



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION I
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May 12, 2009

James A. Spina, Vice President
Calvert Cliffs Nuclear Power Plant, Inc.
Constellation Generation Group, LLC
1650 Calvert Cliffs Parkway
Lusby, Maryland 20657-4702

**SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT - NRC INTEGRATED
INSPECTION REPORT 05000317/2009002 AND 05000318/2009002**

Dear Mr. Spina:

On March 31, 2009, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Calvert Cliffs Nuclear Power Plant (CCNPP) Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on April 10, 2009, with Mr. Trepanier 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 three NRC-identified findings and one self-revealing finding of very low safety significance (Green). All of the findings were determined to involve violations of NRC requirements. Additionally, a 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 (CAP), the NRC is treating these findings as non-cited violations (NCVs) consistent with Section VI.A.1 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 I; the Director, Office of Enforcement; and the NRC Resident Inspector at CCNPP. In addition, if you disagree with the characterization of 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 CCNPP. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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

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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 05000317/2009002 and 05000318/2009002
w/Attachment: Supplemental Information

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3

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.: 50-317, 50-318

License Nos.: DPR-53, DPR-69

Report No.: 05000317/2009002 and 05000318/2009002

Licensee: Constellation Generation Group, LLC (Constellation)

Facility: Calvert Cliffs Nuclear Power Plant, Units 1 and 2

Location: Lusby, MD

Dates: January 1, 2009 through March 31, 2009

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Enclosure

TABLE OF CONTENTS

SUMMARY OF FINDINGS	3
REPORT DETAILS.....	6
REACTOR SAFETY	6
1R01 Adverse Weather Protection	6
1R04 Equipment Alignment	6
1R05 Fire Protection	7
1R08 Inservice Inspection (ISI).....	7
1R11 Licensed Operator Requalification Program	8
1R12 Maintenance Effectiveness	9
1R13 Maintenance Risk Assessments and Emergent Work Control	11
1R15 Operability Evaluations.....	13
1R19 Post-Maintenance Testing.....	14
1R20 Refueling and Outage Activities	15
1R22 Surveillance Testing.....	17
RADIAION SAFETY	17
2OS1 Access Control to Radiologically Significant Areas.....	17
2OS2 ALARA Planning and Controls	20
OTHER ACTIVITIES (OA)	21
4OA1 Performance Indicator (PI) Verification.....	21
4OA2 Identification and Resolution of Problems.....	22
4OA5 Other Activities	24
4OA6 Meetings, Including Exit	25
4OA7 Licensee-Identified Violations.....	25
ATTACHMENT: SUPPLEMENTAL INFORMATION	A-1
KEY POINTS OF CONTACT	A-1
LIST OF ITEMS OPENED, CLOSED AND DISCUSSED	A-1
LIST OF DOCUMENTS REVIEWED	A-2
LIST OF ACRONYMS	A-8

SUMMARY OF FINDINGS

IR 05000317/2009002, 05000318/2009002; 1/1/09 – 3/31/09; Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2: Maintenance Effectiveness; Maintenance Risk Assessments and Emergent Work Control: Refueling and Outage Activities: and Access Control to Radiologically Significant Areas.

The report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. Four Green findings, all of which were non-cited violations (NCVs), were identified. The significance for most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross cutting aspect for each finding was determined using IMC 0305 "Operating Reactor Assessment Program." 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.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Initiating Event

- Green. The inspectors identified an NCV of Technical Specifications (TS) 3.4.5, "RCS Loops – Mode 3," because Constellation did not comply with the required starting conditions for reactor coolant pumps (RCPs) during several plant startups on Unit 1. The inspectors identified a discrepancy between the RCP starting requirements described in the operating instructions (OI) and the RCP starting requirements listed in the TS for loop operability. Specifically, the OI did not provide operators with adequate procedural guidance to meet the Mode 3, 4, and 5 TS RCP starting requirements prior to starting RCPs. Constellation entered this issue into their corrective action program (CAP) for resolution. The immediate corrective actions included revising OI-1A, "Reactor Coolant System and Pump Operations," to ensure that the TS starting conditions are met prior to starting any RCPs.

This finding is more than minor because it is associated with the procedure quality 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, starting a RCP while not meeting the starting requirements could cause a pressure transient and lift a pressurizer PORV. The inspectors determined that the finding is of very low safety significance because it did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available. This finding has a cross-cutting aspect in the area of human performance because Constellation did not provide complete, accurate, and up-to-date procedures that were adequate to assure nuclear safety. Specifically, OI-1A included requirements that were contrary to the TS and led to the operators' failure to comply with the TS when starting RCPs (H.2.c per IMC 0305). (Section 1R20)

Cornerstone: Mitigating Systems

- Green. A self-revealing NCV of TS 5.4.1.a, "Procedures," was identified because Constellation did not follow procedures for refilling the No. 11 main steam isolation valve (MSIV) actuator accumulator with nitrogen. On February 6, 2009, while lining up to refill the No. 11 MSIV actuator accumulator, operators removed a blank flange which caused nitrogen gas to be released. This resulted in the No. 11 MSIV being inoperable. Immediate corrective actions included reinstallation of the blank flange, refilling the nitrogen accumulator to the required pressure, and conducting a prompt investigation. Constellation entered this issue into their CAP for further evaluation.

The inspectors determined that this finding is more than minor because it is associated with the human performance attribute of the Mitigating System cornerstone and affected 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). The finding is of very low safety significance because it is not a design or qualification deficiency, did not represent a loss of a safety function of a system or a single train greater than its TS allowed outage time, and did not screen as potentially risk significant due to external events. This finding has a cross-cutting aspect in the area of human performance because Constellation did not effectively communicate human error prevention techniques, such as holding an adequate pre-job brief and performing proper self and peer checking (H.4.a). (Section 1R12)

- Green. The inspectors identified an NCV of 10 CFR Part 50.65 (a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," because Constellation did not assess and manage the increase in risk that resulted from maintenance activities that impacted the availability of the No. 21 charging pump. On February 4, 2009, operators isolated the Unit 2 core flush piping to prevent back-leakage of water from the charging system into one of the safety injection tanks. Isolating the core flush piping also prevented the ability of the No. 21 charging pump to automatically start on a safety injection actuation signal and deliver concentrated boric acid to the reactor coolant system (RCS). The inspectors noted that this function is modeled in the site specific probabilistic risk assessment (PRA) model. However, Constellation did not assess the risk associated with the unavailability of the No. 21 charging pump for an 8 day period. Immediate corrective actions included a re-evaluation of the risk and entering this issue into their CAP for resolution.

The finding is more than minor because Constellation's risk assessment did not consider risk significant structures, systems, and components (SSCs) (i.e. No. 21 charging pump) that were unavailable during the maintenance activity. The finding is associated with the configuration control attribute of the Mitigating Systems cornerstone and affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors determined that the finding is of very low safety significance because the incremental core damage probability deficit was less than $1.0\text{E-}6$. This finding has a cross-cutting aspect in the area of human performance, because Constellation did not appropriately plan and incorporate risk insights in work activities associated with maintenance activities that impacted the availability of the No. 21 charging pump (H.3.a). (Section 1R13)

Cornerstone: Occupational Radiation Safety

- Green. The inspectors identified an NCV of T.S. 5.4.1.a, "Procedures," because Constellation did not implement radiation protection procedural requirements for obtaining airborne radioactivity samples prior to workers entering the Unit 2 steam generators. Specifically, on February 25, 2009, Constellation did not conduct airborne radioactivity samples to evaluate radiological conditions prior to worker entry as required by radiation work permit (RWP) No. 2009-2408. This resulted in workers entering an area in which radiological conditions were not fully characterized. Constellation subsequently obtained air samples and entered the finding into their CAP.

The finding is more than minor because it is associated with the Occupational Radiation Safety cornerstone attribute of program and process and affected the cornerstone objective of protecting worker health and safety from exposure to radiation. Specifically, Constellation did not fully characterize airborne radioactivity concentrations in the steam generators prior to worker entries. Using IMC 0609, Appendix C, "Occupational Radiation Safety Significance Determination Process," the inspectors determined that the finding was of very low safety significance (Green) because it did not involve: (1) as low as reasonably achievable (ALARA) planning and controls; (2) an overexposure; (3) a substantial potential for overexposure; or (4) an impaired ability to assess dose. This finding has a cross-cutting aspect in the area of human performance because Constellation did not effectively communicate expectations to personnel to follow RWP requirements (H.4.b). (Section 2OS1)

B. Licensee-Identified Violations

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

REPORT DETAILS

Summary of Plant Status

Calvert Cliffs Unit 1 began the inspection period at 100 percent power. On March 28, 2009, operators reduced power to 90 percent to perform main turbine valve testing. Operators returned the unit to 100 percent power on the same day. The unit remained at 100 percent power for the remainder of the inspection period.

Calvert Cliffs Unit 2 began the inspection period at 100 percent power. On February 22, 2009, operators conducted a reactor shutdown to support a planned refueling outage (RFO). Following the RFO on March 20, operators returned Unit 2 to 100 percent power. The unit remained at 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)a. Inspection Scope

The inspectors reviewed the adverse weather preparation and mitigating strategies for Constellation's response to impending adverse weather associated with low bay water temperature on January 21, 2009. This review included an assessment of Constellation's implementation of abnormal operating procedure AOP – 7L, "Circulating Water/Intake Malfunctions" and a walkdown of the intake structure. The inspectors verified that the operator actions specified in the associated procedures maintain readiness of essential equipment and systems to preclude weather induced initiating events. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R04 Equipment AlignmentPartial Walkdown (71111.04Q – Four Samples)a. Inspection Scope

The inspectors conducted partial walkdowns to verify equipment alignment of selected risk significant systems. The inspectors reviewed plant documents to determine the correct system and power alignments, as well as the required positions of critical valves and breakers. The inspectors verified that Constellation had properly identified and resolved equipment alignment problems that could cause initiating events or potentially affect the availability of associated mitigating systems. The inspectors performed a partial walkdown of the following systems:

- No. 22 saltwater (SW) header subsystem due to planned maintenance on the No. 21 SW subsystem header;
- No. 21 component cooling (CC) train due to planned maintenance on the No. 22 CC train;
- Unit 2 service water system, “B” train during engineered safety features actuation system testing on “A” train; and
- 2B Emergency diesel generator (EDG) following planned maintenance activities associated with Unit 2 RFO.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05Q – Six Samples)

a. Inspection Scope

The inspectors conducted a tour of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that combustibles and ignition sources were controlled in accordance with Constellation’s administrative procedures; the fire detection and suppression equipment was available for use; passive fire barriers were maintained in good material condition; and compensatory measures for out-of-service, degraded, or inoperable fire protection equipment were implemented in accordance with Constellation’s fire plan.

- 1A EDG fuel oil storage tank room, fire area EDG1A, Room 5.
- Unit 1 CC pump room, fire area 12, room 201.
- Unit 2 CC pump room, fire area 15, room 228.
- Unit 1, 45’ switchgear room, fire area 34, room 430.
- Unit 2, 45’ switchgear room, fire area 25, room 407.
- Unit 2, containment, room 229.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection (ISI) (IP 71111.08 - One Sample)

a. Inspection Scope

Inservice inspection activities can detect precursors to pressure boundary failures in reactor coolant systems, emergency core cooling systems, risk-significant piping and components, and containment systems. Degradation of pressure boundaries of reactor coolant systems, steam generator tubes, emergency feedwater systems, essential service water systems, and containments would result in a significant increase in risk. This inspection is intended to assess the effectiveness of the licensee’s program for monitoring degradation of vital system boundaries.

The inspectors selected a sample of nondestructive examination activities for review and compared the implementation and results against the requirements of American Society

of Mechanical Engineers, Boiler and Pressure Vessel Code, Section XI and regulations requiring the management of steam generator degradation. The licensee did not implement modifications, repairs, or replacements consisting of welding on pressure boundary risk significant systems.

The inspectors reviewed examination procedures, personnel qualifications and examination test results. This sample includes the review of nondestructive tests performed on dissimilar metal welds that were located in the primary coolant loop on the cold side. The inspectors reviewed samples of examination reports and condition reports initiated during ISI examinations to evaluate Constellation's effectiveness in the identification and resolution of problems.

The inspectors performed a review of nondestructive test results of a number of locations including those of dissimilar metal welds. The inspectors reviewed plant specific steam generator design information, tube inspection criteria, tube plugging criteria, and plans for the identification and disposition of new degradation mechanisms. The inspectors reviewed the plans for the control and monitoring of foreign objects and the performance of integrity assessments if tube flaws were identified. In addition, the inspectors reviewed previous inspection data to assure that areas identified with active degradation mechanisms were included in the current inspection plan. The inspectors determined through direct observation that appropriate calibration of the eddy current testing procedure was being implemented and qualified for the expected types of active tube degradation.

The inspectors evaluated the implementation of the steam generator inspection program by conducting interviews with data management personnel, acquisition personnel, data analysts and resolution analysts. The inspectors interviewed the licensee's independent qualified data analyst, and reviewed selected samples of eddy current data and analysis of selected tubes.

The inspectors reviewed a sample of condition reports which identified flaws and other nonconforming conditions discovered during this outage. The inspectors verified that the nonconforming conditions identified were reported, characterized, evaluated and appropriately disposition and entered into the corrective action program.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program

.1 Resident Inspector Quarterly Review (71111.11Q – One Sample)

a. Inspection Scope

On January 29, 2009, the inspectors observed a licensed operator requalification training scenario to assess operator performance and the adequacy of the licensed operator training program. The training scenario involved an excessive steam demand event. The inspectors focused on high-risk operator actions performed during the implementation of abnormal and emergency operating procedures. The inspectors verified the clarity and formality of communications, the completion of appropriate

operator actions in response to alarms, the performance of timely control board operations and manipulations, and the oversight and direction provided by the shift manager were in accordance with Constellations' administrative and technical procedures.

b. Findings

No findings of significance were identified.

.2 Biennial Review (71111.11B – One Sample)

On January 12, 2009, a region-based inspector conducted an in-office review of final results of the licensee-administered annual operating tests for 2008. Results from the comprehensive written exams were not included in this review because those exams were part of the 2007 testing cycle. The inspection assessed whether pass rates were consistent with the guidance of NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)." The inspector verified that:

- Crew failure rate was less than 20%. (Crew failure rate was 0%);
- Individual failure rate on the dynamic simulator test was less than or equal to 20%. (Individual failure rate was 3.8%);
- Individual failure rate on the walk-through test was less than or equal to 20%. (Individual failure rate was 1.3%); and
- Overall pass rate among individuals for all portions of the exam was greater than or equal to 75%. (Overall pass rate was 94.9%).

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

Quarterly Review (71111.12Q – Two Samples)

a. Inspection Scope

The inspectors reviewed the maintenance effectiveness of the samples listed below for the following: 1) appropriate work practices; 2) identifying and addressing common cause failures; 3) scoping in accordance with 10 CFR Part 50.65(b) of the maintenance rule; 4) characterizing reliability issues for performance; 5) trending key parameters for condition monitoring; 6) recording unavailability for performance; 7) classification and reclassification in accordance with 10 CFR Part 50.65(a)(1) or (a)(2); and 8) appropriateness of performance criteria for SSC classified as (a)(2) and/or appropriateness and adequacy of goals and corrective actions for SSCs classified as (a)(1).

- Unit 1 Low temperature overpressure protection low setpoint (CR-2009-003149).
- No. 11 MSIV inoperable due to nitrogen leak (CR-2009-000856).

b. Findings

Introduction: A self-revealing Green NCV of TS 5.4.1.a, "Procedures," was identified because Constellation did not follow procedures for refilling the No. 11 MSIV actuator accumulator with nitrogen. This resulted in the valve being inoperable.

Description: On February 6, 2009, while lining up to refill the No. 11 MSIV actuator accumulator with nitrogen, operators removed a blank flange which caused nitrogen gas to be released. Because nitrogen gas is used to rapidly shut the valve in the event of a main steam line rupture, the reduction in nitrogen gas in the accumulator resulted in the No. 11 MSIV being inoperable. Based on a review of Constellation's prompt investigation, the inspectors concluded that the operators did not follow the procedure used to refill the MSIV actuator accumulator. The inspectors noted that there are two methods to connect the charging connection to the nitrogen accumulator dependent on the configuration of the MSIV actuator. One method required removing an outer cap and a gas valve cap. The other method required removing a gas valve cap only. The operators inadvertently assumed that an outer cap required removal. This led the operators to implement a procedural step that was not applicable for the MSIV actuator configuration. Specifically, step 6.3.a of OI-8E, "MSIV Actuator System," stated, "If installed, then remove the cap from the actuator accumulator charging fitting." The operators did not recognize that No. 11 MSIV did not have an outer cap and, as a result, removed a blank flange directly on the nitrogen hemisphere causing nitrogen gas to be released. Operators reinstalled the blank flange, recharged the nitrogen accumulator to the required pressure, and restored the No. 11 MSIV to an operable status. Based on a review of Constellation's prompt investigation, the inspectors determined that Operations did not conduct an adequate pre-job brief prior to the evolution. During the pre-job brief, operators did not discuss several key elements of a brief such as critical steps, what could go wrong, roles and responsibilities and conditional steps. In addition, there was a missed opportunity because an adequate peer check was not performed. Constellation entered this issue into their CAP for further evaluation.

Analysis: The performance deficiency is that Constellation did not follow procedures for refilling the No. 11 MSIV actuator accumulator with nitrogen. This resulted in the valve being inoperable. The inspectors determined that this finding is more than minor because it is associated with the human performance attribute of the Mitigating System cornerstone and affected 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). The inspectors evaluated the significance of this finding using IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings." The finding is of very low safety significance because it is not a design or qualification deficiency, did not represent a loss of a safety function of a system or a single train greater than its TS allowed outage time, and did not screen as potentially risk significant due to external events. This finding is related to the cross-cutting area of human performance because Constellation did not effectively communicate human error prevention techniques, such as holding an adequate pre-job brief and performing proper self and peer checking (H.4.a).

Enforcement: TS 5.4.1.a requires, in part, that written procedures be established, implemented, and maintained for activities described in Appendix A of Regulatory Guide (RG) 1.33, "Quality Assurance Program Requirements (Operation)."

Specifically, Section 3 of RG 1.33, Appendix A, "Instructions for energizing, filling, venting, draining, startup, shutdown, and changing modes of operation should be prepared, as appropriate, for the following systems," includes the main steam system. Step 6.3.a of OI-8E stated, "If installed, then remove the cap from the actuator accumulator charging fitting." Contrary to the above, on February 6, 2009, the operators did not correctly implement Step 6.3.a of OI-8E which resulted in an inoperable MSIV. Because this issue is of very low safety significance (Green) and Constellation entered this issue into their CAP as CR-2009-000856, this finding is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 05000317/2009002-01, Did Not Follow MSIV Actuator System Procedure)**

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – Seven Samples)

a. Inspection Scope

The inspectors reviewed the following activities to verify that station personnel performed the appropriate risk assessments prior to taking equipment out of service for work. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The inspectors compared the risk assessments and risk management actions performed by station procedure NO-1-117, "Integrated Risk Management," to the requirements of 10 CFR Part 50.65(a)(4), the recommendations of the Nuclear Management and Resources Council 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," and approved station procedures. In addition, the inspectors assessed the adequacy of Constellation's identification and resolution of problems associated with maintenance risk assessments and emergent work activities.

- Planned maintenance on Unit 1 auxiliary feedwater (AFW) emergency ventilation system on January 15, 2009.
- Planned maintenance on No. 22 SW header subsystem on January 22, 2009.
- Planned maintenance on the No. 12 control room ventilation train and pressurizer power operated relief valve (1-PORV-404) on January 30, 2009.
- Planned maintenance associated with the isolation of the Unit 2 core flush path on February 4, 2009.
- Emergent risk assessment due to No. 11 MSIV nitrogen leak on February 6, 2009.
- Emergent outage risk associated with No. 22 containment spray pump bearing failure on February 24, 2009.
- Emergent risk assessment due to two inoperable Unit 2 wide range nuclear instrumentation channels on March 15, 2009.

b. Findings

Introduction: The inspectors identified a Green NCV of 10 CFR Part 50.65 (a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," because Constellation did not assess and manage the increase in risk that resulted from maintenance activities that impacted the availability of the No. 21 charging pump.

Description: On February 4, 2009, Operations identified seat leakage on 2-MOV-269 which is located in the core flush path between the charging system and the high pressure safety injection (HPSI) system. To eliminate this leakage into one of the safety injection tanks, Operations isolated the Unit 2 core flush piping by shutting 2-HV-CVC-182. The inspectors noted that shutting this valve impacted the ability of the No. 21 charging pump to automatically start on a safety injection actuation signal and deliver concentrated boric acid to the RCS. The inspectors identified that, although this function is modeled in Constellation's PRA model, Operations did not include the unavailability of the No. 21 charging pump on the risk assessment for approximately 8 days. This is contrary to the requirements of 10 CFR Part 50.65(a)(4), which requires that "the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities." Corrective action included a re-evaluation of the risk and entering this issue into their CAP as CR-2009-002722.

Analysis: The performance deficiency is that Constellation did not conduct an adequate risk assessment for maintenance activities that impacted the availability of the No. 21 charging pump. As a result, the risk assessment for Unit 2 was inadequate for approximately 8 days. Using IMC 0612, "Power Reactor Inspection Reports," Appendix B, Section 3, Item 5(a), the finding is greater than minor, because Constellation's risk assessment did not consider risk significant SSCs (i.e., No. 21 charging pump) that were unavailable during the maintenance activity. The No. 21 charging pump is considered risk significant because it is identified as such in Table 2 of the NRC's Phase 2 Significance Determination Process notebook for Calvert Cliffs. The finding is associated with the configuration control attribute of the Mitigating Systems cornerstone and affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Because this finding involves the licensee's assessment and management of risk associated with performing maintenance activities under all plant operating or shutdown conditions, the inspectors used IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," to evaluate this finding. The inspectors determined that the finding is of very low safety significance (Green) because the incrementally core damage probability deficit was less than $1.0E-6$. This finding has a cross-cutting aspect in the area of human performance because Constellation did not appropriately plan and incorporate risk insights in work activities that impacted the availability of the No. 21 charging (H.3.a).

Enforcement: 10 CFR Part 50.65 (a)(4) states, in part, that "the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities." Contrary to the above, from February 4 to February 12, 2009, the risk assessment did not include the unavailability of the No. 21 charging pump associated with the maintenance activity of isolating the Unit 2 core flush piping. Because this violation is of very low safety significance (Green) and Constellation entered the issue into their CAP (CR-2009-002722), this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 05000318/2009002-02: Inadequate Risk Assessment Associated with the No. 21 Charging Pump)**

1R15 Operability Evaluations (71111.15 – Eight Samples)a. Inspection Scope

The inspectors reviewed operability evaluations and/or condition reports (CRs) to verify that the identified conditions did not adversely affect safety system operability or plant safety. The evaluations were reviewed using criteria specified in NRC Regulatory Issue Summary 2005-20, "Revision to Guidance formerly contained in NRC Generic Letter 91-18, Information to Licensees Regarding two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability" and Inspection Manual Part 9900, "Operability Determinations and Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety." In addition, where a component was inoperable, the inspectors verified the TS limiting condition for operation implications were properly addressed. The inspectors performed field walkdowns, interviewed personnel, and reviewed the following items:

- Unit 1 AFW pump room emergency ventilation with degraded flow (CR-2008-002833/OD-08-009);
- No. 12 CC heat exchanger SW normal back-up outlet valve (1-CV-5163) failed open (CR-2008-002648/OD-09-001);
- No. 22 CC heat exchanger SW outlet valve failed stroke time test (CR-2009-000448);
- Unit 2 safety injection to charging header core flush valve leak (CR-2009-000534);
- Unit 2 reactor protection system resistance temperature detector slow response time (CR-2009-000986);
- Unit 2 shutdown cooling flow control valve did not open fully (CR-2009-001235);
- No. 22 containment air cooler doors will not go full open (CR-2009-001446); and
- RCP start guidance and TS on RCS loop operability appear misaligned (CR-2009-001270).

b. Findings

Introduction: The inspectors identified an unresolved item (URI) associated with the performance evaluations (PE-1-36-1-O-M and PE-2-36-2-O-M) used to determine if the AFW emergency ventilation system performs satisfactorily in service for Units 1 and 2. Specifically, the performance evaluation did not incorporate the requirements and acceptance limits contained in the Updated Final Safety Analysis Report (UFSAR).

Description: Following the inspectors' concerns about the AFW pump room emergency ventilation system configuration, Constellation measured the AFW pump room emergency ventilation flow rates. The results of the tests revealed that the flow rates were less than the design requirement stated in the UFSAR. The UFSAR stated, in part, that the emergency ventilation can circulate 2,000 cubic feet per minute (CFM) of air between the mechanical room of the Auxiliary Building at Elevation 5'0" and the AFW pump room of the Auxiliary Building at Elevation 12'0". However, Constellation found that the flow rates for each AFW pump room emergency ventilation fan were less than 2,000 CFM. Constellation entered this issue into their CAP for resolution as CR-2008-002833 and CR-2009-000650 and performed a re-analysis using the degraded flow rates.

As a part of the degraded flow rate review, the inspectors identified that the performance evaluation used to determine the equipment performance of the emergency ventilation fan operation did not incorporate the requirements contained in the UFSAR. The inspectors noted that the monthly performance evaluation only checked for air being drawn into the AFW pump room with no acceptance criteria. The inspectors determined that a performance deficiency existed in that Constellation did not establish an adequate test program to assure that the AFW pump room emergency ventilation system would perform satisfactorily in service. Specifically, the performance evaluation did not contain acceptance limits. This resulted in Constellation not recognizing that the AFW pump room emergency ventilation system did not meet the design requirements stated in the UFSAR. This item is unresolved pending further review and investigation of past operability concerns such that the inspectors can determine if the performance deficiency is more than minor. The inspectors need to review the inputs and assumptions used in the re-analysis to determine if the degraded flow rate adversely affected the Mitigating System cornerstone objective to ensure the availability, reliability, and capability of the AFW steam driven pumps. **(URI 05000317/318/2009002-03, Auxiliary Feedwater Pump Room Emergency Ventilation System Low Flow)**

1R19 Post-Maintenance Testing (71111.19 – Seven 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 procedures to verify that the procedures adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedures were consistent with information in the applicable licensing basis and/or design basis documents, and that the procedures 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.

- Replaced the No. 21 SW pump (MO #22008004074).
- Replaced the suction and discharge expansion boots on the No. 11 and 12 AFW emergency ventilation fan (MO #1200805965).
- 2A EDG speed control repair (MO #2200803389).
- Replaced solenoid valve for No. 22 component cooler heat exchanger outlet valve (MO #2200802235).
- Replaced Unit 1 low temperature overpressure protection power supply (MO #1200806089).
- Adjusted the Unit 2 safety injection flow control valve packing for 2-SI-306-CV (MO #2200703230).
- Replaced No. 11 MSIV o-ring (MO #1200900646).

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities (71111.20 – One Sample)a. Inspection Scope

The inspectors reviewed the activities associated with the Unit 2 eighteenth refueling outage (2R18). Prior to the outage, the inspectors reviewed the outage plan and the risk assessment of the schedule. During the outage, the inspectors examined the following activities: shutdown of the plant; cool-down; drain down to the reactor vessel flange and mid-loop conditions; fuel handling operations; heat-up; dilution to criticality; and rise to full power operations. The inspectors reviewed applicable procedures, observed control room activities, conducted walkdowns, and interviewed key personnel. The inspectors also conducted periodic outage reviews of the following items: location of scaffolding; clearance activities; foreign material exclusion controls; RCS instrumentation; electrical power configuration; shutdown cooling system operation; spent fuel pool cooling system operation; inventory control measures; reactivity control measures; and containment closure requirements. The inspectors evaluated the activities against TS requirements, site procedures, and other applicable guidance and requirements.

b. Findings

Introduction: The inspectors identified a finding of very low safety significance (Green) associated with an NCV of TS 3.4.5, “RCS Loops – Mode 3,” because Constellation did not comply with the required starting conditions for RCPs during several plant startups on Unit 1.

Description: On February 23, 2009, the inspectors observed the Unit 2 plant shutdown in preparation for a refueling outage. Following the shutdown, the inspectors noted a discrepancy between the RCP starting requirements described in OI-1A, “Reactor Coolant System and Pump Operations” and the RCP starting requirements listed in TS for loop operability. Note 2 of TS 3.4.5, “RCS Loops, Mode 3”; TS 3.4.6, “RCS Loops, Mode 4”; and Note 3 of TS 3.4.7, “RCS Loops, Mode 5”, stated the following:

“No reactor Coolant pump shall be started with any RCS cold leg temperature ≤ 365 °F Unit 1), ≤ 301 °F (Unit 2) unless:

- a. The pressurizer water level is ≤ 170 inches;
- b. Pressurizer pressure is ≤ 300 psia (Unit 1), ≤ 320 psia (Unit 2); and
- c. The secondary side water temperature in each SG is ≤ 30 °F above the RCS temperature.”

However, the inspectors noted that OI-1A directed operators to apply the RCP starting requirements only during the “first” RCP start. Contrary to the TS, OI-1A did not require that RCP starting requirements be met for subsequent pump starts. The RCP starting requirements outlined in TS 3.4.5, TS 3.4.6, and TS 3.4.7 are in place for low temperature overpressure protection considerations to preclude a pressurizer PORV from lifting due to a pressure surge in the RCS when an RCP is started. The inspectors noted that Constellation conducted an evaluation in 1994 that interpreted the TS note to apply only to the “first” RCP start. Since that time, OI-1A has directed operators to utilize the RCP starting requirements only when starting the first RCP. The operating

procedures used for both plant startup and shutdown directed the use of this inadequate RCP operating instruction.

Constellation entered this issue into their CAP for resolution as CR-2009-001270 and determined that the RCP starting requirements applied to all RCP starts. Immediate corrective actions included changing OI-1A to direct operators to meet the TS RCP starting requirements prior to starting any RCPs. Constellation subsequently determined that, during previous startups on Unit 1, RCPs had been started while plant conditions in Mode 3 did not meet the TS 3.4.5 RCP start requirements (CR-2009-002841). Planned corrective action included conducting an apparent cause evaluation and preparing a licensee event report (LER) to report this TS violation.

Analysis: The performance deficiency is that Constellation did not comply with the start criteria of Note 2 of TS 3.4.5 prior to starting RCPs during several startups on Unit 1. The finding is more than minor because it associated with the procedure quality 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, starting a RCP while not meeting the starting requirements could cause a pressure transient and lift a pressurizer PORV. The inspectors evaluated the significance of this finding using IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings." The inspectors determined that the finding is of very low safety significance because it did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available. This finding has a cross-cutting aspect in the area of human performance because Constellation did not provide complete, accurate, and up-to-date procedures that were adequate to assure nuclear safety. Specifically, OI-1A included requirements that were contrary to the TS and led to operators' failure to comply with the TS when starting RCPs. The inspectors concluded that the performance deficiency is reflective of current performance because operators had reasonable opportunities to identify this discrepancy during procedure reviews and pre-job briefs each time prior to starting RCPs (H.2.c).

Enforcement: TS 3.4.5, "RCS Loops – Mode 3," requires that no Unit 1 RCP shall be started with any RCS cold leg temperature less than or equal to 365 °F unless: a) pressurizer water level is less than or equal to 170 inches; b) pressurizer pressure is less than or equal to 300 psia; and c) secondary side water temperature in each steam generator is less than or equal to 30 °F above RCS temperature. Contrary to the above, during startups on Unit 1 prior to February 23, 2009, Constellation personnel started multiple RCPs during Mode 3 operation with temperature less than 365 °F and pressurizer pressure greater than 300 psia. Constellation entered this issue into their CAP for resolution as CR-2009-001270 and CR-2009-002841. Because this issue is of very low safety significance (Green) and it was entered into the licensee's CAP, this violation is being treated as an NCV, consistent with the NRC Enforcement Policy. **(NCV 05000317/2009002-03, Did Not Comply with Technical Specification Requirements While Starting Reactor Coolant Pumps)**

1R22 Surveillance Testing (71111.22 – Nine Samples)

a. Inspection Scope

The inspectors observed and/or reviewed the surveillance tests listed below associated with selected risk-significant SSCs to determine whether the testing adequately demonstrated the ability to perform its intended safety function. The inspectors also verified that proper test conditions were established as specified in the procedures, no equipment preconditioning activities occurred, and that acceptance criteria had been satisfied.

- Unit 2 boric acid pumps performance test (STP-O-73F-2).
- Unit 2 AFW pumps large flow inservice test (IST) (STP-O-73H-2).
- Unit 2 main steam safety valve testing (STP-M-003A-0).
- Unit 2 resistance temperature detectors time response data collection test (STP-M-515A-2).
- Unit 2 RCS/shutdown loop operability verification (modes 4, 5 and 6) (STP-O-94B-2).
- No. 23 HPSI pump large flow IST (STP-O-73G-2).
- No. 21 low pressure safety injection pump large flow IST (STP-O-73L-2).
- Unit 2 local leak rate testing of shutdown cooling penetration (containment isolation valve) (STP-O-108C-2).
- Unit 1 RCS leakage evaluation (STP-O-27-1).

b. Findings

No findings of significance were identified.

2. **RADIAION SAFETY**

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01 – Twenty-Two Samples)

.1 Pre-Outage Inspection (Twelve Samples)

a. Inspection Scope

During the period January 20 to 23, 2009, the inspectors conducted the following activities to verify that Constellation was properly implementing physical, administrative, and engineering controls for access to locked high radiation areas, and other radiologically significant areas. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, relevant TS, and Constellation's procedures.

The inspectors reviewed RWPs used to access high radiation areas and identify what work control instructions or control barriers had been specified. The inspectors reviewed electronic personal dosimeter (EPD) alarm set points (both integrated dose and dose rate) for conformity with survey indications and plant policy.

During job performance observations, the inspectors verified the adequacy of radiological controls such as: required surveys, radiation protection job coverage, and

contamination controls. The inspectors observed radiation protection technician performance with respect to radiation protection work requirements. The inspectors also observed radiation worker performance with respect to stated radiation protection work requirements. The inspectors verified that radiation workers were aware of the significant radiological conditions in their workplace, their RWP precautions, and that their performance took into consideration the level of radiological hazards present.

The inspectors reviewed Constellation's self assessments, audits, and CRs related to the access control program since the last inspection to determine if identified problems are entered into the CAP. The inspectors reviewed five CRs related to access control to ensure follow-up actions were conducted in a timely and effective manner.

The inspectors discussed, with radiation protection supervision, the controls in place for special areas that are or have the potential to become very high radiation areas during certain plant operations. The inspectors verified the key controls and toured the auxiliary building to verify the integrity of locks to locked high radiation areas.

b. Findings

No findings of significance were identified.

.2 Outage Inspection (Ten Samples)

a. Inspection Scope

During the period March 2 to 6, 2009, the inspectors conducted the following activities to verify that Constellation was properly implementing physical, administrative, and engineering controls for access to locked high radiation areas, and other radiologically significant areas. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, relevant TS, and Constellation's procedures.

- Performance indicator (PI) events and associated documentation packages reported by Constellation in the Occupational Radiation Safety cornerstone.
- The inspectors identified the steam generator (SG) inspections, scaffold activities, and refueling activities as significant work areas and reviewed the associated controls and surveys of these areas to determine if controls were acceptable.
- The inspectors walked down the perimeter of these areas to determine whether prescribed RWPs, procedures, and engineering controls were in place, whether surveys and postings were acceptable, and whether air samplers were properly located.
- The inspectors reviewed RWPs for scaffold work, refueling activities, RCP seal replacements, SG inspection activities, and minor maintenance used to access high radiation areas and determines what work control instructions or control barriers had been specified. The inspectors reviewed EPD alarm set points (both integrated dose and dose rate) for conformity with survey indications and plant policy. The inspectors verified that workers knew what actions they were to take if their EPD malfunctioned or alarmed.
- During job performance observations for SG inspections, scaffold activities, and refueling activities, the inspectors verified the adequacy of radiological controls,

such as: required surveys, including airborne surveys, radiation protection job coverage, and contamination controls. The inspectors observed the pre-job brief for installation of the upper guide structure.

- The inspectors questioned workers to verify that radiation workers were aware of the significant radiological conditions in their workplace, their RWP precautions, and that their performance took into consideration the level of radiological hazards present and that they were aware of their EPD set-points. The inspectors also observed radiation worker performance with respect to stated radiation protection work requirements.
- The inspectors observed radiation protection technician performance with respect to radiation protection work requirements.
- The inspectors discussed with the radiation protection manager the status of changes in Constellation's procedural controls of high dose rate-high radiation areas and very high radiation areas.

Either because the conditions did not exist or an event had not occurred, no opportunities were available to review the following items:

- RWPs for airborne radioactivity areas with the potential for individual worker internal exposures of > 50 mrem committed effective dose equivalent (20 DAC-hrs).
- Adequacy of Constellation's internal dose assessment for any actual internal exposure > 50 millirems committed effective dose equivalent.

b. Findings

Introduction: The inspectors identified a Green NCV of T.S. 5.4.1.a, "Procedures," because Constellation did not implement radiation protection procedural requirements for obtaining airborne radioactivity samples prior to workers entering the Unit 2 SGs.

Description: On February 25, 2009, workers entered Unit 2 SGs to install nozzle dams. The RWP (2009-2408) controlling this work activity specified that airborne radioactivity samples be obtained prior to entry into the SGs. The RWP and the associated ALARA Plan identified the area as a potential airborne area and indicated airborne radioactivity concentrations in excess of 3.3 derived air concentrations (DAC) were likely. The inspectors asked for the results of the airborne survey. However, Constellation personnel did not collect airborne radioactivity samples as required by the RWP prior to the initial personnel entry for either SG. Constellation entered this issue into their CAP as CR-2009-001928 and took air samples on March 3, 2009. The highest DAC value identified in the SGs with no work activities in progress was 7.83. As part of their normal radiological practices for SG entries, all workers wore respiratory protection and were sent for a whole body count immediately upon exit from the area. The whole body counts confirmed that the workers received no intake of radioactivity.

Analysis: The failure to obtain an air sample for the steam generators prior to worker entry is a performance deficiency. The finding is more than minor because it is associated with the Occupational Radiation Safety cornerstone attribute of program and process and affected the cornerstone objective of protecting worker health and safety from exposure to radiation. Specifically, Constellation did not fully characterize airborne radioactivity concentrations in the SGs prior to worker entries. Because this finding is in the occupational radiation safety area, the inspectors used IMC 0609, "Appendix C,

“Occupational Radiation Safety Significance Determination Process,” to evaluate this finding. The inspectors determined that the finding was of very low safety significance (Green) because it did not involve: (1) ALARA planning and controls; (2) an overexposure; (3) a substantial potential for overexposure; or (4) an impaired ability to assess dose. This finding has a cross-cutting aspect in the area of human performance because Constellation did not effectively communicate expectations to personnel to follow RWP requirements (H.4.b).

Enforcement: TS 5.4.1.a. requires that the licensee establish, implement, and maintain procedures specified in RG 1.33, Revision 2, Appendix A. RG 1.33, Appendix A, Section 7.e specifies procedures for RWPs and airborne radioactivity monitoring be established and implemented. RWP 2009-2408, was written in accordance with the RWP procedure and required an air sample inside the SG prior to worker entry. Contrary to the above, on February 25, 2009, workers entered the Unit 2 SGs and air samples were not collected prior to their entries. Because this finding is of very low safety significance and has been entered into Constellation’s CAP as CR-2009-001928, this violation is being treated as an NCV, consistent with NRC Enforcement Policy. **(NCV 05000318/2009002-04, Did Not Follow Radiation Protection Procedures)**

2OS2 ALARA Planning and Controls (71121.02 - Twelve Samples)

.1 Pre-Outage Inspection (Nine Samples)

a. Inspection Scope

During the period January 20 to 23, 2009, the inspectors conducted the following activities to verify that Constellation was properly implementing operational, engineering, and administrative controls to maintain personnel exposure ALARA. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, applicable industry standards, and Constellation’s procedures.

The inspectors reviewed pertinent information regarding cumulative exposure history, current exposure trends, and current exposure status for ongoing operational activities. The inspectors reviewed the site’s 3-year rolling average dose and compared the site’s average with industry’s average. The inspectors verified that Constellation’s ALARA program procedure and the RWP procedure include job estimating and tracking. The inspectors also reviewed the dose status, controls, and monitoring methods for two declared pregnant workers.

The inspectors reviewed the status and historical trends of source terms and the effects of zinc addition to the RCS. The inspectors also reviewed the activities of the outage source term High Impact Team.

The inspectors reviewed RWPs and ALARA evaluations for the five dose intensive outage tasks for the upcoming Unit 2 outage. The inspectors verified that radiation workers demonstrated an ALARA philosophy.

The inspectors reviewed audits and self assessments to verify identified problems are put into the CAP. The inspectors reviewed elements of Constellation’s CAP related to implementing the ALARA program to determine if problems were being entered into the program for timely resolution. The inspectors reviewed one CR related to dose received

from a discrete hot particle contamination and the effectiveness in predicting and controlling worker dose.

b. Findings

No findings of significance were identified.

.2 Outage Inspection (Three Samples)

a. Inspection Scope

During the period March 2 to 6, 2009, the inspectors conducted the following activities to verify that Constellation was properly implementing operational, engineering, and administrative controls to maintain personnel exposure ALARA. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20, applicable industry standards, and Constellation's procedures.

The inspectors reviewed Constellation's outage dose tracking for individual tasks and total outage dose. The inspectors reviewed cumulative exposure history, current exposure trends, and current exposure status for ongoing outage activities. The inspectors reviewed the source term results during shut down and clean-up. The results were compared to pre-outage estimates and the effects on containment dose rates.

The inspectors reviewed RWPs and ALARA evaluations for the five dose intensive outage tasks. The inspectors reviewed ALARA in-process reviews and Total Effective Dose Equivalent (TEDE)-ALARA respiratory protection evaluations. The inspectors reviewed the ALARA committee meeting minutes to verify total site involvement in the ALARA process.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA1 Performance Indicator (PI) Verification (71151 – One Sample)

a. Inspection Scope

The inspectors reviewed Constellation's submittal of the Safety System Functional Failures (SSFF) PIs for Units 1 and 2. The inspectors reviewed the PIs for the period of January 2008 through December 2008. These dates account for the previous four quarters reported in LERs, maintenance rule records, and maintenance work orders that prevented, or could have prevented, the fulfillment of a safety function. The inspectors used the guidance provided in NEI 99-02 to assess the accuracy of PI data collected and reported. The inspectors reviewed Constellation's PI data and plant records associated with the SSFF PI that also included operator logs and system health reports.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152 – Two Samples)

.1 Reviews of Items Entered Into the Correction Action Program (CAP)

a. Inspection Scope

The inspectors performed a daily screening of items entered into Constellation's CAP as required by IP 71152, "Identification and Resolution of Problems." The review facilitated the identification of potentially repetitive equipment failures or specific human performance issues for follow-up inspection. This was accomplished by reviewing the description of each new CR and attending screening meetings.

b. Findings

No findings of significance were identified.

.2 Annual Sample: AFW Pump Reliability Issues

a. Inspection Scope

This inspection focused on Constellation's problem identification, evaluation, and resolution concerning a declining trend in AFW system reliability. Several factors that have contributed to the declining AFW system reliability have included, air entrainment in the lubrication oil on the No. 22 turbine driven auxiliary feedwater (TDAFW) pump, governor drift on the No. 12 and No. 21 TDAFW pumps, and area ventilation limitations on both the Unit 1 and 2, TDAFWP rooms. Problems with air entrainment and oil foaming continued through August 2008, in which the No. 22 TDAFWP was declared inoperable due to overfilling the lubrication system. As described in CR-2007-00104, the No. 12 TDAFWP governor was required to be replaced due to decreasing speed during a quarterly surveillance test and the No. 21 TDAFWP I/P and hand controller were not in calibration forcing the turbine speed to go low during a quarterly surveillance test. As discussed in Section 1R15 of this report, continued challenges with the adequacy of the TDAFWP area ventilation has resulted in degraded conditions requiring detailed operability analysis and compensatory actions.

The inspectors selected the AFW system reliability issue for review based on the risk significance of the AFW system. The inspectors reviewed Constellation's associated troubleshooting results, apparent cause evaluation, extent of condition review, and short- and long-term corrective actions. The inspectors conducted several walkdowns of the Unit 1 and Unit 2 AFW systems to assess material condition, design control measures, and configuration control. In addition, the inspectors: interviewed plant personnel; directly observed a portion of the No. 23 AFW pump quarterly surveillance test; reviewed recently completed TDAFW pump surveillances, oil and thermography analysis and trending; reviewed related industry operating experience, system health reports, and mitigating system performance indicator; and examined recent maintenance rule inputs and evaluations. The inspectors also reviewed the Calvert Cliffs TS and UFSAR to ensure that Constellation properly operated and maintained the AFW systems, as required.

b. Findings and Observations

No findings of significance were identified. Due to the risk importance of the AFW system, the inspectors examined a wide scope of components, programs, and procedures to assess the reliability of the AFW systems at Calvert Cliffs. The inspectors found that Constellation was appropriately identifying, correcting, and tracking conditions important to AFW system reliability. However, the inspectors did identify several minor deficiencies. Specifically, loose bolts were observed on the No. 23 AFW pump motor box. This condition was entered in Constellation's CAP as CR-2009-002676.

The inspectors also identified several minor observations with respect to the quality of lube oil analysis and trending. Specifically, one instance was identified in which the incorrect oil was identified on the analysis sheet. Additionally, the inspectors identified one lube oil analysis that was incorrectly identified as an AFW component. These issues were entered in Constellation's CAP as CR-2009-002727.

The inspectors noted that Constellation incorrectly removed the No. 23 AFW pump flow path from service, resulting in the additional unnecessary accumulation of six hours of unavailability (see section 4OA7). Although this condition did not cause Constellation to cross a performance threshold, Constellation was required to submit a correction to the fourth quarter heat removal mitigating system performance indicator (MSPI). Constellation captured this issue under CR-2009-000979.

.3 Annual Sample: RCS Draindown and Reduced Inventory Issues

a. Inspection Scope

The inspectors performed an in-depth review of Constellation's apparent cause evaluation and corrective actions associated with IRE-030-690, RCS draindown and reduced inventory issues. Condition Report IRE-030-690 was written to address the trend of operating procedures quality issues from Unit 1 2008 refueling outage and to ensure lessons learned were captured and incorporated into preparatory actions for Unit 2 2009 refueling outage. Lessons learned from the Unit 1 2008 outage included the development of a reactor vessel head void while draining the reactor vessel following emptying the SG tubes with compressed air. Additional lessons learned from the Unit 1 2008 refueling outage included unreliable RCS level instrumentation and inadequate procedure actions for level deviations between RCS level indicators. The inspectors reviewed the appropriateness of the assigned significance, the scope and depth of the causal analysis, and the timeliness of resolution. The inspectors assessed whether the evaluations identified likely causes for the issues and identified appropriate corrective actions to address the identified causes. In addition, the inspectors assessed whether Constellation's evaluation considered extent of condition, generic implications, common cause, and previous occurrences. The inspectors reviewed the potential impact on nuclear safety and risk to verify that Constellation had taken corrective actions commensurate with the significance of the issue. The inspectors evaluated these actions against the requirements of Constellation's CAP and 10 CFR Part 50, Appendix B. Additionally, the inspectors interviewed Constellation's personnel with respect to the effectiveness of the implementation of these corrective measures.

b. Findings and Observations

No findings of significance were identified. The inspectors determined that Constellation's corrective actions were adequate and commensurate with the safety significance of the issue. To address the unreliable RCS level indicators, Constellation installed two new level indicators that met the criteria for independent and continuous level indication discussed in NRC Generic Letter 88-17, "Loss of Decay Heat Removal." In addition, Constellation revised OP-7, "Shutdown Operations," to include appropriate operator action for loss of all level indication and level deviation between RCS level indicators. Constellation determined that the most likely cause of the reactor vessel head void was the emptying of the SG tubes with compressed air and removed the associated steps from OP-7. The inspectors identified a few minor procedure discrepancies associated with OP-7. Operations submitted a procedure change request to address these discrepancies.

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

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

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

b. Findings

No findings of significance were identified.

.2 Completion of Initial Operator License Candidate

a. Inspection Scope

On January 27, 2009, a region-based examiner administered two in-plant job performance measures (JPMs) to a senior reactor operator upgrade applicant whose protected area access had been temporarily suspended. In June 2008, the applicant took the written examination and the parts of the operating examination that could be administered outside of the protected area. See Inspection Report 05000318/2008301 for details regarding the June 2008 examination. The applicant's score on these two JPMs was integrated with the score of the portions of the operating examination that were administered in June 2008. Overall, the applicant achieved a passing score and was issued a license.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On April 10, 2009, the resident inspectors presented the inspection results to Mr. Trepanier and other members of your staff who acknowledged the findings. The inspectors asked Constellation whether any of the material examined during the inspection should be considered proprietary. There was no proprietary information identified.

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 meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as an NCV:

- 10 CFR Part 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," states, in part, "Before performing maintenance activities (including but not limited to surveillance, post maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities." Contrary to this, on August 21, 2008, Constellation removed the Unit 2 motor driven AFW flow path trains to the No. 21 and No. 22 SGs without conducting an adequate risk assessment. Constellation entered this issue in their CAP as CR-2009-000979. This finding is of very low safety significance based on a SDP Phase 1 screening utilizing IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process." Specifically, the incremental core damage probability deficit was less than 1E-6.

ATTACHMENT: SUPPLEMENTAL INFORMATION

ATTACHMENT 1**SUPPLEMENTAL INFORMATION****KEY POINTS OF CONTACT**Constellation Personnel

J. Spina, Site Vice President
 D. Trepanier, Plant General Manager
 A. Ball, Radiation Protection Supervisor
 B. Dansberger, Radiation Protection Supervisor
 J. Davis, Principle Chemist
 S. Dean, Manager, Operations
 B. Erdman, Radiological Engineering Supervisor
 M. Flaherty, Manager, Engineering Services
 J. Gaines, Director, Licensing
 K. Gould, General Supervisor, Radiation Protection
 A. Henni, Senior Design Engineer
 S. Henry, General Supervisor Systems Engineering
 W. Holsten, Director of Training
 R. Jones, Superintendent Operations Support
 A. Kelly, LOR Program Administrator
 L. Larragoite, Manager, Nuclear Safety and Security
 D. Lauver, Assistant Manager Engineering
 N. Lavato, Principle Operations Training Specialist
 C. Neyman, Licensing Engineer
 A. Simpson, Principle Engineer, Licensing
 M. Wasem, Supervisor, Initial License Training
 J. Wynn, Senior System Engineer
 R. Pace, Operations Training Manager
 J. York, Supervisor Radiation Protection

LIST OF ITEMS OPENED, CLOSED AND DISCUSSEDOpened

05000317/318/2009002-03	URI	Auxiliary Feedwater Pump Room Emergency Ventilation Low Flow (Section 1R15)
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Opened and Closed

05000317/2009002-01	NCV	Did Not Follow MSIV Actuator System Procedure (Section 1R12)
05000318/2009002-02	NCV	Inadequate Risk Assessment Associated with the No. 21 Charging Pump (Section 1R13)

05000317/2009002-03	NCV	Did Not Comply with Technical Specification Requirements While Starting Reactor Coolant Pumps (Section 1R20)
05000318/2009002-04	NCV	Did Not Follow Radiation Protection Procedures (Section 2OS1)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

AOP-7L, Circulating Water/Intake Malfunctions, Revision 11
OI-38A, Screen Wash System, Revision 23

Miscellaneous

OAP 92-9, Cold Weather Operations, Change 7

Section 1R04: Equipment Alignment

Drawings

Drawing 62708SH0002, Circulating Water Cooling System, Revision 105
Drawing 62710SH0001, Component Cooling System, Revision 38
Drawing 62710SH0002, Component Cooling System, Revision 24
Drawing 62706SH0002, Service Water Cooling System, Revision 65
Drawing 62706SH0003, Service Water Cooling System, Revision 5

Procedures

OI-15, Service Water System, Revision 45
OI-21B, 2B Diesel Generator, Revision 19

Section 1R05: Fire Protection

Procedures

Calvert Cliffs Fire Fighting Strategies Manual, Revision 00200
SA-1-100, Fire Prevention, Revision 01500
SA-1-101, Fire Fighting, Revision 4

Miscellaneous

CCNPP Fire Hazards Analysis Summary Document, Revision 0000

Section 1R08: Inservice Inspection

Examination Reports

RFO - 2R017

CC09-IV-086	Component 30-RC-22A-10
CC09-IV-067	Component 30-RC-21B-7
CC09-IV-066	Component 30-RC-21A-10

CC09-IV-068	Component 30-RC-22A-7
CC09-IV-083	Component 30-RC-22B-7
CC09-IV-085	Component 30-RC-21A-7
CC09-IV-084	Component 30-RC-21B-10
CC09-IV-082	Component 30-RC-22B-10

RFO - 1R018

CC08-IV-167	Component 12-PSL-13
CC08-IV-017	Component 12-PSL-13

Section 1R11: Licensed Operator Regualification Program

Procedures

NO-1-200, Control of Shift Activities, Revision 03800
EOP-4, Excessive Steam Demand, Revision 17
EOP-8, Functional Recovery Procedure, Revision 32

Section 1R12: Maintenance Effectiveness

Condition Reports

CR-2009-003149
CR-2009-000856

Miscellaneous

CCNPP Maintenance Rule Scoping Document, Revision 28
CCNPP Preventive Maintenance Basis 88, System 11, Service Water System Control Valves

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Condition Reports

CR-2009-000528

Procedures

Maintenance Rule Risk Assessment Guideline, Revision 7
NO-1-117, Integrated Risk Management, Revision 21

Section 1R15: Operability Evaluations

Condition Reports

CR-2008-002833/OD-08-009
CR-2008-002648/OD-09-001
CR-2009-000448
CR-2009-000534
CR-2009-000986
CR-2009-001235
CR-2009-001446
CR-2009-001270

Drawings

Drawing 62730SH0002, Chemical and Volume Control System, Revision 73

Procedures

CNG-OP-1-01-1002, Conduct of Operability Determinations/Functionality Assessments,
Revision 0

Section 1R19: Post-Maintenance Testing

Surveillances

STP O-8B-2, Test of 2B DG and 4KV Bus 24 LOCI Sequencer, Revision 26 dated

Work Orders

MO #2200804074

MO #1200805965

MO #2200803389

MO #2200802235

MO #1200806089

MO #2200703230

MO #1200900646

Section 1R20: Refueling and Outage Activities

Procedures

OP-1, Plant Startup from Cold Shutdown, Revision 26

OP-2, Plant Startup from Hot Standby to Minimum Load, Revision 44

OP-3, Normal Power Operation, Revision 46

OP-4, Plant Shutdown from Power Operation to Hot Standby, Revision 18

OP-5, Plant Shutdown from Hot Standby to Cold Shutdown, Revision 24

OP-7, Shutdown Operations, Revision 40

PSTP-02, Initial Approach to Criticality and Low Power Physics Testing Procedure,
Revision 30

OI-25G, Control Element Assembly Handling Tool, Revision 5

Condition Reports

CR-2009-001445

CR-2009-001462

CR-2009-001634

CR-2009-001901

CR-2009-001446

CR-2009-001651

CR-2009-001653

CR-2009-001532

CR-2009-001534

CR-2009-001608

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Miscellaneous

Generic Letter 88-17, Loss of Decay Heat Removal, dated October 17, 1988

Section 1R22: Surveillance Testing

Procedures

STP-M-003A-0, On-line Main Steam Safety Valve Testing, Revision 3
 STP-O-73H-2, AFW Pump Large flow Test, Revision 9
 STP-M-515A-2, RTD Time Response Data Collection Test, Revision 4
 STP O-108C-2, Local Leak Rate Test, Penetration 41 (Shutdown Cooling), Revision 00306
 STP O-27-1, Reactor Coolant System Leakage Evaluation, Revision 20
 STP O-73F-2, Boric Acid Pump Performance Test, Revision 8
 STP-O-94B-2, RCS/SDC Loop Operability Verification (Modes 4,5,6), Revision 5
 STP-O-73G-2, High Pressure Safety Injection Pump Large Flow Test, Revision 7
 STP-O-73L-2, Low Pressure Safety Injection Pump Large Flow Test, Revision 8

Condition Reports

CR-2009-000986

Section 2OS1: Access Control to Radiologically Significant Areas

Procedures

NO-1-110, Calvert Cliffs Key and Lock Control, Revision 8
 RSP-1-200, ALARA Planning and SWP Preparation, Revision 23
 RP-1-100, Radiation Protection, Revision 8
 RSP-1-132, Job Coverage in Radiologically Controlled Areas, Revision 13

Condition Reports

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 CR-2008-001306
 CR-2008-001354
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 CR-2008-002323

Audits and Assessments

SA200800100-002, Snapshot Self-Assessment "Assessment of a RP Corrective Action Self Identification Rate"
 QPA Assessment Report 2008-084, ISFSI Campaign 57
 QPA Assessment Report 2008-105, Spent Fuel Pool Dive to Inspect and Repair the Unit 2 Fuel Transfer Carriage
 QPA Assessment Report 2008-103, Radiation Protection Self-Assessment Program

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2016	2312	2406
2300	2314	2407
2306	2315	2408
2308	2400	2409

Miscellaneous

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 Shut-Down Surveys

Outage Dose Reports and the 2009 Refuel Outage Dose Graph Dated 3/4/09

Section 2OS2: ALARA Planning and Controls

Procedures

RSP-1-200, ALARA Planning and SWP Preparation, Revision 23

RP-1-100, Radiation Protection, Revision 8

Condition Reports

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Audits and Assessments

SA200800135, Self-Assessment to Evaluate and Identify Areas of Improvement for Exposure Control

TEDE-ALARA Evaluations

2009	2010	2300	2315
2000	2012	2307	2400
2003	2017	2311	2408
2004	2018	2314	2409

ALARA In Process Reviews

2009	2400
2016	2401
2306	2406
2315	2409

Miscellaneous

December 10, 2008, ALARA Committee Meeting Minutes

Section 4OA1: Performance Indicator Verification

Condition Reports

IRE-033-089

Miscellaneous

NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 5

LER 05000317/2008002, Pressurizer Safety Valve Setpoint High due to Low Torque and Misalignment, Revision 0

LER 05000317/2008002, Pressurizer Safety Valve Setpoint High due to Excessive Drift, Revision 1

Section 4OA2: Identification and Resolution of Problems

Procedures

MN-1-209, Predictive Maintenance Program, Revision 7

OI-32A-2, Auxiliary Feedwater System, Revision 18

OP-7-2, Shutdown Operations, Revision 40

OI-1A, Reactor Coolant System and Pump Operations, Revision 29

QL-2-100, Corrective Action Program, Revision 23

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CR-2009-002317	CR-2009-002332	CR-2009-002346
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STP O-5A-2, Auxiliary Feedwater System Quarterly Surveillance Test, Dated 3/25/09

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Operability Determination, OD# 2008-00676, 08-006, 2008-002833
Tier 2 Apparent Cause Evaluation, AFW Foaming, CR-2008-001208, March 31, 2007

Miscellaneous

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AFW System Health Reports, Units 1 and 2, Fourth Quarter 2008
AIT ER200700104, Equipment Performance Action Plan Auxiliary Feed Water (AFW)
Drawing No. 12083-0002, Byron Jackson DVMX Pump Auxiliary Feedwater Pump Outline,
Revision 13
Equipment History Database – Unavailability Detail Report, March 26, 2009
Key Performance Indicator Report, March 2009
Maintenance Unavailability by Group-EUAF100, 13 AFW PP, August 21, 2008
Maintenance Unavailability by Group-EUAF100, 23 AFW PP, August 21, 2008
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Mitigating System Performance Indicator (MSPI) AFW Basis Document, Revision 0
Shift Turnover Information Sheet, March 25, 2009
Unit 1 and 2, AFW Lube Oil Analysis, December 2008
Generic Letter 88-17, Loss of Decay Heat Removal, dated October 17, 1988

Operating Experience

Calvert Cliffs Unit 1 and 2, NRC Inspection Report 50-317/2008003 and 05-318/2008003,
Dated 8/1/08

LIST OF ACRONYMS

ADAMS	Agency-Wide Documents Access and Management System
AFW	Auxiliary Feedwater
ALARA	As Low As Reasonably Achievable
CAP	Corrective Action Program
CC	Component Cooling
CCNPP	Calvert Cliffs Nuclear Power Plant
CFM	Cubic Feet per Minute
CFR	Code of Federal Regulations
CR	Condition Report
DAC	Derived Air Concentration
EDG	Emergency Diesel Generator
EPD	Electronic Personal Dosimeter
HPSI	High Pressure Safety Injection
IMC	Inspection Manual Chapter
IP	Inspection Procedure
ISI	Inservice Inspection
IST	Inservice Test
JPM	Job Performance Measure
LER	Licensee Event Report
MSIV	Main Steam Isolation Valve
MSPI	Mitigating System Performance Indicator
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
OA	Other Activities
OI	Operating Instructions
PARS	Publicly Available Records
PI	Performance Indicator
PORV	Power-Operated Relief Valve
PRA	Probabilistic Risk Assessment
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RFO	Refueling Outage
RG	Regulatory Guide
RV	Reactor Vessel
RWP	Radiation Work Permit
SDP	Significance Determination Process
SG	Steam Generator
SSC	Structure, System, Component
SSFF	Safety System Functional Failure
SW	Salt Water
SWP	Special Work Permit
TDAFW	Turbine-Driven Auxiliary Feedwater
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
°F	degrees Fahrenheit
psia	pounds per square inch absolute