



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

May 9, 2013

Mr. David A. Heacock
President and Chief Nuclear Officer
Virginia Electric and Power Company
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060

SUBJECT: NORTH ANNA POWER STATION – NRC PROBLEM IDENTIFICATION AND
RESOLUTION INSPECTION REPORT 05000338/2013008 AND
05000339/2013008

Dear Mr. Heacock:

On March 28, 2013, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your North Anna Power Station Units 1 and 2. The enclosed report documents the inspection findings, which were discussed on March 28, 2013, with Mr. G. Bischof and other members of your staff.

The inspection was an examination of activities conducted under your license as they relate to the identification and resolution of problems, and compliance with the Commission's rules and regulations and with the conditions of your operating license. Within these areas, the inspection involved examination of selected procedures and representative records, observations of plant equipment and activities, and interviews with personnel.

Based on the inspection sample, the inspection team concluded that the implementation of the corrective action program and overall performance related to identifying, evaluating, and resolving problems at North Anna Power Station Units 1 and 2 was adequate. Licensee identified problems were entered into the corrective action program at a low threshold. Problems were generally prioritized and evaluated commensurate with the safety significance of the problems. Corrective actions were generally implemented in a timely manner commensurate with their importance to safety and addressed the identified causes of problems. Lessons learned from the industry operating experience were generally reviewed and applied when appropriate. Audits and self-assessments were effectively used to identify problems and appropriate actions. One self-revealing finding was identified which did not involve a violation of NRC requirements.

D. Heacock

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). Adams is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Curtis W. Rapp, Chief
Reactor Projects Branch 7
Division of Reactor Projects

Docket Nos. 50-338, 50-339
License Nos. NPF-4, NPF-7

Enclosure: INSPECTION REPORT 05000338/2013008 AND 05000339/2013008
w/Attachment: Supplemental Information
cc w/encl. (see page 3)

D. Heacock

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NAME	R. Taylor	R. Clagg	S. Ninh	J. Quinones	C. Scott	C. Rapp	
DATE	5/9/2013	5/9/2013	4/29/2013	5/6/2013	5/9/2013	5/9/2013	
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D. Heacock

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D. Heacock

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Letter to David A. Heacock from Curtis W. Rapp dated May 9, 2013.

SUBJECT: NORTH ANNA POWER STATION – NRC PROBLEM IDENTIFICATION AND
RESOLUTION INSPECTION REPORT 05000338/2013008 AND
05000339/2013008

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 05000338, 05000339

License Nos.: NPF-4, NPF-7

Report Nos.: 05000338/2013008 and 05000339/2013008

Licensee: Virginia Electric and Power Company

Facility: North Anna Power Station, Units 1 and 2

Location: Mineral, VA

Dates: March 11 – 15, 2013
March 25 – 29, 2013

Inspectors: R. Taylor, Senior Project Inspector, Team Leader
R. Clagg, Resident Inspector, North Anna
S. Ninh, Senior Project Engineer
J. Quinones, Project Engineer
C. Scott, Resident Inspector, Robinson

Approved by: C. Rapp, Chief,
Reactor Projects Branch 7
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000338/2013-008 and 05000339/2013-008; March 11, 2013 – March 25, 2013; North Anna Power Station Units 1 and 2; Biennial Inspection of the Problem Identification and Resolution Program.

The inspection was conducted by a senior project inspector, senior project engineer, project engineer, and two resident inspectors. One Green Finding was identified. The significance of inspection findings are identified by their color i.e. (greater than Green, or Green, White, Yellow, or Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP) dated June 2, 2011. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated June 7, 2012. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4.

Identification and Resolution of Problems

The inspectors concluded that, in general, problems were properly identified, evaluated, prioritized, and corrected. The licensee was effective at identifying problems and entering them into the corrective action program (CAP) for resolution, as evidenced by the relatively few number of deficiencies identified by external organizations (including the NRC) that had not been previously identified by the licensee, during the review period. Generally, prioritization and evaluation of issues were adequate, formal root cause evaluations for significant problems were adequate, and corrective actions specified for problems were acceptable. Overall, corrective actions developed and implemented for issues were generally effective and implemented in a timely manner.

The inspectors determined that overall, audits and self-assessments were adequate in identifying deficiencies and areas for improvement in the CAP, and appropriate corrective actions were developed to address the issues identified. Operating experience usage was found to be generally acceptable and integrated into the licensee's processes for performing and managing work, and plant operations.

Based on discussions and interviews conducted with plant employees from various departments, the inspectors determined that personnel at the site felt free to raise safety concerns to management and use the CAP to resolve those concerns.

Cornerstone: Initiating Events

Green: A self-revealing finding was identified for failure to establish and implement appropriate periodic preventive maintenance for replacement frequency of the C4 capacitor on the Speed Error Amplifier card B (1A08D) in accordance with VPAP-803, Preventive Maintenance Program. Consequently, the C4 capacitor failed due to age related degradation and caused an automatic reactor trip from 100 percent reactor power.

The licensee's failure to establish and implement appropriate periodic preventive maintenance for replacement frequency of the C4 was a performance deficiency. The finding was more than minor because it was associated with the Initiating Events cornerstone attribute of equipment performance and adversely affected the associated cornerstone in that a reactor trip occurred.

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The finding was determined to be of very low safety significance (Green) because it was a transient initiator, but did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available. The finding did not have a cross-cutting aspect because the performance deficiency was not indicative of current plant performance.

REPORT DETAILS

4. OTHER ACTIVITIES

4OA2 Problem Identification and Resolution

.1 Assessment of the Corrective Action Program

a. Inspection Scope

The inspectors reviewed the licensee's CAP procedures which described the administrative process for initiating and resolving problems primarily through the use of condition reports (CRs). To verify that problems were being properly identified, appropriately characterized, and entered into the CAP, the inspectors reviewed CRs that had been issued between March 2011 and March 2013, including a detailed review of selected CRs associated with the following risk-significant systems: AC Electrical Power (AC), Safety Injection (SI), and Emergency Diesel Generators (EDG). Where possible, the inspectors independently verified that the corrective actions were implemented as intended. The inspectors also reviewed selected common causes and generic concerns associated with root cause evaluations to determine if they had been appropriately addressed. To help ensure that samples were reviewed across all cornerstones of safety identified in the NRC's Reactor Oversight Process (ROP), the inspectors selected a representative number of CRs that were identified and assigned to operations, maintenance, engineering, health physics, chemistry, and security. These CRs were reviewed to assess the threshold for identifying and documenting plant problems, thoroughness of evaluations, and adequacy of corrective actions.

The inspectors conducted plant walkdowns to assess the material condition and to identify deficiencies that had not been previously entered into the CAP. The inspectors reviewed CRs, maintenance history, completed work orders (WOs) for the systems, and reviewed associated system health reports to verify that problems were being properly identified, appropriately characterized, and entered into the CAP. Items reviewed generally covered a two-year period; however, in accordance with the inspection procedure, a five-year review was performed for selected systems for age-dependent issues.

Control Room walkdowns were also performed to assess the Main Control Room (MCR) deficiency list and to ascertain if deficiencies were entered into the CAP. Operator Workarounds and Operator Burden screenings were reviewed, and the inspectors verified compensatory measures for deficient equipment which were being implemented in the field.

The inspectors conducted a detailed review of selected CRs to assess the adequacy of the root-cause and apparent-cause evaluations. The inspectors reviewed these evaluations against the descriptions of the problem described in the CRs and the guidance in licensee procedure PI-AA-300-3001, "Root Cause Evaluation" and PI-AA-300-3002, "Apparent Cause Evaluation." The inspectors assessed if the licensee had adequately determined the cause(s) of identified problems, and had adequately addressed operability, reportability, common cause, generic concerns, extent-of-condition, and extent-of-cause. The review also assessed if the licensee had

appropriately identified and prioritized corrective actions to prevent recurrence for significant conditions adverse to quality.

The inspectors attended the Condition Report Review Team (CRT) and Corrective Action Assignment Review Team (CAART) meetings to observe management oversight functions of the corrective action process.

Documents reviewed are listed in the Attachment.

.b Assessment

Identification of Issues

The inspectors determined that the licensee was generally effective in identifying problems and entering them into the CAP and there was a low threshold for entering issues into the CAP. This conclusion was based on a review of the requirements for initiating CRs as described in licensee procedure PI-AA-200, "Corrective Action," management expectation that employees were encouraged to initiate CRs for any reason, and the relatively few number of deficiencies identified during plant walkdowns not already entered into the CAP. Trending was generally effective in monitoring equipment performance. Site management was actively involved in the CAP and focused appropriate attention on significant plant issues.

Prioritization and Evaluation of Issues

The inspectors concluded that problems were generally prioritized and evaluated in accordance with the licensee's CAP procedures as described in the CR severity level determination guidance in PI-AA-200. Each CR was assigned a severity level at the CRT meeting, and adequate consideration was given to system or component operability and associated plant risk.

The inspectors determined that station personnel had conducted root cause and apparent cause analyses in compliance with the licensee's CAP procedures and assigned cause determinations were appropriate, considering the significance of the issues being evaluated. A variety of formal causal-analysis techniques were used depending on the type and complexity of the issue consistent with PI-AA-300-3001, "Root Cause Evaluation" and PI-AA-300-3002, "Apparent Cause Evaluation."

Effectiveness of Corrective Actions

The inspectors determined that overall, corrective actions were timely, commensurate with the safety significance, and effective, in that conditions adverse to quality were corrected. For significant conditions adverse to quality, the corrective actions directly addressed the cause and effectively prevented recurrence. Effectiveness reviews for corrective actions to prevent recurrence (CAPRs) were sufficient to ensure corrective actions were properly implemented and were effective.

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c. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors examined licensee programs for reviewing industry OE, reviewed licensee procedure PI-AA-100-1007, "Operating Experience Program," reviewed the licensee's OE database to assess the effectiveness of how external and internal OE data was handled. In addition, the inspectors selected OE documents (e.g., NRC generic communications, 10 CFR Part 21 reports, licensee event reports, vendor notifications, and plant internal operating experience items, etc.), which had been issued since February 2011, to verify if the licensee had appropriately evaluated each notification for applicability, and if issues identified through these reviews were entered into the CAP. Procedure PI-AA-100-1007, "Operating Experience Program," was reviewed to verify that the requirements delineated in the program were being implemented at the station. Documents reviewed are listed in the Attachment.

b. Assessment

The inspectors determined that the licensee was generally effective in screening operating experience for applicability to the plant. Industry OE was evaluated by plant OE Coordinators and relevant information was then forwarded to the applicable department for further action or informational purposes. OE issues requiring action were entered into the CAP for tracking and closure. In addition, operating experience was included in all root cause evaluations in accordance with licensee procedure PI-AA-300-3001.

c. Findings

No findings were identified.

.3 Assessment of Self-Assessments and Audits

a. Inspection Scope

The inspectors reviewed audit reports and self-assessment reports, including those which focused on problem identification and resolution, to assess the thoroughness and self-criticism of the licensee's audits and self assessments, and to verify that problems identified through those activities were appropriately prioritized and entered into the CAP for resolution in accordance with licensee procedure PI-AA-100-1004, "Self Assessments."

b. Assessment

The inspectors determined that the scopes of assessments and audits were adequate. Self-assessments were generally detailed and critical, as evidenced by findings consistent with the inspectors' independent review. The inspectors verified that CRs were created to document all areas for improvement and findings resulting from the self-assessments, and verified that actions had been completed consistent with those recommendations. Generally, the licensee performed evaluations that were technically accurate. Site trend reports were thorough and a low threshold was established for evaluation of potential trends, as evidenced by the CRs reviewed that were initiated as a result of adverse trends.

c. Findings

No findings were identified.

4. Assessment of Safety-Conscious Work Environment

a. Inspection Scope

The inspectors randomly interviewed several on-site workers regarding their knowledge of the CAP and their willingness to write CRs or raise safety concerns. During technical discussions with members of the plant staff, the inspectors conducted interviews to develop a general perspective of the safety-conscious work environment at the site. The interviews were also conducted to determine if any conditions existed that would cause employees to be reluctant to raise safety concerns. The inspectors reviewed the licensee's Employee Concerns Program (ECP) and interviewed the ECP coordinator. Additionally, the inspectors reviewed a sample of ECP issues to verify that concerns were being properly reviewed and identified deficiencies were being resolved and entered into the CAP when appropriate.

b. Assessment

The inspectors determined that licensee management emphasized the need for all employees to identify and report problems using the appropriate methods established within the administrative programs, including the CAP and ECP. These methods were readily accessible to all employees. Based on discussions conducted with a sample of plant employees, the inspectors determined that employees felt free to raise issues, and that management encouraged employees to place issues into the CAP for resolution. The inspectors did not identify any reluctance on the part of the licensee staff to report safety concerns.

c. Findings

No findings were identified.

4OA3 Event Followup

.1 (Closed) Licensee Event Report (LER) 50-339/2102-001-00, Automatic Reactor Trip Resulting From A Card Failure

a. Inspection Scope

The inspectors reviewed the LER and associated CRs to assess if the issue was properly identified, documented accurately and completely, properly classified and prioritized, adequately considered extent of condition, generic implications, common cause, and previous occurrences, adequately identified root causes/apparent causes, and identified appropriate and timely corrective actions. Also, the inspectors verified the issue was processed in accordance with procedure, PI-AA-200, Revision 20.

b. Findings

Introduction: A Green self-revealing finding was identified for failure to establish and implement appropriate periodic preventive maintenance for replacement frequency of the C4 capacitor on the Speed Error Amplifier card B (1A08D) in accordance with the VPAP-803, Preventive Maintenance Program.

Description: On October 24, 2012, Unit 2 reactor automatically tripped from 100 percent reactor power due to a steam generator Lo-Lo level signal resulting from closure of all four turbine governor valves. The governor valves closed due to a spurious error signal from Speed Error Amplifier card B (1A08D). The card malfunction was the result of a failed C4 capacitor.

The licensee concluded that the C4 capacitor replacement frequency was not implemented in accordance the vendor's recommendations. This capacitor was determined to have a life expectancy of approximately 7.5 years and a shelf life not to exceed 3 years including time spent in manufacturer storage and customer storage. The capacitor was manufactured in May 1999, installed on the original circuit card of the electro hydraulic control (EHC) system on October 17, 2002, and failed on October 24, 2012. No provision was established to adjust the PM frequency, if required, for life cycle time used while the capacitor was being stored after manufacturing and prior to installation on the card.

The inspectors verified that Step 6.4.2.d of procedure VPAP-0602, Vendor Technical Manual Control (VTM), revision 5, stated that maintenance shall review maintenance procedures to ensure that maintenance practices are consistent with VTM. Step 6.2.7 of VPAP-803, Preventive Maintenance Program, revision 18, also stated that the evaluator shall determine the PM requirements by analyzing the failure history and vendor maintenance recommendations while considering the function and important of the component. The licensee established the PM requirements for the C4 capacitor based on a memorandum from the circuit card vendor of a 20 year lifetime. However, this lifetime was based on the originally installed capacitor. The licensee did not have an evaluation to justify the 20 year PM frequency for the replacement C4 capacitor and failed to incorporate the capacitor vendor lifetime of 7.5 years into the PM frequency. A

Enclosure

corrective action to prevent recurrence was to revise VPAP-803 to ensure that component level replacement recommendations are obtained from component manufacturer guidance.

Analysis: The inspectors determined that the licensee's failure to establish and implement appropriate periodic preventive maintenance for replacement frequency of the C4 capacitor on the Speed Error Amplifier card B (1A08D) in accordance with the vendor's recommendations was a performance deficiency. The PD was more than minor because it was associated with the Initiating Events cornerstone attribute of equipment performance and adversely affected the associated cornerstone objective in that age-related failure of the C4 capacitor resulted in a reactor trip. Using NRC Manual Chapter 0609.04, SDP – Phase 1 screening dated June 19, 2012, the finding was determined to be of very low safety significance (Green) because it was a transient initiator, but did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available. The finding did not have a cross-cutting aspect because the performance deficiency was not indicative of current plant performance.

Enforcement: This finding did not involve enforcement action. This finding was determined to be of very low safety significance (Green) and was entered into the licensee's CAP as CR493091. This finding is identified as FIN 05000339/2013008-01, Failure to Implement Vendor Recommendations Causes an Automatic Reactor Trip.

4OA6 Exit

Exit Meeting Summary

On March 28, 2013, the inspectors presented the inspection results to Mr. G. Bischof and other members of the site staff. The inspectors confirmed that all proprietary information examined during the inspection had been returned to the licensee.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

KEY POINTS OF CONTACT

Licensee personnel:

G. Bischof, Site Vice President
F. Mladen, Plant Manager
B. Anhold, Component Engineer
J. Daugherty, Manager Maintenance
F. Errico, CAP Supervisor
P. Harper, CAP Coordinator
E. Hendrixson, Site Engineering Director
P. Kemp, Licensing Supervisor
J. Leberstien, Licensing
S. Morris, Engineering Programs Manager
J. Schleser, Organizational Effectiveness Manager

NRC personnel:

G. Kolcum, Senior Resident Inspector
G. Hopper, Chief, Branch 7, Division of Reactor Projects

LIST OF REPORT ITEMS

Opened and Closed

05000339/2013-008-01	FIN	05000339/2013008-01 Failure to Implement Vendor Recommendations Causes an Automatic Reactor Trip
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Closed

05000339/2012-001-00	LER	Automatic Reactor Trip Resulting From A Card Failure (Section 4OA3)
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LIST OF DOCUMENTS REVIEWED

Procedures

ER-AA-MRL-10, Maintenance Rule Program, Revision 4
ER-AA-PRS-1002, Equipment Reliability Health Report, Revision 7
ER-AA-SYS-1002, System Engineering Walkdowns, Revision 4
ER-AA-SYS-1001, System Health Report, Revision 6
ER-AA-SYS-1003, System Performance Monitoring, Revision 3
OP-AA-101, Operational Decision Making, Revision 10
PI-AA-10, Performance Improvement Process, Revision 0
PI-AA-100-1007, Operating Experience Program, Revision 3
PI-AA-200-2001, Trending, Revision 3
PI-AA-300-3004, Cause Evaluation Methods, Revision 2
PI-AA-300-3003, Common Cause Evaluation, Revision 0
PI-AA-200-2002, Effectiveness Reviews, Revision 5
PI-AA-300-3001, Root Cause Evaluation, Revision 3
OP-AA-102, Operability Determination, Revision 9
PI-AA-100, Performance Monitoring, Revision 4
PI-AA-200, Corrective Action, Revision 20

PI-AA-300, Cause Evaluation, Revision 7
 PI-AA-3002, Apparent Cause Evaluation, Revision 4
 VPAP-0692, Vendor Technical Manual Control, Revision 5
 VPAP-0803, Preventive Maintenance Program, Revisions 17, 18 and 19
 0-MCM-0201-01, Inspection and Repair of Safety-Related Quincy Model 325 Compressors, Rev. 9
 PI-AA-200, Corrective Action, Rev. 20
 0-OP-6.4, Operation of the SBO Diesel (SBO Event), Rev. 16
 1-ES-1.3, Transfer to Cold Leg Recirculation, Rev.23
 DNAP-0110, Identifying and Addressing Nuclear Safety and Quality Concerns, Rev. 2
 2-PT-82J, 2J Emergency Diesel Generator Slow Start Test, Rev.51
 LI-AA-500, NRC/INPO/WANO Performance Indicator and MOR Reporting, Rev.1
 GMP-GM-102, Emergency Diesel Generator Fault Tree Troubleshooting, Rev.0
 DOM-QA-1, "Nuclear Facility Quality Assurance Program", Revision 13
 RP-AA-124, "Dosimetry Discrepancy and ED Alarm", Revision 2

Condition Reports (CRs)

412487	496761	426337
413461	501920	428643
417819	509469	430074
423530	501347	435626
435838	392639	426092
438583	460540	426574
441521	469769	443005
445686	383690	443101
452756	443421	443273
453536	469769	443282
453671	443421	443369
458783	466185	443895
462832	422001	444957
466726	412178	445239
466733	208197	446357
468442	436164	454271
471894	442296	457812
472858	445494	458017
474075	215125	458578
475349	446598	462050
479217	456191	466083
479281	463940	466460
479535	464180	471068
479552	468017	471196
479661	412830	471198
480755	433300	474347
485784	434569	486388
493091	414264	486394
493164	414324	489849
493193	414874	501537
493396	418196	507231
494845	423524	

Corrective Actions

192121	212791	230487
193002	213196	230626
195152	213212	231278
199084	213214	240332
200568	213217	240368
208578	214189	240376
210647	222978	240377
210648	223205	240378
210649	226236	240379
210650	229535	
212790	230409	

Work Orders

59102359918	59102477373	59102432869
59102475165	59102371518	59102407769
59102366379	59102432869	59102417062
59102419929	59102407769	59102465032
59102525535	59102417062	59102420787
59102480137	59102465032	59102419925
59102444426	59102477373	59102409121
5910235468	59102371518	

Self-Assessments

Audit 11-01: Security and Fitness for Duty
 Audit 11-02: Emergency Preparedness
 Audit 12-01: Security, Fitness For Duty, and Unescorted Access Auth
 Audit 12-02: Emergency Preparedness

Other Documents

SI Health System Reports (Q1- 2011 through Q4-2012)
 Maintenance Rule Evaluation (MRE)- 01427, 2-QS-MOV-201B went locked rotor during as left – testing, 10/02/2011 due to aged related issue
 MRE -01546, 1-QS-MOV-101B failed to stroke closed, 8/22/2012, due to age related issue
 Vishay –Sprague Document Number No. 28356, Vishay BC Components
 PM Task Evaluation, dated 10/01/2002
 OD 000477, Load and Frequency Swings on the 1J EDG, Dated 4/17/2012
 NA-12-00018, Seismic upgrade of Refueling Purification System, Dated 11/18/12
 System Health Report (Q1-2013), EG-Emergency Diesel Generator
 OD 000507, CR492850 Small Fire on the Control Side of the 1J EDG during 1-PT-82.2B, Dated 10/23/12
 OD 000510, Small Fire on the Control Side of the 1J EDG during 1-PT-82J, Dated 11/21/12
 North Anna Power Station PRA Risk Summary, Rev.1, Effective Date June 2010
 OD000483, Radiator Fan Vertical Shaft Guard, For the 1J EDG, Has Broken Bottom Welds, Dated 05/09/12
 Nuclear Oversight 2009 Internal Audit Schedule
 Nuclear Oversight 2010 Internal Audit Schedule
 Nuclear Oversight 2011 Internal Audit Schedule

Nuclear Oversight 2012 Internal Audit Schedule
Nuclear Oversight 2013 Internal Audit Schedule
System Health Report, Emergency Electrical System
Engineering Technical Evaluation, ETE-CEM-2012-0004, "NAPS Unit 1 Steam Generator Hot
Leg Inlet Nozzle Flaw Evaluation for Previous Operability", Revision 1