



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
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May 7, 2007

Mr. 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 05000317/2007002 AND 05000318/2007002**

Dear Mr. Spina:

On March 31, 2007, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Calvert Cliffs Nuclear Power Plant Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on April 19, 2007, with Mr. Joseph Pollock 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. However, because of the very low safety significance and because these issues have been entered into your corrective action program, the NRC is treating these violations 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, D.C. 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Calvert Cliffs Nuclear Power Plant.

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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2

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Sincerely,

/RA/

Blake D. Welling, Acting Chief
Projects Branch 1
Division of Reactor Projects

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

Enclosure: Inspection Report 05000317/2007002 and 05000318/2007002
w/ Attachment: Supplemental Information

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3

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/
Blake D. Welling, Acting Chief
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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos. 50-317, 50-318, 72-008

License Nos. DPR-53, DPR-69, SNM 2505

Report Nos. 05000317/2007002 and 05000318/2007002

Licensee: Constellation Generation Group, LLC (Constellation)

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

Location: Lusby, MD

Dates: January 1, 2007 through March 31, 2007

Inspectors: Silas Kennedy, Senior Resident Inspector
Marlone Davis, Resident Inspector
Joseph Furia, Senior Health Physicist
Dante Johnson, Reactor Inspector
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Approved by: Blake Welling, Acting Chief
Projects Branch 1
Division of Reactor Projects

TABLE OF CONTENTS

SUMMARY OF FINDINGS	-iii-
REPORT DETAILS	1
REACTOR SAFETY	1
1R02 Evaluation of Changes, Tests, or Experiments	1
1R04 Equipment Alignment	2
1R05 Fire Protection	2
1R08 Inservice Inspection (ISI)	3
1R11 Licensed Operator Requalification Program	5
1R12 Maintenance Effectiveness	6
1R13 Maintenance Risk Assessments and Emergent Work Control	7
1R15 Operability Evaluations	8
1R17 Permanent Plant Modifications	11
1R19 Post-Maintenance Testing	11
1R20 Refueling and Outage Activities	12
1R22 Surveillance Testing	12
1R23 Temporary Plant Modifications	13
RADIATION SAFETY	13
2OS1 Access Control To Radiologically Significant Areas	13
2OS2 ALARA Planning and Controls	15
2OS3 Radiation Monitoring Instrumentation	17
OTHER ACTIVITIES (OA)	17
4OA1 Performance Indicator (PI) Verification	17
4OA2 Identification and Resolution of Problems	18
4OA3 Event Followup	18
4OA5 Other Activities	23
4OA6 Meetings, Including Exit	28
ATTACHMENT: SUPPLEMENTAL INFORMATION	28
KEY POINTS OF CONTACT	A-1
LIST OF ITEMS OPENED, CLOSED AND DISCUSSED	A-2
LIST OF DOCUMENTS REVIEWED	A-3
LIST OF ACRONYMS	A-14

SUMMARY OF FINDINGS

IR 05000317/2007002, 05000318/2007002; 01/1/2007 - 3/31/2007; Calvert Cliffs Nuclear Power Plant, Units 1 and 2; Operability Evaluations and Event Followup.

The report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. Three Green findings were identified, two of which were determined to be 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). 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: Mitigating Systems

- Green. The inspectors identified a finding for Constellation's failure to take timely action to evaluate and correct adverse conditions associated with the station blackout (SBO) diesel generator. During a February 14, 2007 operational performance evaluation, the SBO diesel experienced high crankcase pressure, a high lube oil filter fouling rate, and glycol in the lube oil. Constellation inspected the diesel engine and identified that the head of the A4 cylinder of the SBO diesel 0C2 engine was cracked. The inspectors determined that similar symptoms existed during a January 14, 2007 performance evaluation; however, the degraded conditions were not adequately evaluated and corrected in a timely manner as specified by the augmented quality assurance program for the SBO diesel. Constellation replaced the cracked cylinder head and entered the deficiency into the corrective action program for resolution.

This finding is more than minor because it was associated with the equipment performance attribute of the Mitigating System cornerstone. The finding represented an actual loss of safety function of one non-technical specification train of equipment and based on a SDP Phase 3 analysis, the finding was of low safety significance (Green). This finding has a cross-cutting aspect in the area of problem identification and resolution because Constellation did not properly prioritize and evaluate conditions adverse to quality. (Section 1R15)

- Green. A self-revealing NCV of Technical Specification 5.4.1.a occurred because Constellation did not adequately implement foreign material exclusion (FME) procedures and controls to prevent debris from entering a fuel assembly guide tube while in the spent fuel pool (SFP). This was the most likely issue to cause a control element assembly (CEA) to bind and become inoperable (untrippable). Constellation submitted a licensee event report (LER) and entered this issue into their corrective action program for resolution.

This finding is more than minor because it is associated with the human performance attribute of the Mitigating System cornerstone and it affected the reliability of the reactivity control system. The inspectors evaluated this finding using Phase I of IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," and determined it to be of very low safety significance because it was not a qualification deficiency; it did not represent a loss of safety function for a train or system; and it was not risk significant due to external event initiators. The inspectors determined that this finding has a cross-cutting aspect in the area of human performance because Constellation did not define and effectively communicate expectations regarding following FME procedures. (Section 40A3.2)

- Green. The inspectors identified a non-cited violation (NCV) of Technical Specification (TS) 3.3.1, because Constellation did not recognize that one or more channels of the high rate-of-change (startup rate) trip function did not meet TS requirements following the completion of linear power channel calibration surveillances on several occasions over a three year period. Constellation discovered this issue during a reduction of power to perform maintenance on the Unit 2 voltage regulator drawers. The inspectors identified additional discrepancies related to this finding, thereby adding value. Constellation submitted a licensee event report (LER) and entered this issue into the corrective action program for resolution.

The finding is more than minor because the reliability of the reactor protection system was reduced with one or more channels of the startup rate trip function inoperable. This finding is associated with the procedure quality 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. The inspectors evaluated this finding using Phase I of IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," and determined it to be of very low safety significance because it was not a qualification deficiency; it did not represent a loss of safety function for a train or system; and it was not risk significant due to external event initiators. This finding has a cross-cutting aspect in the area of problem identification and resolution because Constellation did not take actions to address safety issues in a timely manner, commensurate with their significance. (Section 40A3.5)

B. Licensee-Identified Violations

None

REPORT DETAILS

Summary of Plant Status

Calvert Cliffs Unit 1 (Unit 1) began the inspection period at 100 percent power. On January 31, 2007, reactor power was reduced to less than 10 percent, due to a steam leak on the high pressure turbine exhaust piping of the 12 moisture separator reheater (MSR). On February 2, 2007, following piping repair activities, reactor power was increased to 100 percent, where it remained unchanged for the rest of the inspection period.

Calvert Cliffs Unit 2 (Unit 2) began the inspection period at 100 percent power. On February 4, 2007, Unit 2 began its end of cycle power reduction to support a scheduled refueling outage (RFO). Constellation commenced a reactor shutdown on February 25, 2007, to begin the RFO. The RFO was in progress for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R02 Evaluation of Changes, Tests, or Experiments (71111.02 - 1 sample)

a Inspection Scope

Unit 2 Replacement Reactor Vessel Closure Head (RRVCH)

The inspectors performed on-site and in-office review of various Unit 2 RRVCH project engineering services packages (ESPs). The design of the Unit 2 RRVCH is similar to the original Unit 2 RVCH except for the replacement of the Alloy 600 penetration tube material and Alloy 600 weld material with a new and improved primary water stress corrosion cracking (PWSCC) resistant material Alloy 690. The inspectors reviewed the material compatibility, functional properties, environmental and seismic qualification, and the 10CFR 50.59 screening evaluations for the following Unit 2 components: RRVCH; control element drive mechanisms (CEDMs); thimble support plate (TSP); and, enhanced service structure (ESS).

The inspectors reviewed the associated 10 CFR 50.59 screening/evaluations to verify that changes between the original reactor vessel closure head (RVCH) and the RRVCH, and modifications to structures, systems, and components resulting from installation of the RRVCH were properly performed in accordance with 10 CFR 50.59.

The inspectors reviewed the design specifications for the replacement components and evaluations of applicability determination and screening questions for each design change to determine, for each change, whether a 10 CFR 50.59 had been screened out or performed, and the justification for each. The inspectors reviewed the certified design report for the Unit 2 RRVCH to verify the component was designed and analyzed in accordance with the applicable requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section III, Division 1, 1995 Edition, 1996 Addenda.

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The inspectors also reviewed various CEDM design records to verify the replacement CEDMs were designed and fabricated in accordance with the ASME Boiler Pressure Vessel Code, Section II and III, 1998 Edition through the 2000 Addenda requirements.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

Partial Walkdown (71111.04Q - 4 Samples)

a. Inspection Scope

The inspectors verified that selected equipment trains of safety-related and risk significant systems were properly aligned. 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 the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or potentially impact the availability of associated mitigating systems. The applicable documents used for this inspection are located in the attachment to this report. The inspectors performed a partial walkdown for the following four systems:

- 12 emergency core cooling system (ECCS) train due to maintenance on the 11 ECCS train;
- 1A emergency diesel generator (EDG) safety related heating ventilation air conditioning (HVAC) system following maintenance;
- 12 low pressure safety injection (LPSI) train due to failed 11 LPSI train valve stroke test; and
- Unit 2 containment penetrations due to containment closure verification activities.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

.1 Quarterly Sample Review (71111.05Q - 9 Samples)

a. Inspection Scope

The inspectors conducted a tour of accessible portions of the nine areas listed below to assess the licensee's control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire barriers, and related compensatory measures when required. The inspectors assessed the material condition of fire protection suppression and detection equipment to determine whether any conditions or deficiencies existed which could impair the availability of that equipment. The

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documents reviewed during this inspection are listed in the attachment to this report. The nine areas are as follows:

- Unit 1 No. 11 ECCS pump room, Fire Area 4, Room 119;
- 2B EDG room, Fire Area 28, Room 416;
- Unit 2 intake structure (IS), Fire Area IS, Intake Room;
- Unit 1 turbine building, 12' elevation Fire Area TB, Room 601/607;
- Unit 1 main plant exhaust & equipment room, Fire Area 11, Room 524;
- Unit 2 main plant exhaust & equipment room, Fire Area 11, Room 526;
- Unit 2 containment (Cnmt), Fire Area CNMT, Room 229;
- Unit 2 west electrical penetration room, 45' elevation, Fire Area 38, Room 532; and
- Unit 2 east electrical penetration room, 45' elevation, Fire Area 26, Room 409.

b. Findings

No findings of significance were identified.

.2 Fire Brigade Observations (71111.05A - 1 Sample)

a. Inspection Scope

The inspectors observed the fire brigade on January 31, 2007, following a report of a minor fire in motor control center (MCC) 101-AT located on the 27 foot elevation of the turbine building. The inspectors observed the verification of the fire and initiation of response, including identification of the fire location, dispatching the fire brigade, and sounding alarms. Once the fire brigade responded to the location, the inspectors observed the fire brigade leader performing an assessment of the fire, communicating with team members and the control room supervisor. The documents reviewed during this inspection are listed in the attachment to this report.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection (ISI) (71111.08 - 5 Samples)

a. Inspection Scope

The purpose of this inspection was to assess the effectiveness of the licensee's ISI program for monitoring degradation of the reactor coolant system boundary, risk significant piping system boundaries, and the containment boundary. The inspectors assessed the ISI activities using the criteria specified in the ASME Boiler and Pressure Vessel Code, Section XI and applicable NRC Regulatory Requirements.

The inspectors selected a sample of nondestructive examination (NDE) activities for review and evaluation for compliance with the requirements of ASME Section XI. Also,

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the inspectors selected samples of activities associated with the repair and replacement of safety related pressure boundary components. The sample selection was based on the inspection procedure objectives, risk significance, and availability. Specifically, the inspectors focused on components and systems where degradation would result in a significant increase in risk of core damage. The inspectors reviewed examination procedures, personnel qualifications, and test results. This sample includes the review of nondestructive tests performed on dissimilar metal welds that were direct attachments to the pressurizer. The inspectors reviewed a sample of examination reports and condition reports (CR) initiated during ISI examinations to evaluate the licensee's effectiveness in the identification and resolution of problems.

The inspectors performed a review of nondestructive test results of a sample of dissimilar metal welds made to the pressurizer. The welds selected were subjected to the mechanical stress improvement process (MSIP) which was used to enhance weld resistance to cracking. The inspectors reviewed the MSIP application procedure, equipment qualification and personnel qualifications for application of the process. The inspectors reviewed results of examinations performed on the welds both before and after application of the process.

The inspectors reviewed the procedures used to perform visual examinations for indications of boric acid leaks from pressure retaining components including CEDM connections above the reactor pressure vessel (RPV) head. The inspectors reviewed a sample of CRs initiated as a result of the inspections performed in accordance with the licensee's boric acid control program. The inspectors selected CRs that identified evidence of both active and inactive leak locations which could result in degradation of safety significant components. The inspectors reviewed five CRs which identified active and inactive leaks identified through plant walkdowns performed during the plant shutdown. The inspectors reviewed operability evaluations and corrective actions provided in the CR and determined that the actions specified were consistent with the requirements of the ASME Code and 10 CFR 50, Appendix B, Criterion XVI.

Steam generator tube inspection was not performed this outage. The current generators were installed in 2003 and tube baseline inspection performed in 2005. The next Unit 2 steam generator tube inspection is scheduled to be performed in 2009.

The inspectors performed a documentation review of five nondestructive examinations which included volumetric and surface examinations:

- Ultrasonic Test (UT), Volumetric Examination, Surge Line to #21 SG Hot Leg, Weld #12-PSL-13, Safe end to Nozzle Weld;
- UT, Volumetric Examination, Pressurizer Safety and Relief Valve, Weld 4-SR-2005-1, Safe End to Nozzle Weld;
- Magnetic Particle Test (MT), Surface Examination, Pressurizer Lower Head to Support (Skirt), Weld C69-PZR, Circumferential Attachment Weld;
- Liquid Penetrant Test (PT), Surface Examination, Valve 2-CV-100E-2 Upper Body Weld; and

- Visual Examination (VT), Visual Examination of General Mechanical and Structural Condition of Component Support # HB23-2157-R1.

The inspectors reviewed repair/replacement activities as follows:

The inspector reviewed documentation of two maintenance work orders (Maintenance Work Order 2200303715 for use on steam generator #21 and 2200303716 for use on steam generator #22) for repair and replacement activity which involved welding on an ASME pressure boundary which required the development and implementation of an ASME Section XI repair/replacement plan. The activity included the replacement of a portion of the steam generator feed water supply piping and the weld build up repair of an internal portion of check valve 2CKVFW-133. The inspector reviewed the ASME Section XI plan, piping replacement material, weld procedure specifications and qualifications, welder qualifications, weld filler metals, specified non-destructive tests, acceptance criteria and post work testing.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11Q - 1 Sample)

a. Inspection Scope

On February 13, 2007, the inspectors observed licensed operator requalification training for shutdown scenarios to assess operator performance and the adequacy of the licensed operator training program. The shutdown scenarios involved a shutdown to twenty percent of reactor power, cooldown and depressurization of the reactor coolant system (RCS), entry into reduced inventory, and lower mode operations with a variety of malfunctions. The inspectors focused on high-risk operator actions performed during implementation of shutdown operating procedures, entry into abnormal operating procedures (AOP), and classification of the events related to loss of RCS inventory and shutdown cooling (SDC) issues. The inspectors evaluated the clarity and formality of communications, the completion of appropriate actions in response to alarms, the performance of timely control board operations and manipulations, and the oversight and direction provided by the shift manager. Documents reviewed are listed in the attachment to this report.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness.1 Quarterly Review (71111.12Q - 3 Samples)a. Inspection Scope

The inspectors reviewed the three samples listed below for items such as:
 (1) appropriate work practices; (2) identifying and addressing common cause failures;
 (3) scoping in accordance with 10 CFR 50.65(b) of the maintenance rule (MR);
 (4) characterizing reliability issues for performance; (5) trending key parameters for
 condition monitoring; (6) charging unavailability for performance; (7) classification and
 reclassification in accordance with 10 CFR 50.65(a)(1) or (a)(2); and
 (8) appropriateness of performance criteria for structures, systems, and components
 (SSCs) classified as (a)(2) and/or appropriateness and adequacy of goals and
 corrective actions for SSCs classified as (a)(1). Documents reviewed are listed in the
 attachment to this report.

- 1A EDG room supply fan and exhaust fan failures;
- 0C SBO diesel generator cylinder head cracked; and
- Unit 2 main steam safety valves (MSSV).

b. Findings

No findings of significance were identified.

.2 Triennial Review (71111.12B - 6 Samples)a. Inspection Scope

The inspector conducted a review of Constellation's periodic evaluation of implementation of the Maintenance Rule as required by 10 CFR 50.65(a)(3). The evaluation covered a period from October 2004 to September 2006 at Calvert Cliffs. The purpose of this review was to ensure that Constellation established appropriate goals, and effectively assessed system performance and preventive maintenance activities. The inspectors verified that the evaluation was completed within the required time period and that industry operating experience (OE) was utilized, where applicable. Additionally, the inspectors verified that Constellation appropriately balanced equipment reliability and availability and made adjustments when appropriate.

The inspectors selected a sample of six risk-significant systems to verify that: (1) the structures, systems, and components were properly characterized, (2) goals and performance criteria were appropriate, (3) corrective action plans were adequate, and (4) performance was being effectively monitored in accordance with ER-1-103, "Maintenance Rule Program Implementation."

The following systems were selected for this detailed review:

- Switchgear HVAC;
- Safety injection (SI);
- Auxiliary feed water (AFW);
- Service water (SRW);
- Salt water (SW); and
- Reactor coolant pumps (RCP).

These systems were either in (a)(1) status, had been in (a)(1) status at some time during the assessment period, or experienced degraded performance. The inspectors reviewed corrective action documents for malfunctions and failures of these systems to determine if: (1) system failures had been correctly categorized as functional failures, and (2) system performance was adequately monitored to determine if classifying a system as (a)(1) was appropriate.

The inspectors interviewed the maintenance rule coordinator and several system managers, reviewed documentation for applicable systems, and reviewed a sample of CRs. The documents that were reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 - 7 Samples)

a. Inspection Scope

The inspectors reviewed the following seven activities to verify that station personnel performed the appropriate risk assessments prior to removing equipment 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 50.65(a)(4), the recommendations of NUMARC 93-01, Revision 2, "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. Documents reviewed are listed in the attachment to this report.

- Unit 1 No. 11 emergency core cooling system being out of service due to planned maintenance
- Unit 1 high pressure turbine casing nozzle and 42" cold reheat piping steam leak
- Unit 2 No. 24 4kV bus (alternate feeder) to support MJ switch replacement
- Unit 2 No. 23 SW pump out of service due to planned maintenance
- SBO diesel generator out of service due to cracks identified in engine two (ENG-2) A4 cylinder head

Enclosure

- 480V bus out of service during the Unit 2 refuel outage due to planned maintenance
- Motor control center (MCC) 204 out of service during the Unit 2 refuel outage due to planned maintenance

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 8 samples)

a. Inspection Scope

For the eight operability evaluations described below, the inspectors evaluated the technical adequacy of the evaluations to ensure that Constellation properly justified TS operability and that the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) to verify that the system or component remained available to perform its intended function. In addition, the inspectors reviewed compensatory measures implemented to verify that the measures worked as stated and that they were adequately controlled. The inspectors also reviewed a sample of CRs to verify that Constellation identified and corrected any deficiencies associated with operability evaluations. Documents reviewed are listed in the attachment to this report.

- Unit 2 RPS channel concurrent power supply (IRE-019-350)
- 11 containment air cooler motor shutdown to trip of MCC-101-AT breaker (IRE 019-881)
- 1A EDG fan-12 failure (IRE-019-640)
- 22A service water heat exchanger diverter valve (IRE-019-641)
- 0C SBO diesel generator lube oil filter high fouling rate (IRE-020-200)
- Unit 1 low pressure safety injection valve (1-SI-615-MOV) stroke time (IRE-020-420)
- Functional evaluation for 12 steam generator feed flow instrumentation (IRE-020-409)
- 1A EDG high crankcase pressure (IRE-021-274)

b. Findings

Station Blackout Diesel

Introduction. The inspectors identified a Green finding for Constellation's failure to take timely action to evaluate and correct adverse conditions associated with the SBO diesel generator.

Description. During a February 14, 2007, operational performance evaluation, the SBO diesel experienced high crankcase pressure, a high lube oil filter fouling rate, and glycol in the lube oil. Constellation inspected the diesel engine and identified that the head of

the A4 cylinder of the SBO diesel 0C2 engine was cracked. This condition allowed coolant from the high temperature cooling system to enter the crankcase.

The inspectors interviewed personnel and reviewed the SBO diesel logs and condition reports associated with a previous performance evaluation on January 14, 2007. The inspectors determined that similar symptoms existed during the January 14, 2007, performance evaluation; however, the degraded conditions were not adequately evaluated and corrected in a timely manner as specified by the augmented quality assurance program for the SBO diesel.

On January 14, 2007, Constellation initiated IRE-019-458 concerning high out of specification crankcase pressure and lube oil leakage coming from the generator shaft area. Operations concluded that there was no water in the oil without confirmation from a lube oil analysis and that crankcase pressure was proportional to the SBO diesel load without adequate supporting information for this condition. In addition, Constellation initiated IRE-019-457 to document a high lube oil filter differential pressure alarm. Operators swapped the filters but did not promptly evaluate and determine the cause of the high differential pressure alarm. The inspectors noted that one of the potential causes of high lube oil filter differential pressure and high crankcase pressure is lube oil contamination with water. However, the results of a lube oil sample taken on January 14, 2007, were not pursued in a timely manner. The results were not received until February 15, 2007, following the February performance evaluation. The results revealed that glycol was present in the crankcase on January 14, 2007. Following the discovery of the cracked cylinder head on the 0C2 engine on February 14, 2007, Constellation determined that glycol and water from the high temperature cooling system leaked through a crack in the cylinder head and into the crankcase. The glycol reacted with the oil in the crankcase and created a sludge like substance which caused the lube oil filters and crankcase breather filters to clog and the subsequent high lube oil filter differential pressure and high crankcase pressure. Based on results of the January 2007 oil sample and other symptoms, the inspectors concluded that the head of the SBO diesel A4 cylinder was cracked as early as January 14, 2007. Constellation replaced the cracked cylinder head and entered the deficiency into the corrective action program for resolution.

Analysis. The inspectors determined that the performance deficiency is that Constellation did not take timely action to evaluate and correct an adverse condition on the SBO diesel generator. UFSAR, Section 8.4.5.1, states that guidelines set forth in Regulatory Guide 1.155, "Station Blackout," were used for quality assurance activities associated with station blackout diesel. Appendix A of Regulatory Guide 1.155, states, "Measures should be established to ensure that failures, malfunctions, deficiencies, deviations, defective components, and nonconformances are promptly identified and corrected." Contrary to the above, the inspectors determined that on January 14, 2007, Constellation did not promptly evaluate and correct deficiencies associated with the SBO diesel.

This finding is more than minor because it was associated with the equipment performance attribute of the Mitigating System cornerstone, and it affected the

Enclosure

cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding was evaluated in accordance with IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," using Phase 1, Phase 2, and Phase 3 SDP analyses. The Phase 1 analysis required a Phase 2 evaluation because the finding represented an actual loss of safety function of one non-technical specification train of equipment designated as risk-significant per 10 CFR 50.65, for greater than 24 hours.

A fault exposure time of 32 days was used for loss of offsite power (LOOP) initiating events. The internal events Phase 2 analysis, for core damage frequency (CDF) was conducted in accordance with IMC 0609 Appendix A, using the Risk-informed Inspection Notebook for Calvert Cliffs Nuclear Power Plant Units 1 and 2, revision 2, dated September 30, 2005. From a Phase 2 perspective, utilizing a fault exposure of greater than 30 days and not crediting the time the EDG would have been able to function before it exceeded its lube oil filter loading, the finding had low to moderate CDF safety significance. In accordance with IMC 0609 Appendix H, for large dry containments, only interfacing systems loss of coolant accidents (ISLOCA) and steam generator tube ruptures are contributors for large early release frequency (LERF). Since this finding was only associated with LOOP, there was no change in LERF.

A senior reactor analyst (SRA) conducted a Phase 3 Risk Assessment, to refine the Phase 2 analysis exposure time and to evaluate the available engine run time and possible recovery credit. The analysis used an updated Calvert Cliffs SPAR model, Revision 3 plus, dated October 28, 2005.

Based on the Phase 3 analysis, the finding represented very low safety significance and was determined to be Green for Units 1 and 2 based on CDF. The analysis resulted in an increase in CDF of less than $1 \text{ E-}7$ for the 32-day exposure period. The dominant core damage sequence was a station blackout with a successful reactor shutdown along with a failure to recover the EDGs and restore offsite power in four hours. In accordance with IMC 0609, App. A, since the finding was determined to be Green and less than $1 \text{ E-}7$, it was not evaluated for external events. This finding has a cross-cutting aspect in the area of problem identification and resolution because Constellation did not properly prioritize and evaluate conditions adverse to quality.

Enforcement. Because no violation of regulatory requirements occurred, this issue is being treated as a finding. This issue was entered into Constellation's corrective action program (IRE-020-200). **(FIN 05000317,05000318/2007002-01: Failure to Take Timely Actions to Evaluate and Correct Station Blackout Diesel Degraded Conditions)**

1R17 Permanent Plant Modifications (71111.17 - 1 sample)Unit 2 Replacement Reactor Vessel Closure Head (RRVCH) Modificationsa. Inspection Scope

Recent industry events involving PWSCC of Alloy 600 at other plants throughout the industry prompted Constellation to take the preemptive measure of replacing the Unit 2 RVCH during the Spring 2007 R17 refueling outage.

The inspectors performed direct field observations of the Unit 2 RRVCH with the installed CEDMs and the ESS modifications inside the onsite pre-assembly facility (PAF). CEDM installation activities were performed at the CCNPP site inside the PAF in September 2006.

The inspectors reviewed various records, including design specifications, calculations, drawings, and ASME Code to verify the modifications associated with the Unit 2 RRVCH, CEDMs, TSP, and ESS were performed and documented in accordance with these requirements. The inspectors reviewed the design modification packages to verify that the design bases, licensing bases, and performance capability of the modified components were not degraded through the modifications. The inspectors reviewed the Unit 1 RRVCH lessons-learned to verify that they were incorporated into the Unit 2 RRVCH design, modification, procedures, and outage activities. In addition, contingency plans associated with the modifications were reviewed to verify that guidance had been developed if problems were to occur during the installation process.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19 - 7 Samples)a. Inspection Scope

The inspectors reviewed the seven post-maintenance tests 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 function(s) 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 function(s). Documents reviewed are listed in the attachment to this report.

- Unit 1 No. 11 ECCS air cooler duplex strainer (MO#1200603098)
- Unit 2 containment high range radiation monitors (MO #2200700152)

- Repair steam leak on Unit 1 high pressure turbine cold reheat line (MO#1200700305)
- Performance evaluation of 0C diesel generator following engine-2 cylinder A4 repair (MO#0200700815)
- Unit 2 No. 2B EDG woodward governor modification (MO#2199801933)
- Unit 2 No. 21 main steam isolation valve actuator overhaul (MO#2200503868)
- Unit 2 No. 22A reactor coolant pump motor replacement (MO#2200503578)

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities (71111.20 - 1 Sample)

a. Inspection Scope

The inspectors evaluated Unit 2 refueling outage activities to ensure that Constellation considered risk in the development of outage schedules; implemented administrative risk reduction methodologies developed to control plant configuration; developed mitigation strategies for losses of key safety functions, and adhered to operating license conditions and TS requirements that ensure defense in depth. The inspectors reviewed the following specific areas:

- Review of outage plan
- Monitoring of shutdown activities
- Licensee control of outage activities
- Reduced inventory and mid-loop conditions
- Refueling activities
- Monitoring of heatup and startup activities

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 7 Samples)

a. Inspection Scope

The inspectors observed and/or reviewed the seven surveillance tests listed below associated with selected risk-significant structures, systems, and components to verify TS compliance and that test acceptance criteria was properly specified. 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.

The documents reviewed during this inspection are listed in the attachment to this report.

- STP-562-2, Containment High Range Radiation Monitor Alignment Check
- STP-O-073A-1, Saltwater Pump And Check Valve Quarterly Operability Test
- STP-O-8A-1, Test Of 1A diesel generator (DG) and 11 4kV Bus LOCI Sequencer
- STP-O-65S-1, ECCS LPSI Loop Isolation Valves Quarterly Operability Test
- STP-O-55A-2, Containment Closure Verification
- OI-30, Nuclear Instrumentation Daily Technical Specification Surveillance (SR 3.3.1.2)
- STP-O-182D-2, Containment Penetration Local Leak Rate Tests (CIV)

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23 - 1 Sample)

a. Inspection Scope

The inspectors reviewed one temporary modification to verify that safety systems did not depart from the design basis and system established criteria. The inspectors reviewed the associated 10 CFR 50.59 screening against the system design bases documentation, including the UFSAR and TS. The inspectors walked down each modification to verify that proper configuration control was maintained to ensure continued system operability. In addition, the inspectors verified that Constellation controlled the modification in accordance with the requirements of procedure MD-1-100, "Temporary Alterations."

- Unit 1 high pressure turbine exhaust line modification (TA-1-07-0002)

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety (OS)

2OS1 Access Control To Radiologically Significant Areas (71121.01 - 11 Samples)

a. Inspection Scope

The inspectors identified exposure significant work areas within radiation areas, high radiation areas (<1 R/hr), or airborne radioactivity areas in the plant and reviewed

associated licensee controls and surveys of these areas to determine if controls (e.g. surveys, postings, barricades) were acceptable.

The inspectors walked down these areas or their perimeters to determine: whether prescribed radiation work permits, procedure, and engineering controls were in place, whether licensee surveys and postings were complete and accurate, and whether air samplers were properly located.

The inspectors examined the licensee's physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools.

The inspectors reviewed radiation work permits (RWPs) [called special work permits at Calvert Cliffs] 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.

The inspectors reviewed RWPs for airborne radioactivity areas with the potential for individual worker internal exposures of >50 mrem Committed Effective Dose Equivalent [CEDE] (20 DAC-hrs). The inspectors verified barrier integrity and engineering controls performance (e.g., High Efficiency Particulate Air ventilation system operation).

The inspectors reviewed and assessed the adequacy of the licensee's internal dose assessment for any actual internal exposure greater than 50 mrem committed effective dose equivalent (CEDE). Through March 8, 2007, no uptakes of this magnitude had occurred.

Based on the licensee's schedule of work activities, the inspectors selected three jobs being performed in radiation areas, airborne radioactivity areas, or high radiation areas (<1 R/hr) for observation (reactor vessel head replacement; reactor disassembly; containment sump modifications). The inspectors reviewed radiological job requirements (RWP requirements and work procedure requirements). The inspectors observed job performance with respect to these requirements. The inspectors determined that radiological conditions in the work area were adequately communicated to workers through briefings and postings. The inspectors attended the pre-job briefing for the upper guide structure lift presented on March 7, 2007.

During job performance observations, the inspectors verified the adequacy of radiological controls, such as: required surveys (including system breach radiation, contamination, and airborne surveys), radiation protection job coverage (including audio and visual surveillance for remote job coverage), and contamination controls.

For high radiation work areas with significant dose rate gradients (factor of 5 or more), the inspectors reviewed the application of dosimetry to effectively monitor exposure to personnel. The inspectors verified that licensee controls were adequate.

During job performance observations, the inspectors observed radiation worker performance with respect to stated radiation protection work requirements. The inspectors determined that they were aware of the significant radiological conditions in their workplace, and the RWP controls/limits in place, and that their performance took into consideration the level of radiological hazards present.

During job performance observations, the inspectors observed radiation protection technician performance with respect to radiation protection work requirements. The inspectors determined that they were aware of the radiological conditions in their workplace and the RWP controls/limits, and that their performance was consistent with their training and qualifications with respect to the radiological hazards and work activities. The inspectors observed actions taken by the radiation protection staff in response to the stuck control element assembly during the lifting of the upper guide structure on March 7, 2007.

The inspectors observed activities taken by the radiation protection staff on January 30-31, 2007, in response to the possible need to shut down one of the units in order to effect repairs on the secondary side. The inspectors noted that the licensee had in place a listing of activities to occur in the containment should the plant shut down; mobilized personnel in radiation protection to support potential containment activities; and had in place an extensive telemonitoring system for containment activities that would allow for teledosimetry for all personnel entering the containment, along with sufficient cameras to follow work.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls (71121.02 - 10 Samples)

a. Inspection Scope

The inspectors reviewed the assumptions and basis for the current annual collective exposure estimate. The inspectors reviewed applicable procedures to determine the methodology for estimating work activity-specific exposures and the intended dose outcome.

The inspectors reviewed the licensee's method for adjusting exposure estimates, or re-planning work, when unexpected changes in scope or emergent work are encountered.

Based on scheduled work activities and associated exposure estimates, the inspectors selected three work activities in radiation areas, airborne radioactivity areas, or high radiation areas for observation, as noted in Section 2OS1 above. The inspectors evaluated the licensee's use of ALARA controls for these work activities by performing the following: evaluated the licensee's use of engineering controls to achieve dose reductions; procedures and controls consistent with the licensee's ALARA reviews;

sufficient shielding of radiation sources provided for; and whether dose expended to install/remove the shielding exceeded the dose reduction benefits afforded by the shielding.

The inspectors observed radiation worker and Radiation Protection (RP) technician performance during work activities being performed in radiation areas, airborne radioactivity areas, or high radiation areas. The inspectors determined that workers demonstrated the ALARA philosophy in practice and that there were no procedure compliance issues. Also, the inspectors observed radiation worker performance to determine whether the training/skill level was sufficient with respect to the radiological hazards and the work involved.

The inspectors reviewed the integration of ALARA requirements into work procedures and RWP documents. Limited information was provided in these types of documents. Most ALARA information was transmitted during job briefings. The inspectors compared the person-hour estimates provided by maintenance planning and other groups to the radiation protection group with the actual work activity time requirements and evaluated the accuracy of these time estimates.

The inspectors determined that work activity planning included consideration of the benefits of dose rate reduction activities such as shielding provided by water filled components/piping, job scheduling, and shielding and scaffolding installation and removal activities.

The inspectors reviewed the licensee's exposure tracking system. The inspectors determined that the level of exposure tracking detail provided by radiation protection on a daily basis during the refueling outage appeared minimal; however, exposure report timeliness and exposure report distribution were sufficient. Supervisors and contractor supervisors were also authorized access to the station computer data base which did provide more detailed ALARA information.

The inspectors determined that workers were utilizing the low dose waiting areas and were generally effective in maintaining their doses ALARA. A few instances were observed when work was stopped and workers were not prompt in moving to low dose waiting areas, or leaving the RCA awaiting work to recommence.

The inspectors determined that workers received appropriate on-the-job supervision to ensure ALARA requirements are met. The inspectors determined that the first-line job supervisor aided in ensuring that the work activity was conducted in a dose efficient manner.

Since the outage exposure goal was established, it has been twice lowered based on better than expected dose rates in the containment. Lower dose rates were the result of a successful crud burst at Unit 2 in November 2006 during a forced shutdown, in conjunction with a successful crud burst during the shutdown for the refueling outage.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation (71121.03 - 2 Samples)

a. Inspection Scope

The inspectors reviewed corrective action program reports related to exposure significant radiological incidents that involved radiation monitoring instrument deficiencies since the last inspection in this area.

The inspectors reviewed licensee self-assessments, audits, and Licensee Event Reports and focused on radiological incidents that involved personnel contamination monitor alarms due to personnel internal exposures. For internal exposures >50 mrem CEDE, the inspectors determined that appropriate procedures were in place to ensure that the affected personnel would be properly monitored utilizing calibrated equipment and that the data would be analyzed and internal exposures properly assessed in accordance with licensee procedures.

The inspectors also reviewed the actions taken by the licensee in response to a contractor arriving on site who was found to have contamination on his clothing. The licensee properly denied the worker entry to the protected area, notified the NRC, notified the last facility at which the person had worked and entered the actions taken in its condition report system.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA1 Performance Indicator (PI) Verification (71151 - 1 Sample)

Mitigating Systems Cornerstone

a. Inspection Scope

The inspectors reviewed Constellation's submittal of Safety System Functional Failures (SSFF) performance indicators (PIs) for Units 1 and 2. The PIs were reviewed for the period of January 2006 through December 2006. These dates account for the previous four quarters that have been 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, Revision 4, "Regulatory Assessment Performance Indicator Guideline," 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

Review of Items Entered Into the Corrective Action Program (CAP)

The inspectors performed a daily screening of items entered into Constellation's CAP as required by Inspection Procedure 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.

4OA3 Event Followup (71153 - 6 samples)

.1 Unit 1 Steam Leak on the Main Turbine High Pressure Cold Reheat Line

a. Inspection Scope

On January 31, 2007, operators commenced a power reduction to 5 percent to remove the main turbine from service due to a steam leak on the turbine exhaust line to 12 moisture separator reheater. Following completion of the piping repair, operators restored the unit to 100 percent power on February 1, 2007. The inspectors discussed the event with Constellation management, operations, engineering, and maintenance personnel to gain an understanding of the event and to assess the methods used for flaw characterization. In addition, the inspectors assessed whether the repair method was in accordance with the ASME code. The inspectors reviewed and discussed the non-destructive test results with Constellation personnel. Documents reviewed are listed in the attachment to this report.

b. Findings

No findings of significance were identified.

.2 (Closed) LER 05000317,318/2006-002-01, Control Element Assembly (CEA) Determined to Be Untrippable

Introduction. A Green self-revealing, NCV of TS 5.4.1.a. occurred because Constellation did not adequately implement foreign material exclusion (FME) procedures and controls to prevent debris from entering a fuel assembly guide tube while in the SFP. This caused a control element assembly to bind and become inoperable (untrippable).

Description. On April 08, 2006, Unit 1 experienced a misaligned CEA while performing low power physics testing in Mode 2. The CEA was declared untrippable and the reactor was manually tripped per station procedures. Constellation submitted a licensee event report (LER) and entered this issue into the corrective action program for resolution. Inspectors reviewed LER 2006002, Control Element Assembly Determined to be Untrippable, Revision 1. The LER concluded that the CEA was untrippable due to the presence of debris in or on top of a fuel assembly guide tube. The debris was most likely introduced into the fuel assembly guide tube while in the spent fuel pool.

The inspectors determined that the debris in the spent fuel pool was due to inadequate implementation of administrative maintenance procedure MN-1-109, Foreign Material Exclusion. The procedure requires that personnel prevent and control the introduction of foreign material into systems, structures, and components. Contrary to the procedure, during the Unit 1 2006 Refueling Outage, personnel did not take appropriate precautions to prevent foreign material from entering the SFP. As a result, foreign material in the SFP area caused debris to enter the fuel assembly guide tube, which caused the control element assembly to bind. Constellation performed subsequent tests to demonstrate that the previously stuck CEA and all other CEAs were operable. There were no new issues identified after the subsequent tests were performed. Constellation's corrective actions included improvements to the site FME training program and a new Fleet FME procedure.

Analysis. The performance deficiency is that Constellation did not adequately implement FME procedures and controls to prevent debris from entering a fuel assembly guide tube while in the SFP. This issue is more than minor because it was associated with the human performance attribute of the Mitigating System cornerstone and it affected the reliability of the reactivity control system. Specifically, a CEA was untrippable and operators had to perform a manual shutdown of the plant.

The inspectors evaluated the significance of this finding using Phase 1 of Inspection Manual Chapter 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations." The inspectors determined that this finding was of very low safety significance because it was not a qualification deficiency; it did not represent a loss of safety function for a train or system as defined in the plant specific risk-informed inspection notebook; and it was not risk significant due to external event initiators. This finding has a cross-cutting aspect in the area of human performance because Constellation did not define and effectively communicate expectations regarding following FME procedures.

Enforcement. Technical Specification 5.4.1.a. requires, in part, that written procedures shall be established, implemented, and maintained as recommended in Appendix A of Regulatory Guide 1.33, Revision 2. Appendix A of Regulatory Guide 1.33, Section 9, Procedures for Performing Maintenance, states that maintenance activities that affect the performance of safety-related equipment should be performed in accordance with written procedures appropriate to the circumstances. Contrary to the above, during the Unit 1 2006 Refueling Outage in February and March 2006, Constellation did not adequately implement maintenance procedure MN-1-109, Foreign Material Exclusion, to

prevent the introduction of foreign material into plant systems and components. This resulted in the binding of a CEA. Because this finding is of very low safety significance and since it has been entered into the corrective action program as IRE-013-755, this violation is being treated as a non-cited violation, consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 05000317/2007002-02: Failure to adequately implement FME procedures and controls)**

.3 (Closed) LER 05000317/2006003-00, Impact on Safety-Related Equipment Not Considered When High Energy Line Break (HELB) Barrier Removed

On August 30, 2006, inspectors identified that the auxiliary feedwater (AFW) pump room double doors were opened during the performance of an AFW surveillance test. This action was in accordance with the procedure to provide personnel safety for operators. However, the procedure did not consider the high energy line break (HELB) design support function of the doors. As a result, the inspectors determined that the AFW pumps were inoperable because one of design support function of the doors was to protect the AFW pumps against a HELB postulated to occur outside the room. The issue and associated non-cited violation were discussed in NRC inspection report 2006004 as NCV 05000317,318/2006004-01. The inspectors performed a follow-up inspection to review and assess the causes of the issues identified in the LER. The inspectors reviewed Constellation's evaluation, changes to procedures, and training conducted on the event to assess if the actions taken would address the issue. Additionally, the inspectors performed walkdowns in several areas of the turbine building and safety related rooms to ensure that procedure changes encompassed the HELB boundary doors identified during the walkdown. No new findings of significance were identified. This LER is closed.

.4 (Closed) LER 05000318/2006001-01, Reactor Trip During Performance of Maintenance Clearance Order

On November 16, 2006, Unit 2 automatically tripped from 100 percent power due to a pressurizer pressure high signal. The high pressure signal was caused by a turbine load rejection which resulted from a personnel protective clearance applied for service transformer work. The clearance affected the main turbine electro-hydraulic control system, which was not identified by the operators that prepared the clearance. The issue and associated non-cited violation was discussed in NRC inspection report 2006005 as NCV 05000318/2006005-02. The LER was reviewed by the inspectors, and no additional findings of significance were identified. This LER is closed.

.5 (Closed) LER 05000317/318/2006005-00, Startup Rate Trip Bypass Enabling Function Below Setpoint

Introduction. The inspectors identified a Green non-cited violation (NCV) of Technical Specification (TS) 3.3.1, because Constellation did not recognize that one or more channels of the high rate-of-change (startup rate) trip function did not meet TS

requirements following the completion of the linear power channel calibration surveillance test on several occasions over a three year period.

Description. On December 17, 2006, during a reduction in power on Unit 2, Constellation identified that the reactor protection system (RPS) High Rate of Change of Reactor Power (startup rate) trip enabling function did not reset below the TS required value of 12 percent rated thermal power (RTP) on RPS channel. Constellation performed a subsequent review of previous Unit 1 and Unit 2 linear power channel calibration surveillances (STP M-310-1 and M-310-2) and identified that this condition existed on several occasions during a three year period. Constellation determined that the cause of this event was a failure to recognize that, when Improved Technical Specifications (ITS) were adopted at Calvert Cliffs in 1997, Footnote (a) to TS Table 3.3.1-1 added new acceptance criteria to the startup rate (SUR) trip function. The SUR trip function new acceptance criteria was added to STP M-310-1 and M-310-2. As a result, one or more channels of the startup trip function were determined to be inoperable on a number of occurrences over a three year period. Constellation submitted a LER and entered this issue into their corrective action program for resolution.

The inspectors reviewed LER 2006005, Startup Rate Trip Bypass Enabling Function Below Setpoint, Revision 0. Based on the review of the event, the LER, personnel interviews, and the associated corrective actions, the inspectors identified the following issues and discrepancies:

- Constellation did not identify all applicable TS that required entry when the high rate-of-change trip function did not meet the TS required reset enabled value of 12 percent RTP. This includes a failure to identify that the plant should have implemented TS 3.3.1.E when two or more channels were inoperable after performing STP-M-310.
- Constellation did not promptly correct the surveillance test procedure to add the acceptance criteria so as to preclude repetition of the event. As a result, during a subsequent surveillance in February 2007, inspectors identified that one channel was recorded below the TS required reset enabling value of 12 percent.
- Constellation did not fully assess the actual and potential safety consequences and implications of the event. The LER stated that there is a lack of any safety analysis crediting the high rate-of-change trip function. However, the inspectors identified that the SUR trip is credited in the safety analysis to prevent subcritical events and minimize transients for low power events such as a boron dilution event and uncontrolled CEA withdrawal event.
- Additionally, based on the inspectors discussion with Constellation personnel, it was determined that the direct current (DC) voltage bistable signal provides a more accurate indication of actual power level as compared to the Linear Power Range Nuclear Instrumentation meter since it is the DC voltage that causes the Bistable to trip and reset. The DC voltage acceptance criteria was not included

as part of the corrective actions associated with this LER. Therefore, Constellation decided to review previous surveillance procedures and power conditions to determine occurrences where the DC voltage bistable signal did not meet the TS required reset enable value of 12 percent RTP.

Subsequent to the inspectors' review of the LER, Constellation issued four additional condition reports and initiated actions to revise the LER to address the DC voltage bistable signal, corrective actions associated with this information, and other deficiencies that were identified.

Analysis. The performance deficiency is that Constellation did not recognize that one or more channels of the high rate SUR trip function did not meet Technical Specifications requirements following the completion of the Linear Power Channel Calibration surveillance test on several occasions during a three year period. This issue is more than minor because the finding is associated with the procedure quality 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. Specifically, the reliability of the Reactor Protection System (RPS) was reduced with one or more channels of the Rate-of-Change of Power High function (SUR trip) inoperable.

The inspectors evaluated the significance of this finding using Phase 1 of Inspection Manual Chapter 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations." The inspectors determined that this finding was of very low safety significance because it was not a qualification deficiency; it did not represent a loss of safety function for a train or system as defined in the plant specific risk-informed inspection notebook; and it was not risk significant due to external event initiators. This finding has a cross-cutting aspect in the area of problem identification and resolution because Constellation did not take actions to address safety issues in a timely manner, commensurate with their significance.

Enforcement. Technical Specification 3.3.1 RPS Instrumentation - Operating, requires, in part, that four RPS bistable trip units and the applicable automatic bypass removal features for the SUR trip shall be OPERABLE and is applicable in modes 1 and 2. Contrary to the above, on several occasions from December 2003 through December 2006, Constellation did not enter and complete TS required actions for TS 3.3.1.D or 3.3.1.E due to a failure to recognize that one or more channels of SUR trip function did not meet the TS requirements. Because this finding is of very low safety significance and it has been entered into the corrective action program as IRE-019-028, this violation is being treated as a non-cited violation, consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 05000317, 05000318/2007002-03: Failure to recognize that one or more channels of the high rate-of-change trip function was inoperable)**

- .6 (Closed) LER 05000317/2006004, Reactor Trip Due to Loose Wire During Maintenance on Turbine Control System

On December 12, 2006, Unit 1 was manually tripped due to a pressure transient on the RCS during maintenance on the main turbine control system. The details of this event were discussed in Section 4OA3 of NRC Inspection Report 2006005. The inspectors reviewed the LER and no additional findings of significance were identified. This LER is closed.

4OA5 Other Activities

.1 Reactor Pressure Vessel Head and Vessel Head Penetration Nozzles

a. Inspection Scope

The reactor pressure vessel head and head penetration nozzles were not inspected, as the vessel head was being replaced in its entirety this outage.

The licensee performed appropriate examinations for indications of boric acid leaks from pressure-retaining components above the RPV head. The inspector reviewed the examination procedures and examiner qualifications and determined they were in accordance with the requirements of ASME Section XI. Examination results were reviewed and anomalies, deficiencies, and discrepancies identified during the examination process were evaluated and documented in the licensee's corrective action program.

b. Findings

No findings of significance were identified.

.2 Unit 2 Replacement Reactor Vessel Closure Head (71007 - 1 sample)

a. Inspection Scope

The inspectors reviewed the Unit 2 RRVCH project activities using the guidance in NRC Inspection Procedure 71007, "Reactor Vessel Head Replacement Inspection."

Constellation elected to replace the Unit 2 RVCH during the Spring 2007 R17 refueling outage due to susceptibility of Alloy 600 CEDM nozzles and UNS W86182 weld filler material in the existing RVCH to primary water stress corrosion cracking. The design of the RRVCH is similar to the old RVCH except for the replacement of the Alloy 600 nozzle material and weld material with a new and improved PWSCC resistant material (Alloy 690).

The Unit 2 RRVCH was manufactured by Babcock & Wilcox Canada (BWC) in Cambridge, Ontario, Canada. The RRVCH is a two piece welded low alloy steel forging clad with stainless steel. There are 61 CEDM Alloy 690 nozzles, 8 in-core instrumentation nozzles made from Alloy 690 TT tube attached to the RRVCH, and a 3/4" schedule 80 Alloy 690 TT reactor head vent line is also attached to the RRVCH. In

addition, a new ESS and Thimble Support Plate (TSP) was designed and fabricated for the Unit 2 RRVCH.

Design and Planning

From January 9, 2007 - March 16, 2007, the inspectors conducted in-office and onsite reviews of engineering service packages, engineering calculations, analyses, design specifications, material specifications, component specifications, and certified design reports for the Unit 2 RRVCH, CEDMs, and ESS to assess the technical adequacy of the design changes and to verify that the design bases, licensing bases, and the performance capability of the modified components were not degraded through the modifications. Detailed review of the design changes/modifications of the RRVCH, CEDMs, TSP, and ESS are covered in Section 1R02 and 1R17 of this report.

The inspectors reviewed the original design drawings of the Unit 2 reactor vessel and reactor vessel head. Based on the drawings and dimensional data collected from the original components, the information was reconciled to the replacement components design dimensions and photogrammetry measurements of the original components as-built drawings were developed. The inspectors verified that the RRVCH conformed to as-built design drawings and there were no fabrication deviations from design, and the component was manufactured in accordance with the requirements of ASME Boiler Pressure Vessel Code, Section III, Division 1, 1995 Edition, 1996 Addenda.

The inspectors verified that no major structural modifications were performed for the Unit 2 RRVCH activity and that no temporary modifications were needed for primary containment access to support the replacement activity.

Lifting/Rigging and Transportation of the RVCHs

The inspectors reviewed the adequacy of the lifting and rigging equipment associated with RVCHs, from March 12, 2007 to March 16, 2007, to ensure the devices were tested and/or evaluated in accordance with procedure requirements and to verify that the maximum anticipated loads to be lifted would not exceed the capacity of the lifting/rigging equipment and supporting structures.

The inspectors reviewed the procedures for heavy lifting, inspection, maintenance, and testing of the cranes and lifting equipment to verify compliance with phase 1 of NUREG-0612 guidance. The review focused on applicable lifting and handling procedure CCNPP MN-1-104, Load Handling, CCNPP Industrial Safety Manual Chapter 11, Cranes, Rigging and Forklifts and CCNPP Reactor Vessel Head Replacement Project Heavy Loads Assessment Report LH00258.

The inspectors reviewed the potential impact of load handling activities on the reactor core, spent fuel cooling, and other plant support systems and the consequence of any impact loading of structures, systems, and components due to a RVCH drop accident. The inspectors reviewed risk management documents and various task plans supporting installation of these components.

The inspectors reviewed the Unit 2 polar crane used to handle the RVCHs and Constellation's commitments to phase 1 of NUREG-0612 and guideline requirements were verified by the inspectors. The inspectors verified that the guidelines were being properly implemented by reviewing the heavy load safe load path drawings for lifts inside Unit 2 Primary Containment, plant procedures RV-77 & RV 78A for RVCH load handling operations, training and certification records of crane operators, special lifting devices, and periodic preventive mechanical and electrical maintenance, inspections, and tests.

Removal and Replacement of RVCHs

The inspectors reviewed RVCH and CEDM Task Plan activities associated with removal and replacement of the RVCHs and observed portions of the lifting, rigging and transporting of the RVCHs into and out of the Unit 2 primary containment. The inspectors observed activities in-progress, from March 12, 2007 to March 16, 2007, inside the primary containment via remote video monitor, including underwater welding of the reactor vessel level monitoring system (RVLMS) probe holders. The inspectors observed the old RVCH movement from the primary containment to the transporter. The inspectors noted that Constellation personnel were conducting direct management oversight observations of the lifting and rigging activities.

The inspectors reviewed these activities to ensure that the heavy load handling activities were safely performed and properly controlled in accordance with plant procedures and in accordance with the guidelines of NUREG-0612 and Section 5.7. of the UFSAR.

Fabrication Inspections

The inspectors performed in-office reviews, from January 9, 2007 - March 16, 2007, of Babcock & Wilcox Canada Ltd. (BWC) Certified Design Specification BWC TS-2955 and Replacement Reactor Vessel Closure Head For Unit #2 ASME Design Report BWC-104J-SR-2.2 for the Unit 2 RRVCH to verify that the specified material, design, fabrication, inspection, examination, testing, certification, documentation, and functional requirements were consistent with the requirements of the ASME Boiler and Pressure Vessel (B&PV) Code, Section III, 1995 Edition, 1996 Addenda.

The RRVCH, CEDMs, and ESS were inspected inside the PAF by the inspectors. The inspectors also reviewed documents, including the material used for fabrication, to ensure that the activities were accomplished in accordance with certified specifications, design drawing, and ASME Code requirements.

The inspectors reviewed the ASME Code Data Report Form-2, certified material test report (CMTR), hydro test results report, certificate of compliance, heat treatment records, non-destructive examination reports, and non-conformance reports for the manufacture of the Unit 2 RRVCH and CEDMs. The inspectors also verified that the Authorized Nuclear Inspector (ANI) inspected the replacement parts and certified that the components were fabricated and tested in accordance with the ASME Code.

Review of Quality Assurance (QA) Activities

The inspectors reviewed documentation to verify that Constellation implemented adequate Quality Assurance (QA) oversight of the manufacturing activities at the BWC facility located in Cambridge, Ontario, Canada. The inspectors reviewed a sample of QA surveillance reports prepared by Constellation's QA personnel, which covered activities during the fabrication of the Unit 1 and Unit 2 RRPVHs at the BWC manufacturing facility. The inspectors reviewed the indicated inspection activities in the QA surveillance reports and verified their adequacy and thoroughness of the surveillances and the impact of findings on the fabrication of the RRPVHs.

b. Findings

No findings of significance were identified.

.3 (Open) NRC Temporary Instruction (TI) 2515/166 - Pressurized Water Reactor Containment Sump Blockage

a. Inspection Scope

The inspectors performed this inspection in accordance with TI 2515/166, "Pressurized Water Reactor Containment Sump Blockage," for Unit 2. The TI was developed to support the NRC review of licensee's operating pressurized water reactors' response to NRC Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized Water Reactors." The inspectors reviewed a sample of the licensing and design documents to verify that they were either updated or in the process of being updated to reflect the modifications. A sample of material specifications, testing and surveillance procedures, and calculations were reviewed to verify that they were updated to reflect the effects of the modifications, and the new requirements for the containment sumps and debris generation sources. The inspectors performed a walkdown of the strainer installation to verify it was performed in accordance with the approved design change package. Additionally, the inspectors verified that work was in progress to remove and replace CalSil insulation in containment that could be dislodged during a loss of coolant accident. Finally, the inspectors verified that all choke-points that could prevent water from reaching the recirculation sump during a design basis accident had been identified.

b. Evaluation of Inspection Requirements:

The TI requested the inspectors to evaluate and answer the following questions:

1. Did Constellation implement the plant modifications and procedure changes committed to in their GL 2004-02 response?

The inspectors verified that actions implemented by Constellation as described in response to GL 2004-02 were complete as it related to the installation of the sump screen. The inspectors noted that Constellation had not completed the debris source

evaluation, updated net positive suction head (NPSH) calculations, material specifications, long term downstream effects evaluation, or the effects of chemical precipitants on the strainer head loss at the time of the inspection.

2. Has Constellation updated its licensing basis to reflect the corrective actions taken in response to GL 2004-02?

The inspectors verified that changes to the facility or procedures, as described in the UFSAR, that were identified in Constellation's GL 2004-02 response were reviewed and documented in accordance with 10 CFR 50.59 and Constellation had obtained NRC approval prior to implementing those changes that require such approval as stated in 10 CFR 50.59. Specifically, the inspectors noted Constellation had submitted a TS amendment to change the inspection TS surveillance SR 3.5.2.8. The surveillance set the requirements for visual inspection of the new sump and screens. Finally, the inspectors verified that Constellation intends to update the Calvert Cliffs Unit 2 licensing bases to reflect the final modification and associated procedure changes taken in response to GL 2004-02.

The TI will remain open to allow for the review of portions of the GL response that have not been completed. Specifically, Constellation had not completed several analyses related to the determination of head loss on the strainer and downstream effects of screen bypass material. The results of these analyses have the potential to impact the final size of the strainer, licensing basis and programmatic procedures. Therefore, the inspection will be considered incomplete until the results are reviewed. Constellation plans to evaluate the strainer for adequacy once the test and inspection results needed to quantify the head loss are known. The NRC has set a December 31, 2007, deadline for the completion of these evaluations.

c. Findings

No findings of significance were identified.

.4 Independent Spent Fuel Storage Installation (ISFSI)

a. Inspection Scope (60855 & 60856)

The inspection consisted of evaluating ISFSI-related activities, including procedures and documentation, characterization of selected fuel assemblies for storage, handling and lifting of heavy loads, and review of personnel training and qualification records associated with a recent ISFSI fuel loading campaign. Inspection activities also included an evaluation of corrective actions implemented to address two violations detailed in NRC Inspection Report 07200008/2005-001. This is a supplement to the review performed for NRC Inspection Report 07200008/2007-008 and 05000317/2007-008.

The inspectors reviewed and verified the following attributes:

The licensee demonstrated the ability to safely load spent fuel into a storage cask. Work activities were performed in accordance with approved procedures in compliance with technical specification requirements. Spent fuel loaded into storage casks was properly characterized. Storage casks were properly sealed, tested, surveyed and inspected and met the requirements of technical specifications. Corrective actions for two previous violations were determined to be acceptable and completed in accordance with the licensee's corrective action program.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On April 19, 2007, the resident inspectors presented the inspection results to Mr. Joseph Pollock 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. Although the inspectors reviewed some proprietary items during the inspection, no proprietary information is presented in this report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Constellation Personnel

J. Spina, Vice President
J. Pollock, Plant General Manager
D. Bauder, Operations Manager
R. Camerson, Senior Engineering Analyst
S. Dean, Operations Supervisor
D. Dellario, Director, RVH replacement
G. Detter, Fleet Security and Emergency Preparedness Manager
C. Dobry, Senior Engineer
B. Erdman, ALARA Supervisor
P. Fatka, System Manager
M. Flaherty, Engineering Services Manager
D. Frye, Outage Management
J. Gaines, Licensing Manager
J. Gines, Engineering Consultant
K. Gould, Radiation Protection Manager
K. Greene, Maintenance Rule Coordinator
T. Konerth, Project Engineer, RVH Projects
M. Lewis, System Manager
S. Loeper, System Manager
K. Mills, System Engineering Supervisor
D. Murphy, Balance of Plant Engineering Supervisor
C. Neyman, Engineering Analyst
B. Pumphrey, Security
L. Richards, Component Specialist Supervisor
B. Rudell, RVH Project
E. Schinner, Calvert Cliffs Emergency Preparedness Manager
A. Simpson, Senior Licensee Engineer
V. Trojan, System Manager
J. Wynn, System Manager
J. York, Radiation Protection Supervisor
M. Yox, Engineering Analyst & Licensing
M. Fick, Work Coordinator Manager
E. Kreahting, Senior Engineering Analyst
P. Furio, Senior Licensing Supervisor

LIST OF ITEMS OPENED, CLOSED AND DISCUSSEDOpened

05000318/2515/166	TI	Pressurized Water Reactor Containment Sump Blockage (4OA5.3)
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Opened and Closed

05000317,318/2007002-01	FIN	Failure To Take Timely Actions to Evaluate And Correct Station Blackout Diesel Degraded Conditions (1R15)
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05000317/2007002-02	NCV	Failure To Adequately Implement FME Procedures And Controls (4OA3.2)
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05000317,318/2007002-03	NCV	Failure to Recognize that One Or More Channels Of The High-Rate-Of-Change Trip Function Was Inoperable. (4OA3.5)
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Closed

05000317,318/2006-002-01	LER	Control Element Assembly (CEA) Determined to Be Untrippable (4OA3.2)
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05000317/2006-003-00	LER	Impact On Safety-Related Equipment Not Considered When High Energy Line Break Barrier Removed (4OA3.3)
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05000318/2006-001-01	LER	Reactor Trip During Performance Of Maintenance Clearance Order (4OA3.4)
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05000317/2006-004	LER	Reactor Trip Due To Loose Wire During Maintenance On Turbine Control System (4OA3.6)
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05000317/318/2006-005-00	LER	Startup Rate Trip Bypass Enabling Function Below Setpoint (4OA3.5)
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072-00008/2005-001-01	NOV	Failure to Document Written Evaluation Per 72.48(d)(1) (4OA5.4)
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072-00008/2005-001-02	NOV	Failure To Properly Evaluate Design Change Per 72.48(c)(2)(vii) (4OA5.4)
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LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

Procedures

OI-03A-1, Revision 20, Safety Injection and Containment Spray
OI-22M, Revision 7, 1A and 0C DG Building HVAC
OI-22C, Revision 9, ECCS Pump Room Ventilation
OI-21A-1, Revision 19, 1A Diesel Generator

Condition Reports

IRE-019-607
IRE-020-109

Work Orders

1200603098

Clearance Orders

1200600974

Drawings

DRWG. No. 60731SH0001, Revision 78, Safety Injection And Containment Spray Systems
DRWG. No. 60731SH0002, Revision 44, Safety Injection And Containment Spray Systems
DRWG. No. 62414SH0002, Revision 64, Diesel Generator Building HVAC System
DRWG. No. 61085SH0007A, Revision 14, East ECCS Pump Room Cooling Fans

Section 1R05: Fire Protection

SA-1, Revision 6, Fire Protection Program
SA-1-102, Revision 2, Fire Protection/Appendix R Compensatory Actions
SA-1-100, Revision 13, Fire Prevention
SA-1-101, Revision 3, Fire Fighting
FP-0002, Revision 0, Fire Hazards Analysis Summary Document
Fire Fighting Strategies Manual, Revision 0

Condition Reports

IRE-019-880
IRE-020-590
IRE-020-712
IRE-021-234
IRE-021-183

Drawings:

DRWG. No. 15960-0034SH0001, Revision 0A, Unit 2 CCI Strainer Layout Redline Drawing
DRWG. No. 15960-0065SH0001, Revision 0A, Radial Duct Outline Assembly Drawing

DRWG. No. 15960-0071SH0001, Revision 0A, Radial Duct Connector Outline Assembly

Implementation of Temporary Instruction (TI) 2515/166 - Pressurized Water Reactor Containment Sump Blockage

Action Item IR200400528, Generic Letter 2004-002 Action Item Tracking Report, 10/28/2004
AIT CT 200400030, Generic Letter 2004-002 Action Item Summary Report, 09/16/2004
BGE DWG No. 83240 (M-605), Thermal Insulation for Piping and Equipment, Rev. 17
BGE 91-317-B (SK-M-876, Sh 1&2), Pressurized Relief Valve Piping Inside CTMT, Rev. 14
DWG. NO. 15960-0022SH0001, Strainer Module for Row A, B, B, Typical Modular Configuration Assemble Drawing, Rev. 0A
ES199701925-000, DCALC No., CA04079, Comparison of Available and Required NPSH for the Safety Injection and Containment Spray Pumps During Post-RAS Operation, Rev. 0
ES200400048-001, Engineering Services Package for Unit 2 Emergency Containment Sump Strainer, Rev. 0
ES200400048-002, Form 5, Equivalent Change Evaluation to address interferences impacting the installation of the Containment Sump Strainer, Rev. 0
ES400400407, Unqualified Coatings Within Containment Units 1 & 2, Rev. 0
ES200500079-000, SE00498, 10 CFR 50.59 Evaluation Form, Calvert Cliffs Unit 2 Cycle 17 core reload, Rev. 1
ES200600137, RFO Containment Coatings Walkdown for 2006, Rev. 0
Head Loss Calculation, Calvert Cliffs Units 1 and 2 Reactor Building Emergency Sump, 10/27/2006
MN-3-100, Safety-Related and Controlled Protective Coatings, Rev. 6
Norms Doc ID 99-CT-RFO12, 1999 Calvert Cliffs Unit 2 RFO12 Service Level 1 Coatings Program
Norms Doc ID 04-0161, CCNPP Unit 1 2004 RFO Containment Coating Assessment
N-REP-34320-10000, Jet Impact Tests, Rev. R00
NEI 02-01, Condition Assessment Guidelines: Debris Sources Inside PWR Containments, September 2002
NRC Letter: Calvert Cliffs Nuclear Power Plant Unit Nos. 1 & 2 - License Amendment Request: Revise Containment Sump Surveillance Requirement to Verify Strainer Integrity, dated February 1, 2007
NRC Letter: Calvert Cliffs Nuclear Power Plant Unit Nos. 1 & 2 - Update of Response to GL 2004-02, Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized Water Reactors, dated June 30, 2006
NRC Letter: Calvert Cliffs Nuclear Power Plant Unit Nos. 1 & 2 - Update of Response to GL 2004-02, Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized Water Reactors, dated September 20, 2006
NRC NUREG/CR-6742, Vol. 1, GSI-191 Technical Assessment: Parametric Evaluations for Pressurized Water Reactor Recirculation Sump Performance, August 2001
NRC Safety Evaluation Related to NRC Generic Letter 2004-002, Nuclear Energy Institute Guidance Report: Pressurized Water Reactor Sump Performance Evaluation Methodology, 12/06/2004
Nuclear Energy Institute Guidance Report: Pressurized Water Reactor Sump Performance Evaluation Methodology, Rev. 1

OP-6, Pre-startup Checkoff, Rev. 51
STP-M-661-2, Calvert Cliffs Unit 2 Containment Emergency Sump Inspection, Rev. 5
UCR00553, Technical Specifications Bases Change Request, 01/26/2007

Section 1R08: Inservice Inspection

Examination Procedures

NDE-5110-CC Rev. 3, Dry Powder AC Yoke Magnetic Particle Examination Of Nuclear Components And Welds
NDE-5210-CC Rev. 5, Color Contrast Liquid Penetrant Examination Of Nuclear Components And Welds
NDE-5730-CC Rev. 2, Unit 2 Mode 3 Boric Acid Walkdown
NDE-5711-CC Rev. 5, VT-3 Of Component Supports And Integral Attachments
PDI-UT-10 Rev. 22, Performance Demonstration Initiative (PDI) UT Qualified Instrument Equipment/Associated Essential Settings
PDI-UT-10 Rev. C, Performance Demonstration Initiative UT Test Procedure

Examination Reports

CC07-BV-007, Visual Examination At #22 Hot Leg, System 064, Reactor Coolant System
CC07-EV-011, Visual/Surface Evaluation Of Boric Acid #22 Hot Leg, CR -553
CC07-IV-006, Visual Examination Of Component Supports And Snubbers, System 015
CC07-IP-009, Liquid Penetrant Examination, 2-CV-100E-2 Valve Upper Body Weld
CC07-IM-014, Magnetic Particle Examination, Lower Head To Support

Work Orders

2200701547, Boric Acid Leak At Sample Valve, (IRE-020-448), Clean And Adjust Packing
2200701560, Boric Acid Leak At Valve 2SI-524 (IRE-020-445), Clean, Inspect, And Repair
2200701580, Boric Acid Buildup On Insulation At #22 SG Hot Leg (IRE-020-553), Clean, Determine Source
2200700158, Tighten Loose Jam Nut, Evaluate, Document Acceptance Of Zero Clearance
2200303715, Repair/Replacement Plan #2006-2-053a, Replace Pipe Section On DB-1-2018, #21 SG Feed Water Supply
2200303716, Repair/Replacement Plan # 2006-2-054a, Replace Pipe Section On DB-1-2019, #22 SG Feed Water Supply

Welding Procedures

WPS P1-T-LH, Manual Gas Tungsten Arc And Shielded Metal Arc Weld Processes
WPS P1-T, Manual Gas Tungsten Arc Welding
WPS P1-LH, Manual Shielded Metal Arc Welding
PQR 28, Shielded Metal Arc Welding Procedure Qualification Record
PQR 64G, Shielded Metal Arc Welding Procedure Qualification Record

Miscellaneous

MN-3-105 Rev 5, Qualification Of Nondestructive Examination Personnel and Procedures
ES200700020, Engineering Evaluation of CR IRE-019-388, Pipe Support Gaps
WDI-PJF-1303367-TR-008, Demonstration Report/Technical Basis For Manual UT Of
Pressurizer Safety And Relief Nozzle Dissimilar Metal Welds (DSM)
MN-3-105 Rev 5, Qualification Of Nondestructive Examination Personnel And Procedures
U2-UT-10-001, Procedure Field Change Request For PDI-UT-10 Rev C
Letter 03/09/2006, Letter From NRC, Technical Specification Changes And Safety Evaluation
(Amendments #278 and 255)

Condition Reports

IRE-020-448
IRE-020-445
IRE-020-474
IRE-020-477
IRE-020-553
IRE-019-388

Section 1R11: Licensed Operator Requalification Program

Procedures

LOR-202-3B-S-07, Shutdown Operations
NO-1-200, Revision 32, Control of Shift Activities
NO-1-103, Revision 24, Conduct of Lower Mode Operations
OP-3, Revision 43, Normal Power Operation
OP-4, Revision 16, Plant Shutdown from Power Operation to Hot Standby
OP-5, Revision 22, Plant Shutdown from Hot Standby to Cold Shutdown

Condition Reports

IR4-031-327

Section 1R12: Maintenance Effectiveness

Procedures

NO-1-115, Revision 7, Operations Maintenance Coordination
NO-1-203, Revision 12, Operations Section Performance Evaluation
ER-1-103, Revision 1, Maintenance Rule Program Implementation
STP-M-003A-0, Revision 3, On-line Main Steam Safety Valve Testing

Drawings

DRWG. No. 61403BSH00134, Revision 0, Main Steam Safety Valves

Condition Reports (CR)

IRE-001-326	IRE-009-026	IRE-011-450	IRE-011-454
IRE-012-365	IRE-016-685	IRE-019-372	IRE-021-038

Work Orders

MO#1200404746
MO#1200606127
MO#2200600605
MO#2200604009

Other

PE 0-030-03-O-M, Revision 2, Control Room (CR) HVAC Load Test on 11 CR HVAC I-038, Revision 0, Removal, Storage, Installation, and Inspection of Reactor Coolant Pump Vibration Probes, dated January 4, 2006

Maintenance Rule Documents

(A)(3) Periodic Assessment of Maintenance Rule Program, Calvert Cliffs Nuclear Power Plant, October 2004 through September 2006
Calvert Cliffs Nuclear Power Plant (CCNPP) Maintenance Rule (MR) Scoping Document, Revision 26

(A)(1) - Evaluation, Corrective Action, and Goal Setting Plans

IRE-007-423, Area and Process Radiation Monitoring System, Rev. 0
IRE-008-760, Liquid Effluent Radiation Monitoring System, Rev. 0
IRE-008-859, Auxiliary Feed Water (AFW) System, Rev. 0
IRE-008-929, Unit 2 Instrument Power Supply, Rev. 0
IRE-009-485, Closed Cooling Water Radiation Monitoring System, Rev. 0
IRE-015-094, Reactor Coolant Pumps, Rev. 0
IRE-016-507, Process Radiation Monitoring, Rev. 0
IRE-016-684, Fuel Assemblies, Rev. 0
IRE-019-662, Reactor Coolant Pumps, Rev. 0

Plant Health Committee (PHC) Meeting Minutes

December 7, 2004	April 5, 2005	April 26, 2005
September 20, 2005	November 3, 2005	November 15, 2005
November 29, 2005	December 13, 2005	January 10, 2006
February 14, 2006	April 25, 2006	August 1, 2006
August 15, 2006	September 19, 2006	October 24, 2006
October 31, 2006		

Health Reports

Auxiliary Building And Radwaste Heat & Ventilation Systems, Unit 1 & 2, 4th Quarter 2006
Auxiliary Feed Water System, Units 1 & 2, 4th Quarter 2006
Power Supplies Program, Unit 1, 1st Quarter 2007
Process Radiation Monitoring System, Units 1 & 2, 3rd Quarter 2006
Reactor Coolant Pumps, Units 1 & 2, 4th Quarter 2006
Safety Injection (SI) System, Units 1 & 2, 4th Quarter 2006
Salt Water Cooling (SW) System, Units 1 & 2, 4th Quarter 2006
Service Water (SRW) System, Units 1 & 2, 4th Quarter 2006

Miscellaneous Documents

Calvert Cliffs Maintenance Rule Indicator, (a)(1) SSCs, January 2007

List of Risk Significant System Functional Failures That Occurred January 1, 2005 Through December 30, 2006

Maintenance Rule Unavailability Report, dated 1/17/2007

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures

MN-1-123, Revision 17, Integrated Work Planning

NO-1-117, Revision 18, Integrated Risk Management

Integrated Work Schedule

Integrated Work Schedule Week 704

Integrated Work Schedule Week 705

Integrated Work Schedule Week 706

Integrated Work Schedule Week 708

Integrated Work Schedule Week 709

Integrated Work Schedule Week 710

Miscellaneous Documents

Refuel Outage Scripts and Contingency Plans

Section 1R15: Operability Evaluations

Condition Reports

IRE-019-350 IRE-019-457 IRE-019-458 IRE-019-640

IRE-019-641 IRE-019-881 IRE-019-987 IRE-020-200

IRE-020-409 IRE-020-420 IRE-020-761 IRE-020-486

IRE-021-274

Procedures

OI-30, Revision 23, Nuclear Instrumentation

2K200-ALM, Revision 7, Service Water Heat Exchanger Alarm Manual

OI-6, Revision 17, Reactor Protection System

OI-03A-1, Revision 20, Safety Injection and Containment Spray

STP-O-55A-2, Revision 34, Containment Closure Verification

0C188-ALM, Revision 5, 0C DG Local Control Panel Alarm Manual

NO-1-106, Revision 10, Functional Evaluation/Operability Determination

Calculation

E5200100656-000, Rev. 0, Total Loop Uncertainty For The Plant Computer

Determination Of Maintenance Feedwater Flow

Calculation No. D-92-014, HVAC-Diesel Generator Heating Requirements

Drawings

DRWG. No. 610765SH0011C, Revision 3, Containment Cooling Fan 11

DRWG. No. 60731SH0002, Revision 44, Safety Injection And Containment Spray Systems

Miscellaneous

1A EDG Oil Analysis History Report

Inservice Testing Basis Document (ISTBD), Revision 10, Section 14, Safety Injection System Operator Logs, dated February 26, 2007

OC Diesel Generator Operator Logs dated January 14, 2007, February 22, 2007, and February 23, 2007

Calvert Cliffs Updated Final Safety Analysis Report

Section 1R19: Post-Maintenance Testing

Procedures

NO-1-208, Revision 11, Nuclear Operations (NO) Post Maintenance Testing

MD-1-100, Revision 13, Temporary Alterations

STP-M-562-2, Revision 6, Containment High Range Radiation Monitor Alignment Check

STP O-1-2, Revision 14, MSIV Full Stroke Test

CNG-HU-1.01-1002, Revision 01, Pre-Job Briefings and Post-Job Critiques

ETP-06-004, Revision 0, 2B EDG Speed Control Modification Post Maintenance Test

OI-44, Revision 3, Process Radiation Monitor

Condition Reports

IRE-019-148

IRE-019-314

IRE-021-559

Work Orders

MO#2200700152

MO#1200603098

MO#1200700305

MO#0200700815

MO#2199801933

MO#2200503868

MO#2200503578

Clearance Orders

1200600974

Drawings

DRWG. No.: 12310-0080SH0002B-1001SH0002, Revision 1

DRWG. No.: 61086SH00031-2006SH0002, Revision 12

Other

SD-077, Revision 3, Radiation Monitoring System
TCF-2200700152

Section 1R20: Refueling and Other Outage Activities

Procedures

NO-1-103, Revision 24, Conduct of Lower Mode Operations
NO-1-200, Revision 32, Control of Shift Activities
OP-2, Revision 43, Plant Startup from Hot Standby to Minimum Load
OP-3, Revision 43, Normal Power Operation
OP-4, Revision 16, Plant Shutdown from Power Operation to Hot Standby
OP-5, Revision 22, Plant Shutdown from Hot Standby to Cold Shutdown
OP-6, Revision 51, Pre-Startup Checkoff
OP-7, Revision 32, Shutdown Operations
PSTP-02, Revision 29, Initial Approach to Criticality and Low Power Physics Testing Procedure
PSTP-03, Revision 30, Escalation to Power Test Procedure
PSTP-10, Revision 14, Coastdown Procedure
STP-O-55A-2, Revision 34, Containment Closure Verification
MN-1-123, Revision 17, Integrated Work Planning
NO-1-117, Revision 18, Attachment 9, High Risk Activity Plan
NO-1-114, Revision 14, Containment Closure
CNG-MN-1.01-1001, Revision 1, Foreign Material Exclusion

Condition Reports

IRE-021-790	IRE-020-293	IRE-020-433	IRE-020-690
IRE-021-048	IRE-020-865	IRE-021-561	

Work Orders

2200600522
2200700165
2200701906
2200701793
2200701657

Clearance Orders

2200600373
2200503272
2200600374

Other

Refuel Outage Scripts and Contingency Plans
Generic Letter 88-17, Loss of Decay Heat Removal, dated October 17, 1988
NUMARC 91-06, Guidelines for Industry Actions to Assess Shutdown Management

Section 1R22: Surveillance Testing

Procedures

STP-M-562-2, Revision 6, Containment High Range Radiation Monitor Alignment Check
 STP-O-073A-1, Revision 16, Saltwater Pump and Check Valve Quarterly Operability Test
 STP-O-8A-1, Revision 26, Test of 1A DG and 11 4kV Bus LOCI Sequencer
 STP-O-55A-2, Revision 34, Containment Closure Verification
 STP-O-65S-1, Revision 4, ECCS LPSI Loop Isolation Valves Quarterly Operability Test
 STP-O-108D-2, Revision 3, Containment Penetration Local Leak Rate Tests
 EN-4-102, Revision 6, ASME Pump & Valve Inservice Testing (IST) Program Requirements
 EN-4-108, Revision 1, ASME Inservice Testing of Power-Operated Valves & Manual Valves
 OI-30, Revision 23, Nuclear Instrumentation
 OI-15-2, Revision 45, Service Water System
 OI-29-2, Revision 53, Saltwater System
 Pump-3, Revision 6, Saltwater Pump Overhaul
 Pump-3A, Revision 1, Saltwater Pump Removal and Replacement

Work Orders

MO#2200602402
 MO#2200600440
 MO#2200700152

Clearance Orders

2200700045

Other

SD-012, Revision 6, Saltwater System Description

Section 1R23: Temporary Plant Modifications

Procedures

MD-1-100, Revision 13, Temporary Alterations
 EN-1-102, Revision 10, 10CFR 50.59 / 10 CFR 72.48 Reviews
 Temporary Alteration No. 1-07-0002, NW Unit 1 HP Exhaust Line

Section 2OS1: Access to Radiologically Significant Areas

Condition Reports

IRE-019-566	IRE-019-468	IRE-019-339	IRE-019-264
IRE-019-200	IRE-019-186	IRE-018-831	IRE-018-550
IRE-018-327	IRE-017-718	IRE-017-699	IRE-017-189
IRE-020-688	IRE-020-649	IRE-020-665	IRE-020-655
IRE-020-742	IRE-020-675	IRE-020-711	

Updated Final Safety Analysis Report, Chapter 11, Waste Processing and Radiation Protection
 Reactor Head Project: Radiation Protection Task Plan, November 1, 2006

Reactor Vessel Head Replacement ALARA Plan, September 8, 2006
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Special Work Permits: 2007-2003; 2007-2008; 2007-2306; 2007-2307; 2007-2308; 2007-2311

Section 40A1: Performance Indicator Verification

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Unit 2 Safety System Failure Rate Indicator

Section 40A3: Event Followup

Procedures

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STP-M-310-2, Unit 2 Linear Power Channel Calibration, Rev. 13

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LER 2006-005, Startup Rate Trip Bypass Enabling Function Below Setpoint
LER 05000317/2006-003, Revision 0, Impact On Safety-Related Equipment not Considered When High Energy Line Break Barrier Removed
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IR 05000317/2006004 and 05000318/2006004, Calvert Cliffs Integrated Inspection Report
NRC Information Notice 2000-20, Potential Loss of Redundant Safety-Related Equipment Because of the Lack of High-Energy Line Break Barriers
NRC Regulatory Issue Summary 2001-009, Control of Hazard Barriers
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Section 40A5: Other Activities

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ES 200200768, Supp. No. 00, New Thimble Support Plate, Rev. 7
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B&W Canada Drawing No. 104JE013, Sht. 1, As-Built Dimension -RV2, Rev. 02
B&W Canada Drawing No. 104JE014, Sht. 2, As-Built Dimension -RV2, Rev. 02
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Measurements of the Reactor Vessel & Head at Calvert Cliffs II, dated 1/6/04
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Keyway Gap Study
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Gap Structural Evaluation
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1-12, Rev. 2 and Drawing 50, Sheet 1, Rev. 1
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Canada, dated June 28, 2004
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(DIR) EVALUATION
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Control Element Drive System, System Description No. 55, Rev. 1
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B&W Weld Records and NDE Records - 4 Lifting Lugs on Unit 2 RRVCH
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B&W Canada - PT White Data Sheets for J-Welds
RT Weld Report W.O.# 845006, Work Order 842207, Part No. 5216968, Item # 84066 A, B, C
Condition Reports IRE-019-771, IRE-012-607, IRE-018-064, IRE-018-597
B&W Non-conformance Report 27191

LIST OF ACRONYMS

AC	Alternating Current
ADAMS	Agency-wide Documents Access and Management System
AFW	Auxiliary Feedwater
ALARA	As Low As Reasonably Achievable
ANI	Authorized Nuclear Inspector
AOP	Abnormal Operating Procedures
ASME	American Society of Mechanical Engineers
B&PV	Boiler and Pressure Vessel
BWC	Babcock & Wilcox, Canada
CAP	Corrective Actions Program
CCNPP	Calvert Cliffs Nuclear Power Plant
CDF	Core Damage Frequency
CEA	Control Element Assembly
CEDE	Committed Effective Dose Equivalent
CEDM	Control Element Drive Mechanism
CFR	Code of Federal Regulations
CIV	Containment Isolation Valve
CMTR	Certified Mill Test Reports
CNMT	Containment
CR	Condition Report
DC	Direct Current
DG	Diesel Generator
DIR	Design Input Requirements
DSM	Dissimilar Metal Welds
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
ESS	Enhanced Service Structure
EPD	Electronic Personal Dosimeter
ESP	Engineering Service Package
FME	Foreign Material Exclusion
GL	Generic Letter
HELB	High Energy Line Break
HVAC	Heating Ventilation Air Conditioning
IMC	Inspection Manual Chapter
ISFSI	Independent Spent Fuel Storage Installation
ISI	Inservice Inspection
ISLOCA	Interfacing Systems Loss of Coolant Accident
IRE	Issue Report
IST	Inservice Test
Kv	Kilovolt
LER	Licensee Event Report
LERF	Large Early Release Frequency
LOOP	Loss of Offsite Power
LPS	Low Pressure Safety Injection
MCC	Motor Control Center

MO	Maintenance Work Order
MR	Maintenance Rule
MSIP	Mechanical Stress Improvement Process
MSIV	Main Steam Isolation Valve
MSR	Moisture Separator Reheater
MT	Magnetic Partical Test
NCV	Non-Cited Violation
NDE	Non-Destructive Examination
NO	Nuclear Operations
NPSH	Net Positive Suction Head
NRC	Nuclear Regulatory Commission
OA	Other Activities
OE	Operating Experience
PAF	Pre-Assembly Facility
PARS	Publicly Available Records
PHC	Plant Health Committee
PI	Performance Indicator
PQR	Procedure Qualification Record
PWSCC	Primary Water Stress Corrosion Cracking
PT	Liquid Penetrant Test
QA	Quality Assurance
RCA	Radiologically Controlled Area
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RFO	Refueling Outage
RP	Radiation Protection
RPS	Reactor Protection System
RPV	Reactor Pressure Vessel
RRVCH	Relacement Reactor Vessel Closure Head
RTP	Reactor Thermal Power
RVCH	Reactor Vessel Closure Head
RVLMS	Reactor Vessel Level Monitoring System
RWP	Radiation Work Permit
SBO	Station Blackout
SDC	Shutdown Cooling
SDP	Significance Determination Process
SFP	Spent Fuel Pool
SI	Safety Injection
SRA	Senior Reactor Analyst
SRW	Service Water
SSC	Structures, Systems and Components
SSFF	Safety System Functional Failures
SUR	Start-Up Rate
SW	Salt Water
TI	Temporary Instruction
TS	Technical Specification
TSP	Thermal Support Plate

UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
UT	Ultrasonic Test
VT	Visual Examination
WPS	Weld Procedure Specification