



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

January 27, 2012

Thomas A. Lynch  
Site Vice President - Farley  
Southern Nuclear Operating Company, Inc.  
7388 North State Highway 95  
Columbia, AL 36319

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT - NRC INTEGRATED INSPECTION  
REPORT 05000348/2011005, 05000364/2011005, 05000348/2011014, AND  
05000364/2011014

Dear Mr. Lynch:

On December 31, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Joseph M. Farley Nuclear Plant, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on January 5, 2012, with you and other members of your staff.

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

One self-revealing finding of very low safety significance (Green) was identified during this inspection. This finding was determined to involve a violation of NRC requirements. The NRC is treating this violation as a non-cited violation, in accordance with Section 2.3.2 of the Enforcement Policy.

If you contest the non-cited violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the 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 the NRC Senior Resident Inspector at the Joseph M. Farley Nuclear Plant. In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Senior Resident Inspector at the Joseph M. Farley Nuclear Plant. The information you provide will be considered in accordance with Inspection Manual Chapter (IMC) 0305.

SNC

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if any, will be available electronically for public inspection in the NRC public document room or from the publicly available records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html> (the public electronic reading room).

Sincerely,

**/RA/**

James Hickey, Chief  
Reactor Projects Branch 2  
Division of Reactor Projects

Docket No.: 50-348, 50-364  
License No.: NPF-2, NPF-8

Enclosure: Inspection Report 05000348/2011005, 05000364/2011005, 05000348/2011014,  
and 05000364/2011014  
w/Attachment: Supplemental Information

cc w/encl.: (See page 3)

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Letter to Thomas A. Lynch from James Hickey dated January 27, 2012

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT - NRC INTEGRATED INSPECTION  
REPORT 05000348/2011005, 05000364/2011005, 05000348/2011014, AND  
05000364/2011014

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket Nos.: 05000348, 05000364

License Nos.: NPF-2, NPF-8

Report No.: 05000348/2011005, 05000364/2011005, 05000348/2011014, and 05000364/2011014

Licensee: Southern Nuclear Operating Company, Inc.

Facility: Joseph M. Farley Nuclear Plant, Units 1 and 2

Location: Columbia, AL

Dates: October 1, 2011 through December 31, 2011

Inspectors: E. Crowe, Senior Resident Inspector  
J. Sowa, Resident Inspector  
M. Riley, Reactor Inspector  
B. Caballero, Senior Operations Engineer (1R11.2)  
R. Hamilton, Senior Health Physics Inspector (2RS7)  
G. Kuzo, Senior Health Physics Inspector (2RS1, 4OA1)  
A. Neilsen, Senior Health Physics Inspector (2RS6, 2RS8, 4OA1)  
W. Pursley, Health Physics Inspector (2RS1, 2RS8, 4OA1) Training  
J. Rivera, Health Physics Inspector (2RS6, 4OA1) Training  
B. Collins, Reactor Inspector (1R08)  
A. Sengupta, Reactor Inspector (1R08)  
R. Williams, Reactor Inspector (1R08)

Approved by: James Hickey, Chief  
Reactor Projects Branch 2  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000348/2011005, 05000364/2011005, 05000348/2011014, and 05000364/20111014; October 1, 2011 through December 31, 2011; Joseph M. Farley Nuclear Plant, Units 1 and 2; Identification and Resolution of Problems.

The report covered a three-month period of inspection by the resident inspectors, three senior health physics inspectors, two health physics inspectors, one senior operations engineer and four reactor inspectors. One self-revealing non-cited violation (NCV) with very low safety significance (GREEN) was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609, Significance Determination Process (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after MRC management review. The cross-cutting aspect was determined using IMC 0310, Components Within The Cross-Cutting Areas. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December, 2006.

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

#### Cornerstone: Mitigating Systems (MS)

- Green: A self-revealing non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, Design Control was identified for the licensee's failure to correctly update their design drawing for the Unit 2 Turbine Driven Auxiliary Feedwater (TDAFW) pump electrical controls. This drawing was later used to correct existing discrepancies (a condition adverse to quality) with the TDAFW pump electrical controls which resulted in the Unit 2 TDAFW pump being inoperable. This condition revealed itself 24 days later when the licensee performed a surveillance test to confirm operability of the TDAFW pump from the Hot Shutdown Panel and the pump tripped on an overspeed condition. The licensee restored operability of the TDAFW pump on July 31, 2011, by re-landing the lifted electrical leads.

Failure to maintain the accuracy of station controlled design drawings is a performance deficiency. This performance deficiency is more than minor because it is associated with the Design Control attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the licensee did not maintain adequate design control of the TDAFW pump electrical control drawings which were relied upon to maintain proper configuration of the plant. The inaccurate drawings resulted in the Unit 2 TDAFW pump being inoperable for approximately 24 days. The finding was evaluated using the work sheets of MC 0609, "Significance Determination Process," Attachment 4, and Appendix A. The inspectors determined further review was required by the regional senior risk analyst (SRA) to determine significance. The regional SRAs used the latest NRC Farley Standardized Plant Analysis Risk (SPAR) model and the licensee's full scope Farley Probabilistic Risk Assessment (PRA) model. The licensee's Farley Fire PRA model was used to estimate the external event fire risk.



Recovery human error probabilities were developed using the NRC SPAR-H methodology for diagnostic and action portions of the recovery. The major assumptions of the analysis included: (1) The TDAFW pump would start and trip on overspeed for all automatic and remote manual start attempts, (2) An exposure period of 593 hours, and (3) TDAFW pump recovery via local manual trip and throttle valve control for all scenarios except Anticipated Transient Without Scram and Loss of Seal Cooling scenarios due to time constraints. The dominant sequences were (1) a Loss of Service Water initiator due to pipe rupture leading to a loss of Component Cooling Water and the motor driven AFW pumps, loss of the TDAFW due to the PD, and failure to recover the TDAFW pump via local manual control leading to RCP seal LOCA and core damage, and (2) a Reactor Trip initiator with a common cause failure of the motor driven AFW pumps, loss of the TDAFW pump due to the PD, failure to recover the TDAFW pump via local manual control and failure to implement feed and bleed leading to core damage. The risk was mitigated by the remaining AFW capability, the fact that the PD only affected the TDAFW pump and did not prevent recovery via local manual control, and the relatively short exposure period. The core damage frequency increase was less than  $1 \times 10^{-6}$  per year; therefore the finding was of very low risk significance (GREEN).

The inspectors identified a cross-cutting aspect in the Work Control component of the Human Performance cross-cutting area (H.3(b)). Specifically, the licensee failed to coordinate between departments during planning activities in which interdepartmental coordination was necessary to assure plant performance. (Section 4OA2)

## REPORT DETAILS

### Summary of Plant Status

Unit 1 started the report period at 100 percent rated thermal power (RTP). The unit remained at or near 100 percent RTP for the remainder of the inspection period.

Unit 2 started the report period at 98 percent RTP in a RCS average temperature coast-down condition for the refueling outage (RFO) scheduled for October 9, 2011. The unit was shut down on October 9, to begin 2R21. The unit's reactor was made critical on November 9, and was returned to 100 percent RTP on November 16. The unit remained at or near 100 percent RTP for the remainder of the inspection period.

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

#### 1R04 Equipment Alignment

##### a. Inspection Scope

Partial Walk-Down: The inspectors performed partial walk-downs of the following two systems to verify operability of redundant or diverse trains and components when safety equipment was inoperable. The inspectors attempted to identify discrepancies impacting the function of the system and therefore, potentially increasing risk. The walk-downs were performed using the criteria in licensee Procedures NMP-OS-007, "Conduct of Operations," and FNP-0-SOP-0, "General Instructions to Operations Personnel." The walk-downs included reviewing the updated final safety analysis report (UFSAR), plant procedures and drawings, checks of control room and plant valves, switches, components, electrical power, support equipment and instrumentation. Documents reviewed are listed in the attachment.

- Unit 2, A and B train residual heat removal (RHR) system while aligned for reactor coolant system (RCS) cooldown concurrent with ORANGE risk condition due to RCS level at the reactor vessel flange
- Unit 2, A and B train residual heat removal (RHR) system, 4160 volt AC electrical system, and component cooling water system during ORANGE risk condition due to RCS level at the reactor vessel flange to establish conditions for vacuum refill

Complete Walk-Down: The inspectors conducted a complete walk-down of the accessible portions of the following system. The inspectors used licensee Procedure FNP-2-SOP-22.0A, "Auxiliary Feedwater (AFW) System," to verify system alignment of in-service equipment. The inspectors also interviewed personnel, reviewed control room logs, maintenance rule (MR) monthly reports, condition reports (CRs), quarterly system health reports, outstanding work orders (WOs) and industry operating experience (OE) to verify that alignment and equipment discrepancies were being identified and appropriately resolved. Documents reviewed are listed in the Attachment.

- Unit 2 AFW system

b. Findings

No findings were identified.

1R05 Fire Protectiona. Inspection Scope

Fire Protection Area Tours: The inspectors conducted a tour of the four fire areas listed below to assess material condition and operation status of the fire protection equipment. The inspectors verified combustibles and ignition sources were controlled in accordance with the licensee's administrative procedures; fire detection and suppression equipment was available for use; passive fire barriers were maintained in good material condition and compensatory measures for out-of-service, degraded, or inoperable fire protection equipment were implemented in accordance with the requirements of licensee Procedures FNP-0-AP-36, "Fire Surveillance and Inspection;" FNP-0-AP-38, "Use of Open Flame;" FNP-0-AP-39, "Fire Patrols and Watches;" and the associated fire zone data sheets. Documents reviewed are listed in the Attachment.

- Unit 2, A train motor driven auxiliary feedwater pump room, fire zone 6
- Unit 2, containment, fire zone 55
- Unit 2, containment spray pump 2A room, fire zone SO2
- Unit 2, containment spray pump 2B room, fire zone SO2

b. Findings

No findings were identified.

1R06 Flood Protection Measuresa. Inspection Scope

The inspectors reviewed selected risk-important plant design features and licensee procedures intended to protect the plant and its safety-related equipment from internal flooding events. The inspectors reviewed flood analysis and design documents, including the UFSAR, and engineering calculations and abnormal operating procedures for licensee commitments. The inspectors walked down the area listed below to verify plant design features and plant procedures for flood mitigation were consistent with design requirements and internal flooding analysis assumptions. The inspectors reviewed flood protection barriers, which included plant floor drains, condition of room penetrations, condition of the sumps in the rooms and condition of water-tight doors. The inspectors also reviewed CRs to verify the licensee was identifying and resolving problems. Documents reviewed are listed in the Attachment.

- Unit 2, containment spray pump 2A room

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities

From October 17, 2011, through October 21, 2011, the inspectors conducted a review of the implementation of the licensee's inservice inspection (ISI) program for monitoring degradation of the reactor coolant system, steam generator (SG) tubes, emergency feedwater systems, risk-significant piping and components and containment systems.

The inspections described in Sections 1R08.1, 1R08.2, 1R08.3, 1R08.4 and 1R08.5 below constituted one inservice inspection sample as defined in Inspection Procedure 71111.08-05.

.1 Piping Systems ISI

a. Inspection Scope

The inspectors directly observed the NDE activities listed below and reviewed examination procedures, NDE reports, equipment and consumables certification records, personnel qualification records, and calibration reports (as applicable) for the following examinations:

- RT examination of 2 centrifugal charging pump (CCP) suction line (Work Order SNC214095); and
- VT-3 of RCP 2A support (Work Order F2 APR1-5100-CS-1).

The inspectors also reviewed documentation for the following NDE activities:

- PT of 2 CCP suction line (Work Order SNC214095);
- VT-3 of reactor coolant pump (RCP) 2A support (Work Order F2 APR1-5100-CS-1);
- UT examination of hot leg safety injection, loop 3, elbow to pipe (Thermal Fatigue), (Work Order F2 APR1-4305-5);
- RT examination of 2 CCP suction line (Work Order SNC214095);
- MT examination of reactor pressure vessel head (RPVH) lifting lug (Work Order F2 APR1-1300-CS-1R); and
- VT-3 examination of RPV Support (Work Order Number F2 APR1-1199-CS-6).

With regard to the disposition of relevant NDE indications since the last Unit 1 outage, the licensee did not identify any relevant indications that were analytically evaluated and accepted continued service.

The inspectors reviewed the following pressure boundary welds completed for risk-significant systems during the Unit 2 refueling outage to evaluate if the licensee applied the preservice non-destructive examinations and acceptance criteria required by the construction Code, NRC-approved Code Case, NRC-approved Code relief request or

the ASME Code Section. In addition, the inspectors reviewed the welding procedure specification, welder qualifications, welding material certification and supporting weld procedure qualification records, to evaluate if the weld procedure(s) were qualified in accordance with the requirements of Construction Code and the ASME Code Section IX.

- Welding package for 2 CCP suction line (Work Order SNC214095)

b. Findings

No findings were identified.

.2 Reactor Pressure Vessel Upper Head Penetration Inspection Activities

No inspection was conducted during this outage

a. Findings

No findings were identified.

.3 Boric Acid Corrosion Control (BACC)

a. Inspection Scope

The inspectors performed an independent walkdown of portions of the Unit 2 containment which recently received a licensee boric acid walkdown and evaluated if the licensee's BACC visual examinations emphasized locations where boric acid leaks could cause degradation of safety-significant components. The inspectors reviewed the following licensee evaluations of reactor coolant system components with boric acid deposits to evaluate if degraded components were documented in the corrective action program. The inspectors also evaluated the corrective actions for any degraded reactor coolant system components against the component Construction Code, ASME Code Section XI, and/or NRC-approved alternative

- Evaluation No. 3882, Evaluation performed on May 12, 2011;
- Evaluation No. 3708, Evaluation performed on April 26, 2010;
- Evaluation No. 3710, Evaluation performed on April 19, 2010;
- Evaluation No. 3869, Evaluation performed on February 16, 2011; and
- Evaluation No. 3563, Evaluation performed on April 21, 2011.

The inspectors reviewed the following corrective actions related to evidence of boric acid leakage to evaluate if the corrective actions completed were consistent with the requirements of the ASME Code Section XI, and 10 CFR Part 50, Appendix B, Criterion XVI.

CR 358848	CR 362788	CR 2011111328	CR 2011101928
CR 2010110329	CR 361279	CR 362822	CR 361275
CR 363792	CR 363762		

b. Findings

No findings were identified.

.4 Steam Generator (SG) Tube Inspection Activities

a. Inspection Scope

The NRC inspectors observed the following activities and/or reviewed the following documentation and evaluated them against the licensee's technical specifications, commitments made to the NRC, ASME Section XI, and Nuclear Energy Institute (NEI) 97-06 "Steam Generator Program Guidelines."

- Reviewed the licensee's in-situ SG tube pressure testing screening criteria. In particular, assessed whether assumed NDE flaw sizing accuracy was consistent with data from the EPRI examination technique specification sheets (ETSS) or other applicable performance demonstrations;
- Interviewed Eddy Current Testing (ET) data analysts and reviewed 5 samples of ET data;
- Compared the numbers and sizes of SG tube flaws/degradation identified against the licensee's previous outage Operational Assessment;
- Reviewed the SG tube ET examination scope and expansion criteria;
- Evaluated if the licensee's SG tube ET examination scope included potential areas of tube degradation identified in prior outage SG tube inspections and/or as identified in NRC generic industry operating experience applicable to the licensee's SG tubes;
- Reviewed the licensee's implementation of their extent of condition inspection scope and repairs for new SG tube degradation mechanism(s). No new degradation mechanisms were identified during the EC examinations;
- Reviewed the licensee's repair criteria and processes;
- Primary-to-secondary leakage (e.g., SG tube leakage) was below three gallons per day, or the detection threshold, during the previous operating cycle;
- Evaluated if the ET equipment and techniques used by the licensee to acquire data from the SG tubes were qualified or validated to detect the known/expected types of SG tube degradation in accordance with Appendix H, Performance Demonstration for Eddy Current Examination, of EPRI Pressurized Water Reactor Steam Generator Examination Guidelines, Revision 7;
- Reviewed the licensee's secondary side SG Foreign Object Search and Removal (FOSAR) activities;
- Reviewed the licensee's evaluations and repairs for SG tubes damaged by foreign material or tubes surrounding inaccessible foreign objects left within the secondary side of the steam generators; and
- Reviewed ET personnel qualifications.

b. Findings

No findings were identified.

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspectors performed a review of ISI/SG related problems entered into the licensee's corrective action program and conducted interviews with licensee staff to determine if;

- The licensee had established an appropriate threshold for identifying ISI/SG related problems;
- The licensee had performed a root cause (if applicable) and taken appropriate corrective actions; and
- The licensee had evaluated operating experience and industry generic issues related to ISI and pressure boundary integrity.

The inspectors performed these reviews to evaluate compliance with 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requirements. The corrective action documents reviewed by the inspectors are listed in the Attachment to this report.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program

.1 Resident Inspector Quarterly Review:

a. Inspection Scope

On November 21, 2011, the inspectors observed portions of the licensed operator training and testing program to verify implementation of Procedures FNP-0-AP-45, "Farley Nuclear Plant Training Plan," FNP-0-TCP-17.6, "Simulator Training Evaluation/Documentation," and FNP-0-TCP-17.3, "Licensed Operator Continuing Training Program Administration." The inspectors observed operation's simulator Scenario 11-S1002, conducted in the licensee's simulator for a steam generator tube rupture concurrent with a dual unit trip and loss of emergency air compressors. The inspectors observed high-risk operator actions, overall crew performance, self-critiques, training feedback and management oversight to verify operator performance was evaluated against the performance standards of the licensee's scenario. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.2 Annual Review of Licensee Requalification Examination Results

a. Inspection Scope

On September 06, 2011, the licensee completed the annual requalification operating tests required to be administered to all licensed operators in accordance with 10 CFR 55.59(a)(2). The inspectors performed an in-office review of the overall pass/fail results of the individual operating tests and the crew simulator operating tests. These results were compared to the thresholds established in Manual Chapter 609 Appendix I, "Operator Requalification Human Performance Significance Determination Process."

b. Findings

No findings were identified.

1R12 Maintenance Rule (MR) Effectiveness

a. Inspection Scope

The inspectors reviewed the following two activities for (1) appropriate work practices; (2) identifying and addressing common cause failures; (3) scoping in accordance with 10 CFR 50.65(b) of the MR; (4) characterizing reliability issues for performance; (5) trending key parameters for condition monitoring; (6) charging unavailability for performance; (7) classification and reclassification in accordance with 10 CFR 50.65(a)(1) or (a)(2); and (8) appropriateness of performance criteria for structures, systems, and components (SSCs)/functions classified as (a)(2) and/or appropriateness and adequacy of goals and corrective actions for SSCs/functions classified as (a)(1). In addition, the NRC specifically reviewed events where ineffective equipment maintenance resulted in invalid automatic actuations of engineered safeguards systems affecting the operating units. Documents reviewed are listed in the Attachment.

- CR 2009102852, Unit 1 and Unit 2, reactor vessel indication, core exit thermocouple monitor and subcooled margin monitors have multiple failed inputs
- CR 361386, Unit 2, 2B MDAFWP did not start during safety injection/loss of offsite power B2G sequencer testing

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the following three activities to verify appropriate risk assessments were performed prior to taking equipment out of service for maintenance. The inspectors verified risk assessments were performed as required by 10 CFR 50.65(a)(4), and were accurate and complete. When emergent work was performed, the



inspectors verified appropriate use of the licensee's risk assessment and risk categories in accordance with requirements in licensee Procedures FNP-0-ACP-52.3, "Mode 1, 2, & 3 Risk Assessment," FNP-0-UOP-4.0, "General Outage Operations Guidance," NMP-GM-006, "Work Management," and NMP-OS-007, "Conduct of Operations."

- October 6, 2011, Unit 2, YELLOW risk condition concurrent with A train component cooling water (CCW) maintenance and B train emergency diesel generator (EDG) maintenance.
- October 13, 2011, Unit 2, ORANGE risk condition concurrent with reactor coolant system (RCS) inventory below reactor vessel flange and RCS time to boil equal to fifteen minutes.
- November 2, 2011, Unit 2, Orange risk condition concurrent with RCS mid-loop operations.

b. Findings

No findings were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following four operability evaluations to verify the requirements of licensee Procedures NMP-OS-007, "Conduct of Operations," and NMP-AD-012, "Operability Determinations (ODs) and Functionality Assessments," were met. The scope of this inspection also included a review of the technical adequacy of the evaluations, the adequacy of compensatory measures and the impact on continued plant operation.

- CR 348466, excessive noise emanating from A train control room air conditioning system (CRACS) air handling unit inboard bearing
- OD# 02-11-07, TDAFW Pump operability regarding the isolation of the warmup lines for the turbine – prevent rolling of the pump at low revolutions per minute
- CR 372945, 2B Diesel Generator tripped during slow speed start
- CR 361386, Unit 2, 2B MDAFWP did not start during safety injection/loss of offsite power B2G sequencer testing

b. Findings

No findings were identified.

1R18 Plant Modifications

a. Inspection Scope

The inspectors reviewed the following permanent plant modification to ensure the safety functions of important safety systems were unaffected. The inspectors also verified

design bases, licensing bases and performance capability of risk-significant SSCs had not been degraded through modifications. The inspectors verified any modification performed during risk-significant configuration did not place the plant in an unsafe condition. The inspectors evaluated system operability, availability, configuration control, post-installation test activities, documentation updates and operator awareness of the modification. Documents reviewed are listed in the Attachment.

#### Permanent Plant Modification

- DCP 2070138901, Replace Q2P16FV3009A, B, C Hammel-Dahl Valves and Actuators

#### b. Findings

No findings were identified.

### 1R19 Post-Maintenance Testing

#### a. Inspection Scope

The inspectors reviewed the criteria contained in licensee procedure FNP-0-PMT-0.0, "Post-Maintenance Test Program," to verify post-maintenance test procedures and test activities for the following five systems/components were adequate to verify system operability and functional capability. The inspectors also witnessed the test or reviewed the test data to verify test results adequately demonstrated restoration of the affected safety functions. Documents reviewed are listed in the attachment.

- FNP-2-STP-22.1, "2A Auxiliary Feedwater Pump Quarterly Inservice Test," following replacement of 2A motor driven auxiliary feedwater pump motor
- FNP-2STP-22.16, "Turbine Driven Auxiliary Feedwater Pump Quarterly Inservice Test" following repairs to the governor control system for an actual overspeed condition
- FNP-2-STP-80.4, "B2G Sequencer Operability Test," following reinstallation of B2G Loss of Off Site Power (LOSP) Sequencer Step 5 relay
- FNP-2-STP-40.0, "B2G Sequencer Operability Test," following replacement of K604 relay in B2G Engineered Safeguard Sequencer (ESS)
- FNP-2-STP-21.3, "TDAFWP Steam Supply Valves Valve Inservice Test," following repairs to Q2N12HV3226, common steam supply to the TDAFW pump

#### b. Findings

No findings were identified.

## 1R20 Refueling and Other Outage Activities

### a. Inspection Scope

Refueling Activities: The inspectors reviewed the following activities related to the Unit 2 refueling outage (RFO) to verify compliance with licensee Procedures FNP-0-UOP-4.0, "General Outage Operations Guideline," and FNP-1-UOP-4.1, "Controlling Procedure for Refueling." Surveillance tests were reviewed to verify results were within Technical Specification (TS) requirements. Shutdown risk, management oversight, procedural compliance and operator awareness were evaluated for each of the following activities. Documents reviewed are listed in the Attachment.

- Outage risk assessment
- Cooldown
- Core offload and reload
- Reactor coolant instrumentation
- Electrical system alignments and bus outages
- Reactor vessel disassembly and assembly activities
- Outage-related surveillance tests
- Containment closure
- Low power physics testing and startup activities
- Clearance activities
- Decay heat removal and SFP cooling
- Containment heavy load lifts

### b. Findings

No findings were identified.

## 1R22 Surveillance Testing

### a. Inspection Scope

The inspectors reviewed the following four surveillance tests and either observed the test or reviewed test results to verify testing adequately demonstrated equipment operability and met Technical Specification (TS) requirements. The inspectors reviewed the activities to assess for preconditioning of equipment, procedure adherence and valve alignment following completion of the surveillance. The inspectors reviewed licensee Procedures FNP-0-AP-24, "Test Control," FNP-0-M-050, "Master List of Surveillance Requirements," and NMP-OS-007, "Conduct of Operations," and attended selected briefings to determine if procedure requirements were met. Documents reviewed are listed in the Attachment.

#### Surveillance Tests

- FNP-2-STP-16.10, "2A Containment Spray Pump Comprehensive and Check Valves Flow Test – A Train"

Containment Isolation Valve Surveillance Tests

- FNP-2-STP-627.0, "Local Leak Rate Testing of Containment Penetrations for penetration 42"
- FNP-2-STP-627.0, "Local Leak Rate Testing of Containment Penetrations for penetration 55"

In-Service Test (IST)

- FNP-2-STP-22.26, 2A Auxiliary Feedwater Pump Cold Shutdown Inservice Test and Preservice Test

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness (EP)

1EP6 Drill Evaluation

a. Inspection Scope

The NRC evaluated the conduct of routine licensee emergency drills on the following date to identify any weaknesses and deficiencies in classification, notification, and protection action recommendation (PAR) development activities. The NRC observed emergency response operation in the simulated control room to verify event classification and notifications were performed in accordance with licensee Procedure FNP-0-EIP-9.0, "Emergency Classification and Actions." The NRC used procedure FNP-0-EIP-15.0, "Emergency Drills," as the inspection criteria. The NRC also evaluated the licensee drill critique to compare any inspector-observed weaknesses with those identified by the licensee in order to verify whether the licensee was properly identifying issues.

- December 14, 2011 – General Emergency due to steam generator tube rupture in the "B" steam generator concurrent with a fuel failure and high dose measurements at the site boundary.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

Cornerstones: Occupational Radiation Safety (OS)

## 2RS1 Radiological Hazard Assessment and Exposure Controls

### a. Inspection Scope

Radiological Hazard Assessment Program Status and Inspection Planning: The inspectors discussed status and changes to the radiation protection program since the previous inspection of the occupational radiation protection program activities. The review included evaluation of controls and monitoring equipment capabilities associated with the radiation control area (RCA) access point and associated monitoring equipment, briefing areas, and remote monitoring station equipment. The inspectors reviewed the scope and results for self-assessments and audits conducted since the last inspection. Status of corrective actions and audit findings were reviewed and discussed in detail for applicability to the current Unit 2 Refueling Cycle 21 Outage (2R21) activities.

Hazard Assessment and Instructions to Workers: During site tours, the inspectors directly observed and discussed labeling of radioactive material and/or containers and postings for radiation area, high radiation area (HRA), locked-high radiation area (LHRA) and very high radiation area (VHRA) locations in select RCA locations of the Unit 2 (U2) reactor containment building (RCB), Unit 1 (U1) and U2 reactor auxiliary building (RAB), radioactive waste building processing area, independent spent fuel storage installation (ISFSI), and outside equipment and material storage locations. The inspectors conducted or directly observed health physics technician (HPT) staff conduct independent licensee radiation surveys of in-place equipment and areas within the U2 RCB, U1 and U2 RABs, outside equipment/storage locations, and the ISFSI facility. The inspectors reviewed, evaluated, and discussed pre-job and current surveys and resultant records for selected plant areas, equipment, and selected tasks including monitoring for alpha emitters, hot particles, airborne radioactivity, and monitoring for tasks involving steep dose rate gradients. The inspectors also discussed plant operations and shut-down and chemical cleanup operations that could contribute to changing radiological conditions. For selected 2R21 jobs, the inspectors attended pre-job briefings and reviewed radiation work permit (RWP) details to assess communication of radiation control requirements and current radiological conditions to workers. Results of recent dose rate, contamination, and airborne monitoring surveys were reviewed for selected areas and equipment within the U2 RCB, U1 and U2 RABs, ISFSI, and outside storage locations.

Hazard Control and Work Practices: The inspectors evaluated access barrier effectiveness for selected HRA, LHRA, and VHRA locations within the U2 RCB, U2 and U2 RAB, ISFSI and outside material/waste storage locations. The status of procedural guidance for LHRA and VHRA controls was discussed with HPTs and supervisory personnel. Established radiological controls for both external and internal exposure were evaluated for selected 2R21 tasks including refueling activities, SG eddy current testing, 'B' RCP maintenance, and for radiography and maintenance activities associated with the U2 'C' charging pump. The inspectors reviewed and discussed radiological and operation controls associated with movement of in-core detectors and under vessel entries. In addition, radiological controls, monitoring, and survey results for recent ISFSI activities were reviewed and discussed.

Occupational workers' adherence to selected RWP and HPT proficiency in providing job coverage were evaluated through direct and remote observations, and through interviews with licensee staff. Electronic dosimeter (ED) alarm set points and worker stay times were evaluated against area radiation survey results for LHRA activities associated with the 2R21 activities. ED alarm logs were reviewed and worker responses to dose and dose rate alarms during selected work activities were evaluated.

Control of Radioactive Material: The inspectors observed surveys of material and personnel being released from the RCA control point using small article monitor, personnel contamination monitor, and portal monitor instrumentation. The inspectors discussed equipment sensitivity, alarm set-points, and release program guidance with licensee staff. The inspectors compared recent 10 CFR Part 61 results for the dry active waste (DAW) radioactive waste stream, with calibration source radionuclides to evaluate the appropriateness and accuracy of release survey instrumentation. The inspectors directly reviewed and discussed with responsible staff the status of sealed sources and discussed nationally tracked source transactions, as applicable.

Problem Identification and Resolution: Condition Reports (CR)s associated with radiological hazard assessment and control were reviewed and assessed. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with procedure NMP-GM-002-001, "Corrective Action Program Instructions," Ver. 26.0. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results.

Radiation protection activities were evaluated against the requirements of Updated Final Safety Analysis Report (UFSAR) Section 11 and 12; Technical Specifications (TS) Sections 5.4., "Procedures," 5.7, "High Radiation Area," 10 CFR Parts 19, 20 and 72; and approved licensee procedures. Licensee programs for monitoring materials and personnel released from the RCA were evaluated against 10 CFR Part 20 and IE Circular 81-07, "Control of Radioactively Contaminated Material." Documents reviewed are listed in Section 2RS1 and 4OA1 in the report Attachment.

b. Findings

No findings were identified.

2RS6 Radioactive Gaseous and Liquid Effluent Treatment

a. Inspection Scope:

Radioactive Waste Treatment Systems: The inspectors walked-down selected components of the gaseous and liquid radioactive waste (radwaste) processing and discharge systems. To the extent practical, the inspectors observed and evaluated the material condition of in-place waste processing equipment for indications of degradation or leakage that could constitute a possible release pathway to the environment. Inspected components included waste monitor tanks, floor drain tanks, evaporation equipment, waste gas decay tanks, ventilation filtration systems, vendor-supplied liquid waste processing equipment, and associated piping and valves. The inspectors

interviewed licensee staff regarding radwaste equipment configuration and effluent monitor operation. The inspectors also reviewed surveillance testing records for auxiliary building ventilation filtration systems and for effluent flow rate measuring devices.

Effluents: The inspectors observed the collection of airborne and liquid effluent samples from the U2 plant vent and Waste Monitor Tank 2. Technician proficiency in collecting, processing, and counting the samples, as well as preparing the applicable release permits was evaluated. The inspectors reviewed recent liquid and gaseous release permits including pre-release sampling results, effluent monitor setpoints, and public dose calculations. The inspectors reviewed the 2009 and 2010 annual effluent reports to evaluate reported doses to the public, review any anomalous events, evaluate groundwater sampling results, and to review Offsite Dose Calculation Manual (ODCM), changes. The inspectors also reviewed compensatory sampling data for time periods when selected radiation monitors were out of service. The inspectors reviewed the results of the 2009 and 2010 radiochemistry cross-check program to evaluate the quality of the radioactive effluent sample analyses. The inspectors discussed effluent source term evaluation and changes to effluent release points with licensee staff. Recent land use census results and meteorological data used to calculate doses to the public were evaluated as part of Inspection Procedure (IP) 71124.07.

Ground Water Protection: The inspectors reviewed the licensee's continued implementation of the industry's Ground Water Protection Initiative (NEI 07-07) and discussed any changes to the program. The inspectors discussed program guidance for dealing with spills, leaks, and unexpected discharges with licensee staff and reviewed recent entries into the 10 CFR 50.75(g) decommissioning file. The inspectors reviewed and discussed the licensee's program for monitoring of structures, systems, and components with the potential to release radioactive material to the environment, including selected portions of the liquid radwaste system. Potential effluent release points due to onsite surface water bodies were also evaluated.

Radwaste system operation, effluent processing activities, and groundwater protection efforts were evaluated against requirements and guidance documented in the following: 10 CFR 20; 10 CFR 50 Appendix I; ODCM; UFSAR Section 11; Regulatory Guide (RG) 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants"; RG 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50 Appendix I"; and TS Section 5. Procedures and records reviewed during the inspection are listed in Sections 2RS6, 2RS7, and 4OA1 of the report Attachment.

Problem Identification and Resolution: The inspectors reviewed selected corrective action program (CAP) documents in the areas of gaseous and liquid effluent processing and release activities. The inspectors evaluated the licensee's ability to identify and resolve the identified issues in accordance with procedure NMP-GM-002-001, "Corrective Action Program Instructions", Version 26.0. The inspectors also reviewed recent self-assessment results.

b. Findings

No findings were identified.

2RS7 Radiological Environmental Monitoring Program (REMP)

a. Inspection Scope

REMP Status and Results: The inspectors reviewed and discussed recent and proposed changes applicable to radiological environmental and meteorological monitoring program activities detailed in the UFSAR and ODCM. REMP sample results presented in Annual Radiological Environmental Operating Report (AREOR) documents issued for 2009 and 2010 were reviewed and discussed. REMP vendor laboratory cross-check program results and procedural guidance for collection, processing, and analysis of airborne particulate and iodine samples and broadleaf vegetation samples were reviewed and discussed with knowledgeable personnel. Detection level sensitivities as documented within the AREOR for selected environmental media analyzed by the offsite environmental laboratory were reviewed. The AREOR environmental measurement results were reviewed for consistency with effluent report data and evaluated for radionuclide concentration trends. Licensee actions for missed airborne monitoring samples were reviewed and discussed in detail. The inspectors discussed analysis of water samples from onsite wells and reviewed associated ODCM requirements for the lower limit of detection. The inspectors discussed the contribution to environmental iodine in air, water, and milk samples due to the Fukushima event and actions taken to accurately quantify radionuclides in the environment attributable to licensee operations.

Site Inspection: The inspectors observed and discussed implementation of selected REMP monitoring and sample collection activities for atmospheric particulates and iodine, direct radiation measurements, and broadleaf vegetation samples as specified in the current ODCM and applicable procedures. The inspectors observed equipment material condition and evaluated operability, including a review of flow rates and total sample volume results, at ten atmospheric sampling stations and two composite water sample locations. In addition, the inspectors discussed broadleaf vegetation and milk sampling for selected ODCM locations. The impact of licensee routine releases on offsite doses based on meteorological dispersion parameters and garden locations identified in the most current land use census were reviewed in detail. Changes in annual average atmospheric dispersion coefficients were discussed. Material condition and placement of selected environmental thermo-luminescent dosimeters was observed. Actions for missed samples including compensatory measures and/or availability of replacement equipment were discussed with vendor technicians and knowledgeable licensee staff. In addition, sample pump calibration and maintenance records for the installed environmental air monitoring equipment were reviewed.

The inspectors observed the physical condition of the meteorological towers and associated instruments and discussed equipment operability, maintenance history, and backup power supplies with responsible licensee staff. During the tower walkdown, the inspectors observed in-progress calibration activities. The inspectors noted that the old



meteorological tower is being replaced and that currently both old and new towers are being operated in parallel. For the meteorological measurements of wind speed, wind direction, and temperature, the inspectors reviewed applicable meteorological tower instrumentation semi-annual calibration records and evaluated meteorological measurement data recovery for 2009 and 2010.

The inspectors reviewed ground and surface water sample results and discussed the licensee's groundwater monitoring program. The licensee's 10 CFR 50.75(g) decommissioning file was reviewed and discussed.

Problem Identification and Resolution: The inspectors reviewed selected CRs in the areas of radiological environmental monitoring and meteorological tower maintenance. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with NMP-GM-002, "Corrective Action Program," Revision 12.

Procedural guidance, program implementation, quantitative analysis sensitivities, and environmental monitoring results were reviewed against 10 CFR Part 20; 10 CFR Part 50, and Appendix I to 10 CFR Part 50; TS Sections 5.4 "Procedures," 5.5 "Programs and Manuals," and 5.6, "Reporting Requirements;" ODCM, Rev.24; RG 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment," and the Branch Technical Position, "An Acceptable Radiological Environmental Monitoring Program - 1979." Licensee procedures and activities related to meteorological monitoring were evaluated against the ODCM; RG 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," and ANSI/ANS-2.5-1984, "Standard for Determining Meteorological Information at Nuclear Power Sites." Documents reviewed are listed in Section 2RS7 of the report Attachment.

b. Findings

No findings were identified.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

a. Inspection Scope

Radioactive Material Storage: The inspectors walked down indoor and outdoor radioactive material storage areas. During the walk-downs, the inspectors observed the physical condition and labeling of several storage containers and the posting of radioactive material areas. The inspectors also reviewed the licensee's procedures for routine surveys and waste storage in order to evaluate the impact of long-term storage.

Radioactive Waste System Walkdown, Characterization and Classification: Selected liquid and solid radwaste processing system components were inspected for material condition and for configuration compliance with the UFSAR and process control program in the auxiliary building and the solidification/dewatering facility. Inspected equipment included the recycle hold-up tanks; supplemental demineralizer system; resin transfer piping; resin and filter packaging components; and abandoned waste evaporator

equipment. The inspectors discussed component function, equipment operability, and changes to radwaste processing systems with licensee staff as well as possible changes to the radwaste processing systems. The processes for the dewatering of resins, spent resin tank recirculation, resin sampling, and transfer of resins to the shipping casks and temporary storage casks were discussed.

The inspectors reviewed the 2009 and 2010 "Radioactive Effluent Release Report" and the 2009 and 2011 radionuclide characterization and classification for the DAW and filter waste streams. The inspectors evaluated analyses for hard-to-detect nuclides, reviewed the use of scaling factors, and examined quality assurance comparison results between licensee waste stream characterizations and outside laboratory data. The inspectors also evaluated how changes to plant operational parameters were taken into account in waste characterization.

Shipment Preparation and Records: The inspectors directly observed preparation of limited quantity shipments for program compliance and interviewed the shipping technician for the purpose of assessing knowledge level of Department of Transportation (DOT) regulations. In lieu of observance of a placarded shipment, the training program was reviewed. In addition, training records for selected individuals currently qualified to ship radioactive material were reviewed for compliance with 49 CFR Part 172, Subpart H.

Five shipping records were reviewed for consistency with licensee procedures and compliance with NRC and DOT regulations. This included review of emergency response information, waste classification, radiation survey results, information on the waste manifest, and the authorization of the receiving licensee to receive shipments.

Problem Identification and Resolution: The inspectors reviewed selected CRs in the area of radwaste/shipping, as well as the results of a self-assessment. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with Procedure NMP-GM-002, "Corrective Action Program," Version 12.0, and NMP-GM-002-001, "Corrective Action Program Instructions," Version 26.

Radioactive material and waste storage activities were reviewed against the requirements of 10 CFR Part 20. Radwaste processing activities and equipment configuration were reviewed for compliance with the licensee's process control program and UFSAR Chapter 11. Waste stream characterization analyses were reviewed against regulations detailed in 10 CFR Part 20, 10 CFR Part 61, and guidance provided in the Branch Technical Position on "Waste Classification (1983)." Transportation program implementation was reviewed against regulations detailed in 10 CFR Part 20, 10 CFR Part 71 (which requires licensees to comply with DOT regulations in 49 CFR Parts 107, 171-180, and 390-397), as well as the guidance provided in NUREG-1608. Training activities were assessed against 49 CFR Part 172, Subpart H. Documents reviewed are listed in section 2RS8 of the report Attachment.

b. Findings

No findings were identified.

#### 4. OTHER ACTIVITIES

##### 4OA1 Performance Indicator (PI) Verification

###### a. Inspection Scope

The inspectors sampled licensee data for the PIs listed below to verify the accuracy of the PI data reported during the period listed. For the Emergency Preparedness Cornerstone, the inspector sampled the licensee performance indicator (PI) submittals listed below for the period from the fourth quarter 2010 through third quarter 2011. Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Indicator Guideline," Rev. 6, was used to verify the basis in reporting for each data element. Documents reviewed are listed in the attachment.

###### Cornerstone: Mitigating Systems

- Safety System Functional Failures
- High Pressure Safety Injection System
- Cooling Water Systems

The inspectors reviewed samples of raw PI data, licensee event reports (LERs), and monthly operating reports for the period covering October 1, 2010, to October 1, 2011. The data reviewed was compared to graphical representations from the most recent PI report. The inspectors also examined a sampling of operations logs and procedures to verify PI data was appropriately captured for inclusion into the PI report, as well as ensuring the individual PIs were calculated correctly.

###### Emergency Preparedness Cornerstone

- Emergency Response Organization Drill/Exercise Performance (DEP)
- Emergency Response Organization Readiness (ERO)
- Alert and Notification System Reliability (ANS)

The inspection was conducted in accordance with NRC Inspection Procedure 71151, "Performance Indicator Verification." For the specified review period, the inspectors examined data reported to the NRC, procedural guidance for reporting PI information, and records used by the licensee to identify potential PI occurrences.

For the DEP indicator, the inspectors verified the accuracy of the number of reported drill and exercise opportunities and the licensee's critiques and assessments for timeliness and accuracy of the opportunities. The inspectors reviewed the licensee's documentation for control room simulator training sessions and other designated drills to validate the accuracy of the submittals.

For the ERO indicator, the inspectors reviewed the licensee's records and ERO roster to validate the accuracy of the submittals for the number of ERO members assigned to fill key positions and the percentage of ERO members who had participated in a performance enhancing drill or exercise.

For the ANS indicator, the inspector reviewed of a sample of the licensee's records of periodic system tests. The inspectors reviewed the records of the licensee's reported number of successful siren operability tests as compared to the number of siren tests conducted during the reporting period to validate the accuracy of the PI submittals.

This inspection activity satisfied one inspection sample each for the Drill/Exercise Performance, ERO Drill Participation, and Alert and Notification System as defined in IP 71151.

Occupational Radiation Safety Cornerstone: The inspectors reviewed the Occupational Exposure Control Effectiveness PI results for the Occupational Radiation Safety Cornerstone from October 1, 2010, through September, 2011. For the assessment period, the inspectors reviewed ED alarm logs, whole-body count analyses, personnel contamination event (PCE) and personnel contamination report (PCR) evaluations, and selected CRs related to controls for exposure significant areas. Documents reviewed are listed in sections 2RS1 and 4OA1 of the report Attachment.

Public Radiation Safety Cornerstone: The inspectors reviewed the Radiological Effluent Technical Specification/Offsite Dose Calculation Manual Radiological Effluent Occurrences PI results from December 2010 through September 2011. The inspectors reviewed CAP documents, effluent dose data, and licensee procedural guidance for classifying and reporting PI events. Reviewed documents are listed in Sections 2RS6 and 4OA1 of the report Attachment.

The inspectors completed two of the required samples specified in IP 71151 for the Radiation Safety cornerstones.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems

.1 Daily Condition Report (CR) Reviews

As required by IP 71152, Identification and Resolution of Problems, and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the NRC performed a daily screening of items entered into the licensee's corrective action program (CAP). This review was accomplished by reviewing hard copies of CRs, attending daily screening meetings and accessing the licensee's computerized database.

## .2 Selected Issue Follow-up Inspection

### Inoperable TDAFW Pump:

#### a. Inspection Scope

In addition to the routine review, the inspectors selected the issue listed below for a more in-depth review. The inspectors considered the following during the review of the licensee's actions: (1) complete and accurate identification of the problem in a timely manner; (2) evaluation and disposition of operability/reportability issues; (3) consideration of extent of condition, generic implications, common cause, and previous occurrences; (4) classification and prioritization of the resolution of the problem; (5) identification of root and contributing causes of the problem; (6) identification of CRs; and (7) completion of corrective actions in a timely manner.

- CR 340271, Unit 2 TDAFW pump trip and throttle valve tripped during a surveillance test from the hot shutdown panel

#### b. Findings:

Introduction: A self-revealing Green NCV of 10 CFR 50, Appendix B, Criterion III, Design Control was identified for the licensee's failure to correctly update their controlled design drawing for the Unit 2 TDAFW pump electrical controls. This drawing was later used to correct existing discrepancies (a condition adverse to quality) with the Unit 2 TDAFW pump electrical controls which resulted in the pump being inoperable for 24 days.

Description: On July 31, 2011, the licensee attempted to start the Unit 2 TDAFW from the hot shutdown panel per Appendix O, of station procedure FNP-2-STP-73.1, "Hot Shutdown Panel Operability Verification." The licensee opened the steam admission valves from the hot shutdown panel and the TDAFW pump experienced an over-speed condition and tripped. The licensee performed troubleshooting and discovered a work order had been implemented on July 7, 2011, to lift electrical leads which rendered the speed control circuit of the pump inoperable. The licensee restored operability of the TDAFW pump on July 31, 2011, by re-landing the lifted electrical leads.

The NRC inspectors reviewed the station work documents and condition reports associated with this event. The inspectors reviewed condition report (CR) 333399 written on June 29, 2011, which identified a discrepancy between the field wiring and the design drawing of the TDAFW speed control circuit. The licensee closed CR 333399 to work order SNC 312807, and started the planning process to lift leads in the speed control circuit to resolve the discrepancy between the field wiring and the design drawing. The work order spared the wiring on the right side of terminals 4 and 5. The NRC inspectors reviewed the electronic log associated with work order SNC 312807, which is a chronological log of activities of the work order. The review determined the engineering staff was not involved in the decision to spare the wires. The log indicates work planning and operations personnel were involved in the work order review. The

record indicates the work was completed on July 7, 2011.

The NRC inspectors reviewed the permanent plant modification documentation implemented during the spring 2009 Unit 2 refueling outage. The modification installed a direct current (DC) motor to control the speed of the TDAFW pump. During implementation of the modification, a field change was made to the DC motor steam admission valve (i.e. activates the speed control circuitry) activation signal wiring. Field changes procedurally require the licensee to implement their as built notification (ABN) process to ensure controlled design drawings are up-dated to accurately reflect components/wiring in the field. The controlled design drawing B-204606 was incorrectly updated showing this activation signal wiring to be spared in the field. The NRC inspectors did not identify the exact date of the drawing change and did not identify any reviews of the licensee's drawing changes, verifying the drawing accurately reflected the field change.

Analysis: Failure to maintain the accuracy of station controlled design drawings is a performance deficiency. This performance deficiency is more than minor because it is associated with the Design Control attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the licensee did not maintain adequate design control of the TDAFW pump electrical control drawings which were relied upon to maintain proper configuration of the plant. The inaccurate drawings resulted in the Unit 2 TDAFW pump being inoperable for approximately 24 days. The finding was evaluated using the work sheets of MC 0609, "Significance Determination Process," Attachment 4, and Appendix A. The inspectors determined the finding degraded the secondary short term heat removal portion of the core decay heat removal safety function in the mitigating systems cornerstone and required SDP phase 2 screening. Phase 2 SDP screening yielded a greater than Green result because the tool did not include recovery by operating the TDAFW pump in local manual mode. The regional SRA performed a detailed SDP phase 3 analysis in accordance with IMC 0609, Appendix A utilizing both the latest NRC Farley SPAR model and the licensee's full scope Farley PRA model. The licensee's Farley Fire PRA model was used to estimate the external event fire risk.

The impact of the PD was that the TDAFW pump would start and trip on overspeed for all automatic and remote manual start attempts from main control room or the local control panel. The only potential means of TDAFW pump operation during the PD exposure period was local manual operation through manual control of the TDAFW pump trip and throttle (T & T) Valve. Human reliability analysis was performed to model TDAFW pump local manual operation subsequent to overspeed trip conditions. Recovery human error probabilities were developed using the NRC SPAR-H methodology for diagnostic and action portions of the recovery. The major assumptions of the analysis included: (1) The TDAFW pump would start and trip on overspeed for all automatic and remote manual start attempts, (2) An exposure period of 593 hours, and (3) TDAFW pump recovery via local manual T&T valve control for all scenarios except anticipated transient without scram and loss of seal cooling scenarios due to time constraints. The dominant sequences were (1) a loss of service water initiator due to pipe rupture leading to a loss of component cooling water and the motor driven AFW

pumps, loss of the TDAFW due to the PD, and failure to recover the TDAFW pump via local manual control leading to RCP seal LOCA and core damage, and (2) a reactor trip initiator with a common cause failure of the motor driven AFW pumps, loss of the TDAFW pump due to the PD, failure to recover the TDAFW pump via local manual control and failure to implement feed and bleed leading to core damage. The risk of the performance deficiency was mitigated by the remaining AFW capability, the fact that the PD only affected the TDAFW pump and did not prevent recovery via local manual control, and the relatively short exposure period. The result of the phase 3 risk evaluation of the PD was a core damage frequency increase of less than  $1 \times 10^{-6}$  per year a GREEN finding of very low risk significance.

The inspectors reviewed this performance deficiency for cross-cutting aspects as required by MC 0310, "Components With Cross-Cutting Aspects." The inspectors determined the engineering staff was not formally involved in the work order planning sequencer regarding the decision to spare the wires. The log indicates work planning and operations personnel were involved in the work order review. Additionally, the inspectors did not identify any reviews of the licensee's drawing changes, verifying the drawing accurately reflected the field change. The finding was assigned a cross-cutting aspect in the work control components of the human performance area. Specifically, the licensee work groups did not maintain interfaces with offsite organizations, and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance (H.3(b)).

Enforcement: 10 CFR 50, Appendix B, Criterion III, "Design Control," states in part, that measures shall be established to assure applicable regulatory requirements and design basis for those structures, systems and components (SSCs), to which this appendix applies, are correctly translated into specifications, drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled. Contrary to the above, the licensee failed to correctly update a station controlled design drawing to ensure that actual field changes were translated correctly. Based on a review of licensee documents the start time for this violation could not be determined. Design drawing B-204606 sheet 41 incorrectly showed active electrical wiring spared in the field. As a result, the control wiring was incorrectly configured on July 7, 2011. The wiring was corrected on July 31, 2011 and the drawing was updated in October of 2011. Because this violation was of very low safety significance and entered into the licensee's CAP as CR 340271, this violation is being treated as a NCV, consistent with the Enforcement Policy. NCV 05000364/20110014-01, TDAFW Pump Inoperable due to Improper Control of Station Drawings.

#### 1A RCP Oil Lift Switch Cable Sizing

##### a. Inspection Scope

In addition to the routine review, the inspectors selected the issue listed below for a more in-depth review. The inspectors reviewed station documentation related to the sizing of station cabling supporting the handswitch of the 1A RCP, support equipment, and

additional control circuits. The inspectors also reviewed industry information related to these conductors. The inspectors considered the extent of condition, generic implications, and common cause. The inspectors reviewed the licensee's evaluation and disposition of operability/reportability issues associated with this cable sizing.

- CR 2010116613. Flame detected on the 1A RCP handswitch

b. Observations:

- The inspectors observed the licensee's testing of the GEMCO handswitches which simulated the control room fire related with the mis-wiring of the 1A RCP handswitch. The inspectors observed the application of multiple currents up to and including 30A. From these simulated tests, the maximum current that the circuit could have seen was 30A which welded the switch contacts shut. The inspectors determined the actual contacts had melted and thus some amperage less than 30A were applied to the actual cables.
- The inspectors reviewed the licensee's engineering evaluation of the cables involved in this event (RER 110513201, RCP Feeder Breaker Control Circuit Fuse Evaluation). The licensee assumed an initial ambient temperature of 25 degrees Celsius when the actual event occurred in November, 2010. The inspectors determined this assumption was reasonable. Industry information provided from the evaluation of short circuits on the heating of cables provides the following formula:

$$\circ \quad (I/A)^2 \times t = 0.0297 \log [(T_2 + 234)/(T_1 + 234)].$$

- I = short circuit current – amperes;
- A = conductor area – circular mils;
- t = time of short circuit – seconds;
- $T_1$  = operating temperature – 90 degrees C;
- $T_2$  = maximum short circuit temperature – 250 degrees C.

Rearranging the equation to solve for time of short circuit (t) yields:

$$\circ \quad t = (A/I)^2 \times 0.0297 \log [(T_2 + 234)/(T_1 + 234)].$$

The temperature rating for the type of conductor used at the Farley Nuclear Plant is 600V at 200 degrees C. The conductor evaluated in this case was #16 AWG conductors at 25 degrees C and a final temperature of 200 degrees C. The amperage applied was 30A. The amount of time the fault would have existed to create the above conditions was 49.35 seconds. The inspectors observed the interruption of current from the simulated tests occurred in less than 30 seconds. The inspectors interviewed control room staff to determine the amount of time the circuit was energized during the actual event. The inspectors determined the simulated tests involved a reasonable time (less than 30 seconds).

- The inspectors also reviewed the information related to the amount of time needed to reach the autogenous ignition temperature for #16 AWG conductors. Industry



information related to the jacket material used on these conductors at Farley Nuclear Plant indicate that for perfluoro (ethylene-propylene) copolymer jacket material has an autogenous ignition temperature of 378 degrees C. Utilizing this information in the equation in the previous paragraph, the amount of time the fault would have needed to have existed was 82.22 seconds. The inspectors determined the fault could not have existed for this period of time.

- Finally, the inspectors visually inspected control cables in the area of the affected circuit for obvious indications of deterioration. No indications were observed. Thus from the above information, the inspectors concluded that it is highly unlikely that any cable was damaged beyond the immediate vicinity of the handswitch.

### .3 Semi-annual Trend Review

#### a. Inspection Scope

As required by IP 71152, "Identification and Resolution of Problems," the inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors reviewed repetitive equipment and corrective maintenance issues, and also considered the results of daily inspector CAP item-screening discussed above. The review also included issues documented outside the normal CAP process, including system health reports, corrective maintenance WOs, component status reports and MR assessments. The inspectors' review nominally considered the six-month period of June 1, through December 31, 2011, although some examples expanded beyond those dates when the scope of the trend warranted. The inspectors compared and contrasted their results with the results contained in the licensee's latest integrated quarterly assessment report. Corrective actions associated with the sample of the issues identified in the licensee's trend report were reviewed for adequacy. The NRC will continue to monitor licensee activities related to this trend and include where appropriate into baseline inspection samples. Documents reviewed are listed in the Attachment.

#### b. Observations

The inspectors noted a lack of rigor in the licensee's implementation of design change packages. Over the past two years, the inspectors' noticed instances where licensee staff had complained regarding station procedures which had not been updated following implementation of equipment design changes. The inspectors' monitored the daily condition report summaries for further evidence of this potential problem. Additionally, the inspectors continued to interview station personnel regarding the issue. On July 31, 2011, the inspectors became aware of an inoperable TDAFW pump on Unit 2 which seemed to have some of the symptoms of an inadequate/incomplete design change implementation. The inspectors monitored the licensee's troubleshooting which indicated that an inadequate station drawing had lead to the lifting of leads in the TDAFW pump control circuit resulting in the inoperable pump. The inspectors obtained copies of the design change package which had been implemented in April/May 2010. The package indicated that a field change was required to implement the desired wiring

configuration such that the close limit switch on the TDAFW pump steam admission valve (Q2N12HV3226) was used to activate the speed control circuit for the pump. This field change required the licensee to implement their as-built-notification (ABN) process to update station drawings. During the ABN process, the station drawing was incorrectly updated and indicated spare wires where these leads were landed for Q2N12HV3226's limit switch. This subsequently led to an improper decision by station personnel to configure the plant to this incorrect drawing on July 7, 2011 (See Section 4OA2.2 above). The inspectors determined lack of rigor in the ABN process review was a contributing cause to the inoperable pump.

On August 23, 2011, the inspectors were notified of a surveillance test of the emergency start circuit's response time for the 2B emergency diesel generator (EDG). The inspectors monitored the licensee's activities to resolve instrumentation issues related to the test. The licensee discovered that the instrumentation worked properly, however, the licensee's procedure had not been updated to capture the required terminal points in the emergency start circuit's wiring cabinet following implementation of a design change in June, 2009. The inspectors and licensee personnel concluded that the impact review for this design change had failed to identify that the surveillance test procedure required changes following implementation of this modification. It was further determined the surveillance test could not be implemented per the current revision of the station procedure and the procedure was subsequently revised. The inspectors decided to review these equivalent procedures for the other similar station emergency diesel generators. The inspectors discovered these procedures did not contain the above errors. The inspectors also reviewed station drawings related to the design change on all diesels. The inspectors discovered that the 1B EDG drawing had not been updated following the implementation of a design change on the 1B EDG on February 9, 2008. The inspectors interviewed station personnel regarding why the change to the station drawing had not been updated. The inspectors were told that the design change package had not been closed and thus station procedures did not require the change to the drawing until the closure of the design change.

The licensee installed and placed into operation an uninterruptible power supply for security equipment in July, 2011. During the week of November 13-19, 2011, the inspectors discovered the licensee had not developed a planned maintenance program to address vendor recommended periodic maintenance. The inspectors learned of the licensee's desire to develop a planned maintenance program but had not accomplished this task. On December 20, 2011, the inspectors noticed CR 385621 which documented that another uninterruptible power supply for security equipment installed in July, 2011 has no planned maintenance established for it.

The inspectors also obtained a list of all design change packages that had been implemented on the site for the past eighteen months. The inspectors reviewed this list for similar potential problems regarding safety related equipment. The inspectors noted no other safety related equipment design change packages. Below is a list of the condition reports for the above examples:

- CR 340271, Unit 2 TDAFW pump trip and throttle valve tripped during a surveillance test from the hot shutdown panel

- CR 346379, 2B diesel generator start test aborted
- CR 372845, Security diesel generator UPS in alarm
- CR 385621, Security UPS has never been cleaned

#### 4OA5 Other Activities

##### .1 Quarterly Resident Inspector Observations of Security Personnel and Activities

###### a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

###### b. Findings

No findings were identified.

#### 4OA6 Meetings, Including Exit

On January 5, 2012, the NRC presented the inspection results to you and members of your staff who acknowledged the results. The NRC confirmed proprietary information was not provided or examined during the inspection.

#### 4OA7 Licensee-Identified Violations

None

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee personnel**

B. Boyd, EP Specialist  
M. Byrd, Site Design Supervisor  
David Cosby, BACP and ISI Coordinator  
D. Christiansen, Training Manager  
T. Do, Steam Generator Engineer  
D. Gilbert, EP Assistant  
B. Griner, Engineering Director  
J. Horn, Site Support Manager  
F. Hundley, Fleet Oversight Supervisor  
J. Jerkins, Corrective Action Program Supervisor  
V. Locke, Human Performance Coordinator  
R. Martin, Engineering Programs Manager  
S. McGavin, Security Manager  
S. Odom, Emergency Preparedness (EP) Supervisor Emergency Preparedness  
W. Oldfield, Licensing Engineer  
D. Simmons, EP Specialist  
L. Smith, Maintenance Manager  
T. Smith, Steam Generator Program Manager  
R. Smith, Site Design Manager  
C. Thornell, Operations Manager  
S. Varnum, Chemistry Manager  
H. Vaught, Assistant Maintenance Manager  
R. Vierkandt, Health Physics Manager  
C. Westberry, Engineering Systems Manager  
T. Youngblood, Plant Manager

#### **NRC personnel**

James Hickey, Chief, Branch 2, Division of Reactor Projects  
E. Crowe, Senior Resident Inspector  
J. Sowa, Resident Inspector  
M. Riley, Reactor Inspector

### **LIST OF REPORT ITEMS**

#### **Opened and Closed**

05000364/20110014-01	NCV	TDAFW Pump Inoperable due to Improper Control of Station Drawings (Section 4OA2)
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#### **Closed**

None

#### **Discussed**

None

## **LIST OF DOCUMENTS REVIEWED**

### **Section 1R04: Equipment Alignment**

#### Condition Reports:

2001355125, 2011355015

#### Drawings:

D-172700, Sheet 1, Version 25.0  
D-172701, Sheet 1, Version 5.0  
D-172702, Sheet 1, Version 3.0  
D-205001, Sheet 1, Version 31.0  
D-205003, Sheet 1, Version 44.0  
D-205003, Sheet 2, Version 33.0  
D-205007, Sheet 1, Version 23.0  
D-205033, Sheet 2, Version 23.0  
D-205038, Sheet 1, Version 36.0  
D-205038, Sheet 2, Version 33.0  
D-205041, Sheet 1, Version 19.0

#### Procedures:

FNPP-2-SOP-7.0, Residual Heat Removal System, Version 93.0  
FNPP-2-SOP-7.0, Residual Heat Removal System, Version 93.1  
FNPP-2-SOP-7.0A, Residual Heat Removal System, Version 8.0  
FNPP-2-SOP-22.0, Auxiliary Feedwater System, Version 70.1  
FNPP-2-SOP-22.0A, Auxiliary Feedwater System, Version 9.0  
FNPP-2-SOP-23.0, Component Cooling Water System, Version 88.0

### **Section 1R05: Fire Protection**

#### Drawings:

A-509018, Sheet 14, Fire Zone Data Sheet: Aux. Bldg. El. 100' – 0", Version 2.0  
A-509018, Sheet 046, Fire Zone Data Sheet: Containment El. 105' – 6", Version 3.0  
A-509018, Sheet 047, Fire Zone Data Sheet: Containment El. 129' – 0", Version 2.0  
A-509018, Sheet 048, Fire Zone Data Sheet: Containment El. 139' – 0", Version 1.0  
A-509018, Sheet 049, Fire Zone Data Sheet: Containment El. 155' – 0", Version 1.0  
A-509018, Sheet 054, Fire Zone Data Sheet: Aux. Bldg. El. 77' – 0", Version 2.0

### **Section 1R06: Flood Protection Measures**

#### Condition Reports:

2011104438, 2011104450, 2011104611

#### Documents:

Calculation BM-99-1932-001, Internal Flooding Assessment

#### Technical Evaluations:

77637

## **Section 1R08: Inservice Inspection Activities**

### **Condition Reports**

CR 358848	CR 362788	CR 361279	CR 2011111328	CR 361275
CR 363792	CR 363762	CR 362822	CR 2011101928	CR 2010110329

### **Procedures**

NMP-ES-024-203, Visual Examination (VT-3), Version 5.0, August 25, 2010  
 NMP-ES-024-001, PDI Generic Procedure for the Ultrasonic Examination of Austenitic Pipe Welds (Appendix VIII), Version 4.0, October 5, 2010  
 NMP-ES-024-207, General Visual Examination (IWE), Version 3.0, October 5, 2010  
 NMP-ES-019-001, Boric Acid Corrosion Control program Implementation, Version 6.0, October 5, 2010  
 NMP-ES-019, Boric Acid Corrosion Control Program, Version 8.0, October 5, 2010  
 NMP-ES-019-004, Boric Acid Corrosion Control Program – Corrosion Assessment, Version 2.0, October 5, 2010  
 FNP-2-STP-9.0, RCS Leakage Test, Version 45.0, March 1, 2011  
 FNP-0-ETP-4494, RPV Alloy 600 Material Inspections and Reports, Version 5.0, June 11, 2010  
 FNP-2-ETP-246, RHR Leakage Assessment, Version 13, February 27, 2006  
 NMP-ES-019-GL03, Boric Acid Deposit Sampling, Analysis and Data Evaluation, Version 4.0, October 2010  
 FNP-2-STP-34.0, Containment Inspection (General), Version 27, August 31, 2011  
 FNP-2-ETP-253, Containment Spray Leakage Assessment, Version 10, February 24, 2006  
 FNP-0-M-101, Boric Acid Corrosion Control Program, Version 15.1, August 24, 2011  
 NMP-ES-024-105, Control of Measuring and Test Equipment, Version 1.1, August 24, 2011  
 FNP-0-AP-11.0, Control and Calibration of Measuring and Test Equipment, Version 23.0, December 5, 2010  
 NMP-ES-024-401, Magnetic Particle Examination, Version 7.0, October 5, 2011  
 NMP-ES-024-601, Radiographic Examination, Version 4.1, August 24, 2011

### **Other Documents**

Evaluation No. 3882, Evaluation performed on May 12, 2011  
 Evaluation No. 3708, Evaluation performed on April 26, 2010  
 Evaluation No. 3710, Evaluation performed on April 19, 2010  
 Evaluation No. 3869, Evaluation performed on February 16, 2011-10-26  
 Evaluation No. 3563, Evaluation performed on April 21, 2011  
 IWE inspection, Report No 2R21 IWE 01, October 12, 2011  
 IWL Containment Liner inspection, Report No 2R21 IWL 01, October 12, 2011  
 IWE Containment Liner inspection, Report No IER 004 Rev. 1.0 – 2R21, October 18, 2011  
 2R21 Outage Plan Interval 4 - Period 2 - Outage 1, September 2, 2011  
 PT Level II certificate for Hankhowdu, IQC dated 9/9/2011  
 RT Level II certificate of Morgan dated 10/24/2011  
 UT Level II certificate of Thomas dated 9/14/2011  
 VT-3 Level II certificate for Kimmen dated 10/7/2011  
 VT-3 Level II certificate for Carraher dated 10/7/2011  
 MT Level II certificate for DiValerio dated 9/9/2011  
 MT Level II certificate for Grell dated 10/7/2011  
 RT Level II certificate of Falkenberry, ATS dated 2/3/2011

Ir192 Source certificate  
 Alabama Radioactive Material License 1454  
 Work Order SNC214095, PT of 2 CCP suction line  
 Work Order F2 APR1-5100-CS-1, VT-3 of RCP 2A support  
 Work Order F2 APR1-4305-5, UT examination of Hot Leg safety Injection, Loop 3, Elbow to Pipe (Thermal Fatigue)  
 Work Order SNC214095, RT examination of 2 CCP suction line  
 Work Order F2 APR1-1300-CS-1R, MT examination of RPVH Lifting Lug  
 Work Order Number F2 APR1-1199-CS-6, VT-3 examination of RPV Support  
 Quarterly Health Report, Boric Acid Corrosion, 2<sup>nd</sup> Quarter 2011  
 Quarterly Health Report, Boric Acid Corrosion, 4<sup>th</sup> Quarter 2009  
 ASME Section XI Code Compliance Summary- 4<sup>th</sup> Interval  
 Augmented ISI Examination Plan (includes N-770-1)  
 Pressure Testing of Class 1 Components (Work Order 2082261101)  
 Pressure Testing of Class 2 Components (Work Order 2082288601)  
 Pressure Testing of Class 3 Components (Work Order 2082288801)  
 APR+PTUB, Heat Exchanger Eddy Current Inspection Multi-Frequency Inspection Parameters, Rev. 0  
 APR-01-11, Steam Generator Eddy Current Inspection Multi-Frequency Eddy Current Parameters, Rev. 0  
 APR-02-11, Steam Generator Eddy Current Inspection Multi-Frequency Eddy Current Parameters, Rev. 0  
 APR-03-11, Steam Generator Eddy Current Inspection Multi-Frequency Eddy Current Parameters, Rev. 0  
 APR-04-11, Steam Generator Eddy Current Inspection Multi-Frequency Eddy Current Parameters, Rev. 0  
 APR-05-11, Steam Generator Eddy Current Inspection Multi-Frequency Eddy Current Parameters, Rev. 0  
 APR-06-11, Steam Generator Eddy Current Inspection Multi-Frequency Eddy Current Parameters, Rev. 0  
 APR-07-11, Steam Generator Eddy Current Inspection Multi-Frequency Eddy Current Parameters, Rev. 0  
 APR-BOB, Heat Exchanger Eddy Current Inspection Multi-Frequency Inspection Parameters, Rev. 0  
 MC-5501-PP, Sandvik Technical Report: Ten Tube Test Program, Rev. 1  
 Mistras NDT Certification Form (Carlson), dated 08/07/09  
 Mistras NDT Certification Form (Gootz), dated 6/6/07  
 Mistras NDT Certification Form (Hover), dated 07/14/09  
 Mistras NDT Certification Form (Popovich), dated 2/25/09  
 Mistras NDT Certification Form (Webb), dated 09/07/09  
 Mistras Visual Acuity Record (Carlson), dated 12/20/10  
 Mistras Visual Acuity Record (Gootz), dated 2/17/11  
 Mistras Visual Acuity Record (Hover), dated 11/12/2010  
 Mistras Visual Acuity Record (Popovich), dated 11/30/10  
 Mistras Visual Acuity Record (Webb), dated 11/12/2010  
 NDE Technology, Inc. Personnel Certification Summary (Black), dated 08/03/09  
 NDE Technology, Inc. Personnel Certification Summary (Brown), dated 08/03/09  
 NDE Technology, Inc. Personnel Certification Summary (Causby), dated 08/03/09

NDE Technology, Inc. Personnel Certification Summary (Drumm), dated 7/28/2010  
 NDE Technology, Inc. Personnel Certification Summary (Grant), dated 01/09/08  
 NDE Technology, Inc. Personnel Certification Summary (Haynes), dated 01/14/08  
 NDE Technology, Inc. Personnel Certification Summary (Thompson), dated 11/19/09  
 NDE Technology, Inc. Personnel Vision Certification (Black), dated 7/15/2010  
 NDE Technology, Inc. Personnel Vision Certification (Brown), dated 7/15/2010  
 NDE Technology, Inc. Personnel Vision Certification (Causby), dated 7/20/2010  
 NDE Technology, Inc. Personnel Vision Certification (Drumm), dated 7/21/2010  
 NDE Technology, Inc. Personnel Vision Certification (Grant), dated 8/6/10  
 NDE Technology, Inc. Personnel Vision Certification (Haynes), dated 7/22/2010  
 NDE Technology, Inc. Personnel Vision Certification (Thompson), dated 7/22/2010

### **Section 1R11: Licensed Operator Regualification Program**

#### Documents:

Licensed Operator Continuing Training Simulator Exercise Guide: LOCT 10-12 Segment 10, 2011-S1002

### **Section 1R12: Maintenance Effectiveness**

#### Condition Reports:

361363, 361386, 2005100608, 2005102689, 2005104590, 2006105060, 2006105526, 2007100190, 2007102301, 2007102574, 2007105246, 2008102068, 2008102154, 2008107294, 2008109681, 2009102852, 2009105649, 2009107516, 2009111487, 2009112641, 2010105844, 2010105862, 2010106453, 2010111139, 2010112174

#### Drawings:

D175012, Control Room and Computer Room HVAC and Filter, Sheet 1, Version 40.0  
 D207646, Loading Sequencer B2G ESS Sequencer, Sheet 1, Version 10.0  
 D207650, Loading Sequencer B2G LOSP Sequencer Bus 2G, Sheet 1, Version 9.0

#### Procedures:

FNP-2-EEP-0, Reactor Trip or Safety Injection, Version 38  
 FNP-2-STP-40.0, Safety Injection with Loss of Off-Site Power Test, Version 61.0

#### Work Orders:

339687, 340647, 1051985901, 1051987101, 1051987201, 1060366601, 1060374101, 1060374201, 1070672401, 1070676201, 1070676301, 1090389001, 1090389201, 1090408101, 2042305201, 2050469301, 2051398601, 2051555001, 2051565801, 2051565901, 2060153701, 2060157001, 2060157101, 2061449101, 2061983801, 2062076301, 2062076501, 2070074701, 2070084501, 2070084601, 2070131801, 2070699001, 2071345601, 2071345701, 2080555001, 2080562201, 2080678401, 2080680101, 2081489701, 2081886301, 2082273901, 2090324301, 2091816701, 2091839601, 2092389901, 2092393701, 2101521901, 2101525201, 2101537801, 2101554102, 2102454701, 2102567901, M400280601

### **Section 1R13: Maintenance Risk Assessments and Emergent Work Evaluation**



Procedures:

FNPP-2-SOP-1.3, Reactor Coolant System Filling and Venting – Vacuum Method, Version 57.0  
 FNPP-2-UOP-4.3, Mid-Loop Operations, Version 35.0

**Section 1R15: Operability Evaluations**Condition Reports:

348466, 361386, 362212, 372945

Documents:

Operability Determination OD# 02-11-07, TDAFW Pump operability regarding the isolation of the warmup lines for the turbine – prevent rolling of the pump at low revolutions per minute

Apparent Cause Determination (ACD) Report 192389

Work Orders:

328799, 341681, 346110

**Section 1R18: Plant Modifications**Documents:

DCP 2070138901, Replace Q2P16FV3009A, B, C Hammel-Dahl Valves and Actuators, Version 1.0

DOEJ-FD2070138901-C001, Pipe Support Evaluation for SW Piping of Unit 2 Due to Valve Replacement, Version 1.0

DOEJ-FD2070138901-C003, Qualify Existing Concrete Structures Subject to New Footprint Loads Generated by Service Water Valve Replacements, Version 1.0

DOEJ-FD2070138901-C004, Pipe Supports Evaluation for Rigging Load of Service Water Valve Replacement, Version 1.0

DOEJ-FD2070138901-C005, Evaluation for Removal of Electro-pneumatic Transducers and Assembly and Installation of Pressure Regulator, Version 1.0

DOEJ-FD2070138901-C006, Seismic Evaluation for Installation of Three (3) New Filters in Panel Q2H11NGB2504, Version 1.0

DOEJ-FD2070138901-C009, Qualification of Side Loading on Cable Tray Supports – Unit 2 CCW Room, Version 1.0

DOEJ-FD2070138901-J001, Evaluation of Fisher Model DVC 6030 Digital Valve Positioner Electromagnetic Compatibility, Version 1.0

DOEJ-FD2070138901-M001, Orifice Flange Torque for Unit 2 Service Water Valves, Version 1.0

Work Orders:

2070138902, 2070138904, 2070138905, 2070138906, 2070138907, 2070138908, 2070138911, 2070138913, 2070138916, 2070138918, 2070138919, 2070138920, 2070138923, 2070138924, 2070138925, 2070138926, 2070138927, 2070138928, 2070138932, 2070138933, 2070138935, 2070138936, 2070138937, 2070138938, 2092578801

**Section 1R19: Post Maintenance Testing**Condition Reports:

362040, 369973, 370568

Drawings:

D-207650, LOSP Sequencer Bus 2G, Sheet 1, Version 9.0

Procedures:

FPN-2-STP-16, Turbine Driven Auxiliary Feedwater Pump Quarterly Inservice Test, Version 64.0

FPN-2-STP-21.3, TDAFWP Steam Supply Valves Valve Inservice Test, Version 21.0

FPN-2-STP-22.1, 2A Auxiliary Feedwater Pump Quarterly Inservice Test, Version 26.0

FPN-2-STP-22.16, Turbine Driven Auxiliary Feedwater Pump Quarterly Inservice Test, Version 64.0

FPN-2-STP-40.0, Safety Injection with Loss of Offsite Power Test, Version 61.0

FPN-2-STP-80.4, B2G Sequencer Operability Test, Version 4.0

Work Orders:

344453

**Section 1R22: Surveillance Testing**Condition Reports:

361305, 361324, 362838, 363412, 364991, 2008111988

Documents:

Local Leak Rate Test Record, As-Found Penetration 42 Q2P17V0083, October 18, 2011

Local Leak Rate Test Record, As-Left Penetration 42 Q2P17V0083, October 28, 2011

Local Leak Rate Test Record, As-Left Penetration 55 Q2E14HV3657, October 23, 2011

Local Leak Rate Test Record, As-Found Penetration 55 Q2E14HV3657, October 14, 2011

Q2E14HV3657 LLRT Evaluation, October 24, 2011

Q2P17V0083 LLRT Evaluation, April 26, 2010

Drawings:

D-205007, Auxiliary Feedwater System, Sheet 1, Version 23.0

D-205038, Safety Injection System (Containment Spray), Sheet 3, Version 30.0

Procedures:

FNPP-0-M-93, Appendix J Option B Testing Plan, Version 13.0

FNPP-2-STP-16.10, 2A Containment Spray Pump Comprehensive and Check Valves Flow Test – A Train, Version 15.0

FNPP-2-STP-22.26, 2A Auxiliary Feedwater Pump Cold Shutdown Inservice Test and Preservice Test, Version 20.0

FNPP-2-STP-627.0, Local Leak Rate Testing of Containment Penetrations, Version 55.0

Work Orders:

2070843101, SNC 72516, SNC 74035

**Section 2RS01: Radiological Hazard Assessment and Exposure Controls**Procedures and Guidance Documents

FNPP-RCP-101, Use and Testing of Respiratory Protection Equipment and DAC-Hour Tracking, Rev. 34.0

FNPP-2-RCP-12, Unit 2 Moveable Incore Detector (MID) Work, Ver. 12

FNPP-2-RCP-0.2, Unit 2 Reactor Vessel Maintenance Sump Entry, Ver. 4

NMP- HP-303, Personnel Decontamination, Ver. 1.0

Certificate of Compliance for Spent Fuel Storage Cask, USA/72-1014, 5/31/2000, and applicable Amendments

FNPP 10 CFR 72.212 Report, Ver. 7

NMP-GM-002-001, Corrective Action Program Instructions, Ver. 26.0

Records and Data Reviewed

FNPP Total Dose Summary Reports detailing: DDE, LDE, SDE-WB, SDE-ME, CEDE, CDE, TEDE, TODE data for 2009, 2010, and January 1, 2011 through October 25, 2011,

Access Control Alarms Report: October 1, 2010, through October 24, 2011

FNPP, Daily Health Physics Information Report, 10/24-28/2011

Plant Farley PCE/PCR Data, January 1, 2011, through October 24, 2011

HP Form 257B, DAC-HR Tracking Log, 2/12/2011 through 2/13/2011

Personnel Dosimetry File Records G02.166, Whole Body Count Record – Analysis Output-

Special (Done for Cause), and Associated Paperwork (e.g., DOS Form 921 and/or any other Internal Dose Assignment Paperwork: October 1, 2010, through October 24, 2011

HP Form 257B DAC-HR Tracking Log Data, 02/12-13/2011

Records and Supporting Data for the Following PCE Incidents: PCE 422 (10/18/2011); PCE 414 (09/29/2011); PCE 421 (10/18/2011); Records and Supporting Data.

Gamma Spectrum Analysis 10/19/2011, PCR Analysis – Carpenter Building Scaffold 105 Near PRT

Plant Farley ISFSI Radiation Surveys: 73103 (9/20/2011); 73095 (9/20/2011); 73093

(9/20/2011); 72759 (09/03/2011); 72715 (9/01/2011); 72619 (08/29/2011); 71375 (7/2/2011); 62356 (7/13/2010); 61981 (6/25/2010)

Plant Farley HP Form 822A HI-STORM Surface Dose Rates, Radiation Survey 73093 (9/20/2011)

HP Form 822A, HI-STORM Overpack Surface Dose Rates: Surveys 73093 and 73095 (09/20/2011)  
 Plant Farley Dry Cask Storage Building, Radiation Survey 72759 (09/03/2011)  
 Plant Farley Perimeter OSL Exposure Report, Perimeter Monitoring Dosimeter Locations (1<sup>st</sup> Half of 2011 Locations), August 30, 2011  
 Radiography Plan, Radiography of Unit 2 , '2C' Charging Pump Suction Line, 2R21 Refueling Outage, 10/24/2011  
 FNP Radiological Surveys of U2 C Charging Pump Suction Line Repairs performed 10/20-21/2011, Surveys 74254, 74334, 74202, and 74202.  
 FNP Air Sample Survey #66561, 11/11/2010.  
 RWP 11-2101 – U2 Containment General Entry  
 RWP 11-2301 – Access to Radiation Control Areas  
 RWP 11-2457 – Maintenance Activities U2 Containment  
 RWP 11-2731 – Initial HP Surveys in Support of S/G Activities  
 RWP 11-2901 – U2 Containment Operator and Ironworker Activities  
 FNP Alpha Source Term Characterization Report, July 8th, 2011  
 FNP Health Physics Turnover Log (HP Form 602), 10-27-2011.  
 FNP Radiological Surveys for RCP Seal Replacement work performed 10/20-24/2011. Surveys: 74225, 74244, & 74520.  
 FNP Radiological Surveys for U2 B S/G work performed 10/17-21/2011. Surveys: 74186, 74048, 74154, 74181, 74224, 74230, 74282, 74319, 74358, 74188, 74427, 74380, 74412, 74445, 74483, 74484.

#### Corrective Action Program (CAP) Documents

CR 362922  
 CR 336111  
 CR 2010115510  
 CR 2010115514  
 CR 2011100099  
 CR 2011101921  
 CR 2010117370  
 CR 2010118538  
 CR 2010118270

### **Section 2RS6: Radioactive Gaseous and Liquid Effluent Treatment**

#### Procedures and Manuals

FNP Offsite Dose Calculation Manual, Version 24  
 FNP-2-CCP-212, Detailed Guidance for Unit 2 WMT Releases, Version 25.0  
 FNP-1-CCP-212.1, Liquid Effluent Radiation Monitoring System Setpoints, Version 11.0  
 FNP-1-CCP-213.1, Gaseous Effluent Radiation Monitoring System Setpoints, Version 19.0  
 NMP-EN-002, Radiological Groundwater Protection Program, Version 5.0  
 NMP-GM-002-001, Corrective Action Program Instructions, Version 26.0  
 Systems Training for Chemistry Technicians, Liquid and Solid Waste Processing System, Student Text, Version 1

#### Records and Data

Annual Radioactive Effluent Release Reports, 2009 and 2010

Fleet Oversight Audit of Chemistry, 11/16/2010  
 Gaseous Radioactive Waste Release Permits, G-20111215-2821-C (pre-release data only), G-20111208-2798-C, and G-20111201-2774-C  
 Groundwater Protection Monitoring Results, 11/3/2009 – 12/13/2011  
 Liquid Radioactive Waste Release Permits, L-20111213-3372-B, L-20111212-3366-B and L-20111210-3363-B  
 Radiation Effluent Monitors Unavailability Records Units 1 and 2, 8/1/2009 – 6/31/2011  
 Results of Radiochemistry Cross Check Program, 2/20/2009 and 5/14/2010  
 Work Order 1051123201, U1 Penetration Room Filtration Performance Test, 5/13/08  
 Work Order 1060357801, U1 Penetration Room Filtration Performance Test, 2/27/10  
 Work Order 2060406701, U2 Radwaste Filter Testing, 12/13/07  
 Work Order 2080200501, U2 Radwaste Filter Testing, 4/14/11

CAP Documents

CR 2009109372  
 CR 2009113521  
 CR 2009113522  
 CR 2009115239  
 CR 2010100515  
 CR 2011107115

**Section 2RS7: Radiological Environmental Monitoring Program (REMP)**

Procedures and Reports

Joseph M. Farley Annual Radiological Environmental Operating Report for 2009, 5/14/2010  
 Joseph M. Farley Annual Radiological Environmental Operating Report for 2010, 5/12/2011  
 FNP-0-ENV-17, Meteorological Tower, Rev. 31  
 FNP-0-STP-255.0, Calibration of Primary Meteorological Station Instrumentation, Rev. 29  
 FNP-0-STP-255.1, Calibration of the Back-up Meteorological Station Instrumentation, Rev. 26  
 FNP-0-ENV-798, On-Site Ground Water Monitoring Program, Rev.3  
 FNP-0-ENV-795.1, Ground Water Sampling Analysis, Rev. 1

Records and Data

Last 2 calibration sets for 10 environmental monitoring air sampling stations covering 2009-2011  
 Last 3 calibration sets for 2 environmental monitoring water sampling stations covering 2009-2011  
 2009 and 2010 Interlaboratory Comparison Program results  
 Last 4 Primary Meteorological Tower Calibrations  
 2009 and 2010 wind rose data for various elevations.

CAP Documents

Audit Report of Georgia Power Company Environmental Laboratory, June 10, 2011  
 CR2009113842  
 CR 2010106168  
 CR 2010107397  
 CR 2010110614  
 CR 2010114774  
 CR 2010114777

CR 2010115941  
CR 2011103429  
CR 2011107525

## **Section 2RS8: Radioactive Material Processing and Transportation**

### Procedures and Guidance Documents

FNPP-0-RCP-809, Isotopic Characterization of Radioactive Waste Streams for Offsite Shipments and/or Burial, Version 18  
FNPP-0-M-030, Process Control Program, Version 17  
FNPP-0-RCP-811, Shipment Of Radioactive Material, Version 37  
FNPP-0-RCP-810, Shipment Of Radioactive Waste, Version 47  
FNPP-0-TCP-50.1, Health Physics and Chemistry Controlled Functional Position Qualification Requirements, Version 19

### Records and Data Reviewed

Annual Radioactive Effluent Release Reports for 2009  
Annual Radioactive Effluent Release Reports for 2010  
FNPP Radiological Survey #53070, 06-21-11, Filter Change Out Survey  
FNPP Radiological Survey #53226, 06-28-11, Filter Change Out Survey  
Filter Characterization Report for Filter ID#1SI-2446, 06-25-2010  
Filter Characterization Report for Filter ID#1SI-2445, 06-25-2010  
2010 10CFR-61, Sample Data Set Validations for all plant waste streams, 12-29-2010  
2011 10CFR-61, Sample Data Set Validations for all plant waste streams, 08-25-2011

### Shipping Records

RWS # 11-05, Outage Maintenance Equipment  
RWS # 11-01, Oil Samples  
RWS # 10-76, Sludge Lance Equip.  
RWS # 10-10, DAW  
RWS # 09-08, Empty Fuel Containers

### CAP Documents

Fleet Radioactive Waste Self Assessment, 12-22-2010  
CR64990  
CR347684  
CR351187  
CR192006

## **Section 4OA1: Performance Indicator Verification 71151**

### Condition Reports:

62464, 62846, 292820, 355380, 2010105025, 2010105239, 2010106059t

### Documents:

Access Control Alarms Report: October 1, 2010, through October 24, 2011  
ANS Quarterly Maintenance Check List and Test Records, 2010-2011

DEP Records from 4<sup>th</sup> Quarter 2010 through 3<sup>rd</sup> Quarter 2011  
 Farley Unit 1 and Unit 2 Consolidated Data Entry, MSPI Derivation Report, MSPI Cooling Water System Unavailability and Unreliability Indexes, dated September 2011  
 Farley Unit 1 and Unit 2 Consolidated Data Entry, MSPI Derivation Report, MSPI High Pressure Injection System, Unavailability and Unreliability Indexes, dated September 2011  
 NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 6  
 Selected Drill and Exercise Participation Records from 4<sup>th</sup> Quarter 2010 through 3<sup>rd</sup> Quarter 2011  
 Selected Records of Silent, Full Cycle, and Growl ANS Testing, 2010-2011  
 Selected Unit 1 and Unit 2 Control Room Logs from October 2010 through October 2011  
 Siren test data from 4<sup>th</sup> Quarter 2010 through 3<sup>rd</sup> Quarter 2011  
 Whelen Engineering Co, Inc, ANS Test Result Reports

Procedures:

FNP-0-AP-54, Preparation and Reporting of NRC Performance Indicator Data and NRC Operating Data, Version 14.0  
 NMP-EP-110, Emergency Classification Determination and Initial Action, versions 1.0 and 2.0  
 NMP-EP-111, Emergency Notifications, versions 4.0 and 5.0

**Section 40A2: Identification and Resolution of Problems**

Condition Reports:

333399, 340271, 346379, 355125, 372845, 385621, 2010115933, 2010116613

Documents:

CAR 191489, Root Cause Investigation for CAR 191489 TDAFW Pump Trip  
 Conductor Ampacity: Physics of Conductor and Insulators  
 Current Carry Capacity of Single Conductors – Teflon 200 degrees C  
 DCP 1959891501, Replace of Amerace (Agastat) Relays – DG 1B  
 DCP 2060862701, TDAFWP Governor Replacement, Version 3.0  
 DCP 2599891601, Amerace Part 21 for Agastat E7000 Series Relay Timers Diesel Generator 2B  
 Email from Benjamin Braswell to Binko Freeman dated November 11, 2011 regarding Governor explanation  
 Fluoropolymer Comparison – Typical Properties from DuPont Technical Document  
 Gemco Compact Control Units Cut Sheet  
 NEC 2011 Edition, Table 310.15  
 Okonite Electrical Wires and Bables – Short Circuit Currents  
 Okonite Engineering Technical Center, General Conductor Information – DC resistance  
 RER 110513201, RCP Feeder Breaker Control Circuit Fuse Evaluation, dated 1/12/2012  
 Teflon FEP, PTFE, TFE Autogenous Ignition Temperature from Wendel Hull  
 Wire-Gauge Ampacity from Transwiki  
 Military Specification MIL-W-16878F – General Specification for Wire, Electrical, Insulated, Amendment 1

Drawings:

D-172774, Sheet 1, Version 21.0  
 D-172778, Sheet 1, Version 20.0  
 D-202778, Sheet 1, Version 19.0  
 D-205033, Sheet 2, Version 23.0  
 U-260069, Version 0.1  
 U-260243, Version 0.2

Procedures:

FNPP-0-EMP-2443.05, General Electrical Undervoltage Relays Type 12NGV13 Calibration, Version 11.0  
 FNPP-2-ARP-1.9, Main Control Board Annunciator Panel J, Version 34.0  
 FNPP-2-IMP-209.12, TDAFW Pump Control Q2N12SIC3405, N2N12SI3411 A&B and Woodward Governor Calibration, Version 26.0  
 FNPP-2-IMP-226.04, Diesel Generator 2B Single Circuit Emergency Start Test, Version 5.0  
 FNPP-2-IMP-226.04, Diesel Generator 2B Single Circuit Emergency Start Test, Version 6.0  
 FNPP-2-SOP-22.0, Auxiliary Feedwater System, Version 70.0  
 FNPP-2-SOP-22.0, Appendix I, TDAFWP Operation Without Control Power, Version 70.0  
 FNPP-2-STP-22.16, Turbine Driven Auxiliary Feedwater Pump Quarterly Inservice Test, Version 64.0 (completed 11/09/2011)  
 FNPP-2-STP-22.16, Turbine Driven Auxiliary Feedwater Pump Quarterly Inservice Test, Version 64.0 (completed 11/10/2011)  
 FNPP-2-STP-22.16, Appendix I, Installation and Removal of Test Gauges, Version 64.0  
 FNPP-2-STP-73.1 Appendix O, Verification of TDAFWP Steam Admission Valve Operation From the Hot Shutdown Panel, Version 19.0  
 NMP-ES-022, DCP Site Approval, Implementation and Closure, Version 9.0  
 NMP-ES-026, As-Built Notices (ABNs), Version 9.0

Work Orders:

1091709901, 1959891502, 2070622601, 20819455101, 2959891602, S0811553801, S101824901, SNC 80419, SNC 312807