October 4, 2006

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 COMPONENT DESIGN BASES INSPECTION REPORT 05000317/2006008 AND 05000318/2006008

Dear Mr. Spina:

On August 25, 2006, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Calvert Cliffs Nuclear Power Plant Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on August 25, 2006, with Mr. J. 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. In conducting the inspection, the team examined the adequacy of selected components and operator actions to mitigate postulated transients, initiating events, and design bases accidents. The inspection also reviewed Constellation's response to selected operating experience issues. The inspection involved field walkdowns, examination of selected procedures, calculations and records, and interviews with station personnel.

Based on the results of this inspection, no findings of significance were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosures, 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 the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

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

Enclosure: Inspection Report Nos. 05000317/2006008 and 05000318/2006008
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No:	50-317, 50-318
License Nos.	DPR-53, DPR-69
Report Nos.	05000317/2006008, 05000318/2006008
Licensee:	Constellation Generation Group, LLC
Facility:	Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Location:	Lusby, MD
Inspection Period:	July 17 - August 25, 2006
Inspectors:	J. Schoppy, Senior Reactor Inspector, Division of Reactor Safety (DRS), Team Leader D. Johnson, Reactor Inspector, DRS J. Kulp, Reactor Inspector, DRS J. Jessie, Nuclear Safety Professional Development Program (NSPDP) Participant (Trainee) A. Turilin, NSPDP Participant (Trainee) J. Williams, NRC Consultant H. Anderson, NRC Mechanical Contractor L. Hajos, NRC Electrical Contractor
Approved By:	Lawrence T. Doerflein, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000317/2006-008, 05000318/2006-008; 07/17/06 - 08/25/06; Calvert Cliffs Nuclear Power Plant, Units 1 and 2; Engineering Design Team Inspection.

This inspection was conducted by a team of four NRC inspectors and two NRC contractors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

None.

B. Licensee Identified Violations

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Component Design Bases Inspection (IP 71111.21)

.1 Inspection Sample Selection Process

The team selected risk significant components and operator actions for review using information contained in Calvert Cliffs' Probabilistic Risk Analysis (PRA), the U. S. Nuclear Regulatory Commission's (NRC's) Standardized Plant Analysis Risk (SPAR) model, and the Significance Determination Process (SDP) Risk Informed Inspection Notebook, Revision 2, for the Calvert Cliffs Nuclear Power Plant (CCNPP). In general, this included components and operator actions that had a risk achievement worth (RAW) of greater than two. The components selected were located within both safety related and non-safety related systems and included a variety of components such as electrical buses, pumps, motors, diesel generators, heat exchangers (HXs), tanks, piping and valves.

An initial list, consisting of over 50 components, was created based on risk considerations. The team performed a margin assessment to narrow this list down to 16 components for a detailed design review. This design margin assessment considered original design issues, margin reductions due to modifications, or margin reductions identified as a result of material condition/equipment reliability issues. Issues impacting design margin included failed performance test results, significant corrective action history, repeated maintenance, Maintenance Rule (MR) (a)(1) status, operability reviews for degraded conditions, NRC resident inspector input of problem equipment, system health reports and industry operating experience (OE). Consideration was also given to the uniqueness and complexity of the design and the available defense-in-depth margins. An overall summary of the reviews performed and the specific inspection findings identified are included in the following sections of the report. Specific documents reviewed are listed in the attachment to this report.

.2 Results of Detailed Reviews

.2.1 Detailed Component Design Reviews (16 Samples)

.2.1.1 No. 21 4160 Volt Alternating Current (AC) Safety Bus

a. Inspection Scope

The team reviewed calculations and drawings to determine if the loading of the No. 21 4160Vac vital bus was within equipment ratings. The team reviewed the adequacy and appropriateness of design assumptions and calculations related to motor starting and loading voltages to determine if the voltages across motor terminals, under worst-case motor starting and loading conditions, would remain above the minimum acceptable values. On a sample basis, the team reviewed maintenance and test procedures and

acceptance criteria to verify that the No. 21 4160Vac vital bus was capable of supplying the minimum voltage necessary to ensure proper operation of connected equipment during normal and accident conditions. The team reviewed the adequacy of the short circuit ratings of the switchgear and circuit breakers and the adequacy of protective device coordination provided for a selected sample of equipment.

The team reviewed calculations, drawings, and procedures to determine whether undervoltage relay setpoints, load shed schemes, and load sequencing were adequate to assure availability of vital loads within the times assumed in Updated Final Safety Analysis Report (UFSAR) Section 8.3.1.2. The team conducted a walkdown of the 4160Vac vital buses to verify that their material condition, operating environment, and breaker alignments were consistent with the design bases.

b. Findings

No findings of significance were identified.

.2.1.2 No. 22 Component Cooling Water Heat Exchanger

a. Inspection Scope

The team selected the No. 22 component cooling water (CCW) heat exchanger (HX) as a representative sample of the CCW HXs installed in both units. The team evaluated the CCW HX design, maintenance history, and current material condition to assess whether it was capable of removing sufficient heat from the CCW system during normal and accident conditions. The team reviewed the CCW HX vendor manual, CCW system design calculations, and CCW system operating procedures. The team also reviewed condition reports (CRs), work orders, system health reports, maintenance procedures, engineering evaluations, and fouling data trends to assess the effectiveness of preventive and corrective maintenance on the No. 22 CCW HX. In addition, the team interviewed and conducted a walkdown with the CCW system engineer.

b. Findings

No findings of significance were identified.

.2.1.3 No. 2A Emergency Diesel Generator

a. Inspection Scope

The team selected the No. 2A emergency diesel generator (EDG) as a representative sample of the EDGs installed in both units. The team conducted a walkdown of all EDGs and their associated EDG rooms. In addition, the team conducted a detailed walkdown of No. 2A EDG with the EDG system manager. The team reviewed design documents, calculations, in-service test (IST) criteria and results, surveillance testing, vendor manuals, maintenance history, licensing basis documents, and CRs.

b. Findings

No findings of significance were identified.

.2.1.4 Unit 1 No. 23 Control Element Assembly

a. Inspection Scope

The team selected the No. 23 control element assembly (CEA) as a representative sample of the CEAs installed in both units. The team reviewed CRs, operating procedures, surveillance test results, system health reports, and work orders. In addition, the team reviewed Licensee Event Report (LER) 2006-002 and the corrective actions taken as a result of the event. LER 2006-02 described an event which occurred on April 8, 2006, at CCNPP Unit 1 during which the No. 21 CEA was determined to be untrippable due to the introduction of debris into the reactor coolant system. The team reviewed the project plan for the upcoming Unit 2 outage and CCNPP's actions to preclude a repeat occurrence of this event. The team also interviewed the reactor protection system engineer and the engineer responsible for the CEAs and the control element drive mechanisms.

b. Findings

No findings of significance were identified.

.2.1.5 No. 12 Condensate Storage Tank and Auxiliary Feedwater System Suction Piping

a. Inspection Scope

The team walked down accessible portions of the No. 12 condensate storage tank (CST) and auxiliary feedwater (AFW) suction piping including components associated with the CST and enclosure structure, the AFW valve pit, and AFW pump rooms to assess material condition and system alignment. On August 14, the team made a confined space entry to inspect the AFW piping and valves within the AFW valve pit (common to both units). The team reviewed the records of previous excavation, inspection, and repair of portions of currently inaccessible underground AFW piping; pipe support inspection results; design and engineering documentation; calculations and evaluations; records of surveillance and investigation of potential sinkholes in or near system components and equipment; and inspection, testing, and maintenance records related to the CST and suction piping. The review included impact or potential impact of the CST level and nitrogen gas blanket on AFW system flow and performance; available net positive suction head (NPSH); and vortexing and nitrogen ingestion. The team reviewed calculations and evaluations related to pump operation under various transient, accident, and minimum flow conditions.

b. Findings

No findings of significance were identified.

.2.1.6 No. 11A 480 Volt Alternating Current Load Center

a. Inspection Scope

The team reviewed calculations and drawings to determine if the loading of the No. 11A 480Vac vital bus was within equipment ratings. The team reviewed the adequacy and appropriateness of design assumptions and calculations related to motor starting and loading voltages to determine if the voltages across motor terminals, under worst-case motor starting and loading conditions, would remain above the minimum acceptable values. On a sample basis, the team reviewed maintenance and test procedures and acceptance criteria to verify that the No. 11A 480Vac vital bus was capable of supplying the minimum voltage necessary to ensure proper operation of connected equipment during normal and accident conditions. The team reviewed the adequacy of the short circuit ratings of the switchgear and circuit breakers and the adequacy of protective device coordination provided for a selected sample of equipment.

The team reviewed calculations, drawings, and procedures to determine whether undervoltage relay setpoints, load shed schemes, and load sequencing were adequate to assure availability of vital loads within the times assumed in UFSAR Section 8.3.1.2. The team conducted a walkdown of the 480Vac vital buses to verify that their material condition, operating environment, and breaker alignments were consistent with the design bases.

b. Findings

No findings of significance were identified.

.2.1.7 No. 13 High Pressure Safety Injection Pump

a. Inspection Scope

The team reviewed design and engineering documentation; calculations, evaluations and vendor documentation; and inspection, testing, and maintenance records related to the No. 13 high pressure safety injection (HPSI) pump. The review included system flow and performance; available NPSH; vortexing and air ingestion; calculations and evaluations related to pump operation under various transient, accident, and minimum flow conditions; and suction sources (refueling water tank (RWT) and containment recirculation sump) and level. The team performed detailed walkdowns of selected accessible HPSI components and supporting features to assess material condition and system alignment. The team reviewed pump flow and quarterly surveillance test results completed during the last refueling outage; documentation of maintenance; CRs; system health reports; pump performance trending records; as well as documentation associated with various industry and regulatory notifications. The team also reviewed CCNPP's evaluation of selective oil analysis results associated with the pump and motor.

b. Findings

No findings of significance were identified.

2.1.8 No. 22 Turbine Driven Auxiliary Feedwater Pump

a. Inspection Scope

The team reviewed design and engineering documentation; calculations, evaluations and vendor documentation; and inspection, testing, and maintenance records related to the No. 22 turbine-driven AFW (TDAFW) pump. The review included system flow and performance; NPSH; vortexing and gas ingestion; calculations and evaluations related to pump operation under various transient, accident, and minimum flow conditions; and suction source (CST) and level. The team performed detailed walkdowns of the TDAFW pump and supporting features to assess material condition and system alignment. The team reviewed pump flow and quarterly surveillance test results completed during the last refueling outage; documentation of maintenance; CRs; system health reports; pump performance trending records; as well as documentation associated with various industry and regulatory notifications. The team also reviewed the performance of equipment associated with this pump in relation to motive steam supply (AFW turbine steam admission) and motive steam supply bypass (AFW turbine steam admission bypass) valves, air accumulator sizing and tests, and pump/turbine cooling in the event of loss of all AC power. The review included logic documentation related to the AFW actuation system which provides an actuation signal (open) to the AFW turbine steam admission and turbine steam admission bypass valves and a signal (start) to the motor-driven AFW (MDAFW) pump.

b. Findings

No findings of significance were identified.

.2.1.9 No. 23 Motor Driven Auxiliary Feedwater Pump Motor

a. Inspection Scope

The team selected the No. 23 MDAFW pump motor as a representative sample of the installed MDAFW pump motors in both units. The team conducted a walkdown of the motor and associated pump. In addition, the team reviewed vendor manuals, design changes, apparent cause investigations, engineering evaluations, maintenance history and CRs associated with the pump and motor.

b. Findings

No findings of significance were identified.

.2.1.10 2MOV659 High Pressure Safety Injection System Recirculation Valve

a. Inspection Scope

The team reviewed design and engineering documentation; calculations and evaluations; and selective inspection, testing, and maintenance records related to the 2MOV659 HPSI system recirculation valve. The review included calculation of required system pressures under which the valve must perform its safety function, required valve performance, and valve test results. The team walked down accessible portions of the HPSI system to assess material condition and system alignment. The team reviewed system health reports; documentation associated with various industry and regulatory notifications; and HPSI system CRs. The team also reviewed logic documentation related to the recirculation actuation signal (RAS) which provides an actuation signal (close) to 2MOV659.

b. Findings

No findings of significance were identified.

.2.1.11 No. 11 Emergency Core Cooling System Pump Room Cooler

a. Inspection Scope

The team selected the No. 11 emergency core cooling system (ECCS) pump room cooler as a representative sample of the ECCS pump room coolers. Each ECCS pump room has a single room cooler cooled by the saltwater (SW) system. The failure of a room cooler could prevent adequate heat removal from the associated ECCS pump room and result in the loss of safety function of the associated ECCS pump train. The team conducted a walkdown of the No. 11 ECCS pump room cooler with the ventilation system manager; and reviewed vendor manuals, design calculations, engineering evaluations, maintenance history, and CRs.

b. Findings

No findings of significance were identified.

.2.1.12 1CV4521 Steam Generator Block Valve

a. Inspection Scope

The team reviewed design and engineering documentation, calculations, evaluations, and testing records related to the 1CV4521 steam generator (SG) block valve. The review included calculation of required system pressures under which the air operated block valve must perform its safety function, required valve performance, associated air accumulator sizing and tests, and valve test results. The team walked down 1CV4521 and accessible portions of its supporting features to assess material condition and system alignment. The team reviewed system health reports and CRs associated with

the valve. The team also reviewed logic documentation related to the AFW actuation system (AFAS) which provides an actuation block signal (close) to 1CV4521.

b. Findings

No findings of significance were identified.

.2.1.13 No. 22 125 Volt Direct Current Class 1E Station Battery

a. Inspection Scope

The team reviewed the station battery calculations to verify that the battery sizing would satisfy the requirements at the loads and that the minimum possible voltage was adequate for postulated loading scenarios. Specifically, the evaluation focused on verifying that the battery and battery chargers were adequately sized to supply the design duty cycle of the 125 Vdc system for both the loss of offsite power/loss of coolant accident (LOOP/LOCA) and station blackout (SBO) loading scenarios, and that adequate voltage would remain available for the individual load devices required to operate during a four-hour SBO coping duration. In addition, the team conducted a walkdown to visually inspect the physical/material condition of the battery and battery chargers and confirm that the battery room temperatures were within specified design temperature ranges. During the walkdown, the team visually inspected No. 22 battery for signs of degradation such as excessive terminal corrosion and electrolyte leaks. The team verified that the battery chargers were energized with acceptable indicated voltage and current present. The team reviewed battery surveillance results to verify that applicable technical specification (TS) specified acceptance criteria and frequency requirements were met.

b. Findings

No findings of significance were identified.

.2.1.14 Unit 2 Switchgear Heating Ventilation and Air Conditioning System

a. Inspection Scope

The team selected the Unit 2 switchgear heating, ventilation and air conditioning (HVAC) system as a representative sample of the switchgear HVAC systems. The failure of a switchgear HVAC system may result in the loss of safety function of the associated switchgear under design basis conditions. The team conducted a walkdown of the Unit 2 switchgear HVAC system; and reviewed vendor manuals, maintenance history, design calculations, engineering evaluations, design changes, and CRs.

b. Findings

No findings of significance were identified.

.2.1.15 No. 11 Saltwater Cooling Pump

a. Inspection Scope

The team selected the No. 11 saltwater cooling (SW) pump as a representative sample of the SW pumps installed in both units. The team reviewed the system design basis flow and NPSH calculations related to pump operation under various transient and accident conditions. The team reviewed recent pump test results, SW CRs, SW intake silt surveys and trending data, and SW system maintenance history. The team conducted walkdowns of all six SW pumps (three per unit), the SW sluice gates, and the SW intake structure and traveling screens to assess material condition and readiness. In addition, the team conducted a walkdown of the No. 11 SW pump with the SW system engineer.

b. Findings

No findings of significance were identified.

2.1.16 No. 11A Service Water Heat Exchanger Inlet Strainer

a. Inspection Scope

The team selected the No. 11A service water (SRW) HX inlet strainer as a representative sample of the SRW HX inlet strainers installed in both units. The team conducted a walkdown of the No. 11A SRW HX and had detailed discussions with the SW and SRW system engineers. The team observed portions of two SRW HX internal inspection and cleaning preventive maintenance (PM) activities. In addition, the team reviewed vendor manuals, operating procedures, maintenance history, design changes, and CRs.

b. Findings

No findings of significance were identified.

.2.2 Review of Low Margin Operator Actions (4 Samples)

The team performed a margin assessment of expected operator actions, and selected a sample of operator actions for detailed review based upon risk significance and time dependency of the actions. The operator actions were selected from PRA rankings of human action importance based on risk reduction worth (RRW) values and other PRA insights.

Considerations in the review process included the following factors:

- Environmental conditions or restrictions for performing the actions;
- Personnel access to equipment;
- Plant procedures that address the actions;
- Need for additional personnel or equipment;
- Information available for diagnosing conditions and initiating actions;
- Ability of operator to recover from errors while performing a task;
- Consequences of failure to complete actions;
- Time to complete actions; and
- Task included in the Systematic Approach to Training (SAT) based training program and trained on.

The selected operator actions were generally characterized as having one or more of the following attributes:

- Low margin between the time required and time available to perform the actions;
- Reliability or redundancy of the components associated with the actions;
- Complexity of the actions; and
- Procedure or training challenges that may impact the operators' ability to perform the actions.

.2.2.1 Restore Power to a Safety Related 4 KV Bus

a. Inspection Scope

Following a LOOP with several equipment failures (BHEC4A Rev. 1), the crew has 45 minutes to locally prelube, start, and load the 0C diesel generator (DG) onto the 4 kV bus. The team reviewed task lists, the task-to-training matrix and training materials to ensure that the operator actions were included in their SAT based training program. The team discussed the operator actions with five NRC licensed operators. The team reviewed drawings and procedures and conducted a plant walkdown to assess the capability of performing these actions. The team observed four crews in evaluated simulator scenarios restore power to a safety related 4 kV bus with the 0C DG. The team also reviewed training performance data and corrective actions reports.

b. Findings

No findings of significance were identified.

.2.2.2 Cross Connect Unit 1 AFW Pump to Supply Unit 2

a. Inspection Scope

In the PRA sequence described in training event BHEFIV Rev. 1, it is assumed that all 3 of the affected unit’s AFW pumps fail and the crew must cross connect the other unit’s AFW pump to supply AFW to the affected unit within 45 minutes. The team reviewed

task lists, the task-to-training matrix and training materials to ensure that the operator actions were included in their SAT based training program. The team discussed the operator actions with five NRC licensed operators. The team reviewed drawings and procedures and conducted a plant walkdown to assess the capability of performing these actions.

b. Findings

No findings of significance were identified.

.2.2.3 Initiate Once Through Core Cooling

a. Inspection Scope

In the PRA sequence described in training event BHEOTA Rev. 1, the crew must initiate once through core cooling (OTCC) within 5 minutes of when the SG level reaches -350 inches and there is no feedwater flow available to the SGs. The team reviewed tasks lists, the task-to-training matrix and training materials to ensure that the operator actions were included in their SAT based training program. The team discussed the operator actions with five NRC licensed operators. The team reviewed drawings and procedures to assess the capability of performing these actions. The team observed two crews in evaluated simulator scenarios to verify their capability to initiate OTCC within the five minute time limit.

b. Findings

No findings of significance were identified.

.2.2.4 Establish Long Term Auxiliary Feedwater Flow

a. Inspection Scope

In the PRA sequence described in training event BHEF3X Rev. 2, the crew must align the No. 11 CST to supply Unit 1 and the No. 21 CST to supply Unit 2 within 50 minutes to prevent AFW pump failure due to cavitation. The team reviewed task lists, the task-to-training matrix and training materials to ensure that the operator actions were included in their SAT based training program. The team discussed the operator actions with five NRC licensed operators. The team reviewed drawings and procedures and conducted a plant walkdown to assess the capability of performing these actions.

b. Findings

No findings of significance were identified.

.2.3 Review of Industry Operating Experience and Generic Issues (5 Samples)

a. Inspection Scope

The team reviewed selected operating experience (OE) issues that had occurred at domestic and foreign nuclear facilities for applicability at CCNPP. The team performed an independent applicability review and selected issues with apparent applicability to Calvert Cliffs for a detailed review to verify that the licensee had taken appropriate actions. The team performed a detailed review of the following OE issues; documents reviewed for these issues are listed in the attachment to this report.

.2.3.1 Grid Reliability and Impact on Plant Risk and Operability of Offsite Power

The team reviewed the applicability and disposition of grid reliability and operability of offsite power described in NRC Generic Letter (GL) 2006-02. The purpose of GL 2006-02 was to determine if compliance was being maintained with NRC regulatory requirements governing electric power sources and associated personnel training. The team selected this OE item for detailed review because grid reliability remains an important issue as licensees add new generation to the grid. The detailed review assessed CCNPP's protocols with the transmission system provider and offsite power restoration procedures using NRC Regulatory Guide 1.155, Station Blackout, Section 2.

.2.3.2 Operational Challenges During a Dual Unit Transient

At the time of the event described in NRC Information Notice (IN) 93-44, the licensee's staffing was the minimum allowed by TSs. This complicated response and recovery due to the lack of enough licensed operators to perform the necessary actions. In addition, the licensee's training was conducted with two licensed operators, so the crew configuration during the event was not as well-staffed as in training.

The Calvert Cliffs facility had the same potential staffing problem for coping with a dual unit event. The team reviewed CCNPP's response to NRC IN 93-44 to ensure that enough operators would be on shift to handle dual unit events. The team reviewed CCNPP's procedures and shift staffing, online and during simulator training.

.2.3.3 Vibration-Induced Degradation of Butterfly Valves

The team reviewed the applicability and disposition of NRC IN 2005-23, Vibration-Induced Degradation of Butterfly Valves. IN 2005-23 concerned the degradation of butterfly valves supplied by Fisher Controls and other manufacturers. The team reviewed CCNPP's evaluation addressing the issues raised in IN 2005-23 and CCNPP's butterfly valve maintenance procedures. In addition, the team discussed butterfly valve condition and maintenance with the engineer responsible for addressing the Information Notice.

.2.3.4 Flow Accelerated Corrosion

The team reviewed the applicability and disposition of NRC IN 99-019, Rupture of the Shell Side of a Feedwater Heater at Point Beach Nuclear Plant. The team reviewed CCNPP's current and revised programs that monitor material condition of HXs and piping systems. The team interviewed the Flow Accelerated Corrosion (FAC) Program manager concerning use of industry OE and the implementation of the current inspection program. The team reviewed OE notifications generated as a result of CCNPP's FAC program, and viewed pictures and videos of inspections conducted on both units.

.2.3.5 Potential Damage to Redundant Safety Related Equipment Due to Internal Flooding

The team reviewed the applicability and disposition of NRC IN 83-44 (Supplement 1), Potential Damage to Redundant Safety Equipment as a Result of Backflow Through the Equipment and Floor Drain System; and NRC IN 2005-30, Safe Shutdown Potentially Challenged By Unanalyzed Internal Flooding Events and Inadequate Design. At the Kewaunee Power Station, multiple trains of safety-related systems necessary for safe-shutdown (e.g., AFW, EDGs, and electrical distribution switchgear) were located at the same elevation and immediately adjacent to the turbine building (TB) basement. Water from a TB flood could have flowed into these spaces through non-watertight doors and through the floor drain system, which consisted of an open pipe connecting the spaces to the TB sump. The team selected this OE sample based on the risk significance of the Kewaunee internal flooding concern and potential vulnerabilities inherent in the plant layout of the Calvert Cliffs units.

The team reviewed plant drawings, PM and corrective maintenance work orders, CRs, internal flooding calculations and evaluations, system operating and alarm response procedures, and plant modifications. The team also performed numerous detailed walkdowns of the following areas at both units: EDG rooms, SW and circulating water pump rooms, SRW pump rooms, battery and switchgear rooms, ECCS pump rooms, radiation exhaust ventilation equipment rooms, and TDAFW pump rooms. The team performed the detailed reviews and walkdowns to ensure that CCNPP implemented and maintained adequate flood barriers; appropriate administrative controls and procedures; properly functioning sump pumps, check valves, drains, and level instruments; and adequate maintenance practices. The team also observed several related maintenance activities, including SRW HX cleaning/flushing and SRW pump room drain snaking/cleaning.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Problem Identification and Resolution

a. Inspection Scope

The team reviewed a sample of problems that CCNPP personnel identified and entered into their corrective action program. The team reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions related to design and qualification issues. In addition, the team reviewed CRs written on NRC-identified issues during the inspection to verify adequate problem identification and incorporation of the problem into the corrective action system. The specific corrective action documents that were sampled and reviewed by the team are listed in the attachment to this report.

b. Findings

No findings of significance were identified.

4OA6 Meetings, including Exit

On August 25, 2006, the team presented the inspection results to Mr. J. Pollock and other members of Constellation management. The team verified that no proprietary information is documented in the report.

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel:

R. Bleacher	Reactor Operator Technical Writer
J. Boggs	Engineer, Design Engineering
R. Cameron	Engineering Analyst, Equipment Reliability
G. Dare	Engineering Analyst, System Engineering
S. Dean	Assistant Operations Manager
C. Dobry	Senior Engineer, System Engineering
A. Drake	Mechanical Engineering Consultant, Design Engineering
B. Dyer	Supervisor Maintenance Services
P. Fatka	Senior Engineer, System Engineering
M. Flaherty	Manager, Engineering Services
T. Giles	Engineering Analyst, Engineering Programs
J. Gineś	Mechanical Engineering Consultant, System Engineering
A. Henni	Mechanical Engineering Consultant, Design Engineering
T. Konerth	Principle Engineer, CCNPP Projects
K. Lebarron	Engineering Analyst, System Engineering
D. Lenker	Principle Engineer, Design Engineering
M. Lewis	Mechanical Engineering Consultant, System Engineering
S. Loeper	Mechanical Engineering Consultant, System Engineering
D. Murphy	Senior Engineer, System Engineering
J. Pollock	Plant General Manager
K. Robinson	General Supervisor, Design Engineering
B. Scott	Principle Engineer, Design Engineering
A. Simpson	Engineering Consultant, Licensing
R. Stark	E&C Engineering Consultant, Design Engineering
R. Stattel	I&C Engineering Consultant, System Engineering
J. Stone	Principle Engineer, CGG Nuclear PRA
V. Trojan	Senior Engineer, System Engineering
L. Williams	Senior Engineering Analyst, System Engineering
J. Wilson	Control room Supervisor
J. Wynn	Senior Engineer, System Engineering

NRC Personnel:

J. Giessner	Senior Resident Inspector
M. Davis	Resident Inspector
W. Cook	Senior Reactor Analyst

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Open and Closed

None

LIST OF DOCUMENTS REVIEWED

Audits and Self-Assessments

MPR-2938, Calvert Cliffs Nuclear Power Plant Component Design Basis Inspection Self Assessment - June 2006, Rev. 1
OL-2-104, Backlog of Calculation Notices (CCNs), dated July 2006 (Draft)

Calculations

1-87-7, Capacity of Condensate Storage Tank No. 12, Rev. 0
1-90-187, Air Accumulator Sizing for Valves CV-4070 & 4071, Rev. 1
1-90-266, Determination of Differential Head for 400 GPM Flow in HPSI System, Rev. 0
1-91-13, Auxiliary Feedwater Air Pressure Setpoint, Rev. 0
1-92-60, AFW Air Accumulator Pressure Switch Setpoints, Rev. 0
95-0141, SRW Heat Exchanger Operating Limits, Rev. 1
CA0023, EDGs Load Flow and Fault Calculation, Rev. 0
CA00067, EDG Fuel Oil Consumption Rate and Tank Capacity Calculation, Rev. 0
CA03386, Unit 1 Saltwater Flow Model Database (Post FCR 94-204 Configuration), dated 4/7/98
CA03387, Unit 1 Saltwater Flow Analysis, Rev. 1
CA03414, AFW Pumps - NPSH and Maximum Allowable Flows for Combinations of AFW Pumps, Rev. 0
CA03421, Design Report of the Alfa Laval Model Alf 40 R Filter (Strainer) to be Used with Alfa Laval Plate and Frame Heat Exchanger, Rev. 0
CA03548, Determination of Worst Case Operating Conditions for Air Operated Valves (AOVs) in the Auxiliary Feedwater System (AFW), Rev. 1
CA03693, Re-rating of CCNPP Emergency Diesel Generator Air, Jacket Water and Lube Oil Heat Exchangers, Rev. 1
CA03745, Uncertainty Calculation for 12 Condensate Storage Tank Level, Rev. 1
CA03771, Determination of Minimum Water Level in Containment during Containment Sump Recirculation, Rev. 2
CA03821, Equilibrium Temperature in Service Water Room After Insulation of Auxiliary Feedwater Pump, Rev. 0
CA04076, Maximum Equilibrium Temperature in ECCS Pump Rooms Following a LOCA, Rev. 0
CA04079, Comparison of Available and Required NPSH for the Safety Injection and Containment Spray Pumps during Post-RAS Operation, Rev. 0
CA04129, Heat Balance of the ECCS Pump Rooms as a Function of Bay Water Temperature, Rev. 0

CA04312, Switchgear Room HVAC System - Cooling Load Increase due to addition of 15 KVA Transformer, Rev. 0
CA04411, Switchgear Room HVAC - Outdoor Temperature Limitations for 100% Outdoor Ventilation, Rev. 0
CA04570, Heat-up Temperature Profile of the Unit 1 and Unit 2 Switchgear Rooms During a Loss of HVAC as a Result of a Fire, Rev. 2
CA04658, Use of Outside Air Only to Cool the Unit 1 and Unit 2 Switchgear Rooms, Rev. 0
CA04750, Evaluation of Vortexing in RWT and Resultant Void Fraction of Fluid Ingested by the ECCS Pumps, Rev. 1
CA04765, Maximum Expected EDG Room (2A, 1B, and 2B) Temperature during Accident Conditions with EDG Loaded to 3600KW, Rev. 0
CA04879, Saltwater NPSH and Pressure Evaluation, Rev. 0
CA04891, Evaluation of Vortexing in RWT and Resultant Void Fraction of Fluid Ingested by the ECCS Pumps during Post-RAS Operation, Rev. 0
CA04978, Evaluation of Vortexing Potential for the AFW Pumps when Pumping from 12 CST, Rev. 0
CA0566, AOV Component Level Calculations - AFW Block Valves, AFW Cross-Connect Valves, and SDC Temperature/Flow Control Valves, Rev. 0
CA06053, Evaluation of Effect of Nitrogen Gas in AFW Inventory on AFW Pump Performance, Rev. 0
CA06605, Unit 1 Cycle 18 Physics Groundrules, Rev. 0
CA06606, Unit 1 Cycle 18 Plant Parameter Groundrules, Rev. 0
CA1206, Safety Related 4KV Undervoltage Protection, Rev. 4
D-E-94-001, Relay Settings and Coordination, Rev. 7
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E-87-008, Electrical Penetration Assembly Short Circuit Rating, Rev. 1
E-87-012, Voltage Drop, Short Circuit, Cable Sizing & Protective Relay Settings - Screenwash, Rev. 0
E-87-013, 4kV Degraded Voltage Relays Replacement, Rev. 0
E-88-007, Conversion of Cable IR values, Rev. 0
E-88-008, Vital DC System Coordination, Rev. 8
E-88-015, Diesel Generator Loading Calculation, Rev. 3
ECCS Pump Room Coolers, dated 3/31/77
Emergency Diesel Generator Vent Fan Units, dated 2/11/71
E-89-042, Voltage Drop in DC Systems, Rev. 3
E-90-024, Power Cable Impedance and Reactance, Rev. 0
E-90-030, MCC Momentary Voltage, Rev. 0
E-90-033, AC Fault Study, Rev. 1
E-90-065, 4kV Bus 11 Protective Devices, Rev. 4
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E-90-075, 4kV Bus 21 Protective Devices, Rev. 4
E-90-081, 4kV Bus 24 Protective Devices, Rev. 0
E-90-085, Protective Relay Set Point Calculation for 480V Bus 11A, Rev. 3
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E-91-023, Short Circuit Current for Battery Charger Ammeters, Rev. 1
E-92-004, 480V MCC Protective Device Curves, Rev. 1

E-92-009, Diesel Generator 11 Protective Relays, Rev.1
E-92-010, Emergency Diesel Generator #12 Protective Relays, Rev. 0
E-92-011, Emergency Diesel Generator #21 Protective Relays, Rev. 0
E-92-059, 4kV Bus Voltage Requirements, Rev. 0
E-93-015, Coordination Study for NSF Power Distribution System, Rev. 0
E-93-024, 120 VAC Vital Instrument Bus Coordination, Rev. 1
E-94-005, Relay Setting for Relays 250G/T-11(-12, -13, -21, -22, -23) and Ground Relays 251G1ST-1(-2), 251G1SG-11(-21), Rev. 0
E-94-017, Plant Electrical AC Loadflow Analysis, Rev. 2
M-88-13, AFW & ECCS Recirculation - IE Bulletin 88-04, Rev. 0
M-90-170, Flood Height Resulting from a Pipe Break in the Radiation Exhaust Vent. Equip. Rooms, dated 4/25/91
M-90-178, Flood Height Resulting from a Pipe Break in the Switchgear Rooms, dated 8/1/91
M-90-179, Internal Plant Flooding for the Purge Supply Air Supply Rooms, dated 8/15/91
M-90-196, Time Response Calculation for Isolation of a Flooding Event in the Aux Building and Intake Structure, dated 9/18/91
M-91-60, Blowdown of the EDGs Air Receivers, dated 5/14/91
M-92-236, Maximum Continuous SRW Flow to the EDG, Rev. 0
M-92-268, Predict ECCS Pump Recirculation Flowrates when Six of the Pumps are Operating (2HPSI, 2 LPSI, 2CS), Rev. 1
M-93-041, Component Cooling Water Heat Exchanger, Rev. 0
M-93-144, EDG Room Temperature, Rev. 2
ME931615.012, Cooling Water Calculations, dated 7/1/93
M-94-046, No. 11/12 Condensate Storage Tank Minimum Level for Useable Volume, Rev. 0
M-94-62, ECCS Pump Room Air Cooler Performance with Reduced Air and Water Flows, dated 4/14/94
Switchgear Room HVAC System, dated 3/8/77

<u>Completed Surveillance Test Procedures</u>
STP M-150-1, #12 Station Battery Weekly Check, dated 7/13/06
STP M-150-2, #22 Station Battery Weekly Check, dated 7/11/06
STP M-152-1, #11 Station Battery Weekly Check, dated 7/13/06
STP M-152-2, #21 Station Battery Weekly Check, dated 7/11/06
STP M-211-1, Secondary CEA Position Display Out of Sequence, Deviation and Power Dependent Insertion Limit (PDIL) Alarm Functional Check, dated 10/21/05
STP M-350-1, #11 Station Battery Quarterly Check, dated 7/13/06
STP M-350-2, #12 Station Battery Quarterly Check, dated 5/18/06
STP M-350-2, #21 Station Battery Quarterly Check, dated 4/19/06
STP M-350-2, #22 Station Battery Quarterly Check, dated 7/11/06
STP M-550-1, #12 Station Battery Service Test, dated 3/4/04
STP M-550-2, #22 Station Battery Service Test, dated 4/7/04
STP M-552-1, #11 Station Battery Service Test, dated 9/1/05
STP M-552-2, #21 Station Battery Service Test, dated 5/30/06
STP M-551A-0, Battery Charger #23 and #11 Operability Test, dated 8/25/04
STP M-551B-0, Battery Charger #24 and #12 Operability Test, dated 10/20/05
STP M-551C-0, Battery Charger #21 and #13 Operability Test, dated 4/13/06
STP M-551D-0, Battery Charger #22 and #14 Operability Test, dated 7/27/04

STP O-4B-1, B Train Integrated Engineered Safety Features Test, dated 3/28/06
STP O-5A-1, Auxiliary Feedwater System Quarterly Surveillance Test, dated 6/1/06
STP O-5A-2, Auxiliary Feedwater System Quarterly Surveillance Test, dated 6/9/06
STP O-7A-1, “A” Train Engineered Safety Features Logic Test, dated 6/5/06
STP O-7A-2, "A" Train Engineered Safety Features Logic Test, dated 6/11/06
STP O-7B-1, "B" Train Engineered Safety Features Logic Test, dated 6/18/06
STP O-7B-2, "A" Train Engineered Safety Features Logic Test, dated 6/23/06
STP O-8A-1, Test of 1A DG and 11 4KV Bus LOCI Sequencer, dated 7/8/06
STP O-8A-2, Test of 2A DG and 21 4KV Bus LOCI Sequencer, dated 6/11/06
STP O-8B-1, Test of 1B DG and 14 4KV Bus LOCI Sequencer, dated 6/18/06
STP O-8B-2, Test of 2B DG and 24 4KV Bus LOCI Sequencer, dated 6/25/06
STP O-9A-2, AFAS Equipment Response Time Test, dated 6/24/05
STP O-29-1, CEA Free Movement Test, dated 6/21/06
STP O-29-2, CEA Free Movement Test, dated 6/8/06
STP O-62-1, Monthly Valve Position Verification - Unit 1, dated 7/22/06
STP O-62-2, Monthly Valve Position Verification - Unit 2, dated 7/8/06
STP O-65N-1, Saltwater Subsystem Valve Quarterly Operability Test, dated 5/20/06
STP O-65N-1, Saltwater Subsystem Valve Quarterly Operability Test, dated 11/28/05
STP O-67B-2, Auxiliary Feedwater/Main Steam Check Valve Test, dated 4/17/03 and 4/20/03
STP O-73A-1, Saltwater Pump and Check Valve Quarterly Operability Test, dated 12/21/05 and 3/30/06
STP O-73A-2, Saltwater Pump and Check Valve Quarterly Operability Test, dated 4/11/06
STP O-73G-1, HPSI Pump Large Flow Test, dated 2/25/06 and 3/25/06
STP O-73G-2, HPSI Pump Large Flow Test, dated 3/4/05
STP O-73H-1, AFW Pump Large Flow Test, dated 2/17/06
STP O-73H-2, AFW Pump Large Flow Test, dated 2/24/05
STP O-90-1, AC Sources and On Site Power Distribution Systems 7 Day Operability Verification, dated 7/9/06
STP O-90-2, AC Sources and On Site Power Distribution Systems 7 Day Operability Verification, dated 7/9/06

Condition Reports

IR0-009-845	IR3-082-024	IR4-018-402	IR5-023-409
IR1-044-189	IR4-012-026	IR4-018-593	IRE-011-661
IR3-031-757	IR4-010-178	IR4-019-561	IRE-016-610*
IR3-014-512	IR4-000-158	IR4-019-984	IRE-008-095
IR3-031-197	IR4-003-593	IR4-022-347	IRE-006-286
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IR3-059-319	IR4-009-053	IR4-023-606	IRE-008-106
IR3-059-622	IR4-010-308	IR4-024-810	IRE-010-982
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IRE-007-662	IRE-016-036*	IRE-016-294	IRE-016-646*
IRE-008-549	IRE-016-059*	IRE-016-300	IRE-016-649*
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IRE-013-508	IRE-016-201*	IRE-016-375*	IRE-016-740*
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IRE-013-768			

* NRC identified during this inspection

Drawings

12103-0002, Piping - Bearing & Stuffing Box Cooling with Seal Circulation - HPSI Pump 22, Rev. 1
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12337-0015, Finned Tube Heat Exchanger Rear Header Two Pass, Rev. 2
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18002-0021SH0002, 6" Rubber Compensator for Water Circuit, Rev. 3
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FSK-M-P-823, HC-23, Refueling Water Tank No. 11 Miscellaneous Piping, Rev. 1

Engineering Evaluations

12337-007-1004, ECCS Pump Room Cooler RTV Cure Time, dated 10/7/98
93-0203, EDG Capacity Increase, Rev. 0
93-0203, EDG Capacity Increase - Supplement 3, dated 2/21/95
94-111R, 11 and 12 ECCS Pump Room Air Cooler Periodic Performance Evaluation, Rev. 2, dated 11/11/02
94-111R, 11 and 12 ECCS Pump Room Air Cooler Periodic Performance Evaluation, Rev. 2, dated 2/22/05
BHEC4A, Start, Align and Load 0C DG to 11 (24) 4 KV Bus, Rev. 1
BHEF3X, Establish Long Term AFW (5' CST Lvl, no ind.), Rev. 2
BHEF94, Operator Aligns AFW PP 23 to Support Unit 1 Within 45 Minutes Following Failure to Align AFW Standby Turbine-driven Pump, Rev. 0
BHEFIV, X-Connect Unit 2 AFW PP to Supply Unit 1 Within 45 Minutes of a Low Water Level Trip Given Loss of IA and 125 VDC Bus 11, Rev. 1
BHEOTA, Initiate OTCC Within 5 minutes of SG level at -350 Inches Following LOOP and no LOCA, Rev. 1
DES Evaluation of Debris in Reactor Vessel Annulus Region (Ref. IR0-045-355), dated 5/5/95
Engineering Test Report for 3500 KW A.C. Synchronous Alternator, dated 10/14/93
ES-001, Flooding, Rev. 2
ES-034, Electrical Device Settings, Rev. 0
ES199501141, Replace SRW Heat Exchangers with Plate Heat Exchangers, Rev. 0
ES199601674, Replace Fan Section of Switchgear Room Air Handling Units 21 and 22, Rev. 0
ES199700192, 2RV1587 Relief Valve Set Pressure Change, Rev. 0

ES199701272, Allow Installation of Additional Anodes in the Tank Farm and West Road Cathodic Protection System in Areas where Corrosion Protection Levels are Weak / Allow Installation of Electrical Box next to Each Cathode Protection Shunt Box to House Variable Resistors Needed to Balance Protection Levels and Compensate for Changing System Conditions, Rev. 0 and Rev. 1
ES199800039, Installation of Fall Protection for the Craft while Performing Maintenance Activities on Top of #12 Condensate Storage Tank, Rev. 1
ES199801432, Evaluate Possibility of Vortexing Occurring in 12 CST, Rev. 0 Supp. 1, 10/25/01
ES199801432 - Calc. No. CA04891, Evaluation of Air-Entrainment Levels for the ECCS Pumps when Pumping from the RWT Post-RAS, Rev. 1
ES199801583, Response to Protective Coating on Underground AFW Pump Suction Piping Found Damaged, dated 11/20/98
ES200100918, Address the Impact of Nitrogen Gas Coming out of Solution during a LOFW Event, Rev. 0, Supplement 2
ES200100938-000, Evaluate the Use of Cutler Hammer 480V DS Breakers, Rev. 0
ES200200014, EDG Room Drain Piping Check Valve Equivalent Change Evaluation, Rev. 0
ES200200127, Ensure that Testing Performed on Each ECCS and AFW Pump is Sufficient to Ensure that the Pump is Performing in Accordance with Inputs and Assumptions Used in Design Basis Hydraulic Evaluations in regard to STP Acceptance Criteria and Instrument Uncertainties, Rev. 0
ES200200687, Provide Analyses which Document that the AFW System is Capable of Performing Its Design Functions with consideration of Nitrogen Gas Effects at Low NPSH Available Conditions, Rev. 0
ES200300412, Operating SRW System with Bay Temperature > 32°F, Rev. 0
ES200400379, Installation of Cathodic Protection System, Rev. 0
ES200400727, Impact to Plant Equipment with Component Cooling Water Heat Exchanger Outlet Temperature Decrease to 70°F, Rev. 0
ES200500006, Maximum Flow Limits for Component Cooling Water Heat Exchanger, Rev. 0
ES200500181, Basis for Reasonable Expectation of Continued Operability (RECO) - Total Developed Head for 11, 12, and 13 HPSI Pumps (2/25/06 & 2/26/06) Exceeded High Action Limit, dated 3/22/06
FCR# 93-0203 Supp # 1, Diesel Generator Upgrade Analysis, dated August 1994
IR200500254, Apparent Cause Evaluation: 23 AFW Pump Motor Bearing High Temperature, dated 3/3/06
IRE-009-980 AIT# 3R200502575, Intake Structure Concrete Structural Integrity, dated 5/15/06
MCR NO. 91-097-025, Install Additional Emergency Lighting in the Aux Feed Water Pump Rooms, dated 5/15/92
MCR 92-036-004-00, Install Covers over AFW Pumps to Eliminate Packing Spray, dated 12/17/92
MEU-91-999-232, NCR 11726 Flooding the Intake Structure Rendering All Salt Water Pumps Inoperable, dated 9/3/91
MTR024, Reliance Electric Company Model P14G408NEV and P14H0408PNM Electric Motors, Rev. 8
OD 05-002, Operability Determination for Tech Spec SSCS: 21 ECCS Pump Room Cooler, dated 5/18/05

Licensing Bases

Calvert Cliffs Nuclear Power Plant Application for License Renewal, Attachment (1), Appendix A - Technical Information, 5.1 - Auxiliary Feedwater System, Group 9 (Elastomer Degradation of No. 12 CST Perimeter Seal), 1999

CCNPP Response to Generic Letter 96-05, dated 3/13/97, 6/30/98, 4/2/99, & 12/21/00

Final Response to Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Equipment, dated 6/30/94

Letter from NRC to BGE, NRC Requirements for Auxiliary Feedwater Systems at Calvert Cliffs Nuclear Power Plant Units 1 and 2, dated 11/7/79

Letter from BGE to NRC, Auxiliary Feedwater System Modifications, dated 2/2/81

Letter from BGE to NRC, NRC Requirements for Auxiliary Feedwater System, dated 3/5/81

Letter from NRC to BGE, Safety Evaluation by the Office of NRR Regarding the AFWS Recommendation GL-2, dated 6/29/81

Letter from BGE to NRC, Clarification of Auxiliary Feedwater System Commitments, dated 9/18/90

Letter from BGE to NRC, Emergency Diesel Generator Upgrade Project, dated 8/17/93

Letter from NRC to BGE, Qualification Testing Program for Emergency Diesel Generator Project, dated 2/10/94

Letter from NRC to BGE, Issuance of Amendments for Calvert Cliffs Nuclear Power Plant, dated 9/27/94

Letter from NRC to BGE, Issuance of Amendments for Calvert Cliffs Nuclear Power Plant, dated 3/3/95

Letter from BGE to NRC, License Amendment Request; Enhancement of the Engineered Safety Features Electrical System, dated 11/1/95

Letter from NRC to BGE, Issuance of Amendments for Calvert Cliffs Nuclear Power Plant, Unit No. 1 and Unit No. 2, dated 4/2/96

Letter from BGE to NRC, Rev. 9 to the License Amendment Request to Convert to the Improved Technical Specifications, dated 10/23/97

Letter from BGE to NRC, Rev. 11 to the License Amendment Request to Convert to the Improved Technical Specifications, dated 1/12/98

Letter from NRC to BGE, Issuance of Amendments for Calvert Cliffs Nuclear Power Plant, dated 5/4/98

Maintenance Work Orders

0199702447	1200204076	1200403626	1200602850	2200304489
0200500248	1200204149	1200404017	1200602900	2200304854
0200500562	1200301887	1200404654	2200003788	2200305185
0200502826	1200301889	1200404893	2200003789	2200305527
0200600333	1200302164	1200405052	2200100640	2200400266
1199503088	1200303820	1200406400	2200101645	2200400636
1199705294	1200304277	1200500303	2200103080	2200401139
1200002522	1200400263	1200501258	2200104093	2200401597
1200102692	1200400375	1200502830	2200301069	2200401598
1200103711	1200401541	1200503041	2200302046	2200402169
1200104890	1200401811	1200504503	2200302825	2200402855
1200200685	1200401901	1200601792	2200302891	2200402890
1200201308	1200403270	1200602791	2200304386	2200403255

2200404216	2200501237	2200502870	2200505225	2200602117
2200404391	2200501320	2200503110	2200505261	2200602118
2200500462	2200501524	2200504343	2200601047	2200602122
2200500888	2200501730	2200505216	2200601376	
2200501180	2200502493			

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1-36-7-O-SA, Cycle 1-AFW-131 & 1-AFW-167 Per OI-32A, Rev. 1
2-012-06-O-W, Saltwater System Flow Verification Per OI-29, dated 3/29/06
22 Component Cooling Water Heat Exchanger Single Tube Test Results, dated 9/13/05
22 Component Cooling Water Heat Exchanger Tube Layout, dated 7/24/06
2-36-7-O-SA, Cycle 2-AFW-131 & 2-AFW-167 Per OI-32A, Rev. 1
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CMF No. 05-109, Place 11 Turbine Building Sump Pump No. 11 Handswitch to Off, dated 6/9/05
CMF No. 06-067, Maintain the OC DG Building Sump Pumps in Off, dated 7/28/06
Eddy Current Examination and Condition Assessment of CCNPP #22 Component Cooling Heat Exchanger in January 2006, dated 7/20/06
ETP-01-005R, Single Tube Thermal Performance Testing for 21 & 22 Component Cooling Heat Exchanger, dated 9/13/05
ETP 89-76, CV-5149 Accumulator Capacity Check, dated 1/6/90
ETP-99-004, Saltwater Pump Minimum Flow Test, dated 5/5/99
ETP-99-015R, CEDM Performance Testing, dated 4/7/06
Heat Exchanger Program Guideline, Rev. 0
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MN-1-102, Preventive Maintenance Program, Rev. 8 and Rev. 13
MN-3-124, Flow Accelerated Corrosion Program, Rev. 1
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NO-1-205, Locked Valves, Rev. 12
0-102-4-O-M, Freeze Protected Equipment, Rev. 8
OC DG Operator Logs, dated 6/17/06
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PC Control Log, dated 8/2/06
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RAN: 01-017, MOV Risk Ranking, Rev. 0
SP-0095, Safety Related Electric Motor Repair, Rev. 14
Special Work Permit 2006-1018, Reactor Vessel Loose Parts Monitor Inspection / Repair (Reactor Cavity Annulus Check), dated 4/11/06
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STP-O-5A-2, Auxiliary Feedwater System Quarterly Surveillance Test, Rev. 18
STP-O-5B-1, AFW Flow Path Verification, Rev. 1
STP-M-583-1, Instrument Air Safety Related Pressure Boundary Check Valve Leak Test, Revision 6
STP-M-583-2, Instrument Air Safety Related Pressure Boundary Check Valve Leak Test, Revision 6
Service Water Reliability Program (Generic Letter 89-13), dated 2/3/06
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Valve-43, Masoneilan Pacesetter Butterfly Valve Overhaul, dated 12/19/03
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1C62/2C62/2C61, 1A/2A/2B Diesel Generator Alarm Monitor, Rev. 8
2CLO-ALM, ESFAS 23 Alarm Manual Unit 2, Rev. 38
AOP-7A, Loss of Saltwater Cooling, Rev. 12
AOP-7I, Section XXIV, 14A 480 Volt Bus, Rev. 23/Unit1
AOP-7L, Circulating Water / Intake Malfunctions, Rev. 10
EN-1-327, Service Water Reliability Program, Rev. 0 - 3
EOP Attachment 8, Maintain AFW Pump Suction Supply and CST Inventory
EOP Attachment 10, High Pressure Safety Injection Flow, Rev.18/Unit1 & Rev.17/Unit2
EOP Attachments, Maintain AFW Pump Suction and CST Inventory (Unit 1), Rev. 18
EOP-0, Post Trip Immediate Actions, Block Step C, Verify the Vital Auxiliaries Safety Function is Satisfied, Rev. 10
EOP-0, Post Trip Immediate Actions Technical Basis Document, Block Step C, Verify the Vital Auxiliaries Safety Function is Satisfied, Rev. 16
EOP-2, Loss of Offsite Power/Loss of Forced Circulation, Rev. 14
EOP-2, Loss of Offsite Power/Loss of Forced Circulation Technical Basis Document, Rev. 17
EOP-3, Loss of All Feedwater Technical Basis Document, Block Step IV.J, Rev. 21
EOP-3, Loss of All Feedwater, Block Step IV.J, Initiate Once-Through Cooling, Rev. 18/Unit1
EOP-3, Loss of All Feedwater, Block Step IV.J, Initiate Once-Through Cooling, Rev. 17/Unit2
EOP-4, Excess Steam Demand Event, Rev. 17
EOP-4, Excess Steam Demand Event Technical Basis Document, Rev. 18
EOP-7, Station Blackout Technical Basis Document, Block Steps IV.I, J, K, L, M, N and O, Rev. 20
EOP-7, Station Blackout, Block Step IV.I, Attempt to Restore Power to at Least One 4 KV Bus, Rev. 16/Unit1
EOP-8, HR-1, S/G Heat Sink with no SIS Operation, Rev. 29/Unit1 & Rev. 27/Unit2
EOP-8, Functional Recovery Procedure, Appendix 4, Core and RCS Heat Removal, Rev. 30
EOP-8, HR-2, S/G Heat Sink with SIS Operation, Rev. 29/Unit1 & Rev.27/Unit2
EOP-8, HR-4, Once Through Cooling, Rev. 29/Unit1 & Rev. 27/Unit2
EOP-8, Functional Recovery Procedure Technical Basis Document, Appendix 4, Rev. 30
EOP-09.02, Action Value used to Verify RCS and Core Heat Removal Safety Function Acceptance Criteria are Satisfied and to Monitor the Operability of the Condensate and AFW Systems - Condensate Storage Tank Level, Rev. 1
NO-1-103, Conduct of Lower Mode Operations, Rev. 23
NO-1-200, Control of Shift Activities, Rev. 32

OI-3A, Safety Injection and Containment Spray, Rev. 19
OI-14A, Circulating Water System Unit 1, Rev. 19
OI-16-2, Component Cooling System, Rev. 28
OI-20, Fire Protection System (Common), Rev. 28
OI-21A, Section 6.5, Restart of 2A DG with an Automatic Start Signal Present, Rev. 18/Unit2
OI-21A, Section 6.2.5, Restart of 1A DG with an Automatic Start Signal Present, Rev. 19/Unit1
OI-21B, Section 6.5, Restart of 2B DG with an Automatic Start Signal Present, Rev. 18/Unit2
OI-21B, Section 6.5, Restart of 1B DG with an Automatic Start Signal Present, Rev. 17/Unit1
OI-21C, Section 6.4, 0C DG Fast/Emergency Start from Local Control Panel 0C 188, Rev. 20
OI-21C, Section 6.22, Operate the 0C Pneumatic Prelube Pumps, Rev. 20
OI-21C, Section 6.8, Energize a Safety Related 4 KV Bus with 0C DG, Rev. 20
OI-22H, Switchgear Ventilation and Air Conditioning, Rev. 21
OI-23, Control Element Drive System Alignment Units 1 & 2, Rev. 3
OI-23B, Demineralized Water (Unit One and Two), Rev. 27
OI-27E, Section 6.4, Energizing Engineered Safety Features Buses from SMECO Power Supply System, Rev. 13
OI-29, Saltwater System Unit 1, Rev. 59
OI-32A, Auxiliary Feedwater System Unit 1, Rev. 20
OI-42, CEDM System Operation, Rev. 23
OI-47, 1A and OC Diesel Generator Buildings, Attachment 1G, Rev. 7
OP-6, Pre-Startup Checkoff, Rev. 51
PR-1-103, Use of Procedures, Rev. 5

Operating Experience

AIT No. 4B200000101, CCNPP Response to NRC Information Notice 2000-20, dated 4/10/01
AIT No. 4B200500321, CCNPP Response to NRC Information Notice 2005-23, dated 10/11/05
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Licensee Event Report 2006-002, Rev. 0, Control Element Assembly Determined to be Untrippable, dated 6/5/06
MEU 91-999-182, POEAC 01-90-19-03A (INFON 83-44 Supplement 1) AIT PC9013639 Final Response, dated 6/26/91
NRC Information Notice 83-44, Supplement 1: Potential Damage to Redundant Safety Equipment as a Result of Backflow Through the Equipment and Floor Drain System, dated 8/30/90
NRC Information Notice 93-44: Operational Challenges During a Dual-Unit Transient
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NRC Information Notice 2005-30: Safe Shutdown Potentially Challenged By Unanalyzed Internal Flooding Events and Inadequate Design, dated 11/7/05
NRC Generic Letter 96-05: Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves, dated 9/18/96
NRC Information Notice 2005-23, Vibration Induced Degradation of Butterfly Valves, dated 8/1/05

NRC Generic Letter 2006-02: Grid Reliability and Impact on Plant Risk and Operability of Offsite Power, dated 2/1/06

Operator Training

JPM-AOP-9A-24, Start a Diesel Generator (DG) (SOER 83-1)
JPM-EOP-0-03F, 07F and 12, Verify the Vital Auxiliaries Safety Function is Satisfied
JPM-EOP-3-2, Start Once Through Core Cooling
JPM-OI-21A-1, Parallel 1A Diesel Generator to the 11/17 4 KV Bus
JPM-OI-21A-2, Transfer 4 KV Bus Loads from a Diesel Generator to Offsite Power Source
JPM-OI-21C-1, Parallel 0C DG to SMECO from the Control Room, Start a Diesel Generator
JPM-OI-21C-2, 1A/0C DG Normal Shutdown from Control Room. Shutdown a Diesel Generator
JPM-OI-21C-3, Test 0C DG
JPM-OI-27C -2, Energize a 4 KV Bus From Its Service Transformer
JPM-OI-27D-1, Energize/De-energize a 480 Volt Single Ended Load Center
Lesson Plan #LOR-064-1-5, RCS, CVCS, & SI Interfaces
Lesson Plan #LOR-201-27-S-05, EOP's 2 & 7
Lesson Plan #LOR-201-3-5-05, EOP-3, Loss of all Feedwater
Lesson Plan #POC-052–01-06, Safety Injection/Containment Spray for Plant Operators
Lesson Plan #POC-36-1-05, Auxiliary Feedwater for Plant Operators
Lesson Plan #POC-64A-1-99, Reactor Coolant System for Plant Operators
OP-25, Simulator Operating Examination, Rev. 6
OP-30, Simulator Operating Examination, Rev. 5
Task Lists for EOPs 3, 5, 6, 7 and 8
Task-to-Training Matrixes for EOPs 3, 5, 6, 7 and 8

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0-42-2-O-M, Test Intake Structure Sump Level Alarms Per OI-14A, Rev. 2
EIN 201-052-ILS5437, East ECCS Pump Room Level, Rev. 0
EIN 202-011-ILS1650, Service Water Pump Room Level High, Rev. 0
PMO and RT No. 2200500373/20532018, PM Deferral Request, dated 7/11/06
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UEI 1(2)MA 502, PM Change Request - Ensure Periodic Inspections Are Performed on Scaffold Handrail Installations to Verify They Still Meet the Criteria for a Safe Scaffold as Defined in MN-1-203, dated 8/15/06

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Calvert Cliffs Nuclear Power Plant Probabilistic Risk Assessment Individual Plant Examination Summary Report, dated December 1993
Calvert Cliffs Nuclear Power Plant Probabilistic Risk Assessment Individual Plant Examination of External Events Summary Report, dated August 1997
Constellation Energy Generation Group Fleet Engineering Guideline, Margin Management, Rev. 0
NO-1-117, Attachment 5, Schedule Risk Assessment Worksheet for Operating Units (Modes 1, 2, 3), Rev. 16
RAN: 01-017, MOV Risk Ranking, Rev. 0
Risk-Informed Inspection Notebook for Calvert Cliffs Nuclear Power Plant Units 1 and 2, Rev. 2

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No. 004, 4160 VAC Electrical Power Distribution System, Rev. 2
No. 9, 042A, 108, Circulating Water, Rev. 5
No. 12, Saltwater System, Rev. 5
No. 15, Component Cooling System, Rev. 3
No. 024C, SACM Diesel Generator, Rev. 4
No. 032, Auxiliary Building Ventilation, Rev. 3
No. 36 A/B, Auxiliary Feedwater, Rev. 3
No. 52/61, Safety Injection and Containment Spray, Rev. 3
No. 53, Plant Sumps, Rev. 3
No. 55, Control Element Drive System, Rev. 1
No. 58, Reactor Protection System, Rev. 4
No. 64A, Reactor Coolant System, Rev. 3
No. 71A, Miscellaneous Liquid waste Processing, Rev. 3
No. 103, EDG Ventilation, Rev. 3

System Health Reports & Trending

12 Saltwater Pump Motor Oil Analysis History Report, dated 5/2/06
Auxiliary Feedwater Valve Pit Walkdown Results, performed 5/25/04
Baffle Wall Depth and Flow Velocity Trend (following survey on 3/31/06)
Individual Parameter Trend - HPSI PP 13 Motor Outboard Oil Analysis Trend (Total Acid Number), dated 6/23/96 to 3/20/06
Individual Parameter Trend - HPSI PP 13 Pump Outboard Oil Analysis Trend (Total Acid Number), dated 6/23/96 to 3/20/06
MN-1-319, Mechanical System Walkdown Report (Intake Structure and Waterfront), dated 3/30/06
MN-1-319, Structure Monitoring Walkdown Report (AFW Valve Pit), dated 5/12/04
Pump Performance Record - #22 Turbine Driven Pump, STP-0-73H-2 AFW Large Flow, dated 4/9/91 - 2/18/05 and STP-0-5A-2 Minimum Flow, dated 8/12/97 to 6/8/06
Pump Performance Record - #23 Motor Driven Pump, STP-0-73H-2 AFW Large Flow, dated 4/9/91 - 2/18/05 and STP-0-5A-2 Minimum Flow, dated 10/14/96 to 6/7/06
Unit 1 and Unit 2 125V DC System Health Report (Q2 - 2006)
Unit 1 and Unit 2 Auxiliary Feedwater System Health Report (Q2 - 2006)
Unit 1 and Unit 2 Component Cooling System Health Report (Q2 - 2006)
Unit 1 and Unit 2 Control Rod Drive Mechanism & Electrical System Health Report (Q2 - 2006)
Unit 1 and Unit 2 Electrical 480V Transformers and Buses System Health Report (Q2 - 2006)
Unit 1 and Unit 2 Electrical 4KV Transformers and Buses System Health Report (Q2 - 2006)
Unit 1 and Unit 2 Emergency Diesel Generator, Diesel Oil System System Health Report (Q2 - 2006)
Unit 1 and Unit 2 Intake Structure System Health Report (Q2 - 2006)
Unit 1 and Unit 2 Reactor Protective System Health Report (Q2 - 2006)
Unit 1 and Unit 2 Safety Injection System System Health Report (Q2 - 2006)
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Vendor Technical Manuals

12310-168-1001, Service Manual for Model TD3800TD8-1/8 Engine Generating Set and Accessories
12337-007-1001, Air Cooled Heat Exchanger Erection and Operating Instruction, dated 12/5/85
12337-007-1002, Installation, Operation and Maintenance of Hartzell Fans, Rev. 0
12337-007-1005, Installation and Operation Manual: Fractional Horsepower Duty Master A-C Motors, Rev. 0
15000-015-1002, Motor Equipment for Auxiliary Feed Water Modification Pumps, dated 2/10/84
15000-015-1004, World Series Horizontal Induction Motor Instruction Book: Motor Equipment for Auxiliary Feed Water Modification Pumps Cleveland [sic] Cliffs Nuclear Power Plant Units 1 & 2, dated 3/1/82
Vendor Technical Manual #12103-006-1005, Borg-Warner High Pressure Heat Exchanger, dated 11/1/84
Vendor Technical Manual #12753-160, Magnetrol-Miscellaneous Switches, Issue Date 5/3/06
Vendor Technical Manual, Terry Steam Turbine (Ingersoll-Rand), dated 1/21/85
VTM-V080-0001, Velan Valve Manual, Tab 1, pgs 20–22
VTM-12045-003, Component Cooling Heat Exchanger, Rev. 4
VTM-12315-010, Saltwater Pumps, Rev. 25
VTM-12383-057-1010, Namco Limit Switches and Quick Connections for Nuclear Environments, Rev. 0
VTM-12551A-061, Enertech 12" Mark Butterfly Valves, Rev. 5
VTM-12715-009-011, Butterfly Control Valve Body, Rev. 1
VTM-15077-006-1002, Instruction Manual: Alfa Lava Filters

LIST OF ACRONYMS

AC	Alternating Current
ADAMS	Agency-Wide Documents Access and Management System
AFAS	Auxiliary Feedwater Actuation System
AFW	Auxiliary Feedwater
AOP	Abnormal Operating Procedure
AOV	Air Operated Valve
BGE	Baltimore Gas & Electric Company
CCNPP	Calvert Cliffs Nuclear Power Plant
CCW	Component Cooling Water
CGG	Constellation Generation Group
CEA	Control Element Assembly
CMF	Component Manipulation Form
CR	Condition Report
CST	Condensate Storage Tank
DC	Direct Current
DG	Diesel Generator
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EOP	Emergency Operating Procedure
FAC	Flow Accelerated Corrosion

GL	Generic Letter
HPSI	High Pressure Safety Injection
HVAC	Heating Ventilation and Air Conditioning
HX	Heat Exchanger
IN	Information Notice
IST	In-Service Test
JPM	Job Performance Measure
LER	Licensee Event Report
LOCA	Loss of Coolant Accident
LOOP	Loss of Offsite Power
MDAFW	Motor-Driven Auxiliary Feedwater
MOV	Motor Operated Valve
MR	Maintenance Rule
NPSH	Net Positive Suction Head
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OE	Operating Experience
OTCC	Once Through Core Cooling
PARS	Publicly Available Records
PC	Procedure Controlled
PM	Preventive Maintenance
PRA	Probabilistic Risk Analysis
RAS	Recirculation Actuation Signal
RAW	Risk Achievement Worth
RRW	Risk Reduction Worth
RWT	Refueling Water Tank
SAT	Systematic Approach to Training
SBO	Station Blackout
SDP	Significance Determination Process
SG	Steam Generator
SPAR	Standardized Plant Analysis Risk
SRW	Service Water
SW	Saltwater
TB	Turbine Building
TDAFW	Turbine-Driven Auxiliary Feedwater
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
Vac	Volts Alternating Current
Vdc	Volts Direct Current