UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

November 6, 2012

Mr. George H. Gellrich, Vice President
Calvert Cliffs Nuclear Power Plant, LLC
Constellation Energy Nuclear Group, LLC
1650 Calvert Cliffs Parkway
Lusby, Maryland 20657-4702

SUBJECT: CALVERT CLIFFS NUCLEAR GENERATING STATION – NRC INTEGRATED INSPECTION REPORT 05000317/2012004 AND 05000318/2012004

Dear Mr. Gellrich:

On September 30, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on October 12, 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.

This report documents two NRC-identified findings, and one self-revealing finding of very low safety significance (Green). Two of these findings were determined to involve violations of NRC requirements. Additionally, one licensee-identified violation, which was determined to be of very low safety significance, is listed in this report. However, because of the very low safety significance, and because they are entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs) consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest any NCV in this report, 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 1; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Calvert Cliffs. 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 I; and the NRC Resident Inspector at Calvert Cliffs.

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/

Glenn T. Dentel, Chief
Reactor Projects Branch 1
Division of Reactor Projects

Docket Nos.: 50-317, 50-318
License Nos.: DPR-53, DPR-69

Enclosure: Inspection Report 05000317/2012004 and 05000318/2012004
w/Attachment: Supplemental Information

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REGION I

Docket Nos.:	50-317, 50-318
License Nos.:	DPR-53, DPR-69
Report No.:	05000317/2012004 and 05000318/2012004
Licensee:	Constellation Energy Nuclear Group, LLC
Facility:	Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Location:	Lusby, MD
Dates:	July 1, 2012 through September 30, 2012
Inspectors:	M. Halter, Acting Senior Resident Inspector S. Kennedy, Senior Resident Inspector E. Torres, Resident Inspector R. Barkley, Senior Project Engineer S. Barr, Senior Emergency Preparedness Inspector J. Brand, Reactor Inspector S. Hammann, Senior Health Physicist O. Masnyk-Bailey, Health Physicist J. Nicholson, Senior Health Physicist S. Pindale, Senior Reactor Inspector R. Rolph, Health Physicist J. Schoppy, Senior Reactor Inspector S. Shaffer, Senior Project Engineer T. Ziev, Project Engineer
Approved by:	Glenn T. Dentel, Chief Reactor Projects Branch 1 Division of Reactor Projects

TABLE OF CONTENTS

SUMMARY OF FINDINGS 3

REPORT DETAILS 6

1. REACTOR SAFETY 6
   - 1R01 Adverse Weather Protection 6
   - 1R04 Equipment Alignment 7
   - 1R05 Fire Protection 7
   - 1R06 Flood Protection Measures 8
   - 1R11 Licensed Operator Requalification Program 8
   - 1R12 Maintenance Effectiveness 9
   - 1R13 Maintenance Risk Assessments and Emergent Work Control 14
   - 1R15 Operability Determinations and Functionality Assessments 15
   - 1R18 Plant Modifications 18
   - 1R19 Post-Maintenance Testing 18
   - 1R20 Refueling and Other Outage Activities 19
   - 1R22 Surveillance Testing 20
   - 1EP2 Alert and Notification System Evaluation 21
   - 1EP3 Emergency Response Organization Staffing and Augmentation System 21
   - 1EP4 Emergency Action Level and Emergency Plan Changes 22
   - 1EP5 Maintaining Emergency Preparedness 22
   - 1EP6 Drill Evaluation 23

2. RADIATION SAFETY 23
   - 2RS5 Radiation Monitoring Instrumentation 23
   - 2RS6 Radioactive Gaseous and Liquid Effluent Treatment 26

4. OTHER ACTIVITIES 29
   - 4OA1 Performance Indicator Verification 29
   - 4OA2 Problem Identification and Resolution 31
   - 4OA3 Followup of Events and Notices of Enforcement Discretion 36
   - 4OA5 Other Activities 37
   - 4OA6 Meetings, Including Exit 39
   - 4OA7 Licensee-Identified Violations 39

ATTACHMENT: SUPPLEMENTARY INFORMATION 40

SUPPLEMENTARY INFORMATION A-1

KEY POINTS OF CONTACT A-1

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED A-2

LIST OF DOCUMENTS REVIEWED A-2

LIST OF ACRONYMS A-14

SUMMARY OF FINDINGS

IR 05000317/2012004, 05000318/2012004; 7/1/2012 – 9/30/2012; Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2; Maintenance Effectiveness, Operability Determinations and Functionality Assessments.

The report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. Inspectors identified three findings of very low safety significance (Green), two of which were non-cited violations (NCVs). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspects for the findings were determined using IMC 0310, "Components Within the Cross-Cutting Areas." Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Cornerstone: Initiating Events

- Green: A self-revealing NCV of Technical Specification (TS) 3.4.13, "Reactor Coolant System (RCS) operational LEAKAGE," was identified because Constellation failed to completely isolate a fault in the RCS pressure boundary, which resulted in Constellation operating with RCS pressure boundary leakage for a period of time prohibited by Technical Specifications. Constellation's corrective actions included entering the issue in their Corrective Action Program (CAP) (CR-2012-007012 and CR-2012-007276), performing repairs, and conducting root and apparent cause analyses for the issue.

  The finding is more than minor because it is associated with the equipment performance attribute of the Initiating Events cornerstone and affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, after the Constellation personnel identified reactor coolant pressure boundary (RCPB) leakage at 5:15 p.m. on July 17, 2012, they did not reach Mode 3 within six hours because they did not verify complete isolation of the leak. Constellation's actions did not limit the likelihood of a small loss of coolant accident (LOCA) event when they operated with RCS pressure boundary leakage from July 17 until July 21, 2012. The inspectors evaluated the finding using IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings at Power," and determined the finding is of very low safety significance (Green) because the performance deficiency, after a reasonable assessment of degradation, could not result in exceeding the RCS leak rate for a small LOCA and could not likely affect other systems used to mitigate a LOCA, resulting in a total loss of their function.

  The finding has a cross-cutting aspect in the area of Human Performance, Decision Making, because Constellation personnel did not use conservative assumptions in decision making and adopt a requirement to demonstrate that the proposed action was safe in order to proceed, rather than a requirement to demonstrate that it is unsafe in order to disapprove the action. Specifically, after attempting to isolate the RCS pressure boundary leakage, Constellation personnel non-conservatively assumed that the leak was isolated based on an inadequate post-isolation verification and monitoring plan. [H.1.(b) per IMC 0310]. (Section R15)

Cornerstone: Mitigating Systems

- Green**:** An NRC-identified NCV of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," paragraph (a)(2), was identified because Constellation personnel did not adequately demonstrate that the 2A diesel generator ventilation train (a)(2) performance was effectively controlled through performance of appropriate preventive maintenance. Specifically, Constellation personnel did not identify and properly account for a functional failure of the 2A emergency diesel generator (EDG) ventilation train in June 2012, and thereby did not recognize that the train exceeded its performance criteria and required a Maintenance Rule (a)(1) evaluation. The subsequent evaluation concluded that the 2A EDG ventilation train (a)(2) performance demonstration was no longer justified and therefore the train should be classified as (a)(1), corrective actions specified, and train monitoring completed. Constellation personnel entered the issue into their CAP as CR-2012-006132.

  The finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and affects the cornerstone objective of ensuring the capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, following a functional failure of the 2A EDG ventilation train in June 2012, Constellation did not identify that the train should be monitored in accordance with 10 CFR 50.65(a)(1) for establishing goals and monitoring against the goals. The inspectors evaluated the significance of this finding using IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings at Power." The inspectors determined that this finding was of very low safety significance (Green) because the finding was not a design or qualification deficiency; did not represent a loss of safety system function; and did not screen as potentially risk significant due to external initiating events.

  The finding has a cross-cutting aspect in the area of Problem Identification and Resolution because Constellation personnel did not thoroughly evaluate the problem such that the resolution fully addressed causes and extent of conditions, as necessary. This includes properly classifying, prioritizing, and evaluating for operability and reportabililty a condition adverse to quality. Specifically, Constellation personnel did not properly evaluate the impact of the condition of the dampers on the ability of the ventilation train to perform its safety function. [P.1(c) per IMC 0310]. (Section 1R12.1)

- Green**:** An NRC-identified finding of very low safety significance was identified because Constellation staff did not follow Procedure CNG-CA-1.01-1000, "Corrective Action Program." Specifically, Constellation staff did not complete corrective actions previously prescribed within their Corrective Action Program as a result of root and apparent cause evaluations for drain failures which impacted safety-related equipment. This resulted in a drain line within the intake structure becoming clogged and the 21 saltwater (SW) pump becoming submerged in water. Constellation personnel entered the issue into their CAP as CR-2012-008363, cleaned out the drain line, and implemented a new preventive maintenance (PM) schedule to keep the drain line clear. Planned corrective actions include overhauling the 21 SW pump bearings.

  The finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely impacted the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to

initiating events to prevent undesirable consequences (i.e., core damage). Specifically, because the intake structure drain piping was clogged, the 21 saltwater pump pit filled with water and caused the pump bearing housings to be contaminated with water, which adversely impacts the long-term reliability of the pump bearings and will cause the pump to be unavailable while the issue is corrected. The inspectors evaluated the significance of this finding using IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings at Power." The inspectors determined that this finding was of very low safety significance (Green) because the finding was not a design or qualification deficiency; did not represent a loss of safety system function; and did not screen as potentially risk significant due to external initiating events.

The inspectors determined that the finding has a cross-cutting aspect in the area of Problem Identification and Resolution because Constellation personnel did not take appropriate corrective actions to address safety issues and adverse trends in a timely manner, commensurate with their safety significance and complexity. Specifically, Constellation personnel did not perform corrective actions previously prescribed to address and correct drain failures that impacted safety-related equipment. [P.1(d) per IMC 0310]. (Section 1R12.2)

Other Findings

A violation of very low safety significance that was identified by Constellation was reviewed by the inspectors. Corrective actions taken or planned by Constellation have been entered into Constellation's corrective action program. This violation and corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. On July 7, an unplanned downpower to 95 percent power was conducted due to the failure of 15 circulating water pump. The unit returned to 100 percent the following day. On July 9, operators reduced power to 85 percent to investigate a leak in containment from the wet layup connection on 11 steam generator. The unit was returned to 100 percent the following day. On July 12, operators reduced power to 85 percent to repair the leak on the 11 steam generator wet layup connection. The unit was returned to full power the next day. On July 17, operators reduced power to 10 percent to isolate an RCS pressure boundary leak. The unit was returned to 100 percent the following day. On July 21, operators commenced a TS required shutdown due to RCS pressure boundary leakage. Repairs were completed and the unit was returned to 100 percent on July 25. On August 12, operators commenced TS required shutdown due to control element assembly (CEA) number 9 dropping to the bottom of the core and being unable to recover it within the TS completion allowed time. After repairs, the unit was returned to 100 percent on August 18. The unit remained at or near 100 percent for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent power. On July 14, operators reduced power to 86 percent to conduct main condenser waterbox cleaning. The unit was returned to full power the same day. On July 18, operators reduced power to 76 percent to conduct additional main condenser waterbox cleaning. The unit was returned to 100 percent the next day. On September 14, operators reduced power to 88 percent to conduct main condenser waterbox cleaning. The unit was returned to 100 percent the following day. The unit remained at or near 100 percent power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – one sample)

Evaluate Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors performed a detailed review of Constellation procedures and actions to address impending adverse weather conditions associated with a tornado watch in the vicinity of CCNPP on September 18, 2012. This review evaluated Constellation's preparation and readiness for a potential tornado, including applicable compensatory measures, as well as inspector-conducted walkdowns of plant equipment and general plant areas. The inspectors conducted the review to verify that the station's implementation of applicable procedures appropriately maintained readiness of equipment required for normal operation and safe shutdown conditions. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment

Partial Walkdowns (71111.04Q – three samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- 13 SW pump aligned to 12 SW header due to maintenance on 12 SW pump on July 10, 2012
- 23 SW pump aligned to 21 SW header due to maintenance on 21 SW pump on July 10, 2012
- 22A and 22B service water (SRW) heat exchangers during maintenance on 21B SRW heat exchanger on August 16, 2012

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable procedures, system diagrams, the UFSAR, work orders, technical specifications, condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted system performance of their intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether Constellation staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

1R05 Fire Protection

Quarterly Inspection (71111.05Q – six samples)

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that Constellation controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in Constellation's fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out of service, degraded or inoperable fire protection equipment, as applicable, in accordance with procedures.

- 0C/station blackout diesel building, fire area EDG 0C, rooms SB 102 and 202, on August 21, 2012
- Unit 1 and Unit 2 Spent Fuel pool, fire area 11, rooms 313 and 314, on August 21, 2012
- Unit 1 auxiliary feedwater (AFW) pump room, fire area 42, room 603, on August 21, 2012
- Unit 2 AFW pump room, fire area 43, room 605, on August 21, 2012
- Unit 1 11 ECCS pump room, fire area 4, room 119, on August 22, 2012
- Unit 2 12 ECCS pump room, fire area 3, room 118, on August 22, 2012

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – one sample)

Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to assess susceptibilities involving internal flooding. The inspectors also reviewed surveillance testing records of equipment used to measure flood levels in sealed rooms and actuate alarms. The inspectors focused on the Unit 1 service water pump room to verify the adequacy of floor and water penetration seals, watertight door seals, check valves in floor drain lines, and level alarms.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11 – two samples)

.1 Quarterly Review of Licensed Operator Requalification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator simulator training on September 18, 2012, which included the loss of 12 condensate pump, a hydrogen fire in the C phase bus duct, a manual reactor trip and loss of all feedwater to 11 and 12 steam generators. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the TS action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room

a. Inspection Scope

The inspectors observed and reviewed various activities conducted in the main control room, including: Unit 1 TS-required reactor shutdowns due to a reactor coolant system pressure boundary leak on July 17 and July 21, 2012; Unit 1 reactor startup on July 24, 2012; a Unit 1 TS-required reactor shutdown due to a dropped control element assembly on August 12, 2012; and Unit 1 reactor startup on August 17, 2012. Additionally, the inspectors observed procedure use and adherence, crew communications, and coordination of activities between work groups to verify that established expectations and standards were met.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – four samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on systems, structures, and components (SSCs) performance and reliability. The inspectors reviewed system health reports, corrective action program documents, maintenance work orders, and maintenance rule basis documents to ensure that Constellation was identifying and properly evaluating performance problems within the scope of the maintenance rule. For each sample selected, the inspectors verified that the SSC was properly scoped into the maintenance rule in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria established by Constellation staff was reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these SSCs to (a)(2). Additionally, the inspectors ensured that Constellation staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries.

- 2A EDG room ventilation system temperature transmitter failure on June 3, 2012
- 21 SW pump pit flooding on July 28, 2012
- 12 SW pump breaker lockout relay on August 2, 2012
- 23 AFW pump out of step on the 24 4 kilovolt (Kv) Bus shutdown sequencer on September 5, 2012

b. Findings

.1 Introduction: The inspectors identified an NCV of very low safety significance (Green) of 10 CFR 50.65, “Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants,” paragraph (a)(2), because Constellation personnel did not

adequately demonstrate that the 2A EDG ventilation train (a)(2) performance was effectively controlled through performance of appropriate preventative maintenance. Specifically, Constellation personnel did not identify and properly account for a functional failure of the 2A EDG ventilation train in June 2012, and thereby did not recognize that the train exceeded its performance criteria and required a Maintenance Rule (a)(1) evaluation. The subsequent evaluation concluded that the 2A EDG ventilation train (a)(2) performance demonstration was no longer justified and therefore the train should be classified as (a)(1), corrective actions specified, and train monitoring completed.

Description: On June 3, 2012, during a regularly-scheduled 2A EDG surveillance run, the 2A EDG ventilation dampers did not reposition in accordance with the design of the system. The 2A EDG ventilation train, which is pneumatically controlled by non-safety related instrument air, is designed to provide climate control for the 2A EDG space and limit room temperature to 120 Fahrenheit (F) maximum in the summer and 60 F minimum in the winter. The dampers, in their standby condition, are in the closed position, such that the ventilation system provides internal recirculation of the air mass in the room. The dampers are designed to reposition when the temperature of the room rises and reaches 105 F – as it often does during the operation of the 2A EDG - in order to provide fresh air from outside of the building to cool the space. Immediately following the surveillance run, Constellation personnel identified that the recirculation air damper was about 90 percent open and the outside air damper was about 10 percent open, even though the room temperature had reached the point at which the dampers should have fully repositioned. Due to the short duration of the EDG surveillance run (about one hour), the temperature of the room reached 105 F, but had not reached the point at which the 2A EDG would have been made inoperable (120 F). However, in this alignment, the ventilation system would have been unable to adequately remove the heat generated by the 2A EDG for an extended period of operation, as would be required during a design basis event. Constellation personnel entered this issue into their corrective action program as CR-2012-005773. Immediate actions taken included isolating the instrument air to the pneumatic controls for the ventilation dampers, which failed the dampers into the safe (open) position to maintain operability of the 2A EDG.

The EDG ventilation system is scoped into the Calvert Cliffs Maintenance Rule program and its performance is monitored at the train level in accordance with guidance provided in CNG-AM-1.01-1023, “Maintenance Rule Program.” Initially, Constellation personnel did not classify the June 2012 ventilation damper issue as a functional failure because the ventilation dampers are designed to fail in the open position during a design basis event when instrument air is lost. However, based on the inspector’s questions, Constellation personnel determined that the instrument air compressors are automatically reloaded onto an EDG-backed safety related 4KV electrical bus during a design-basis event, and therefore the ventilation dampers would have automatically returned to their deficient position and the 2A EDG room would not have received adequate cooling had the EDG operated for an extended period of time. Constellation personnel entered this issue into their corrective action process as CR-2012-006132. Corrective actions included reclassifying the issue as a maintenance rule functional failure of the 2A EDG ventilation train, and further determining under CR-2012-006358 that the 2A EDG ventilation train required the establishment of goals and monitoring in accordance with 10 CFR 50.65 (a)(1).

Analysis: The inspectors determined that Constellation’s failure to identify the June 3, 2012 2A EDG ventilation condition as a functional failure, and as a result, the failure to

perform an evalution of the system under 50.65(a)(1) and thereby specify goals, corrective actions, and monitoring, was a performance deficiency within Constellation's ability to foresee and correct and should have been prevented. The finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and affects the cornerstone objective of ensuring the capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, following the functional failure of the 2A EDG ventilation train in June 2012, Constellation did not identify the train should be monitored in accordance with 10 CFR 50.65(a)(1) for establishing goals and monitoring against the goals. The inspectors evaluated the significance of this finding using IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings at Power." The inspectors determined that this finding was of very low safety significance (Green) because the finding was not a design or qualification deficiency; did not represent a loss of safety system function; and did not screen as potentially risk significant due to external initiating events.

The inspectors determined that the finding has a cross-cutting aspect in the area of Problem Identification and Resolution because Constellation personnel did not thoroughly evaluate the problem such that the resolution addressed causes and extent of conditions, as necessary. This includes properly classifying, prioritizing, and evaluating for operability and reportabililty conditions adverse to quality. Specifically, Constellation personnel did not properly evaluate the impact of the condition of the dampers on the ability of the ventilation train to perform its safety function (P.1.c per IMC 0310).

Enforcement: 10 CFR 50.65 (a)(1), requires, in part, that the holders of an operating license shall monitor the performance or condition SSCs within the scope of the rule as defined by 10 CFR 50.65 (b), against licensee-established goals, in a manner sufficient to provide reasonable assurance that such SSCs are capable of fulfilling their intended functions. 10 CFR 50.65 (a)(2) states, in part, that monitoring as specified in 10 CFR 50.65 (a)(1) is not required where it has been demonstrated that the performance or condition of an SSC is being effectively controlled through the performance of appropriate preventive maintenance, such that the SSC remains capable of performing its intended function. Contrary to the above, as of June 3, 2012, Constellation personnel failed to demonstrate that the performance or condition of the 2A EDG ventilation train had been effectively controlled through the performance of appropriate preventive maintenance and did not monitor against licensee-established goals. Specifically, Constellation personnel failed to identify and properly account for a maintenance rule functional failure of the 2A EDG ventilation dampers on June 3, 2012, which demonstrated that the performance or condition of this SSC was not being effectively controlled through the performance of appropriate preventive maintenance and, as a result, that goal setting and monitoring was required. Because this violation was of very low safety significance (Green) and has been entered into Constellation's CAP (CR-2012-006132), this violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV-05000318/2012004-01: 2A Diesel Generator Ventilation Train 10 CFR 50.65 (a)(2) Performance Demonstration Not Met)**

.2 Introduction: The inspectors identified a finding of very low safety significance (Green) for Constellation staff not following Constellation Procedure CNG-CA-1.01-1000, "Corrective Action Program." Specifically, Constellation staff did not complete corrective

actions previously prescribed within their Corrective Action Program as a result of root and apparent cause evaluations for drain failures which impacted safety-related equipment. This resulted in a drain line within the intake structure becoming clogged and the 21 saltwater (SW) pump becoming submerged in water.

Description: On July 28, 2012, Constellation personnel found the 21 SW pump cavity and the Unit 2 side of the 12 intake structure sump flooded and overflowing water onto the main floor of the intake structure. Operators shifted the SW pump lineup, removed 21 SW pump from service and placed 23 SW pump in service. After using portable sump pumps to pump down the water level in the 21 SW pump cavity, operators found that the pump casing drain plug was corroded and had fallen out of the pump casing, causing a leak of approximately 100 gallons per minute (gpm) out of the casing. Constellation personnel entered the missing pump casing drain plug issue into their CAP as CR-2012-007169.

The 21 SW pump cavity contains a floor drain to a four-inch drain header, which in turn drains to a separate six-inch drain header, located underneath the 12 intake structure auxiliary sump. The six inch header, which drains water from multiple other points within the intake structure, terminates in a sump pump pit, where the drain water is pumped out of the intake structure. At the time of the flooding event, operators noted that the sump pump area was dry, and generated CR-2012-007166 to document that the drain path was clogged. Additionally, in accordance with their alarm response procedure, operators wrote CR-2012-007168 to have the 21 SW pump bearings inspected and repacked as a result of pump submergence.

Based on inspector questioning, Constellation personnel inspected the six-inch drain header with a boroscope and identified that the line was restricted with debris. CR-2012-008252 was written to document the inspection results. Through interviews with design engineers, the inspectors concluded that the design drain capacity should have been able to remove the 100 gpm leak that occurred on 21 SW pump, and that the pump pit flooded because the drain path to the sump pump had been clogged.

The inspectors reviewed the design specification of the SW pumps, 6750-M-66, which identifies the SW pumps as vertical dry-pit pumps. The inspectors also reviewed engineering change package ECP-12-000308, which documented that, based on vendor input in 1991, there is a reasonable expectation that the SW pumps would continue perform their safety function, and operate for no less than 30 days, regardless of a flooding event as described in the UFSAR. The inspectors noted that this conclusion was based, in part, on vendor and original equipment manufacturer (OEM) feedback that it is unlikely that the pump bearings would catastrophically fail due to grease contamination from water. Instead, the failure mode of lubricant contamination in alloyed steel bearings, which would be the resulting mode from a SW pump flooding event, would be corrosion buildup and subsequent bearing damage over time. Further, the evaluation documented that the pump OEM stated that pump submergence would “shorten the bearing life due to corrosion,” and that repack or replacement of the bearings or purging of the grease in the bearing housings is recommended as soon as possible after flooding. Additionally, the inspectors noted that Constellation personnel had previously concluded, following the vendor input, that inspecting and repacking the SW pump bearings after a flooding event was “standard procedure and a good operating practice,” and in turn had revised their alarm response procedure to incorporate this vendor recommendation.

The inspectors interviewed component engineers and reviewed photographs and work order C91951746 completed to inspect the bearing housings following the pump flooding event. The inspectors noted that water was identified to have permeated the bearing housing at the time of the flooding event. Additionally, the peak velocity measurements for the bearings on 21 SW pump, which are taken routinely as part of predictive maintenance, have been noted to increase following the flooding event. The inspectors noted that the component engineers have attributed these increased vibration readings to early bearing degradation as a result of water intrusion into the bearing housings during the flooding event. Constellation personnel created work order C91967515 to perform an overhaul of the pump and implement vendor-recommended corrective actions in the fall of 2012 as a result of the flooding event.

The inspectors reviewed past condition reports (CRs) of blocked drains at Calvert Cliffs and determined that this was a repetitive issue. In December 2008, the 21 SW pump sump flooded when there was excessive packing leak off from the pump, but the floor drain was clogged. As a result of the apparent cause evaluation performed for the issue, the prescribed corrective actions included snaking all SW pump pit drains (CA-2010-000051) and implementing PMs requiring for the floor drains to be cleaned out on a frequency concurrent with SW pump overhauls (CA-2010-000168). The inspectors noted that the PM created for the 21 SW pump pit floor drain was incorporated as a task in the periodic work order for overhauling the pump. Upon reviewing the work order for the most recent pump overhaul, C91078641, which was completed in early July 2012, the inspectors noted that maintenance personnel had not completed the action to snake out the 21 SW pump pit and had marked the step “N/A.”

Additionally, in August 2011, when Hurricane Irene was impacting the area around Calvert Cliffs, the 1A EDG became inoperable when floor drains in the upper level of the building became clogged and the overflowing drains wetted the speed sensing switch of the EDG. As a result of the root cause evaluation performed for the issue, the prescribed corrective actions included developing a PM program for floor drains in the protected area to ensure proper drainage (CA-2012-000314). The inspectors noted that the actions taken in response to CA-2012-000314, which was closed at the time of the inspection, did not include the cleaning of any drains in the intake structure, including the six-inch drain header that had been found clogged following the 21 SW pump pit flooding event on July 28, 2012.

The inspectors concluded that the failure of Constellation personnel to snake out the 21 SW pump pit drain following pump overhaul and failure to implement PMs on the six-inch drain header in the intake structure constituted two examples of Constellation’s failure to complete corrective actions as previously prescribed within their Corrective Action Program to prevent flooding from impacting safety related equipment.

Constellation personnel entered this issue into their CAP as CR-2012-008362. Corrective actions completed include cleaning the six-inch drain header in the intake structure and implementing preventive maintenance to keep the drain path clear.

Analysis: The performance deficiency associated with this finding was that Constellation staff did not follow procedure CNG-CA-1.01-1000 when they did not implement preventive maintenance on the six-inch drain header in the intake structure, as prescribed by CA-2010-000168, and also did not perform preventive maintenance on the 21 SW pump pit following pump overhaul in early July 2012, as prescribed by CA-2012-

000314. The finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely impacted the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, because the intake structure drain piping was clogged, the 21 saltwater pump pit flooded and caused the pump bearing housings to be contaminated with water, which adversely impacts the long-term reliability of the pump bearings and will cause the pump to accrue additional unavailability while the issue is corrected. The inspectors evaluated the significance of this finding using IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings at Power." The inspectors determined that this finding was of very low safety significance (Green) because the finding was not a design or qualification deficiency; did not represent a loss of safety system function; and did not screen as potentially risk significant due to external initiating events.

The inspectors determined that the finding has a cross-cutting aspect in the area of Problem Identification and Resolution because Constellation personnel did not take appropriate corrective actions to address safety issues and adverse trends in a timely manner, commensurate with their safety significance and complexity. Specifically, Constellation personnel did not perform corrective actions previously prescribed to address and correct drain failures that impacted safety-related equipment. (P.1.d per IMC 0310).

Enforcement: The inspectors identified a Green finding because Constellation personnel did not follow procedure CNG-CA-1.01-1000 to complete corrective actions previously prescribed within their Corrective Action Program as a result of root and apparent cause evaluations for drain failures which impacted safety-related equipment. No violation of regulatory requirements occurred because the drains in the intake structure are not safety related. Because this issue does not involve a violation of regulatory requirements and has very low safety significance, it is identified as a finding. This issue was entered into Constellation's CAP as CR-2012-008363. **(FIN 05000318/2012004-02, Corrective Actions Not Completed for Drains in the Intake Structure)**

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – four samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that Constellation performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that Constellation personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When Constellation performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the TS requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Emergent medium risk due to a tornado warning on August 7, 2012
- Medium risk during planned maintenance on 4 KV bus 11 alternate feeder on August 21, 2012
- Medium risk during STP-O-65H-1, Power Operated Relief Valve Block Test, on August 24, 2012
- Medium risk during 22 SW header maintenance with 22 low pressure safety injection and 22 containment spray header out of service on September 10, 2012

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – six samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions:

- Unit 2 reactor head seal pressure high alarm potential isolation on July 2, 2012
- 23 AFW pump started on incorrect shutdown sequencer step on July 11, 2012
- Unit 1 pressure boundary leakage from 11A Reactor Coolant Pump pressure differential transmitter weld on July 17, 2012
- Unit 1 and 2 SRW pump rooms high energy line break damper gap on July 17, 2012
- 12 station battery gap between cell 15 and end of rack on July 19, 2012
- Air leak in 2A diesel generator starting air pipe on August 2, 2012

The inspectors selected these issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the operability determinations to assess whether technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and UFSAR to Constellation's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by Constellation. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations.

b. Findings

Introduction: A self-revealing NCV of TS 3.4.13, "RCS Operational LEAKAGE," was identified because Constellation failed to completely isolate a fault in the RCS pressure boundary, which resulted in Constellation operating with reactor coolant pressure boundary leakage for a period of time prohibited by Technical Specifications.

Description: On June 22, 2012, Unit 1 operators received a containment particulate radiation monitor equipment alarm in the control room. Three days later, Constellation personnel entered containment and noted RCS leakage in the vicinity of 11A reactor

coolant pump; however, high radiation levels in the vicinity of the RCP prevented the identification of the specific leak source. Operators classified the leakage as unidentified leakage, and quantified the leak rate to be 0.12 gpm, which is less than the TS-allowed unidentified leakage rate of 1.0 gpm. On July 17, after further investigation using a specialized camera, Constellation personnel identified that the leak was located on the discharge side of the 11A RCP differential pressure transmitter, on lagging-covered American Society of Mechanical Engineers (ASME) code class 1 piping, downstream of valves RC-141 and RC-142. At 5:15 p.m., operators concluded that the leakage constituted RCS pressure boundary leakage, entered TS 3.4.13 action statement B.1, and commenced a shutdown to be in Mode 3 within six hours.

10 CFR 50.2 defines reactor coolant pressure boundary as "…all those pressure-containing components of boiling and pressurized water-cooled nuclear power reactors, such as pressure vessels, piping…which are…connected to the reactor coolant system, up to and including any and all of the following….The outermost containment isolation valve in system piping which penetrated primary reactor containment…" TS 3.4.13 states, in part, that "RCS operational LEAKAGE shall be limited to: no pressure boundary LEAKAGE," and TS further defines pressure boundary leakage as "LEAKAGE (except primary to secondary LEAKAGE) through a nonisolable fault in an RCS component body, pipe wall, or vessel wall."

During the shutdown, at approximately ten percent power, Constellation personnel entered containment and attempted to isolate the RCS pressure boundary leakage by shutting manually-operated valves RC-141 and RC-142 upstream of the differential pressure transmitter instrument, and RC-1092 and RC-1093 downstream of the instrument. Shortly afterwards, Constellation personnel entered containment a second time and recorded video footage of the leakage area. The footage showed that although the lagging surrounding the leak area continued to drip water, a steam plume which had previously been observed emanating from the vicinity of the leak had stopped. At 10:50 p.m., the licensee concluded that the leak had been isolated and operators exited TS action statement 3.4.13.B.1.

Unit 1 returned to 100 percent power at 7:50 p.m. on July 18. A few hours later, the containment particulate radiation levels returned to the levels recorded by operators prior to the attempted RCS leak isolation. During the morning of July 19, the containment particulate radiation levels reached the alarm setpoint.

At approximately 6:00 p.m. on July 20, chemistry personnel sampled the containment sump and detected RCS activity. The next morning, Constellation personnel entered containment and observed that the RCS pressure boundary leakage from the 11A RCP differential pressure transmitter line continued, which demonstrated that the isolation valves were leaking by and the RCS leak was not fully isolated. As such, there was a fault through a RCS component that was not isolable. At 12:10 p.m., operators entered TS 3.4.13 action statement B.1, and commenced a reactor shutdown. Unit 1 achieved Mode 3 at 4:58 pm and Mode 5 at 5:58 p.m. on July 22. While preparing for repairs of the ASME class 1 component, Constellation personnel removed the lagging from the affected line and identified the exact location of the leak to be downstream of RC-142, in a weld for an adapter that joined one inch piping to ¾ inch tubing.

The inspectors reviewed actions taken by Constellation personnel to verify that the RCS leak had been isolated following the closure of manually-operated valves RC-141, RC-

142, RC-1092 and RC-1093 on July 17, and also reviewed operators' response to plant parameters in the days following the attempted leak isolation. The inspectors noted that the lagging had not been removed from the affected RCS piping on the evening of July 17, which had masked the continued RCS pressure boundary leakage. Additionally, the inspectors reviewed plant drawings which showed the presence of drain lines for the suction and discharge sides of 11A RCP differential pressure transmitter. Through interviews with operations personnel, the inspectors confirmed that the drain lines had not been opened during either of the containment entries on the evening of July 17 in order to verify zero leakage past the seats of the differential pressure transmitter isolation valves. The inspectors determined that the drain lines could have provided indication to Constellation personnel that the leak was not isolated. Upon reviewing the operating logs, the inspectors noted that Constellation personnel had entered containment a third time during the early morning hours of July 18, and determined that this entry had been an additional opportunity to open the drain lines and identify that the leak had not been isolated.

The inspectors also noted that the frequency with which the operators had to drain the Unit 1 containment sump did not appreciably decrease after the attempted leak isolation. Additionally, the inspectors noted that the containment particulate radiation readings should have significantly lowered following successful RCS leak isolation. The inspectors determined that these two abnormal plant indications had provided operators additional opportunities to investigate for continued RCS leakage.

The inspectors concluded that Constellation personnel did not adequately verify that the RCS pressure boundary leakage had been isolated after closing valves RC-141, RC-142, RC-1092 and RC-1093 on July 17, and failure to do so resulted in continued operation with RCS pressure boundary leakage. Constellation entered this issue into their CAP as CR-2012-007012 and CR-2012-007276. Corrective actions included replacing the affected section of tubing and adapter, completing root and apparent causes for the issue, and submitting Licensee Event Report (LER) 2012-002-00 to the NRC. The inspectors' review of the LER and cause of the event will be documented in a future inspection report.

Analysis: The inspectors determined that Constellation's failure to verify complete isolation of the RCS pressure boundary leakage resulted in Unit 1 not reaching Mode 3 within six hours after identification, as required by TS 3.4.13, was a performance deficiency. The finding is more than minor because it is associated with the equipment performance attribute of the Initiating Events cornerstone and affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, after the Constellation personnel identified reactor coolant pressure boundary leakage at 5:15 p.m. on July 17, 2012, they failed to reach Mode 3 within six hours because all available means to verify proper RCS leak isolation were not used. Constellation's actions did not limit the likelihood of a small LOCA event when they operated with RCS pressure boundary leakage from July 17 until July 21, 2012. The inspectors evaluated the finding using IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings at Power," and determined the finding is of very low safety significance (Green) because the performance deficiency, after a reasonable assessment of degradation, could not result in exceeding the RCS leak rate for a small LOCA and could not likely affect other systems used to mitigate a LOCA resulting in a total loss of their function.

The finding has a cross-cutting aspect in the area of Human Performance, Decision Making, because Constellation personnel did not use conservative assumptions in decision making and adopt a requirement to demonstrate that the proposed action was safe in order to proceed, rather than a requirement to demonstrate that it is unsafe in order to disapprove the action. Specifically, after attempting to isolate the RCS pressure boundary leakage, Constellation personnel non-conservatively assumed that the leak was isolated based on an inadequate post-isolation verification and monitoring plan (H.1.b per IMC 0310).

Enforcement: Technical Specification 3.4.13, "RCS Operational LEAKAGE," states, in part, that RCS operational leakage shall be limited to no pressure boundary leakage. If RCS pressure boundary exists, the licensee is required to be in Mode 3 within six hours and Mode 5 within 36 hours. Contrary to the above, from 5:15 p.m. on July 17, 2012 until 5:59 p.m. on July 22, 2012, Unit 1 operated in Mode 1 with RCS pressure boundary leakage. Constellation's corrective actions included repairing the affected section of piping and performing cause analyses. Because this violation was of very low safety significance (Green) and was entered into Constellation's CAP (CR-2012-007012 and CR-2012-007276), the issue is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV-05000317/2012004-03: Inadequate Assessment of RCS Pressure Boundary Leakage)**

1R18 Plant Modifications (71111.18 – one sample)

Temporary Modifications

a. Inspection Scope

The inspectors reviewed the temporary modification listed below to determine whether the modification affected the safety functions of systems that are important to safety. The inspectors reviewed 10 CFR 50.59 documentation and post-modification testing results to verify that the modification did not degrade the design bases, licensing bases, and performance capability of the affected systems.

- ECP-12-000692, Temporary Change for Leak Repair on Packing of 1HVCVC-377, on August 3, 2012

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – six samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities ensured system operability and functional capability. The inspectors reviewed the test procedure to verify that the procedure adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved. The inspectors also witnessed

the test or reviewed test data to verify that the test results adequately demonstrated restoration of the affected safety functions.

- Unit 1 reactor coolant system pressure boundary leakage repair on July 25, 2012
- No. 12 SW pump breaker protective relay calibration and replacement on July 26, 2012
- 21 SW pump replacement on July 26, 2012
- 13 AFW pump discharge check valve maintenance on July 26, 2012
- 1A EDG combustion air inlet piping boot seal replacement on August 14, 2012
- Unit 1 CEA number 9 coil stack replacement on August 15, 2012

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20 – two samples)

.1 RCS Pressure Boundary Leakage

a. Inspection Scope

The inspectors reviewed the station's work schedule and outage risk plan for the Unit 1 RCS pressure boundary leakage forced outage, which was conducted July 21 through July 25, 2012. The inspectors reviewed Constellation's development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered. During the outage, the inspectors observed portions of the shutdown and cooldown processes and monitored controls associated with the following outage activities:

- Configuration management, including maintenance of defense-in-depth, commensurate with the outage plan for the key safety functions and compliance with the applicable technical specifications when taking equipment out of service
- Implementation of clearance activities and confirmation that tags were properly hung and that equipment was appropriately configured to safely support the associated work or testing
- Status and configuration of electrical systems and switchyard activities to ensure that technical specifications were met
- Monitoring of decay heat removal operations
- Activities that could affect reactivity
- Repair activities
- Reactor and plant startup

b. Findings

No findings were identified.

.2 CEA drop

a. Inspection Scope

The inspectors reviewed the station's work schedule and outage risk plan for the Unit 1 dropped CEA number 9 forced outage, which was conducted August 12 through August 18, 2012. The inspectors reviewed Constellation's development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered. During the outage, the inspectors observed portions of the shutdown and cooldown processes and monitored controls associated with the following outage activities:

- Configuration management, including maintenance of defense-in-depth, commensurate with the outage plan for the key safety functions and compliance with the applicable technical specifications when taking equipment out of service
- Implementation of clearance activities and confirmation that tags were properly hung and that equipment was appropriately configured to safely support the associated work or testing
- Status and configuration of electrical systems and switchyard activities to ensure that technical specifications were met
- Activities that could affect reactivity
- Repair activities
- Reactor and plant startup

b. Findings

No findings were identified

1R22 Surveillance Testing (71111.22 – six samples)

a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant SSCs to assess whether test results satisfied technical specifications, the UFSAR, and Constellation procedural requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- STPO-029-2, CEA Free Movement Test, on July 3, 2012
- STPM-220G-2, 21 and 24 4 KV Undervoltage Relay Functional Test, on July 13, 2012
- STPM-200-1, Reactor Trip Circuit Breaker Functional Test, on July 14, 2012
- STP-M-551D, Battery Charger 22 Operability Test, on July 31, 2012
- STP-O-008A, Test of 2A EDG and 21 4KV Bus loss of coolant incident (LOCI) Sequencer, on August 24, 2012

- STP-O-65H-1, Pressurizer Power-Operated Relief Block Valves Quarterly Operability Test, on August 24, 2012

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP2 Alert and Notification System Evaluation

a. Inspection Scope (71114.02 - one sample)

An onsite review was conducted to assess the maintenance and testing of the Calvert Cliffs Alert and Notification System (ANS). During this inspection, the inspectors conducted a review of the ANS testing and maintenance programs. The inspectors reviewed the associated ANS procedure and the Federal Emergency Management Agency (FEMA) approved ANS Design Report to ensure compliance with design report commitments for system maintenance and testing. The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 2. Title 10 of the *Code of Federal Regulations* (10 CFR) 50.47(b)(5) and the related requirements of FR Part 50, Appendix E, were used as reference criteria.

b. Findings

No findings were identified.

1EP3 Emergency Response Organization Staffing and Augmentation System

a. Inspection Scope (71114.03 - one sample)

The inspectors conducted a review of the Calvert Cliffs Emergency Response Organization (ERO) augmentation staffing requirements and the process for notifying and augmenting the ERO. The review was performed to verify the readiness of key licensee staff to respond to an emergency event and to verify Constellation's ability to activate their emergency response facilities (ERF) in a timely manner. The inspectors reviewed: the Calvert Cliffs Emergency Plan for ERF activation and ERO staffing requirements; the ERO duty roster; applicable station procedures; communication test reports; the most recent drive-in drill report; and CRs related to this inspection area. The inspectors also reviewed a sample of ERO responder training records to verify training and qualifications were up to date. The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 3, 10 CFR 50.47(b)(2) and related requirements of 10 CFR Part 50, Appendix E, were used as reference criteria.

b. Findings

No findings were identified.

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04 – one sample)

a. Inspection Scope

The Office of Nuclear Security and Incident Response (NSIR) headquarters staff performed an in-office review of the latest revisions of various Emergency Plan Implementing Procedures (EPIPs) and the Emergency Plan located under ADAMS accession number ML122050221, as listed in the Attachment.

The licensee determined that in accordance with 10 CFR 50.54(q), the changes made in the revisions resulted in no reduction in the effectiveness of the Plan, and that the revised Plan continued to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. The NRC review was not documented in a safety evaluation report and did not constitute approval of licensee-generated changes; therefore, this revision is subject to future inspection.

b. Findings

No findings were identified.

1EP5 Maintaining Emergency Preparedness

a. Inspection Scope (71114.05 - one sample)

The inspectors reviewed a number of activities to evaluate the efficacy of Constellation's efforts to maintain the Calvert Cliffs emergency preparedness program. The inspectors reviewed: Letters of Agreement and/or Memorandums of Understanding with offsite agencies; the 10 CFR 50.54(q) Emergency Plan change process and practice; licensee maintenance of equipment important to EP; and records of evacuation time estimate population evaluation. A walkdown of the power plant was conducted to inspect equipment important to EP, which included interviews with work control staff on the process for identifying and managing any out-of-service EP equipment. The inspectors also verified Constellation's compliance at Calvert Cliffs with new NRC EP regulations regarding: emergency action levels for hostile action events; the emergency operations facility performance-based approach; emergency response organization augmentation at alternate ERFs; event declaration within 15 minutes; and protective actions for on-site personnel during events.

The inspectors further evaluated Constellation's ability to maintain their EP program through their identification and correction of EP weaknesses, by reviewing a sample of drill reports, actual event reports, self-assessments, 10 CFR 50.54(t) audits, and EP-related CRs. The inspectors reviewed a sample of EP-related CRs initiated at Calvert Cliffs from January 2011 through July 2012. The inspection was conducted in accordance with NRC Inspection Procedure 71114.05. 10 CFR 50.47(b) and the related requirements of 10 CFR Part 50, Appendix E, were used as reference criteria.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06 – one sample)

Training Observations

a. Inspection Scope

The inspectors observed a simulator training evolution for licensed operators on September 18, 2012, which required emergency plan implementation by an operations crew. Constellation planned for this evolution to be evaluated and included in performance indicator data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the post-evolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the crew's performance and ensure that Constellation evaluators noted the same issues and entered them into the corrective action program.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Occupational/Public Radiation Safety

2RS5 Radiation Monitoring Instrumentation (71124.05 – one sample)

a. Inspection Scope

Inspection Planning

The inspectors reviewed Constellation and third-party evaluation reports of the radiation monitoring program since the last inspection, including evaluations of offsite calibration facilities or services, if applicable. The inspectors reviewed procedures that govern instrument source checks and calibrations, and focused on instruments used for monitoring transient high radiological conditions, including instruments used for underwater surveys. The inspectors reviewed the calibration and source check procedures for adequacy and reviewed the area radiation monitor (ARM) alarm setpoint values and bases, as provided in the TSs and the UFSAR. Additionally, the inspectors reviewed effluent monitor alarm setpoint bases and the calculation methods provided in the Offsite Dose Calculation Manual (ODCM).

Walkdowns and Observations

The inspectors walked down three effluent radiation monitoring systems, including at least one liquid and one gaseous effluent system, and focused on flow measurement devices and all accessible point-of-discharge liquid and gaseous effluent monitors. The inspectors assessed whether the effluent/process monitor configurations align with what is described in the UFSAR. The inspectors selected five portable survey instruments in use or available for issuance and assessed calibration and source check stickers for currency, as well as, instrument material condition and operability. The inspectors

observed Constellation staff performance as the staff demonstrated source checks for more than three different types of portable survey instruments. The inspectors assessed whether high-range instruments are source checked on all appropriate scales.

The inspectors walked down five ARMs and five Continuous Air Monitors (CAMs) to determine whether they are appropriately positioned relative to the radiation sources or areas they were intended to monitor. Selectively, the inspectors compared ARM monitor response (via local readout or remote control room indications) with actual area radiological conditions for consistency. The inspectors selected three personnel contamination monitors, three portal monitors, and two small article monitors (SAMs) and evaluated whether the periodic source checks were performed in accordance with the manufacturer's recommendations and Constellation procedures.

Calibration and Testing Program

Process and Effluent Monitors

The inspectors selected three effluent monitor instruments and evaluated whether channel calibration and functional tests were performed consistent with TS and the ODCM. The inspectors assessed whether: (a) the licensee calibrated its monitors with National Institute of Standards and Technology (NIST) traceable sources; (b) the primary calibrations adequately represented the plant nuclide mix; (c) when secondary calibration sources were used, the sources were verified by comparison with the primary calibration source; and (d) channel calibrations encompassed the instrument's alarm setpoints. The inspectors assessed whether the effluent monitor alarm setpoints are established as provided in the ODCM and station procedures. For changes to effluent monitor setpoints, the inspectors evaluated the basis for changes to ensure that an adequate justification exists.

Laboratory Instrumentation

The inspectors assessed laboratory analytical instruments used for radiological analyses to determine whether daily performance checks and calibration data indicate that the frequency of the calibrations was adequate and there were no indications of degraded performance. The inspectors assessed whether appropriate corrective actions were implemented in response to indications of degraded performance.

Whole Body Counter

The inspectors reviewed the methods and sources used to perform functional checks on the whole body counter before daily use and assessed whether check sources were appropriate and aligned with the plant's radionuclide mix. The inspectors reviewed calibration records for the whole body counter since the last inspection, and evaluated whether calibration sources were representative of the plant radionuclide mix and that appropriate calibration phantom(s) was/were used. The inspectors looked for anomalous results or other indications of instrument performance problems.

Post-Accident Monitoring Instrumentation

The inspectors reviewed the calibration documentation for the containment high-range monitors. The inspectors assessed whether an electronic calibration was completed for all ranges and also ensured the calibrations were performed using an appropriate radiation source. The inspectors assessed whether calibration acceptance criteria were reasonable, considering the large measurement range and the intended use of the instrument. The inspectors selected one effluent/process monitor that is relied on by the licensee in its emergency operating procedures as a basis for triggering emergency action levels and subsequent emergency classifications, or to make protective action recommendations during an accident, and evaluated the calibration and availability of this instrument. The inspectors reviewed the licensee's capability to collect high-range, post-accident effluent samples. As available, the inspectors observed electronic and radiation calibration of those instruments associated with the post accident effluent sampling to verify conformity with the licensee's calibration and test protocols.

Portal Monitors, Personnel Contamination Monitors, and SAMs

The inspectors selected at least one of each type of these instruments and verified that the alarm setpoint values were reasonable under the circumstances to ensure that licensed material is not released from the site. The inspectors reviewed the calibration documentation for each selected instrument and reviewed the calibration methods to determine consistency with the manufacturer's recommendations.

Portable Survey Instruments, ARMs, Electronic Dosimetry, and Air Samplers/CAMs

The inspectors reviewed calibration documentation for at least one of each type of portable instrument. For portable survey instruments and ARMs, the inspectors reviewed detector measurement geometry and calibration methods and reviewed the use of its instrument calibrator, as applicable.

Instrument Calibrator

The inspectors reviewed the current radiation output values for portable survey and ARM instrument calibrator unit(s). The inspectors assessed whether Constellation personnel periodically verify calibrator output over the range of the exposure rates/dose rates using an ion chamber/electrometer. The inspectors assessed whether the measuring devices had been calibrated by a facility using NIST traceable sources and whether decay corrective factors for these measurement devices were properly applied during calibrator output verification.

Calibration and Check Sources

The inspectors reviewed the site source term or waste stream characterization per 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," to assess whether calibration sources used were representative of the types and energies of radiation encountered in the plant.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with radiation monitoring instrumentation were being identified by Constellation personnel at an appropriate threshold and were properly addressed for resolution in their CAP. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involved radiation monitoring instrumentation.

b. Findings

No findings were identified.

2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06 – one sample)

a. Inspection Scope

Event Report and Effluent Report Reviews

The inspectors reviewed the Calvert Cliffs Annual Radiological Effluent Release Reports for 2010 and 2011 to determine if the reports were submitted as required by TSs and the ODCM. The inspectors reviewed anomalous results, unexpected trends, or abnormal releases identified by Constellation personnel, and verified these issues were entered into the CAP, evaluated, and adequately resolved.

The inspectors identified radioactive effluent monitor operability issues reported by Calvert Cliffs as provided in the Annual Radioactive Effluent Release Report. The inspectors reviewed these issues and determined if the issues were entered into the corrective action program and were adequately resolved.

ODCM and Updated Final Safety Analysis Report Review

The inspectors reviewed UFSAR descriptions of the radioactive effluent monitoring systems, treatment systems, and effluent flow paths to identify system design features and required functions. The inspectors reviewed changes to the ODCM since the last inspection. When differences were identified, the inspectors reviewed the technical basis or evaluations of the change and determined whether the changes were technically justified and maintained effluent releases ALARA. The inspectors reviewed documentation for any non-radioactive systems that have become contaminated, as disclosed either through an event report or the ODCM since the last inspection. The inspectors reviewed selected 10 CFR 50.59 evaluations to evaluate whether any newly contaminated systems had an unmonitored effluent discharge path to the environment, and whether these new pathways were required to be reported in accordance with RG 1.21 and necessitated changes to the ODCM.

Groundwater Protection Initiative (GPI) Program

The inspectors reviewed reported groundwater monitoring results and changes to the CCNPP written program for identifying and controlling contaminated spills and leaks to groundwater.

Procedures, Special Reports, and Other Documents

The inspectors reviewed Licensee Event Reports, event reports and/or special reports related to the effluent program issued since the previous inspection to identify any additional focus areas for the inspection based on the scope/breadth of problems described in these reports. The inspectors reviewed effluent program implementing procedures, including those associated with effluent sampling, effluent monitor set-point determinations, and dose calculations. The inspectors reviewed copies of Constellation and third party (independent) evaluation reports of the effluent monitoring program since the last inspection to gather insights into the effectiveness of the Calvert Cliffs effluent program.

Walkdowns and Observations

The inspectors walked down selected components of gaseous and liquid discharge systems to assess equipment material condition, verify that equipment configuration and flow paths align with the descriptions in the UFSAR, and to identify potential unmonitored release points. The inspectors reviewed material condition surveillance records, as applicable, for equipment or areas associated with the systems selected for review that were not readily accessible due to radiological conditions. The inspectors walked down filtered ventilation systems to verify there were no degraded conditions associated with high-efficiency particulate air /charcoal banks, improper alignment, or system installation issues that would impact the performance, or the effluent monitoring capability, of the system. As available, the inspectors observed selected portions of the routine processing and discharge of radioactive gaseous effluent to verify that appropriate treatment equipment was used and the processing activities conform to discharge permits. The inspectors determined that CCNPP has not made changes to their effluent release points. As available, the inspectors observed selected portions of the routine processing and discharge of liquid waste. The inspectors verified that appropriate effluent treatment equipment was being used and that radioactive liquid waste was being processed and discharged in accordance with site procedures.

Sampling and Analyses

The inspectors selected two effluent sampling activities and assessed whether adequate controls had been implemented to ensure representative samples were obtained. The inspectors selected two effluent discharges made with inoperable effluent radiation monitors to verify that controls were in place to ensure compensatory sampling was performed consistent with TS and the ODCM, and that those controls are adequate to prevent the release of unmonitored liquid and gaseous effluents. The inspectors determined whether the facility is routinely relying on the use of compensatory sampling, in lieu of adequate system maintenance, based on the frequency of compensatory sampling since the last inspection. The inspectors reviewed the results of the inter-laboratory and intra-laboratory comparison program to verify the quality of the radioactive effluent sample analyses. The inspectors also assessed whether the intra and inter-laboratory comparison program includes hard-to-detect isotopes, as appropriate.

Instrumentation and Equipment

Effluent Flow Measuring Instruments

The inspectors reviewed the methodology that CCNPP uses to determine the effluent stack and vent flow rates to verify that the flow rates are consistent with TS, ODCM and/or UFSAR values. The inspectors reviewed the differences between assumed and actual stack and vent flow rates to ensure that they do not affect the results of calculated public radiation doses.

Air Cleaning Systems

The inspectors assessed whether surveillance test results for TS required ventilation effluent discharge systems meet TS acceptance criteria.

Dose Calculations

The inspectors reviewed all significant changes in reported dose values compared to the previous radioactive effluent release report to evaluate the factors which may have resulted in the change. The inspectors reviewed more than three radioactive liquid and two gaseous waste discharge permits to verify that the projected doses to members of the public were accurate and were based on representative samples of the discharge path. The inspectors reviewed the current waste stream analysis and evaluated the methods used to determine all applicable radionuclides in the source term. The inspectors reviewed changes in CCNPP methodology for offsite dose calculations since the last inspection to verify the changes are consistent with the ODCM and RG 1.109. The inspectors reviewed meteorological dispersion and deposition factors used in the ODCM and effluent dose calculations to ensure appropriate dispersion/deposition factors are being used for public dose calculations. The inspectors reviewed the latest Land Use Census to verify that changes in the local land use have been factored into the dose calculations and environmental sampling/analysis program. The inspectors evaluated whether the calculated doses are within the 10 CFR Part 50, Appendix I and TS dose criteria.

There were no abnormal effluent discharges during the inspection period. Unmonitored leakage and discharges made with inoperable effluent radiation monitors were reviewed to ensure that Constellation personnel evaluated the effluent releases and accounted for the releases in the calculated doses to the public.

Groundwater Protection Initiative Implementation

The inspectors reviewed monitoring results of the GPI to identify any anomalous results and to determine if Constellation has implemented its program as intended. For anomalous results or missed samples, the inspectors assessed whether the licensee has identified and addressed deficiencies through its CAP.

The inspectors reviewed identified leakage or spill events and entries made into Calvert Cliffs decommissioning files. The inspectors reviewed evaluations of leaks or spills and reviewed the effectiveness of any remediation actions. The inspectors reviewed on-site contamination events involving contamination of groundwater, and assessed whether the source of the leak or spill was identified and isolated/terminated. For unmonitored

spills, leaks, or unexpected liquid or gaseous discharges, the inspectors assessed whether an evaluation was performed to determine the type and amount of radioactive material that was discharged by: 1) assessing whether sufficient radiological surveys were performed to evaluate the extent of the contamination and assessing whether a survey/evaluation has been performed to include consideration of hard-to-detect radionuclides; and 2) determining whether Constellation personnel completed offsite notifications in accordance with GPI implementing procedures.

The inspectors verified that Calvert Cliffs has no on-site surface water bodies that contain or potentially contain radioactivity, and no potential for groundwater leakage from on-site surface water bodies. The inspectors assessed whether on-site groundwater sample results and a description of any significant on-site leaks/spills into groundwater for each calendar year are documented in the Annual Radioactive Effluent Release Report. For significant, new effluent discharge points, such as significant or continuing leakage to groundwater that continues to impact the environment, the inspectors evaluated whether the Calvert Cliffs ODCM was updated to include the dose calculation method for the new release point and the associated dose calculation methodology.

Problem Identification and Resolution

The inspectors assessed whether problems associated with the effluent monitoring and control program are being identified by Calvert Cliffs at an appropriate threshold and are properly addressed for resolution in Calvert Cliffs corrective action program. In addition, the inspectors evaluated the appropriateness of the corrective actions for a selected sample of problems documented by Calvert Cliffs involving radiation monitoring and exposure controls.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index (MSPI) (10 samples)

a. Inspection Scope

The inspectors reviewed Constellation's submittal of the Unit 1 and Unit 2 MSPI performance indicators for the following systems for the period of July 1, 2011 through June 30, 2012:

- Emergency AC Power System
- High Pressure Injection System
- Heat Removal System
- Residual Heat Removal System
- Cooling Water System

To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02,

"Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors also reviewed Constellation's operator narrative logs, condition reports, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.2 RETS/ODCM Radiological Effluent Occurrences (one sample)

a. Inspection Scope

The inspectors reviewed relevant effluent release reports for the period January 1 through December 31, 2011, for issues related to the public radiation safety performance indicator, which measures radiological effluent release occurrences that exceed 1.5 millirem/quarter whole body or 5.0 millirem/quarter organ dose for liquid effluents; 5 millirads/quarter gamma air dose, 10 millirads/quarter beta air dose, and 7.5 millirads/quarter for organ dose for gaseous effluents. The acceptance criteria documented in NEI 99-02, "Regulatory Assessment Performance Indicator Guidelines," Revision 6, was used as reference criteria.

b. Findings

No findings were identified.

.3 Emergency Preparedness (three samples)

a. Inspection Scope

The inspectors reviewed data for the three EP Performance Indicators (PI), which are: (1) Drill and Exercise Performance (DEP); (2) ERO Drill Participation; and, (3) ANS Reliability. The last NRC EP inspection at Calvert Cliffs was conducted in the third calendar quarter of 2011. Therefore, the inspectors reviewed supporting documentation from EP drills and equipment tests from the third calendar quarter of 2011 through the second calendar quarter of 2012 to verify the accuracy of the reported PI data. The inspectors additionally verified the licensee was documenting which specific Calvert unit(s) was/were affected during the DEP drills. The review of the PIs was conducted in accordance with NRC Inspection Procedure 71151. The acceptance criteria documented in NEI 99-02, "Regulatory Assessment Performance Indicator Guidelines," Revision 6, was used as reference criteria.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – three samples)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that Constellation entered issues into the CAP at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the CAP and periodically attended CR screening meetings.

b. Findings

No findings were identified.

.2 Annual Sample: AFW System Flow Control Valves Air Leaks

a. Inspection Scope

This inspection was conducted to assess the effectiveness of Constellation's corrective actions implemented and planned to address repetitive air leaks on the actuators associated with the Unit 2 auxiliary feedwater system (AFW) flow control valves (2CV-4525 and 2CV-4535). Specifically, on June 9, 2011, during performance of a scheduled AFW system quarterly operability test, valve 2CV-4535 failed to fully shut (stopped at mid position) and air was noted to be blowing out of the actuator (CR-2011-6099). Constellation determined the cause of the air leak was a cup seal failure on the actuator.

The inspectors reviewed Constellation's immediate and follow-up actions, apparent cause evaluation, extent-of-condition review (including similar valves in Unit 1), and associated corrective actions. The inspectors conducted interviews with site personnel, performed walkdowns and inspection of all Unit 1 and 2 AFW flow control valves and associated components, and reviewed associated CRs, plant drawings, and design documents.

b. Findings and Observations

No findings were identified.

The inspectors noted that a similar air leak had previously occurred on the actuator for valve 2CV-4535. Specifically, based on a history search, the licensee determined that a similar cup seal failure had occurred on valve 2CV4535 on March 22, 2007 (IRE-021-404). The cause of this seal failure was not determined.

Following the June 9, 2011, failure (CR-2011-6099), Constellation discovered the seal had dislodged, preventing the actuator from fully pressurizing. Constellation performed an apparent cause evaluation, but did not identify a specific cause. However, engineers

believe there was no proper groove-to-seal engagement based on discussions with the vendor which indicated the seal may not have snapped into place in its retaining groove. The seal was replaced and the valve was retested and returned to service. Constellation's corrective actions included updating the vendor technical manual with a new valve drawing and information regarding the retaining groove and seal, and revising the maintenance procedure to validate seal dimensions and to verify seal retaining groove meets the drawing specifications.

The inspectors noted that on December 20, 2011, a similar air leak was reported on the operator for valve 2CV-4535 (CR-2011-6233) during the post maintenance test after scheduled valve maintenance. An engineering evaluation determined that plant operators may have withdrawn the manual operator for valve 2CV-4535 too far in the open direction, causing the dislodging of the snap ring from its retaining groove. The snap ring is installed in the manual actuator gear mechanism and is independent of the cup seal; however, engineering determined it was possible to damage or dislodge the cup seal if the manual operator was withdrawn too far and shut again. Constellation replaced the cup seal and the valve was returned to service. The follow-up extent-of-condition inspection of similar AFW flow control valve actuators determined the snap rings were bent, confirming the over-stroking of the valve actuators in the open direction. To prevent over stroking the valve, Constellation implemented additional corrective actions which included issuing instructions to operators to minimize the use of the manual actuator; changing procedures to require an immediate retest of the valve if the manual actuator was used; and issuing operator training, as well as posting awareness/clarification signs at each valve to ensure operators do not over stroke the manual operator.

There are a total of four AFW flow control valves (FCVs) on site; two in each unit (CV-4525 and CV-4535). There are no other similar valves used in any other safety-related application on-site. The safety function of the AFW FCVs is to open and throttle AFW flow depending on plant conditions. The valves open on loss of air and the deficient condition would not have prevented the ability of the AFW system to provide the required flow. The engineers determined the degraded conditions identified impacted only the throttling function of the valves, which can be mitigated by operator actions to shut the redundant AFW system block valves and throttle flow via manual flow control by-pass valves. Local manual operation of the valve was not lost as a result of the air leaks on the actuator. The inspectors determined the deficiencies were appropriately entered into the corrective action program, the potential causes of the deficiencies were identified, and corrective actions were taken as appropriate.

.3 Annual Sample: Excessive Leakage Past High Pressure Safety Injection System Header Isolation Check Valve 1-SI-113

a. Inspection Scope

The inspectors performed an in-depth review of Constellation's evaluation and corrective actions associated with back-leakage past a high pressure safety injection system header isolation check valve, 1-SI-113, that was identified during surveillance testing on October 2, 2011. Specifically, the valve exceeded its 2 gpm acceptance criterion by a substantial amount (as-found leakage rate was about 35 gpm).

The inspectors assessed Constellation's problem identification threshold, cause analyses, extent-of-condition reviews, and the prioritization and timeliness of their corrective actions to determine whether they were appropriately identifying, characterizing, and correcting problems associated with this issue; and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of Constellation's corrective action program and 10 CFR 50, Appendix B.

The inspectors reviewed the condition report and associated documents, including an operability evaluation and a modification evaluation that subsequently removed the check valve internals from 1-SI-113 and the similar check valves in the redundant piping on both units. The inspectors also interviewed engineering personnel to assess the acceptability and effectiveness of the implemented corrective actions.

b. Findings and Observations

No findings were identified.

Constellation determined the most probable cause was internal wear because there was no maintenance history for the valve, and that it was never opened, inspected and/or rebuilt. As the lack of specific maintenance was identified as a contributing cause, the inspectors reviewed Constellation's actions to ensure that critical check valves were part of a specific preventive maintenance activity (e.g., an open and inspect procedure). No deficiencies were identified.

The inspectors found that Constellations actions were appropriate. These actions included the associated operability determination and subsequent modification that removed the valve internals. The inspectors also reviewed the results of a maintenance activity that inspected the internals of check valve 1-SI-113 when it was removed from service.

However, the inspectors identified two minor deficiencies that constituted minor violations not subject to enforcement action in accordance with the NRC's Enforcement Policy. The first was related to the valve internals inspection conducted on check valve 1-SI-113 via Work Order C91083641 (conducted as part of the activity to remove the valve internals). The data recording sheet documented that the valve disk was found stuck open due to a sludge-type material around the valve's upper guide. However, a condition report was not identified to document this deficiency. The inspectors found that although a condition report had not been initiated, there were several actions taken by Constellation in response to the deficiency. In particular, other valves had been inspected internally and the presence of a similar foreign material confirmed to not be present. Subsequently, Constellation submitted a condition report to identify the presence of the sludge in the check valve.

In addition, the inspectors noted that the basis for a postulated scenario in the modification that removed the valve internals (ECP-11-001045) lacked sufficient detail to support a conclusion that backflow through the line that previously contained the check valve internals would not present a challenge in maintaining sufficient safety injection flow. When questioned, Constellation provided a reasonable basis regarding the postulated scenario and their conclusion why safety injection flow would not be compromised, and stated that the evaluation in the modification would be revised.

.4 Annual Sample: Non-Conservative Secondary Calorimetric Calculation

a. Inspection Scope

The inspectors performed an in-depth review of Constellation's apparent cause evaluation (ACE) and corrective actions associated with a non-conservative error of 2.6 MWth found in the plant calorimetric calculation (CR-2011-010852). Specifically, while reviewing the software requirements specification for the calorimetric calculation to support the plant process computer upgrade project, the thermal performance engineer identified that there was no documented basis for an operating instruction (OI) table that converts the volumetric measurement of steam generator (SG) blowdown flow to a mass flow rate that operators input into the plant computer to determine reactor thermal power. The thermal performance engineer determined that a calculated basis was needed because the OI table does not involve a direct conversion from volumetric flow to mass flow (i.e. simple multiplication by density) and that the existing table values could be in error by approximately double the uncertainty assumed in the blowdown flow measurement.

The inspectors assessed Constellation's problem identification threshold, cause analysis, extent of condition reviews, compensatory actions, and the prioritization and timeliness of corrective actions to determine whether Constellation was appropriately identifying, characterizing, and correcting problems associated with this issue and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of Constellation's CAP. In addition, the inspectors performed field walkdowns and interviewed operations and engineering personnel to assess the effectiveness of the implemented corrective actions. Specifically, the inspectors toured accessible Unit 1 and Unit 2 in-plant instrumentation that input into the calorimetric calculation, SG blowdown tanks and flow control panels, and control room instrumentation to independently assess the material condition and the operating environment and to verify the adequacy of Constellation's configuration control. The inspectors also reviewed a sample of operator narrative and surveillance logs, process computer alarm setpoints, reactor power displays and trends, and operating procedures to verify that operators maintained reactor power in accordance with the operating license, operating procedures, and NRC guidelines.

b. Findings and Observations

No findings were identified.

Constellation conducted a thorough technical and historical review of the blowdown flow measurement used in the calorimetric calculation. Constellation determined that the apparent cause of the error was a 1994 change to the blowdown constants in Table 1 of OI-8A (the blowdown system operating guide for both units). Specifically, in making the change, engineering did not use sufficient engineering rigor to establish an appropriate basis for the change in blowdown constants, resulting in non-conservative inputs to the secondary calorimetric calculation. Constellation also determined that the engineering analysis supporting an engineering change (ES200200578) in 2002, that raised the setpoint of the blowdown tank pressure controller, was a contributing cause as it did not re-baseline the Table 1 blowdown constants, but made incremental changes to the blowdown constants assuming that the prior values were correct.

In response to this Constellation-identified issue, Constellation initiated prompt action (via the Shift Turnover Information Sheet) to limit reactor power on both units until engineering corrected the non-conservative blowdown constants. Constellation corrective actions included: a detailed calculation to determine appropriate blowdown constants (based on blowdown system properties and thermodynamic principles applicable in the tank), troubleshooting to validate the blowdown rate calculation, an extensive extent-of-condition review of all of the calculated inputs to the calorimetric calculation to ensure an appropriate and well-documented bases, and timely revisions to the blowdown system OIs for both units.

Due to the non-conservative calorimetric, Constellation noted that there was a potential for Unit 1 and Unit 2 operators to unknowingly operate at values slightly above Calvert Cliffs' license limit for rated thermal power (RTP) when operating at 100 percent RTP. Based on a review of NRC NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73," and plant power level history (October 28, 2008 – October 28, 2011), Constellation determined that they never entered a condition prohibited by Technical Specifications and that the occurrence was not reportable under 10 CFR 50.73(a)(2)(i)(B). Specifically, Constellation's power history review showed that there were no occurrences where the plant computer and Better Axial Shape Selection System (BASSS) were out-of-service with the plant power level at a level within 2.6 MWth of the license limit for more than six hours. The inspectors noted that Constellation's reportability review was reasonable for the circumstance.

The inspectors concluded that Constellation had taken timely and appropriate action in accordance with the Calvert Cliffs Nuclear Power Plant TS, operating and administrative procedures, and Constellation's CAP. The inspectors determined that Constellation's associated ACE was sufficiently thorough and based on the best available information, troubleshooting, sound engineering judgment, and relevant operating history. Constellation's assigned corrective actions were aligned with the identified causal factors, adequately tracked, appropriately documented, and completed as scheduled. Based on the documents reviewed, plant walkdowns, and discussions with engineering and operations personnel, the inspectors noted that Constellation personnel identified problems and entered them into the CAP at a low threshold. In response to several minor issues identified by the inspector, Constellation personnel promptly initiated CRs and/or took immediate action to address the issue.

The performance deficiency resulted in a non-conservative plant calorimetric calculation and the potential to operate at slightly above the licensed limit for rated thermal power. Based on NRC Inspection Manual Chapter (IMC) 0612, Appendix E "Examples of Minor Issues," the inspectors determined that the associated performance deficiency was of minor safety significance. Constellation identified the issue and entered it into their CAP (CR-2011-010852). Specifically, the inspectors determined the issue was not more than minor because, based on the sample of activities reviewed, operating procedure guidance directed conservative operation near the license RTP limit, operators complied with procedures and promptly reduced power once they identified that they may be operating above the license RTP limit, thermal power remained bounded by the reactor safety analysis, and no safety limits were exceeded. Additionally, operators did not knowingly or intentionally exceed licensed RTP, or take inappropriate actions that resulted in operation above the licensed RTP limit.

4OA3 Followup of Events and Notices of Enforcement Discretion (71153 – three samples)

.1 Plant Events

a. Inspection Scope

For the plant event listed below, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated plant events to appropriate regional personnel, and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. As applicable, the inspectors verified that Constellation personnel made appropriate emergency classification assessments and properly reported the event in accordance with 10 CFR 50.72 and 50.73. The inspectors reviewed Constellation staff's follow-up actions related to the events to assure that corrective actions commensurate with their safety significance were implemented.

- TS-required shutdown due to RCS pressure boundary leakage on July 17, 2012

b. Findings

No findings were identified

.2 (Closed) Licensee Event Report (LER) 05000318/2011-002-00 & LER 05000318/2011-002-01: Pressurizer Safety Valve Setpoint High

On July 7, 2011, after further reviewing testing results received from a vendor facility, Constellation personnel determined that Unit 2 had operated outside of conditions permitted by TS. Specifically, the as-found lift setting for pressurizer safety valve (PSV) BS03213 was 2617 psia, which exceeded the TS-allowed setpoint of 2565 psia +/- 2% (2514 psia to 2616 psia). The valve had been installed in Unit 2 at the 2RV201 location (Unit 2 PSV) and was removed during the 2009 Unit 2 refueling outage for scheduled testing and maintenance. Although this valve had been previously removed from the plant and tested in 2009, the setpoint drift outside of TS limits was not identified until Constellation personnel subsequently reviewed the vendor test report at a later date.

Constellation staff originally identified the apparent cause of BS03213 lifting high to be due to evaporation of liquid within the valve before as-found testing, which caused the internal friction to increase because the water was no longer present to lubricate the bearing surface. However, Constellation personnel progressed with a more detailed analysis of the event and submitted a revised event report to the NRC after the cause of the failure was determined to be different than originally reported. The revised apparent cause of the issue is documented in LER 2011-002-01.

The inspectors noted that in 2011, the NRC issued a noncited violation for the failure to identify and correct a condition adverse to quality associated with the Unit 2 PSVs. Specifically, it was determined that the temperature profile to which the safety valves are subjected at Unit 2 was lower than previously assumed. These lower ambient temperatures have shown to have the effect of causing a safety valve's setpoint to drift higher over the operating cycle, as was noted in this LER. This situation was temporarily addressed by an operability determination that placed constraints on the number of

operating containment fan cooler units. These constraints are now in-place until the end of the current operating cycle to ensure the ambient temperature of the safety valves does not drop low enough to cause an unacceptable setpoint drift, such as was noted with PSV BS03213.

As noted, the NRC issued a non-cited violation in inspection report 50-318/2011-004 for the failure to identify and correct a condition adverse to quality associated with the Unit 2 PSVs. This NCV addressed the key element suspected of causing the pressurizer safety valve setpoint drift noted in the subject LER supplement. The failure to promptly identify and report the setpoint drift following vendor testing was a human performance issue that was determined to constitute a minor violation not subject to enforcement action in accordance with the NRC's Enforcement Policy.

The inspectors reviewed LER 2011-02-00 and the supplemental LER 2011-02-01 concurrently, along with the associated condition report CR-2011-001263, and verified that Constellation staff's evaluation and corrective actions were adequate. The enforcement aspects of this licensee-identified finding are discussed in Section 4OA7. This LER is closed.

4OA5 Other Activities

.1 Temporary Instruction 2515/187 – Inspection of Near-Term Task Force Recommendation 2.3 – Flooding Walkdowns

On September 5, 2012, inspectors commenced activities to independently verify that Constellation conducted external flood protection walkdown activities using an NRC-endorsed walkdown methodology. These flooding walkdowns are being performed at all sites in response to Enclosure 4 of a letter from the NRC to licensees entitled, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Daiichi Accident," dated March 12, 2012 (ADAMS Accession No. ML12053A340). The results of this temporary instruction will be documented in a future inspection report.

.2 Temporary Instruction 2515/188 – Inspection of Near-Term Task Force Recommendation 2.3 – Seismic Walkdowns

On August 8, 2012, inspectors commenced activities to independently verify that Constellation conducted seismic walkdown activities using an NRC-endorsed seismic walkdown methodology. These seismic walkdowns are being performed at all sites in response to Enclosure 3 of a letter from the NRC to licensees entitled, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Daiichi Accident," dated March 12, 2012 (ADAMS Accession No. ML12053A340). When complete, the results of this temporary instruction will be documented in a future inspection report.

.3 (Closed) Severity Level IV NCV NRC Investigation Report No.1-2011-047: Inattentive Non-Licensed Operator (92702)

a. Inspection Scope

In accordance with Inspection Procedure 92702, "Followup on Traditional Enforcement Actions Including Violations, Deviations, Confirmatory Action Letters, Confirmatory Orders, and Alternative Dispute Resolution Confirmatory Orders," the inspectors conducted a follow-up inspection of a Severity Level IV NCV which was identified due to the deliberate failure of a non-licensed operator to remain attentive to their duties while performing a maintenance evolution on the 2B EDG on June 15, 2011, contrary to Technical Specification 5.4.1.a, "Procedures." This issue was communicated to Constellation in a letter dated April 9, 2012, following the completion of an NRC investigation into this matter.

The inspectors reviewed the scope and depth of analysis performed in addressing the identified deficiency. The inspectors also reviewed Constellation's assessment of generic implications of the identified violation and evaluated the corrective actions implemented by Constellation personnel to determine whether they were adequate to address the identified deficiency and prevent recurrence. The inspectors reviewed Constellation's identified causes and the actions taken to prevent recurrence of those causes.

b. Findings

No findings were identified.

.4 Operation of an Independent Spent Fuel Storage Installation (ISFSI) at Operating Plants (IP 60855 and 60855.1)

a. Inspection Scope

The inspectors observed and evaluated the licensee's loading of the last of three dry shielded canisters (DSCs) associated with the licensee's current ISFSI dry cask campaign for Unit 2, and reviewed documentation and records associated with the first two DSC loadings. The inspectors also reviewed the licensee's activities related to long-term operation and monitoring of the ISFSI. The inspectors verified compliance with the Certificate of Compliance (CoC), TS, regulations, and licensee procedures.

The inspectors observed DSC processing operations, including: decontamination and surveying, welding, non-destructive weld examinations, DSC draining, vacuum drying, helium backfilling, and leak testing. During performance of the activities, the inspectors evaluated the licensee's familiarity with procedures, supervisory oversight, and communication and coordination between the personnel involved. The inspectors attended licensee briefings to assess their ability to identify critical steps of the evolution, potential failure scenarios, and human performance tools to prevent errors. The inspectors also reviewed loading and monitoring procedures and evaluated the licensee's adherence to these procedures.

The inspectors reviewed the licensee's program associated with fuel characterization and selection for storage. The inspectors reviewed cask fuel selection packages to

verify that the licensee was loading fuel in accordance with the CoC and TS. The licensee did not plan to load any damaged fuel assemblies during this campaign.

The inspectors reviewed radiation protection procedures and radiation work permits (RWPs) associated with the ISFSI loading campaign. The inspectors also reviewed the ALARA goal for the loading of all three casks to determine the adequacy of the licensee's radiological controls, and to ensure that radiation worker doses were ALARA, and that project dose goals could be achieved. The inspectors reviewed radiological records from the current loading campaign to confirm that contamination levels measured on the DSCs were within limits specified by the TS and consistent with values specified in the FSAR.
The inspectors performed tours of the ISFSI pad to assess the material condition of the pad and the loaded horizontal storage modules (HSMs) and verified the licensee was appropriately performing daily HSM screen surveillances in accordance with TS requirements. The inspectors also verified that transient combustibles were not being stored on the ISFSI pad or the vicinity of the HSMs, and confirmed vehicle entry onto the ISFSI pad was controlled in accordance with the licensee's procedures. The annual environmental reports were reviewed to verify that areas around the ISFSI site boundary were within limits specified in 10 CFR Part 20 and 10 CFR Part 72.104.

The inspectors reviewed the licensee's 10 CFR 72.48 screenings, corrective action reports, and the associated follow-up actions that were generated since the licensee's last loading campaign to ensure that issues were entered into the corrective action program, prioritized, and evaluated commensurate with their safety significance. The inspectors also ensured that the licensee adequately implemented "Written Instructions for Use of Strongback to Correct Bowed Condition of Top Casing Plate on Top Shield Plug for NUHOMS 32P DSC S/N CEG32P-1069." The inspectors noted that the procedure was developed during the licensee's last loading campaign to address an issue (CR 2011-009263) with DSC #CEG32P-106769.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On October 12, 2012, the inspectors presented the integrated inspection results to Mr. George Gellrich, Vice President, and other members of Constellation staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as a non-cited violation.

TS LCO 3.4.10.4, “Pressurizer Safety Valves,” requires that two pressurizer safety valves shall be operable, which is specifically met, in part, if the as-found setpoints are within applicable acceptance criteria during in-service testing. Contrary to this requirement, on July 7, 2011, Constellation personnel determined that the as-found lift setpoint for PSV, serial number BS03213, exceeded the TS required value by 1 psi. Therefore, Unit 2 PSV BS03213 was determined to be inoperable for an indeterminate period while it had been installed in the plant between March 2007 and March 2009. Calvert Cliffs personnel documented this issue into their corrective action program as CR-2011- 001263. The inspectors evaluated the significance of this finding using IMC 0609 Appendix A, “The Significance Determination Process (SDP) for Findings at Power.” The inspectors determined that this finding was of very low safety significance (Green) because the finding was not a design or qualification deficiency; did not represent a loss of safety system function; and did not screen as potentially risk significant due to external initiating events.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Constellation Personnel
G. Gellrich, Site Vice President
J. Allen, System Manager
J. Beasley, Supervisor, Engineering
K. Bodine, Supervisor, Engineering
C. Conover, Chemistry Supervisor
C. Costanzo, Plant General Manager
R. Cox, Senior Engineering Analyst
H. Crockett, Senior Engineer
H. Daman, Maintenance Manager
J. D'Sousa, Chemistry Engineer
B. Erdman, Radiation Protection Supervisor
K. Eiane, Associate Engineer
J. Etzweiller, Principle Engineer
R. Fearrington. Radiation Protection Instrument Technician
M. Fick, Director, Emergency Preparedness
J. Gaines, General Supervisor, Shift Operations
J. Galbreath, Senior Engineer
M. Giacini, Manager, Operations
K. Gould, Radiation Protection Manager
M. Hillebrand, Maintenance Supervisor
D. Lauver, Director, Licensing
J. Remeniuk, Project Manager
T. Riti, General Supervisor, System Engineering
K. Robinson, Manager, Nuclear Safety and Security
A. Simpson, Supervisor, Licensing
J. Stanley, Manager, Engineering Services
R. Thomas, Chemistry Supervisor
T. Unkle, Licensing Engineer
T. White, Mechanical Maintenance General Supervisor
J. Wood, Senior Engineer, Fleet Nuclear Fuels
J. Wynn, Principle Engineer
J. York, Manager, Chemistry

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Discussed

05000317/318/2515/187	TI	Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns (Section 4OA5)
05000317/318/2515/188	TI	Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns (Section 4OA5)

Closed

05000318/2011-002-00	LER	Pressurizer Safety Valve Setpoint High Due to Increased Internal Friction (Section 4OA3)
05000318/2011-002-01	LER	Pressurizer Safety Valve Setpoint High Due to Setpoint Variation (Section 4OA3)

Opened and Closed

05000318/2012004-01	NCV	2A Diesel Generator Ventilation Train 10 CFR 50.65 (a)(2) Performance Demonstration Not Met (Section 1R12)
05000318/2012004-02	FIN	Corrective Actions Not Completed for Drains in the Intake Structure (Section 1R12)
05000317/2012004-03	NCV	Inadequate Assessment of Unit 1 RCS Pressure Boundary Leakage (Section 1R15)
05000317/318/2012004-04	NCV	Inattentive Non-Licensed Operator (Section 4OA5)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
EP-1-108, Severe Weather Preparation, Revision 00300
ERPIP-3.0, Immediate Actions, Revision 04901

Section 1R04: Equipment Alignment

Procedures
OI-15-2, Service Water System, Revision 46
OI-29-1, Saltwater System, Revision 65
OI-29-2, Saltwater System, Revision 58

Drawings
60708SH0002, Circulating Saltwater Cooling System, Revision 112
62708SH0002, Circulating Saltwater Cooling System, Revision 109

Section 1R05: Fire Protection

Procedures
FP-0002, Fire Hazards Analysis Summary Document, Revision 0

Drawings
62149SH0001, Appendix 'R' Separation Requirements Aux Bldg. & Containment Structure Floor Plan at 10′-0″, Revision 6
62157SH0001, Appendix 'R' Separation Requirements Aux Bldg. & Containment Structure Floor Plan at 69′-0″, Revision 10

Work Orders
C91083041

Section 1R06: Flood Protection Measures

Procedures
STP-F-592-1, Penetration Fire Barrier Inspection, Revision 01000

Work Orders
1200406400

Miscellaneous
ES-001, Flooding, Revision 3

Section 1R11: Licensed Operator Requalification Program

Procedures
CNG-OP-1.01-2001, Communication and Briefings, Revision 00100
CNG-OP-1.01-1000, Conduct of Operations, Revision 00600
AOP-3G, Malfunction of Main Feedwater System, Revision 12
EOP-0, Post Trip Immediate Actions, Revision 12
EOP-3, Loss of All Feedwater, Revision 13

Miscellaneous
99-01-EAL-TB, Emergency Action Level Technical Basis Document, Revision 00401
NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 6

Condition Report
CR-2012-008568

Section 1R12: Maintenance Effectiveness

Procedures
CNG-AM-1.01-1023, Maintenance Rule Program, Revision 00200
NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Revision 2

CNG-AM-1.01-1017, Performance Monitoring Program, Revision 00100
EN-1-136, CCNPP Relay Reliability Process, Revision 0
CNG-AM-1.01-1000, Equipment Reliability Process, Revision 00500
CNG-AM-1.01-1018, Preventive Maintenance Program, Revision 00700
E-10, Testing and Adjustment of Agastat Relays, Revision 00500
CNG-CA-1.01-1000, Corrective Action Program, Revision 00700
CNG-CA-1.01-1005, Apparent Cause Evaluation, Revision 00601
2C10-ALM, ESFAS 23 Alarm Manual, Revision 38

Condition Reports

IRE-004-373	IRE-008-801	IRE-010-697	IRE-013-803
IRE-013-844	IRE-014-682	IRE-026-232	CR-2008-000741
CR-2009-008188	CR-2009-009030	CR-2010-000167	CR-2010-002958
CR-2010-003784	CR-2010-008493	CR-2010-008503	CR-2010-010399
CR-2010-011795	CR-2010-011892	CR-2011-003807	CR-2011-008708
CR-2012-000854	CR-2012-001297	CR-2012-005773	CR-2012-006132
CR-2012-006358	CR-2012-006368	CR-2012-006460	CR-2012-007140
CR-2012-007166	CR-2012-007168	CR-2012-007169	CR-2012-007331
CR-2012-007385	CR-2012-007732	CR-2012-007772	CR-2012-007882
CR-2012-007994	CR-2012-008125	CR-2012-008252	CR-2012-008362

Work Orders

C90708705	C91078641	C91331303	C91522940
C91951746	C220073768	C220081184	C220092411
C120061880	C1200501339	C1200501344	C1200501416
C1200503039	C1200700532	C1200700537	

Drawings
61005, Meter and Relay Diagram 4KV System Unit Buses 11 and 14, Revision 36
61030, Single Line Diagram Vital 120V AC & 125V DC Emergency 250V DC, Revision 32
61080SH0007, Schematic Diagram Salt Water Pump 12, Revision 21
61071SH0008, Schematic Diagram 4KV Bus 14 Feeder Breaker 152-1414, Revision 19
60733SH003, Miscellaneous Drain & Sump Piping Turbine & Diesel Bldg. and Yard, Revision 60
60488, Intake Structure Piping Sections Unit-1, Revision 27
62487, Intake Structure Piping Plan Unit-2, Revision 30
60489, Intake Structure Piping Plan Units 1 & 2, Revision 30
62488, Intake Structure Piping Sections, Revision 27
60847, Intake Structure Piping Plan Unit-1, Revision 24

Miscellaneous
VTD-J073-1129, T-5210 Pneumatic Temperature Transmitter, Issue Date 0489
EPRI TR-102067, Maintenance and Application Guide for Control Relays and Timers, 1993
E-90-71, 4KV Bus 14 Coordination Study, Revision 5

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
CNG-OP-4.01-1000, Integrated Risk Management, Revision 01100
NO-1-200, Control of Shift Activities, Revision 0500
EOOS Risk Monitor Guidelines – Senior Reactor Operators, Revision 1

EOOS Guidelines – Dominant Risk Activities, Revision 0
EP-1-108, Severe Weather Preparation, Revision 00300
ERPIP-3.0, Immediate Actions, Revision 04901

Miscellaneous
EOOS PRA Risk Model for August 7, 2012
EOOS PRA Risk Model for August 21, 2012
EOOS PRA Risk Model for August 24, 2012
EOOS PRA Risk Model for September 12, 2012

Section 1R15: Operability Determinations and Functionality Assessments

Procedures
CNG-OP-1.01-1002, Conduct of Operability Determinations/Functionality Assessments, Revision 00200
CNG-CA-1.01-1000, Corrective Action Program, Revision 00700
CNG-OP-1.01-2003, Alarm Response and Control, Revision 00200

Condition Reports

CR-2012-006249	CR-2012-006251	CR-2012-006319	CR-2012-006368
CR-2012-006414	CR-2012-006701	CR-2012-006826	CR-2012-006830
CR-2012-006843	CR-2012-006912	CR-2012-006913	CR-2012-006914
CR-2012-006952	CR-2012-007012	CR-2012-007156	CR-2012-007276
CR-2012-007284	CR-2012-007286	CR-2012-007317	CR-2012-008272

Work Orders

C120064897	C2199904699	C2200200500	C2200503237
C220093890	C91921672		

Drawings
60727SH0001, Diesel Generator Cooling Water, Starting Air, Fuel, Lube Oil Diesel No. 2A, Revision 60
63058ASH0001, Logic Diagram Engineered Safety Features Actuation System, Revision 53
63085SH0001F, Schematic Diagram Heating & Ventilating Control Room A/C Compressor 12, Revision 12
63085SH0001G, Schematic Diagram Heating & Ventilating Control Room Condenser Fan 12, Revision 12
65740SH0001, Instrument Installation Detail for 1-PDT-123A, Revision 0

Miscellaneous
E-92-046, Diesel Generator LOCI and SD Sequence Voltage Profile, Revision 2
SP-024B, Nuclear Class Carbon and Austenitic Stainless Steel Gate, Globe, and Check Valves, Revision 20
IEEE 450-1995, Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications

Section 1R18: Plant Modifications

Procedures
CNG-CM-1.01-1003, Design Engineering and Configuration Control, Revision 00500
CNG-CM-1.01-1004, Temporary Plant Configuration Change Process, Revision 00201
LR-01, On Line Leak Repairs to Various Pressure Retaining Components, Revision 00600

Work Orders
C91962297

Engineering Change Package
ECP-12-000692, Temporary Change for Leak Repair on Packing of 1HVCVC-377, Revision 0

Drawings
60730SH0002, Chemical and Volume Control System, Revision 76
Condition Reports
IRE-030-751 CR-2012-007270 CR-2012-007387

Section 1R19: Post-Maintenance Testing

Procedures
NO-1-208, Calvert Cliffs Operability and Maintenance Testing, Revision 01800
CNG-MN-4.01-1008, Pre/Post Maintenance Testing, Revision 00100
CNG-MN-4.01-GL002, Post Maintenance Test and Post Maintenance Operability Test Requirements Guideline, Revision 0

Completed Procedures
STP O-5A-1, Auxiliary Feedwater System Quarterly Surveillance Test, dated July 26, 2012
STP O-73A-2, Saltwater Pump and Check Valve Quarterly Operability Test, dated July 12, 2012

Condition Reports
CR-2011-009211 CR-2012-007350 CR-2012-007619

Work Orders

C91078641	C91242138	C91482532	C91482533
C91606265	C91971247	C91921672	C120061880

Drawings
60583SH0001, Auxiliary Feedwater System (Steam), Revision 63
64067, Diesel Generator Building Safety-Related Penetration Schedule & Details, Revision 2

Miscellaneous
DCALC D-M-92-038, Tornado Depressurization Analysis – Third Floor, Revision 2
Design Specification SP-784, Diesel Generator Project Safety Related Penetration Seals, Revision 1
DC-A-001-DG, Architectural Design Criteria, Revision 0
CMP-AFW-002, CCNPP Auxiliary Feedwater System Condition Monitoring Plan, Revision 0
SP-784, Design Specification for Diesel Generator Project Safety Related Penetration Seals, Revision 1

Section 1R20: Refueling and Other Outage Activities

Procedures
OP-3-1, Normal Power Operation, Revision 62
OP-4-1, Plant Shutdown from Power Operation to Hot Standby, Revision 34
OP-5-1, Plant Shutdown from Hot Standby to Cold Shutdown, Revision 62

Work Orders
C91921672

Section 1R22: Surveillance Testing

Procedures
PSTP-301, RCS Flow Measurement, Revision 01001

Completed Procedures
STP O-29-2, CEA Free Movement Test, dated July 3, 2012
STP O-8A-2, Test of 2A DG and 4 KV Bus 21 LOCI Sequencer, dated August 24, 2012
STP O-65H-1, Pressurizer Power-Operted Relief Block Valves Quarterly Operability Test, dated August 24, 2012
STP M-220G-2, 21 & 24KV Undervoltage Relay Functional Test, dated July 13, 2012
STP M-200-1, Reactor Trip Circuit Breaker Functional Test, dated July 13, 2012

Work Orders
C91501804

Drawings
12129-0032, Reactor Protective System Functional Diagram, Revision 5

Miscellaneous
CA07719, Calvert Cliffs Unit 1 Cycle 21 RCS Flow Evaluation, Revision 0
ES199900201, Reactor Coolant Pumps Operating Curves, Revision 0

Section 1EP2: Alert and Notification System Evaluation

Procedures
EP-1-106, Management and Configuration of the Public Alert and Notification System (PANS) – Sirens, Revision 1
S-W-4, Siren Test Procedure for the PANS System, Revision 9

Miscellaneous
FEMA Approval Letter to upgrade the Alert and Notification System, dated February 11, 2003
ANS System Health Report, 1st Quarter 2012
ANS System Health Report, 2nd Quarter 2012

Section 1EP3: Emergency Response Organization Staffing and Augmentation System

Procedures
Calvert Cliffs Nuclear Power Plant Emergency Response Plan, Revision 43
EP-1-107, Emergency Response Organization Expectations and Responsibilities, Revision 00200

EP-1-306, Calvert Cliffs Emergency Response Organization Training, Revision 00501
EP-1-307, Emergency Response Organization Personnel Assignment and Qualifications, Revision 00400
ET-W-27, Personnel Notification/Recall, Revision 26

Miscellaneous
1st Quarter 2012 ERO Notification Results
2nd Quarter 2012 ERO Notification Results
1st Quarter 2011 ERO Notification Results
2nd Quarter 2011 ERO Notification Results
3rd Quarter 2011 ERO Notification Results
4th Quarter 2011 ERO Notification Results

Section 1EP4: Emergency Action Level and Emergency Plan Changes

Procedures
Emergency Response Plan, Revision 44
ERPIP-3.0, "Immediate Actions," Revision 51
ERPIP-501, "Emergency Director/Recovery Manager," Revision 13

Section 1EP5: Correction of Emergency Preparedness Weaknesses

Procedures
CNG-EP-1.01-1002, Control of Emergency Preparedness Program Activities, Revision 00100
CNG-EP-1.01-1004, 10 CFR 50.54(q) Effectiveness Review, Revision 00100
CNG-CA-1.01-1000, Corrective Action Program, Revision 00400
CNG-NL-1.01-1011, 10 CFR 50.59/10 CFR 72.48 Applicability Determinations, Screenings and Evaluations, Revision 00200

Miscellaneous
Report of Audit EPP-12-01-C, Emergency Preparedness Program
Report of Audit EPP-11-01-C, Emergency Preparedness Program
Emergency Preparedness Drill Reports, January 2011 – July 2012
CALVEX Report for October 18, 2011
Emergency Preparedness Classified Event Report, Classified Event on August 23, 2011
Emergency Preparedness Classified Event Report, Classified Event on August 27, 2011

Section 1EP6: Drill Evaluation

Procedure
NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 6
AOP-3G, Malfunction of Main Feedwater System, Revision 12
EOP-0, Post Trip Immediate Actions, Revision 12
EOP-3, Loss of All Feedwater, Revision 13

Miscellaneous
99-01-EAL-TB, Emergency Action Level Technical Basis Document, Revision 00401

Section 2RS05: Radiation Monitoring Instrumentation

Procedures
ITEC-611, Calibration of the Eberline PIC-6A/B Survey Meter, Revision 1
ITEC-618, Calibration of Eberline Ion Chamber Models RO-2 and RO-2A, Revision 2
ITEC-619, Certification of J.L. Sheppard Calibrator Model 89, Revision 1
ITEC-639, Calibration of SAIC Radeco Variable Flow "Grab" Air Sampler Models H-809V1 and H-809C, Revision 1
ITEC-652, Calibration of SAIC Radeco Constant Flow (K-Flow) Air Sampler Model HD-29, Revision 00104
ITEC-653, Calibration of SAIC Radeco Air Sampler with Air Volume Totalizer Model H810V, Revision 0
ITEC-657, Calibration of Eberline Ion Chamber Model RO-20, Revision 00102
ITEC-664A, Calibration of Eberline Radiation Monitor Model E-600, Revision 1
ITEC-668, Generic Calibration Process to Calibrate Radiation Instrumentation, Revision 00100
ITEC-671, Calibration of the Gilair-5 Air Sampler Pump, Revision 00000
ITEC-612, Calibration of Eberline E-520 Survey Meter, Revision 00102
ITEC-644, Calibration of Eberline Personnel Monitor Model PM-7, Revision 00501
ITEC-650, Calibration of Bicron/NE Technology Small Articles Monitor Model SAM-9 or SAM-11, Revision 00201
STP M-462-1, Main Vent Stack Flow Measurement, Revision 00102
STP M-462-2, Main Vent Stack Flow Measurement, Revision 00103
STP M-467-0, Channel Functional Test of the Common Liquid Waste Discharge, Revision 00001
STP M-562-1, Containment High Range Radiation Monitor Alignment Check, Revision 00801
STP M-562-1, Containment High Range Radiation Monitor Alignment Check, Revision 00900
STP M-562-2, Containment High Range Radiation Monitor Alignment Check, Revision 00700
STP M-563-1, Containment High Range Radiation Monitor Source Check, Revision 00600
STP M-563-2, Containment High Range Radiation Monitor Source Check, Revision 4
STP M-564-1, Wide Range Noble Gas Monitor Calibration Check, Revision 01205
STP M-564-2, Wide Range Noble Gas Monitor Calibration Check, Revision 01407
STP M 569-2 Main Vent Gaseous Radiation Monitor Channel Calibration, Revision 1

Condition Reports

CR-2011-005752	CR-2011-005760	CR-2011-007377	CR-2011-007579
CR-2011-009530	CR-2011-010770	CR-2011-011506	CR-2011-011540
CR-2012-003699	CR-2012-005034	CR-2012-005425	

Section 2RS06: Radioactive Gaseous and Liquid Effluent Treatment

Procedures
CP-0428, Miscellaneous Primary and Secondary System Sampling and Chemical Addition, Revision 02700
CP-502, Sampling of Gases for Activity, Revision 00600
CP-504, Radioactive Liquid Waste Sampling and Compositing, Revision 6
CP-601, Liquid Radioactive Waste Release Permits, Revision 01900
CP-604, Radioactive Gaseous Waste Permits, Revision 02001
CP-614, Unmonitored Liquid Radioactive Waste Release Permit, Revision 7
CP-615, Plant Main Vent Release, Revision 00602
CNG-EV-1.01-1001, Radiological Groundwater Protection Program, Revision 00100

Condition Reports

CR-2010-010719	CR-2011-000340	CR-2011-002035	CR-2011-006620
CR-2011-010283	CR-2012-002098	CR-2012-002550	CR-2012-002550
CR-2012-006802	CR-2012-010719		

Miscellaneous
Liquid releases 90211, 90216, 90234, 90266, 90271, 90279, 90294
Gaseous Permits 90354, 90355, 90364, 90411, 90478, 90566

Section 4OA1: Performance Indicator Verification

Procedures
RM-1-323, Preparation of Emergency Preparedness Cornerstone NRC Performance Indicators, Revision 3

Section 4OA2: Problem Identification and Resolution

Condition Reports

IRE-021-404	IRE-021-410	IRE-020-797	CR-2008-000676
CR-2008-000853	CR-2008-002833	CR-2009-001434	CR-2009-006492
CR-2010-003189	CR-2010-008739	CR-2011-002872	CR-2011-003484
CR-2011-003485	CR-2011-006099	CR-2011-006233	CR-2011-006246
CR-2011-006303	CR-2011-006485	CR-2011-009825	CR-2011-010852
CR-2011-011044	CR-2011-011384	CR-2011-011828	CR-2011-012319
CR-2012-000203	CR-2012-002057	CR-2012-002844	CR-2012-003667
CR-2012-004438	CR-2012-004580	CR-2012-005221	CR-2012-006845
CR-2012-006608	CR-2012-006912	CR-2012-006913	CR-2012-006914
CR-2012-008085	CR-2012-008550	CR-2012-008551	CR-2012-008570
CR-2012-008614	CR-2012-008615		

Procedures
EOP-0, Post-Trip Immediate Actions, Revision 12
EOP-1, Reactor Trip, Revision 13
EOP-3, Loss of All Feedwater, Revision 18
EOP-4, Excess Steam Demand Event, Revision 17
EOP-6, Loss of Coolant Accident, Revision 24
ES-001, Internal Plant Flooding Design Evaluations, Revision 3
STP O-9A-1, AFAS Equipment Response Time Test, Revision 12
OI-15, SRW Pump Room Ventilation, Unit 2, Revision 46
OI-32A, Draining AFW Turbine Steam Lines, Unit 1, Revision 24
NO-1-203, 1-53-3-O-D, Unit 1 SRW Pump Room Floor Drains, Revision 1
CNG-CA-1.01-1000, Corrective Action Program, Revision 00700
STP O-67G-1, Safety Injection Check Valve Cold Shutdown Test, Revision 4
AOP-7H, Unit 1 and Unit 2 Loss of Plant Computer in Mode One or Two, Revision 23
CNG-CA-1.01-1005, Apparent Cause Evaluation, Revision 6
CNG-OP-1.01-1000, Conduct of Operations, Revision 8
CNG-OP-3.01-1000, Reactivity Management, Revision 7
NO-1-200, Control of Shift Activities, Revision 5
OI-8A, Unit 1 Blowdown System, Revisions 42 and 43
OI-8A, Unit 2 Blowdown System, Revisions 40 and 41

OI-30, Unit 1 and Unit 2 Nuclear Instrumentation, Revision 23
OP-3, Normal Power Operation, Revision 62

Completed Procedures
STP O-5A-1, Auxiliary Feedwater System Quarterly Surveillance Test, dated September 12, 2011
STP O-5A-1, Auxiliary Feedwater System Quarterly Surveillance Test, dated December 15, 2011
STP O-5A-1, Auxiliary Feedwater System Quarterly Surveillance Test, dated December 17, 2011
STP O-5A-1, Auxiliary Feedwater System Quarterly Surveillance Test, dated January 11, 2012
STP O-5A-1, Auxiliary Feedwater System Quarterly Surveillance Test, dated March 10, 2012
STP O-5A-1, Auxiliary Feedwater System Quarterly Surveillance Test, dated March 17, 2012
STP O-5A-1, Auxiliary Feedwater System Quarterly Surveillance Test, dated April 8, 2012
STP O-5A-2, Auxiliary Feedwater System Quarterly Surveillance Test, dated December 20, 2011
STP O-5A-2, Auxiliary Feedwater System Quarterly Surveillance Test, dated December 29, 2012
STP O-5A-2, Auxiliary Feedwater System Quarterly Surveillance Test, dated February 3, 2012
STP O-5A-2, Auxiliary Feedwater System Quarterly Surveillance Test, dated March 7, 2012
STP O-5A-2, Auxiliary Feedwater System Quarterly Surveillance Test, dated March 20, 2012
STP O-5A-2, Auxiliary Feedwater System Quarterly Surveillance Test, dated June 1, 2012
STP O-5A-2, Auxiliary Feedwater System Quarterly Surveillance Test, dated June 8, 2012
STP O-065J-1, Safety Injection Check Valve Operability Test, dated October 2, 2011
Valve-14, Velan Piston Check Valve Inspection and Repair, dated February 23, 2012
1-064-04-O-Q, Thermal Performance Operations Performance Evaluation, dated November 22, 2011
1-064-04-O-Q, Thermal Performance Operations Performance Evaluation, dated August 25, 2012
1-083-06-O-M, Thermal Performance Operations Performance Evaluation, dated August 12, 2012
2-064-04-O-Q, Thermal Performance Operations Performance Evaluation, dated November 22, 2011
2-064-04-O-Q, Thermal Performance Operations Performance Evaluation, dated August 11, 2012
2-083-07-O-M, Thermal Performance Operations Performance Evaluation, dated August 12, 2012

Work Orders

C90981574	C91083641	C91319975	C91697431
C91753661	2200702062		

Drawings
60583SH0001, Auxiliary Feedwater System (Steam), Revision 64
60583SH0002, Auxiliary Feedwater System (Condensate), Revision 3
60731, Safety Injection and Containment Spray Systems, Sh. 1, Revision 84
60731, Safety Injection and Containment Spray Systems, Sh. 2, Revision 46
60731, Safety Injection and Containment Spray Systems, Sh. 3, Revision 30

Miscellaneous
36A-07, Maintenance Rule Scoping Criteria, dated November 4, 2009

Engineering Standard ES-014, Summary of Environmental Service Conditions, Revision 4
EN-4-108, ASME Inservice Testing of Power-Operated Valves & Manual Valves, Revision 400
Component Basis Information – Unit 1 (IST) for 1-SI-113, 11A HPSI Header Isolation Check Valve, Revision 3
Component Basis Information – Unit 1 (IST) for 1-SI-113, 11A HPSI Header Isolation Check Valve, Revision 4
Component Basis Information – Unit 1 (IST) for 1-SI-114, LPSI Header Isolation Check Valve, Revision 4
Component Basis Information – Unit 1 (IST) for 1-SI-414, 12 HPSI Pump Discharge Check Valve, Revision 4
Component Basis Information – Unit 1 (IST) for 1-SI-427, 11 HPSI Pump Discharge Check Valve, Revision 4
ECP-11-000839, Evaluation of 1-SI-113 (11A HPSI Header Isolation Check Valve) Leakage, Rev. 0000
ECP-11-001045, Elimination of HPSI Header Isolation Check Valves, Revision 0
IST Program Scope Change for 1(2)-SI-113, 123, 133, and 143, dated January 6, 2011
1-93-071, Secondary Calorimetric Constants Baseline Calculation, Revision 2
CA04564, Steam Generator Blowdown Flow Uncertainty, Revision 3
CA06945, Calorimetric Uncertainty Using the LEFM CheckPlus Flow Measurement System, Revision 2
CA07695, Determine the Total SGBD Mass Flow Rate Based on Reading at FI-4089, Revision 0
ECP-11-000920, “Correct Table 1 in OI-8A” 10CFR 50.59 Screening Form, dated November 9, 2011
ECP-11-000920-015-7-01, Energy Balance of the Steam Generator Blow Down (SGBD) Tank, Revision 0
ES200400390, 8-Hour Power Averaging, Revision 0
ES200400492, Review/Revise Calorimetric Constants as Required by IR200300340, Revision 0
ETP No. 88-023, U-1 RCS Heat Loss Test, Revision 0
OI-30 Appendix A, Manual Secondary Calorimetric Calculation Using PA911C Inputs, dated November 22, 2011
OI-30 Appendix A, Manual Secondary Calorimetric Calculation Using PA911C Inputs, dated August 28, 2012
CNG-OP-1.01-1004 Attachment 2, ECP-11-000920 PORC Presentation Form, dated November 23, 2011
LTR-TAS-04-105, Guidelines for Calvert Cliffs Licensed Power Limit Monitoring, dated August 20, 2004
NRC NUREG 1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73, Revision 2
NRC Regulatory Issue Summary 2007-21, Adherence to Licensed Power Limits, dated February 9, 2009
Nuclear Plant Operations Section Standing Order No. 04-02, Reactivity Management Guidelines, dated March 6, 2012
PCR-11-07270, OI-8A-1 Procedure Change Request, dated November 10, 2011
PCR-11-07272, OI-8A-2 Procedure Change Request, dated November 10, 2011
Safety Evaluation Regarding Endorsement of NEI Guidance for Adhering to the Licensed Thermal Power Limit (TAC No. MD9233), dated October 8, 2008
Shift Turnover Information Sheet, dated November 21, 2011
Shift Turnover Information Sheet, dated September 17, 2012
Unit 1 and Unit 2 Operator Narrative Logs, dated September 9 – September 15, 2012

Section 4OA3: Followup of Events and Notices of Enforcement Discretion

Procedures
OP-3-1, Normal Power Operation, Revision 62
OP-4-1, Plant Shutdown from Power Operation to Hot Standby, Revision 34
OP-5-1, Plant Shutdown from Hot Standby to Cold Shutdown, Revision 62

Condition Reports

CR-2009-003660	CR-2011-001263	CR-2012-006251

Section 4OA5: Other Activities

Condition Reports

CR-2010-011633	CR-2011-006328	CR-2011-008964	CR-2011-009263
CR-2012-000811	CR-2012-001119	CR-2012-007848	CR-2012-007868
CR-2012-007919	CR-2012-008210		

Work Orders

C91404151	C91441704	C91456038	C91442490
C91456234	C91456489	C91639284	

Procedures
CNG-OP-4.01-1000, Attachment 9, HIGH Risk Activity/IPTE/IMA Plan for Dry Storage Canisters 70, 71, and 72, Revision 01100
ISFSI-03, Independent Spent Fuel Storage Installation (ISFSI) Loading, NUHOMS-32P Dry Shielded Canister, Revision 01201
FH-352, NUHOMS-32P DSC Loading & Unloading, Revision 00400
CNG-OP-1.01-1002, Attachment 1, Operability Determination, Revision 00200
CNG-NL-1.01-1011, 10 CFR50.59/10 CFR 72.48 Applicability Determination, Screening and Evaluations, Revision 00200
ITEC-646, Calibration of Ludlum Count Ratemeter Model 12 with Eberline Neutron Detector Model NRD, Revision 4

Miscellaneous Documents
Calvert Cliffs Nuclear Power Plant Materials License SNM-2505 (Specific ISFSI License) Amendment 9
Appendix A to Materials License SNM-2505, Technical Specifications, Amendment 9
Self Assessment Calvert SA-2011-000286 for Dry Storage Canisters 67, 68, and 69
Audit ISF-12-01-C, Independent Spent Fuel Storage Installation (ISFSI), dated August 14, 2012
Dose Reports for Dry Cask Campaigns 64 through 71
Receipt Inspection Report of NUHOMS 32-P Canister for DSC loads 70 and 71
Written Instructions for Use of Strongback to Correct Bowed Condition of Top Casing Plate on Top Shield Plug for NUHOMS 32P DSC S/N CEG32P-1069

LIST OF ACRONYMS

ACE	apparent cause evaluation
ADAMS	Agency-Wide Documents Access and Management System
AFW	auxiliary feedwater
ALARA	as-low-as-reasonably-achievable
ANS	alert and notification system
ARMS	area radiation monitoring system
ASME	American Society of Mechanical Engineers
CAP	corrective action program
CAM	continuous air monitors
CCNPP	Calvert Cliffs Nuclear Power Plant
CEA	control element assembly
CFR	*Code of Federal Regulations*
CoC	certificate of compliance
CR	condition report
DEP	drill and exercise performance
DSC	dry shielded canister
EAL	emergency action level
EDG	emergency diesel generator
EP	emergency preparedness
EPIP	emergency plan implementing procedures
ERF	emergency response facilities
ERO	emergency response organization
F	Fahrenheit
FCV	flow control valve
FEMA	Federal Emergency Management Agency
GPI	groundwater protection initiative
GPM	gallons per minute
HSM	horizontal storage module
IMC	Inspection Manual Chapter
ISFSI	independent spent fuel storage installation
KV	kilovolt
LOCA	loss of coolant accident
LOCI	loss of coolant incident
NCV	non-cited violation
NIST	National Institute of Standards and Technology
NRC	Nuclear Regulatory Commission
NSIR	Office of Nuclear Security and Incident Response
ODCM	offsite dose calculation manual
OEM	original equipment manufacturer
OI	operating instruction
PARS	publicly available records
PI	performance indicator
PM	portal monitor
PSV	pressurizer safety valve
RCS	reactor coolant system
RTP	rated thermal power
RWP	radiation work permit(s)
SAM	small article monitor
SDP	significance determination process

SG	steam generator
SRW	service water
SSC	systems, structures, and components
SRW	service water
SW	saltwater
TS	technical specification
UFSAR	Updated Final Safety Analysis Report
WO	work order