (RCCA) Analysis, Apparent Cause Determination (ACD), or Basic Cause Determination (BCD) have not yielded much useful information due to the very large number of codes and the tendency of the users to select the category "other" to describe an individual event.

The inspectors determined that the station conducted an adequate number of formal cause determinations based on the overall number and significance of issues entered into the CAP. The cause determinations were consistent with established CAP procedures. Between August 2005 and July 2007 the licensee initiated one Severity Level 1, 59 Severity Level 2, and 335 Severity Level 3 CRs. The station performed approximately 1229 cause determinations during this period. The processes used ranged from the most formal tool, the RCCA, to less rigorous methods such as an ACD or a BCD.

While most of the cause determinations reviewed were detailed and thorough, some examples of weak or less-than-fully-effective causal analyses were identified resulting in similar events occurring after the initial event had been evaluated. The following were examples noted by the inspectors.

- CR 2005112351 documents the gas binding of 2A Charging Pump. The original engineering evaluation did not consider the integrated effect of the gas on the system until questioned by the resident inspector. The evaluation could have been more thorough in evaluating the potential for the identified gas affecting more than one charging pump due to its location.
- CR 2007100621 documents water in the oil for the 1A Charging Pump Speed Increaser Gearbox. The engineering evaluation failed to address the following:

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- The cause of the water in the oil was attributed, in part, to a tube leak resulting from high flow of the CCW system. The defective tube was plugged, further increasing the CCW flow. The effect of this increased flow was not addressed.
- The capacity of the oil reservoir was 5.5 gallons; however, 8 gallons were drained. Water sample revealed a water content of 0.2154%. The evaluation did not address the discrepancy between the drained volume and the normal capacity.

In addition, some apparent cause and root cause evaluations did not include thorough broadness reviews (i.e., extent of condition evaluations). NMP-GM-002-001, Corrective Action Program Instructions, Section 6.9.3.5, states that for apparent cause determinations, a broadness review is required for equipment failures and QA audit findings. Section 6.9.8.6 further states that, where appropriate, the broadness review should include the same component used in other systems, as well as other components susceptible to the same failure mechanism. The broadness reviews for the following CRs considered only the other trains or other unit for the affected component, rather than taking a more expansive view of the issue.

- CR 2006107396 - Inoperable service water flow control valve from Unit 1 Train A component cooling water heat exchanger
- CR 2007103277 - Failure of as-found local leak rate testing for Unit 2 Penetration # 32 motor operated valves
- CR 2006104942 - Speed controller failure for Unit 1 turbine driven auxiliary feedwater pump
- CR 2004105586 - Reduced service water flow to Unit 1 Train B reactor coolant pump motor air cooler

Furthermore, CR 2005112941 was written due to Unit 1 Engineered Safeguards Function (ESF) room cooling system performance resulting in a Maintenance Rule a(1) classification. The root cause evaluation included a broadness review section that was simply a list of other CRs that may have been related to the event. No analysis of the CRs to support any conclusion for extent of condition was documented in the broadness review section of the CR.

Effectiveness of Corrective Actions. CAP procedure (NMP-GM-002) required that effectiveness reviews be performed on all Severity Level 1 and 2 CRs and selected Severity Level 3 CRs. Effectiveness reviews were intended to determine if corrective actions taken were effective by ensuring that the causes identified in the CR had been corrected, there had been no recurrence of the same or similar event, and that the corrective actions had been adequately challenged. For the sample selected, the team found that the corrective actions developed and implemented for problems were generally timely and effective, appropriate in scope, and commensurate with the safety significance of the issues. For significant conditions adverse to quality, the corrective actions directly addressed the cause and effectively prevented recurrence.

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However, a review of closed action items (AIs) determined that there were instances where the documentation for “actions taken” to close an action item did not explicitly match the required “action to perform,” as detailed in the AI record on a given CR. The following are examples noted by the inspectors:

- CR 2005107406 was written on July 26, 2005, due to the Unit 2 B component cooling water (CCW) pump exceeding its unavailability hours after replacement of the pump shaft. AI 2005203751 was created as a result of the condition report. The documented action to perform under AI 2005203751 was to ‘Implement pump rotating plan for systematic overhaul/replacement of CCW pumps. Include recommendation for rotating spare procurement.’ The action taken to close the AI indicates that a plan was ‘developed’ and the AI was subsequently closed on March 29, 2007. The inspection team noted that, at the time of the inspection, implementation of the plan had not been completed; none of the CCW pumps had been refurbished and the first CCW pump refurbishment had been scheduled to occur in 2008.
- CR 2005112444 was written on December 6, 2005, for an inadvertent automatic start of the Unit 2 A motor driven auxiliary feed water pump (MDAFWP) due to a failure of a safeguards driver board. AI 2005205403 was developed as a result of the condition report to... ‘Revise the TQRs for SSPS card receipt criteria to utilize KIMKA test system to inspect all SSPS cards during receipt inspections. The KIMKA board tester can be used with all types of SSPS boards to test for overall function of the card, along with testing all components for degradation.’ The action taken to close the AI was ‘Added additional acceptance to TQR for stock numbers listed as follows: Have FNP card repair facility inspect and verify overall function and proper operability of card/board.’ The AI was subsequently closed on March 28, 2006. The action taken as documented by the AI record did not specify the testing method to be used or whether the testing was to be performed at the component level.
- CR 2006103043 was written on April 8, 2006, to address various issues discovered during the performance of the Unit 1 main steam isolation valve (MSIV) and bypass valve cold shutdown in-service test, FNP-1-STP-45.7. AI 2006201983 was created as a result of the condition report, and the documented action to perform was to ‘Ensure parts available to support U2R18 replacements.’ The action taken to close the AI stated that ‘Items are on order and will be tracked to ensure that there is adequate stock. A scope of the items required is in the documents tab.’ The AI was subsequently closed on October 2, 2006. The action taken to close the AI as documented by the AI record indicates that the parts were on order but were not on hand at the site at the time that the AI was closed. The inspectors noted that the AI was classified as a Priority 2 Action Item and that it was completed by, verified by, and closed by the same person. Although this is permitted by the CAP under certain circumstances, another independent person may have noticed the discrepancy.

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For the previous three examples, the team found no indication that the actual actions taken were either (1) not performed or (2) not deferred to a future date. The observation is made with respect to the thoroughness of the documentation of the action taken versus the action required to be performed prior to closing the action item record.

(3) Findings

Introduction. The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, for a failure to promptly identify and correct a condition adverse to quality. In November 2004, the licensee identified that the carbon steel valves in the service water system were susceptible to corrosion which caused the valve disc to separate from the stem. The licensee did not promptly identify the complete population of valves affected by this deficiency. In May 2007, a service water valve failure occurred in which stem-disc separation occurred as a result of similar corrosion issues.

Description. In November 2004, the licensee identified that low service water (SW) cooling flow existed for the 1B reactor coolant pump (RCP) motor air cooler. Investigation revealed that the disc had become separated from the valve stem in N1P16V047C, the SW inlet isolation valve. The cause of this stem-disc separation was determined to be corrosion; a result of the carbon steel valve components being exposed to the service water environment. Corrective actions for this issue included identifying whether carbon steel valves were installed elsewhere in the SW lines that supply the RCP motor air coolers on Unit 2, and replacing the affected valves with stainless steel valves. The licensee documented this event in CR 2004105586 and performed an apparent cause determination.

In May, 2007, the licensee identified that the disc had separated from the valve stem in Q2P16V077, an outlet isolation valve in a RCP motor air cooler SW line on Unit 2. This condition prevented SW cooling flow to all three RCP motor air coolers for Unit 2. This event was documented in CR 2007104849 and included an apparent cause determination. Corrective actions for this issue identified and prioritized the replacement of twenty-two other carbon steel valves in the SW system. Inspectors concluded that the extent-of-condition investigation was not timely in that more than thirty months elapsed between the time that the licensee became aware of the potential problem with valve failure via corrosion and the time that all the valves were inspected and plans for corrective actions were implemented.

Analysis. The finding is of more than minor significance because it affects the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, susceptibility of the valves to corrosion reduced the reliability of safety-related systems. The finding is of very low safety significance (Green) because it was not a design or qualification deficiency, and did not represent an actual loss of safety function for greater than the allowed technical specification outage time.

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The inspectors evaluated this finding for a cross-cutting aspect; no primary cross-cutting aspect was identified.

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, requires that "...measures shall be established to assure that conditions adverse to quality... are promptly identified and corrected." Contrary to this requirement, the licensee did not promptly identify the complete population of carbon steel gate valves affected by a known deficiency (the system's corrosive environment). Specifically, a subsequent valve failure occurred and twenty-two other carbon steel valves were identified in the SW system more than thirty months after the deficiency was originally identified. Because the finding is of very low safety significance and has been entered in the licensee corrective action program as CR 2007104849, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. This item will be tracked as NCV 05000348, 364/2007-006-01, Failure to Promptly Identify the Complete Population of Service Water Valves Affected by the System's Corrosive Environment and Correct the Condition.

b. Assessment of the Use of Operating Experience (OE)

(1) Inspection Scope

The inspectors conducted a review of the licensee's OE program to verify that actions were implemented in accordance with licensee procedure NMP-GM-008, Operating Experience Program. NMP-GM-002-GL03, Cause Determination Guideline, was reviewed to verify that guidance was provided for reviewing internal and external operating experience for evaluating issues in the corrective action program. The inspectors interviewed station personnel, attended selected daily Management Review Meetings and CAPCO CR screening meetings, and evaluated CAP documentation to determine if OE was being used effectively. In addition, the inspectors reviewed the licensee's evaluation of selected Southern Nuclear Operating Company and industry operating experience information, NRC Regulatory Information Summaries (RIS) and Information Notices (INs), and generic vendor notifications to verify that issues applicable to Farley were appropriately addressed.

(2) Assessment

The inspectors determined that OE was regularly used proactively to prevent events from occurring and to address events or near-misses. OE was regularly included in System Health Reports and CRs associated with station events as part of the causal investigations and corrective action development process. In general, the inspectors determined that OE items were adequately identified, evaluated, and utilized. However, CR 2007106481 was identified to be a case in which an OE item was not utilized to its fullest potential.

CR 2007106481 documents the spurious safety injection (SI) event at North Anna. Farley plant personnel had reviewed several options for resetting the SI and determined that Farley's SI termination procedure, under the condition documented in the OE, would not be successful in terminating the SI flow either. The event occurred at North Anna on June 29; the CR was written at Farley on July 3. Following questioning by the

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inspectors regarding interim training and awareness of the issue, the licensee concluded that the measures taken to date may not have been effective in ensuring that all operating crews were aware of the potential vulnerability to the plant. The licensee was waiting on vendor information to revise procedures to address the OE item. The inspectors noted that written interim guidance was issued on August 23.

(3) Findings

No findings of significance were identified.

c. Assessment of Self-Assessments and Audits

(1) Inspection Scope

The inspectors reviewed completed self-assessments and audits conducted by station and corporate organizations to assess the thoroughness of the actions items that resulted from these activities and these action items were appropriately prioritized and entered into the CAP. The inspectors verified that the self-assessments and audits were consistent with the NRC's assessment of the CAP and supporting programs.

Documents reviewed are listed in the Attachment.

(2) Assessment

The inspectors determined that, in general, the scopes of the self-assessments and audits conducted over the review period were adequate and were self-critical in nature. Corrective actions were incorporated into the CAP and were tracked to completion. Updates on the status of these action items were provided to station management at department and site-level CARB meetings. The inspectors determined that the licensee had adequately prioritized issues identified by these assessments and audits in the CAP.

However, the inspectors noted an example which indicated that the licensee's ability to effectively utilize the CAP self-assessment process to identify and prioritize adverse performance trends and to ensure that timely action is taken to correct identified issues warranted additional focus. Specifically, although the inspectors identified at least nineteen CRs written since February 7, 2005, related to elevated component cooling water (CCW) flow rate issues, no adverse trend in this area was identified by the licensee's CAP for further evaluation and prompt resolution. The following CRs are examples taken from the group of nineteen identified by the inspectors:

- CR 2005101548 documents an issue on February 7, 2005, related to the erratic control of the Unit 1 CCW letdown heat exchanger temperature control valve Q1P17TCV3083. Subsequent flow scan analysis of the valve did not indicate any abnormal friction in the stroke of the valve. Corrective actions associated with this event focused on replacing the valve positioner. The control loop was calibrated but the positioner was not changed due to issues with the work sequence.

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- CR 2005101583 documents an unanticipated reactivity change event on February 8, 2005, where reactor power decreased from 100% to 98.5% during a CCW system alignment change while the Unit 1 CCW letdown heat exchanger temperature control valve Q1P17TCV3083 was in manual control due to temperature oscillations. The apparent cause determination concluded that changing plant parameters were not properly evaluated and that the pre-job brief did not involve sufficient detail to address the system alignment effect on CCW temperatures. The apparent cause did not make any conclusions regarding the cause of the temperature oscillations, which led to the valve being placed in manual, but committed to additional analysis on the sizing of the positioner as documented by CR 2005101548.
- CR 2005111830 documents the discovery of valve body wastage below the cage seating area on Unit 2 valve Q2P17HV3184 (CCW from reactor coolant pump thermal barrier) on November 19, 2005. The apparent cause determination indicated that the wastage was more than likely the result of flow-induced erosion and short term cavitation.
- CR 2006106453 was written on July 6, 2006, for Unit 2 CCW flow indicator N2P17FI3077 (seal water heat exchanger CCW discharge flow) being in an over-ranged high condition. A subsequent work order found no problem with the flow indicator.
- CR 2006110689 was written on December 1, 2006, to request evaluation of operating flow conditions through the CCW system in comparison to the normal operating conditions specified in the functional system description (FSD). The condition report notes that flow rates for various system components currently exceed the flow rates referenced in the CCW FSD. At the time of this inspection, the requested engineering evaluation has not been completed and has a scheduled due date of December 20, 2007.
- CR 2007100621 was written on January 23, 2007, for an event where CCW was found in the Unit 1 A charging pump speed increaser gear box. The water intrusion was due to a tube leak in the gearbox heat exchanger. The apparent cause determination concluded that there were two combined possible causes for the tube failure; (1) microbial-induced pitting of the heat exchanger during a period of time when service water was the cooling source or (2) flow-accelerated corrosion following a redistribution of CCW flows which increased heat exchanger flow velocity when the CCW system was the cooling source.

The inspection team noted that, as detailed by the above examples, there were multiple opportunities within the period of time prior to CR 2006110689 for the corrective action program to identify and take prompt action on an adverse trend with respect to CCW system issues related to elevated flow rates. The team also noted that, to date, while awaiting completion of the pending engineering evaluation referenced by CR 2006110689 and replacement of the trim assembly for the Unit 1 CCW letdown heat exchanger temperature control valve Q1P17TCV3083, that there have been six additional condition reports that are related to CCW system flow issues. The team

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concluded that an adverse trend for CCW flow-related issues was evident based on the aggregate number of CRs identifying these related issues. Although individual CRs were, in general, being addressed, a broader cause evaluation may have revealed other generic corrective action for the high flow conditions.

(3) Findings

No findings of significance were identified.

d. Assessment of Safety-Conscious Work Environment

(1) Inspection Scope

The inspectors reviewed the licensee's Employee Concerns Program (ECP) which provides an alternate method to the CAP for employees to raise concerns and remain anonymous if so desired. The inspectors interviewed members of the plant staff on their understanding and their willingness to initiate condition reports or raise safety concerns through the ECP in order to develop a general perspective of the safety-conscious work environment at the site. The inspectors looked for indications of conditions that would cause plant personnel to be reluctant to raise safety concerns. The inspectors also interviewed both the ECP Corporate Program Manager and the Plant Farley ECP Coordinator, and reviewed ECP documents to verify that concerns were being identified, properly reviewed and resolved. ECP documents reviewed are listed in the Attachment.

In addition, the inspectors reviewed selected ECP files for completeness, adequacy of the investigation, file documentation, responsiveness to the concerned individuals, responses to "recommended corrective actions" by station management, and to verify that employee concerns remain anonymous. The inspection included verification that concerns were being properly reviewed; identified deficiencies were being resolved; and issues were entered into the CAP when appropriate.

(2) Assessment

Based on the interviews held with plant staff, reviews of CRs and selected Employee Concern packages, ECP metrics, and an assessment of the implementation of the licensee's ECP, the inspectors concluded that personnel were overall willing to promptly identify and report problems using available administrative programs.

(3) Findings

No findings of significance were identified.

4OA6. Management Meetings

On August 24, 2007, the inspectors presented the inspection results to Mr. J. Randy Johnson, Vice President - Farley, and other members of his staff who acknowledged the findings. The inspectors returned to the licensee the only piece of proprietary information which had been reviewed during the course of the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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## **SUPPLEMENTARY INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee Personnel

R. Johnson, Vice President - Farley  
W. Barger, Plant Manager  
R. Bayne, Performance Analysis Supervisor  
M. Boggs, Supply Chain Superintendent  
S. Chestnut, Engineering Support Manager  
D. Christianson, Nuclear Operations Training Supervisor  
P. Hayes, SNC Farley Support Manager  
J. Jerkins, Performance Analysis Engineer  
T. Livingston, Chemistry Manager  
B. Moore, Support Manager  
W. Oldfield, Quality Assurance Supervisor  
W. Sparkman, Nuclear Licensing  
J. Swartzwelder, Work Control Superintendent  
R. Wells, Operations Manager  
C. Westberry, Acting Engineering Supervisor  
T. Youngblood, Project Manager

#### NRC Personnel

S. Shaeffer, Chief, Reactor Projects Branch 2

### **LIST OF ITEMS OPENED AND CLOSED**

05000348, 364/2007-006-01	NCV	Failure to Promptly Identify the Complete Population of Service Water Valves Affected by the System's Corrosive Environment and Correct the Condition. Section 4OA2.a.(3)
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## **LIST OF DOCUMENTS REVIEWED**

### **Procedures**

- NMP-ES-006-GL02, Preventive Maintenance Request, Version 3.0
- NMP-GM-002, Corrective Action Program, Version 6.0
- NMP-GM-002-001, Corrective Action Program Instructions, Version 2.0
- NMP-GM-008, Operating Experience Program, Version 3.0
- FNP-0-AP-25, Equipment Identification and Labeling, Version 13.0
- FNP-0-AP-11, Control and Calibration of Measuring and Test Equipment, Version 19.0
- FNP-2-STP-627, Local Leak Rate Testing of Containment Penetrations, Version 41.0
- NMP-OS-001, Reactivity Management Program, Version 6.0
- Concerns Program Procedure, Revision 8

### **FOCUS SYSTEMS**

#### **Auxiliary Feedwater (AFW) System**

##### **Condition Reports**

2005108436, 2005109077, 2005112444, 2006104942, 2006105386, 2007101332, 2007103267, 2007104623, 2007104725, 2007106196

##### **Work Orders**

2077001901, 1062792201, 20533203701, 1062850001, 1062578501, 1052722501, 1062604601, 2071003201

##### **Miscellaneous Documents**

- System Health Reports: 3<sup>rd</sup> Quarter 2005 through 2<sup>nd</sup> Quarter 2007
- Farley AFW Piping Vibration Report, March 2007
- Farley AFW Motor Vibration Report, March 2006

#### **Service Water (SW) System**

##### **Condition Reports**

2004102596, 2005102412, 2006101160, 2006101512, 2006101959, 2006102447, 2006108326, 2006103077, 2006104504, 2006107396, 2006108326, 2006108584, 2007100589, 2007101588, 2007104849

##### **Work Orders**

2051571405, 2060950001, 2060691801, 2060722701, 2062129401, 1061048901, 2060422701, 1061320001

##### **Miscellaneous Documents**

- System Health Reports: 3<sup>rd</sup> Quarter 2005 through 2<sup>nd</sup> Quarter 2007

#### **Component Cooling Water (CCW) System**

##### **Condition Reports**

2005101548, 2005101583, 2005102204, 2005107406, 2005108473, 2005109521, 2005109590, 2005109978, 2005110463, 2005110747, 2005110755, 2005110797, 2005110809, 2005110978, 2005111357, 2005111383, 2005111511, 2005111563, 2005111830, 2005113014, 2006100503, 2006100765, 2006101121, 2006101185, 2006101292, 2006101815, 2006104038, 2006104043, 2006104107, 2006104256, 2006104292, 2006104497, 2006105137, 2006105138, 2006105150, 2006106453, 2006106614, 2006106699, 2006107483, 2006107575, 2006108151, 2006108548, 2006109243, 2006109443, 2006109634, 2006109670, 2006109899, 2006110502,

2006110689, 2006110933, 2006110972, 2007100057, 2007100621, 2007100672, 2007100685, 2007102308, 2007103804, 2007104232, 2007104280, 2007104285, 2007104474, 2007104536, 2007105156, 2007105221, 2007105283

#### Action Items

2005203761, 2005203762, 2005203751, 2005203752, 2005203753, 2006202225, 2007200772, 2007201261, 2007202464, 2005205357, 2005205358, 2005205359, 2006200067, 2007201261, 2007202819, 2007201965, 2007202417, 2007202420, 2007203401

#### Work Orders

1060634801, 1060655601, 1061109201, 1061295301, 1061298901, 1061468401, 1062278701, 1062984701, 1063129801, 1063463001, 1070175601, 1071211701, 2052279101, 2052412301, 2052546901, 2052710201, 2052775501, 2052818001, 2052818301, 2052823101, 2052956301, 2052958001, 2052963301, 2060407801, 2061463401, 2061463501, 2062216701, 2062908301, 2063318801, 2070004801, 2070843101, 2070977501, 2070980901, 2070996901, 2070998001, 2071205201, 2071216301, C026000901, C036033901, C051797501, C063138101, C063346201, M300726201

#### Procedures

- FNP-1-STP-23.8, Component Cooling Water Inservice Test, Version 38.0
- FNP-1-SOP-23.0, Component Cooling Water, Version 64.0
- FNP-2-SOP-23.0, Component Cooling Water, Version 66.0

#### Additional Documents

- Farley Component Cooling Water System Health Reports, Unit 1 and Unit 2: Reporting Periods 3<sup>rd</sup> Quarter 2005 through 2<sup>nd</sup> Quarter 2007
- Farley Incident Report 2-96-266
- Farley Nuclear Plant Occurrence Report 96-273
- Farley Nuclear Plant Occurrence Report 96-275
- FNP-0-ETP-4506, Air-Operated Valve (AOV) Data Sheet for Q2P17HV3096B, Attached to Work Order 2070996901

#### **Chemical & Volume Control System (CVCS)/ High Head Safety Injection (HHSI)**

##### Condition Reports

2004002293, 2004106637, 2005104853, 2005107630, 2005109880, 2005110602, 2005111227, 2005111259, 2005111303, 2005111572, 2005112351, 2006100400, 2006100684, 2006101869, 2006102430, 2006102440, 2006103491, 2006103648, 2006104110, 2006104117, 2006104737, 2006106205, 2006110335, 2006201266, 2006201556, 2006201970, 2006202019, 2007100147, 2007100621, 2007103359, 2007103419, 2007104066, 2007104253, 2007105426, 2007106481, 2007108195, 2007200782, 2007200783, 2007200784

##### Drawings

- D-175038, Unit 1 P&ID – Safety Injection, Sheet 2, Revision 0
- D-175038L, Unit 1 License Renewal Mech Boundary Safety Injection Sys (Cntmnt Spray), Sheet 3, Revision 0
- D-175039, Unit 1 P&ID – Chem & Vol Control System, Sheet 6, Revision 0
- D-205038L, Unit 2 License Renewal Mech Boundary Safety Injection Sys (Cntmnt Spray), Sheet 3, Revision 0

- D-205039, Unit 2 P&ID – Chem & Vol Control System, Sheet 6, Revision 1
- D-515342, Unit 2 Chem & Vol Control System – E21 Auxiliary Building – EI 114' & Below, Sheet 1, Revision 0
- D-515343, Unit 2 Chemical & Volume Control System Auxiliary Building – EI 109' & Below, Sheet 1, Revision 0

### **Residual Heat Removal (RHR)/Low Head Safety Injection (LHSI)**

#### **Condition Reports**

2005108343, 2005109681, 2005110727, 2005113080, 2005205244, 2006102430, 2006101039, 2006102578

### **Containment Spray (CS)**

#### **Condition Reports**

2006103494, 2006107942, 2007101119, 2007102078, 2007103285, 2007105329, 2007106142

### **Radiation Monitors**

#### **Condition Reports**

2005102457, 2005108346, 2005109474, 2005109698, 2005110137, 2005110869, 2005111479, 2005111721, 2005112350, 2006100475, 2006100699, 2006100700, 2006102151, 2006106514, 2006108436, 2006108443, 2006109052

#### **Additional Documents**

- Request for Engineering Review (RER) 2042135401, Log: PS-06-0248
- RER C050882501, Log: PS-05-1083
- RER C050882501, Log: PS-05-1853
- System Health Reports for Radiation Monitors: 3<sup>rd</sup> Quarter 2005 through 2<sup>nd</sup> Quarter 2007

### **OPERATING EXPERIENCE DOCUMENTS**

- Night Order regarding the North Anna Spurious SI
- IN 2005-24; Nonconservative in Leakage Detection Sensitivity
- IN 2006-17; Recent Operating Experience of Service Water Systems Due to External Conditions
- IN 2006-20; Foreign Material Found in the Emergency Core Cooling System
- IN 2006-21; Operating Experience regarding Entrainment of Air into Emergency Core Cooling and Containment Spray Systems
- IN 2007-06; Potential Common cause Vulnerabilities in Essential Service Water Systems
- IN 2007-18; Operating Experience Regarding Entrainment of Gas or Debris into Auxiliary Feedwater Systems

### **AUDITS AND SELF-ASSESSMENTS**

- Farley Nuclear Plant Corrective Action Program Self-Assessment, July 18-22, 2005
- Self-Assessment, Southern Nuclear Company/Farley Nuclear Plant, Health Physics Corrective Action Program, date performed: 7/24/2006 - 7/28/2006
- QA Audit of the Corrective Action Program, Audit # F-CAP-2005-2, Log: FQA-2005-34
- QA Audit of the Corrective Action Program, Audit # F-CAP-2007-1, Log: FQA-2007-08
- Surveillance # F-2006-006, Corrective Action Program, 3/20/2006
- Surveillance # F-2006-020, Corrective Action Program, 7/17/2006
- Surveillance # F-2007-006, Corrective Action Program, 3/30/2007
- Surveillance # F-2007-013, Corrective Action Program, 6/28/2007
- SNC 2005 Safety Culture Assessment, 12/30/2005

**ADDITIONAL DOCUMENTS REVIEWED**Condition Reports

2004105586, 2005103658, 2005106476, 2005106868, 2005108436, 2005108563, 2005108681, 2005108799, 2005109077, 2005109734, 2005109839, 2005110094, 2005110381, 2005110485, 2005111196, 2005111326, 2005111594, 2005112103, 2005112279, 2005112444, 2005113037, 2006100202, 2006101160, 2006103828, 2006104803, 2006104942, 2006105386, 2006105422, 2006105584, 2006106954, 2006107084, 2006107396, 2006108039, 2006108326, 2006108365, 2007100589, 2007103025, 2007103249, 2007103277, 2007103591, 2007104460, 2007104849, 2007104936, 2007106481, 2007106751, 2007107812, 2007107826,

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2004204193, 2005203955, 2005203956, 2005203957, 2005203958, 2005203960, 2005203961, 2005203963, 2005203965, 2005203969, 2005203970, 2005203971, 2005203972, 2005204057, 2005204059, 2005204081, 2005204106, 2005204307, 2005204311, 2005204315, 2005204336, 2005204387, 2005204401, 2005204562, 2005204563, 2005204564, 2005204565, 2005204566, 2005204567, 2005204568, 2005204645, 2005204863, 2005205059, 2005205256, 2005205257, 2005205260, 2005205261, 2005205267, 2005205268, 2005205269, 2005205270, 2005205298, 2006200240, 2006200397, 2006200398, 2006200399, 2006200547, 2006200548, 2006200549, 2006200550, 2006200551, 2006201595, 2006201596, 2006201904, 2006201905, 2006201906, 2006201907, 2006202015, 2006202226, 2006202227, 2006202228, 2006202360, 2006202361, 2006202362, 2006202363, 2006202364, 2006202590, 2006202593, 2006202594, 2006202595, 2006202657, 2006203470, 2006204135, 2007202027, 2005204863, 2007100664, 2007200884, 2007202028, 2007202029, 2007202030, 2007202031, 2007202032, 2007202033, 2007202034, 2007202198, 2007202474, 2007202476, 2007202478, 2007202479, 2007202480, 2007202710, 2007202711, 2007202712, 2007202713, 2007203439, 2007203440, 2007203441, 2007203442, 2007203443, 2007203444, 2007203445, 2007203446, 2007203447, 2007203448, 2007203449, 2007203450, 2007203521, 2007203522, 2007203523, 2007203524, 2007203525

Work Orders

2077001901, 1041645901, 2062534201, 1052107401, 2070595701, 2070595601, 2060138801, 2060140401, 1060140001, 2060196801, 1060140101, 2070251901, 2070252101, 2070419001

Miscellaneous Documents

- Farley RCCA CRs by Initiating Department by Calendar Quarter
- Farley ACD CRs by Initiating Department by Calendar Quarter
- Farley BCD CRs by Initiating Department by Calendar Quarter
- Farley CRs by Initiating Department by Calendar Quarter
- Maintenance Rule Monthly Report for April, 2007
- May 2007, Maintenance Rule Report, Log: FNP-07-0093-ES
- June 2007, Maintenance Rule Report, Log: FNP-07-0106-ES