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

July 31, 2013

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

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT – NRC INTEGRATED INSPECTION REPORT 05000317/2013003 AND 05000318/2013003

Dear Mr. Gellrich:

On June 30, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on July 11, 2013, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents two NRC-identified findings of very low safety significance (Green). These findings were determined to involve violations of NRC requirements. Additionally, a licensee-identified violation, which was determined to be of very low safety significance, is listed in this report. However, because of the very low safety significance, and because they are entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs) consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest any NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspectors at CCNPP. In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Resident Inspectors at CCNPP.

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 component of NRC's Agencywide Documents Access Management 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/

Daniel L. Schroeder, Chief
Reactor Projects Branch 1
Division of Reactor Projects

Docket Nos: 50-317 and 50-318
License Nos: DPR-53 and DPR-69

Enclosure: Inspection Report 05000317/2013003 and 05000318/2013003
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

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REGION I

Docket Nos:	50-317 and 50-318
License Nos:	DPR-53 and DPR-69
Report No:	05000317/2013003 and 05000318/2013003
Licensee:	Constellation Energy Nuclear Group, LLC (CENG)
Facility:	Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Location:	Lusby, MD
Dates:	April 1, 2013 through June 30, 2013
Inspectors:	S. Kennedy, Senior Resident Inspector E. Torres, Resident Inspector E. Burket, Emergency Preparedness Inspector J. Furia, Senior Health Physicist J. Laughlin, Emergency Preparedness Inspector, Office of Nuclear Security and Incident Response S. Pindale, Senior Reactor Inspector R. Rolph, Health Physicist
Approved by:	Daniel L. Schroeder, Chief Reactor Projects Branch 1 Division of Reactor Projects

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SUMMARY

IR 05000317/2013003, 05000318/2013003; 04/01/2013 – 06/30/2013; Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2; Equipment Alignment.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. Inspectors identified two findings of very low safety significance (Green), which were non-cited violations (NCVs). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process", dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Components Within the Cross-Cutting Areas," dated October 28, 2011. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated January 28, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Cornerstone: Mitigating Systems

- Green: The inspectors identified an NCV of Title 10 of the *Code of Federal Regulations* (10 CFR) 50, Appendix B, Criterion XI, "Test Control," because CENG failed to establish a test program to ensure that diesel fuel oil (DFO) transfer system header check valves, DFO-146 and DFO-148, would perform their safety function. Specifically, on November 1, 2012, the inspectors identified that DFO-146 and DFO-148 had never been tested in the reverse flow direction or inspected. DFO-146 and DFO-148 have a design function to close in reverse flow conditions to ensure that the Tornado/Missile protected No. 21 fuel oil storage tank (FOST) will not drain if the non-Tornado/Missile protected No. 11 FOST fails during a tornado/missile event. CENG's immediate corrective actions included entering this issue into their corrective action program (CAP) and performing a reasonable expectation of continued operability. Planned corrective actions include performing an evaluation which includes a probabilistic risk assessment to credit a non-tornado/missile protected manual valve located in the DFO unloading station and a tornado/missile protected manual valve in the No. 21 FOST building to perform the function of the DFO tornado/missile protected check valves.

  This finding is more than minor because it is associated with the protection against external factors attribute of the Mitigating Systems cornerstone and affects the cornerstone objective of ensuring the capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, a reasonable doubt of operability existed because the capability of the check valves to perform their design function had never been demonstrated. The failure of check valves during a tornado/missile event causing the loss of the No. 11 FOST would result in the draining of the safety-related No. 21 FOST and consequential loss of all Fairbanks Morse emergency diesel generators (EDGs). Also, this issue is similar to IMC 0612, Appendix E, Example 3.i, in that, if credit is taken for manual valves in lieu of testing the check valves, additional analysis would be required to be performed to assure licensing basis requirements are met. The inspectors evaluated the significance of this finding using IMC 0609 Appendix A, "The Significance Determination Process for Findings at Power," Exhibit 2, "Mitigating Systems Screening Questions." The inspectors determined that this finding was of very low safety significance (Green) because the

finding did not involve the loss or degradation of equipment or function specifically designed to mitigate a seismic, flooding, or severe weather event. The inspectors determined that the finding has a cross-cutting aspect in the area of Problem Identification and Resolution, CAP, because CENG failed to ensure that issues potentially impacting nuclear safety are promptly identified and fully evaluated and that actions are taken to address safety issues in a timely manner, commensurate with their significance. Specifically, CENG did not take appropriate corrective actions to address safety issues and adverse trends in a timely manner associated with inadequate testing programs of risk significant equipment. [P.1(d)] (Section 1R04)

Cornerstone: Barrier Integrity

- Green: The inspectors identified an NCV of Technical Specification 5.4.1.b, "Procedures," because CENG failed to maintain guidance in Emergency Operating Procedure (EOP)-6, "Steam Generator Tube Rupture (SGTR)." Specifically, EOP-6 guidance does not provide an alternative action to cool down the reactor coolant system (RCS) for a SGTR event with a loss of offsite power (LOOP) and the single failure of the unaffected steam generator (SG) atmospheric dump valve (ADV). This could result in the inability to terminate the primary to secondary leak into the affected SG and the cycling of the affected SG ADV to control the SG level resulting in additional dose to the public. Immediate corrective actions included entering this issue into their CAP. Corrective actions planned include revising EOP-6 to address the identified deficiency. In addition, CENG established interim administrative controls of the ADVs to ensure that appropriate remedial actions are taken if the ADVs are out of service and is evaluating adding the ADVs to their technical specifications.

  This finding is more than minor because it is associated with the procedure quality attribute of the Barrier Integrity cornerstone and affects the cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, RCS, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the performance deficiency could result in the operation of the affected SG ADV and, consequently, the release of radioactivity to the environment until an adequate method to cool down the RCS is established. The inspectors evaluated the significance of this finding using IMC 0609, Appendix A, "The Significance Determination Process for Findings at Power," Exhibit 3, "Barrier Integrity Screening Questions." The inspectors determined that this finding was of very low safety significance (Green) because the finding does not represent an actual open pathway in the physical integrity of reactor containment. Also, the finding did not involve an actual reduction of hydrogen igniters in the reactor containment. The inspectors determined that the finding has a cross-cutting aspect in the area of Human Performance, Resources, because CENG did not ensure that personnel, equipment, procedures, and other resources were available and adequate to assure nuclear safety. Specifically, CENG did not ensure that EOP-6 was complete, accurate, and up-to-date through required periodic reviews. [H.2(c)] (Section 1R04)

Other Findings

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

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. The unit remained at or near 100 percent power throughout the inspection period.

Unit 2 began the inspection period at 100 percent power. On May 8, 2013, the unit automatically tripped due to high pressurizer pressure caused by a malfunction in the main turbine controls system. On May 11, operators commenced a reactor start up. The unit reached 100 percent power on May 13. On May 21, operators manually tripped the unit due to the loss of the No. 22 SG feed pump. On May 23, operators commenced a reactor start up. On May 30, the unit reached 100 percent power. The unit remained at or near 100 percent power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 3 samples)

.1 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors performed a review of CENG's readiness for the onset of seasonal high temperatures. The review focused on EDGs. The inspectors reviewed the Updated Final Safety Analysis report (UFSAR), technical specifications, control room logs, and the CAP to determine what temperatures or other seasonal weather could challenge these systems, and to ensure CENG personnel had adequately prepared for these challenges. The inspectors reviewed station procedures, including CENG's seasonal weather preparation procedure and applicable operating procedures. The inspectors performed walkdowns of the selected systems to ensure station personnel identified issues that could challenge the operability of the systems during hot weather conditions. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

.2 Summer Readiness of Offsite and Alternate Alternating Current (AC) Power Systems

a. Inspection Scope

The inspectors performed a review of plant features and procedures for the operation and continued availability of the offsite and alternate AC power system to evaluate readiness of the systems prior to seasonal high grid loading. The inspectors reviewed CENG's procedures affecting these areas and the communications protocols between the transmission system operator and CENG. This review focused on changes to the

established program and material condition of the offsite and alternate AC power equipment. The inspectors assessed whether CENG established and implemented appropriate procedures and protocols to monitor and maintain availability and reliability of both the offsite AC power system and the onsite alternate AC power system. The inspectors evaluated the material condition of the associated equipment by reviewing condition reports (CRs) and open work orders, and walking down portions of the offsite and AC power systems including the 500 kilovolt (kV) switchyard.

b. Findings

No findings were identified.

.3 Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors reviewed CENG's preparations for a severe weather tornado watch on April 19, 2013. The inspectors reviewed the implementation of adverse weather preparation procedures before the onset of and during this adverse weather condition. The inspectors walked down the EDGs and the intake structure. The inspectors verified that operator actions defined in CENG's adverse weather procedure maintained the readiness of essential systems. The inspectors discussed readiness and staff availability for adverse weather response with operations and work control personnel.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04Q – 5 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- No. 13 saltwater pump during maintenance on No. 12 saltwater pump on April 13, 2013
- No. 13 and No. 14 containment air coolers during maintenance on No. 11 and No. 12 containment air coolers on April 22, 2013
- 2A EDG during maintenance on 2B EDG on May 10, 2013
- 1B EDG during maintenance on 1A EDG on May 21, 2013
- No. 12 auxiliary feedwater (AFW) pump during maintenance on No. 11 AFW pump on June 17, 2013

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable procedures, system diagrams, the UFSAR, technical specifications, CRs, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted system performance of their intended safety

functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether CENG staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

b. Findings

Introduction: The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XI, "Test Control," because CENG failed to establish a test program to ensure that DFO transfer system header check valves, DFO-146 and DFO-148, would perform their safety function.

Description: Calvert Cliffs DFO system for the three Fairbanks Morse EDGs consists of two above ground diesel FOSTs, three fuel oil transfer pumps, three fuel oil day tanks, and the piping between the FOSTs to the fuel oil day tanks. Two headers interconnect the FOSTs and the EDGs. The No. 21 FOST is enclosed in a concrete structure that protects the tank from tornado/missile events. The No. 11 FOST is not tornado/missile protected. The DFO unloading station is in front of the No. 11 FOST which contains above ground portions of both DFO header piping and manual valves that are not tornado/missile protected. DFO-146 and DFO-148 are located in an underground vault in front of the DFO unloading station and separate the tornado/missile protected FOST from the non-missile protected FOST. Calvert Cliffs normally maintains 2A EDG aligned to No. 11 FOST on header one and the 1B and 2B EDGs aligned to No. 21 FOST on header two, maintaining both tanks separate. In this configuration DFO-146 and DFO-148 will assure that the No. 21 FOST will not drain as a result of a tornado/missile that would cause the loss of No. 11 FOST.

On November 1, 2012, the inspectors identified that DFO-146 and DFO-148 had never been tested in the reverse flow direction or disassembled and inspected. Calvert Cliffs UFSAR states, in part, "A check valve in each supply header ensures a failure of No. 11 FOST will not drain No. 21 FOST." This statement refers to the reverse flow design function of DFO-146 and DFO-148 in a tornado/missile event.

DFO-146 and DFO-148 are swing check valves. Industry operating experience has shown that check valves are susceptible to failures and commensurate with their safety function, they must be tested and inspected. The NRC issued Bulletin No. 83-03, "Check Valve Failures in Raw Water Cooling Systems of Diesel Generators," focused on the failure mode of disassembly or partial disassembly of check valve internals. The bulletin states that forward flow testing to verify the open position are inadequate for detecting internal disassembly. On October 22, 1992, Morning Report (MR 4-92-0085), "Inoperability Caused by EDG Fuel Oil System Check Valve Failure," South Texas Project Nuclear Power Plant reported that a 3/4 inch fuel line check valve disc separated from its hinge and lodged in the fuel line. South Texas Project Nuclear Power Plant disassembled the valve and determined that the check valve disc hold-down nut had not been staked to its threaded fastener. This resulted in the disc hold-down nut backing off the threaded fastener, causing the disc to become disconnected from the hinge.

The inspectors determined that CENG had a reasonable recent opportunity to identify this issue. In May 2012, following the inspectors' identification of testing issues associated with the AFW system emergency air accumulators and the EDG shutdown sequencers, CENG initiated CR-2012-005253 to identify any additional inadequate test programs. In support of this review, CENG selected the top ten risk significant systems, which included the EDGs, and formed a multi-discipline team of Operations, Maintenance, System Engineering, and Design Engineering personnel to review each selected system. CENG completed the review without identifying any additional testing issues. This review did not identify the lack of testing of the DFO transfer system header check valves.

CENG entered this issue into their CAP (CR-2012-009976). Immediate corrective actions included a reasonable expectation of continued operability that was based on the favorable service conditions of the DFO and experience with similar check valves at CCNNP. Planned corrective actions include performing an evaluation which includes a probabilistic risk assessment to credit a non-tornado/missile protected manual valve located in the DFO unloading station and a tornado/missile protected manual valve in the No. 21 FOST building to perform the function of the DFO tornado/missile protected check valves.

Analysis: CENG's failure to establish a testing program in accordance with 10 CFR 50, Appendix B, Criterion XI, "Test Control," to demonstrate that the DFO check valves will satisfactorily perform their safety function described in the UFSAR is a performance deficiency that was within the CENG's ability to foresee and correct and should have been prevented. This finding is more than minor because it is associated with the protection against external factors attribute of the Mitigating Systems cornerstone and affects the cornerstone objective of ensuring the capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, a reasonable doubt of operability existed because the capability of the check valves to perform their design function had never been demonstrated. The failure of check valves during a tornado/missile event causing the loss of the No. 11 FOST would result in the draining of the safety related No. 21 FOST and consequential loss of all Fairbanks Morse EDGs. Also, this issue is similar to IMC 0612, Appendix E, Example 3.i, in that, if credit is taken for manual valves in lieu of testing the check valves, additional analysis would be required to be performed to assure licensing basis requirements are met. The inspectors evaluated the significance of this finding using IMC 0609 Appendix A, "The Significance Determination Process for Findings at Power," Exhibit 2, "Mitigating Systems Screening Questions." The inspectors determined that this finding was of very low safety significance (Green) because the finding did not involve the loss of degradation of equipment or function specifically designed to mitigate a seismic, flooding, or severe weather event.

The inspectors determined that the finding has a cross-cutting aspect in the area of Problem Identification and Resolution, CAP, because CENG failed to ensure that issues potentially impacting nuclear safety are promptly identified, fully evaluated and that actions are taken to address safety issues in a timely manner, commensurate with their significance. Specifically, CENG did not take appropriate corrective actions to address safety issues and adverse trends in a timely manner associated with inadequate testing programs of risk significant equipment [P.1(d)].

Enforcement: 10 CFR 50, Appendix B, Criterion XI, "Test Control," requires, in part, that a test program shall be established to assure that all testing required to demonstrate that structures, systems, and components (SSCs) will perform satisfactorily in service. The test program shall include an operational test during power plant operation. Contrary to the above, prior to March 31, 2013, CENG failed to establish a test program for DFO-146 and DFO-148 to demonstrate that the valves would perform satisfactorily in service. Specifically, the reverse flow design function of these valves had not been incorporated into a testing program. Immediate corrective actions included a reasonable expectation of continued operability. Planned corrective actions include performing an evaluation, including a probabilistic risk assessment, to credit manual valves (missile-protected and non-missile protected) to perform the function of the check valves. Because this violation was of very low safety significance (Green) and has been entered into CENG's CAP (CR-2012-009976), this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV-05000317/318/2013003-01: Failure to Establish a Test Program for DFO Check Valves)**

.2 Full System Walkdown (71111.04S – 1 sample)

a. Inspection Scope

On June 4, 2013, the inspectors performed a complete system walkdown of accessible portions of the main steam system, to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures, EOPs, surveillance tests, drawings, equipment line-up check-off lists, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed valves and actuators design and construction for the main steam isolation valves (MSIVs) and ADVs, MSIV actuator refurbish testing, and ADVs weak link and thrust calculations. The inspectors performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. Additionally, the inspectors reviewed a sample of related CRs and work orders to ensure CENG appropriately evaluated and resolved any deficiencies.

b. Findings

Introduction: The inspectors identified a Green NCV of Technical Specification 5.4.1.b, "Procedures," because CENG failed to maintain adequate guidance in EOP-6, "Steam Generator Tube Rupture," to prevent excessive radiological releases.

Description: EOP-6 mitigates a SGTR event by directing plant operators to:

- Monitor RCS depressurization
- Cooldown the RCS by steaming from both SGs ADVs to prevent lifting a SG safety relief valve and feeding with AFW flow
- Identify and Isolate the most effected SG
- Cool down the RCS by steaming the unaffected SG and feeding with AFW
- Maintain SG pressure and level in the affected SG
- Transition to shutdown cooling and cooldown affected SG

The EOP is written for both non-LOOP and LOOP conditions. Preferred method of RCS cooldown is steaming to the condenser via the turbine bypass valve with the alternate method steaming through the ADVs. When a LOOP occurs, condenser vacuum will be lost and MSIV will go shut thus the only methods to draw steam from the SG is via the ADVs and the SG Safety Relief valves. During RCS depressurization, high pressure safety injection (HPSI) will be initiated to control RCS subcooling and RCS inventory. Cooldown will be established by steaming both SG with ADVs and feeding with AFW until the RCS temperature reaches 515°F. When RCS temperature reaches 515°F, the most affected SG will be isolated and RCS cooldown will continue with the unaffected SG ADV until shutdown cooling system conditions are established for decay heat removal.

On June 7, 2013, the inspectors identified a concern that EOP-6 guidance was inadequate for the design basis analysis SGTR event with a LOOP and the failure of the ADV to operate on the unaffected (or least affected) SG. Following identification and isolation of the affected SG, if the ADV on the unaffected SG is not available, the EOP guidance does not provide an alternative action to cool down the RCS and there is no means to exit the EOP in order to implement alternate means of core cooling. In this condition the affected SG level and pressure could remain elevated and be required to be relieved via ADV operation per the procedure. Therefore, the affected SG ADV will be operated longer and more frequently to control the affected SG level or pressure. The more frequent operation of the affected SG ADV would lead to increased release of radioactivity to the environment.

The inspectors observed this postulated design bases SGTR event in the CCNPP simulator and noted that without a controlled method to cool down the RCS, RCS pressure could not be reduced to nearly equal the affected SG pressure to terminate the leak of RCS into the SG. Operation of the affected SG ADV was required to control the SG level by steaming. During the postulated event, the inspectors further noted that RCS temperature slowly decreased due to some cooling being provided by HPSI system flow; however, this was not a controllable method of cooling. The inspectors observed all safety function status checks were met during the event, including RCS cold leg temperature. Based on the simulator response, the inspectors concluded that the inability to perform a controlled cool down of the RCS could result in continuous steaming of the affected steam generator to the atmosphere with no exit criterion from EOP-6 if all safety function status checks are met. The operation of the affected SG ADV would result in release of radioactivity to the environment until an adequate method to cool down the RCS is established.

In addition, the inspectors noted that although the CCNPP ADVs are relied upon in the EOP as a primary success path for mitigating a design basis event, the ADVs operability or functionality is not controlled in the technical specifications or the technical requirements manual. The ADVs are monitored via the Calvert Cliff's Maintenance Rule Program for reliability and unavailability. CENG initiated CR-2013-005020 to review this issue.

After the Three Mile Island accident in 1979, the NRC issued NUREG-0737, "Clarification of Three Mile Island Action Plan Requirements," concerning the upgrade of EOPs. Section I.C.1, "Guidance for the Evaluation and Development of Procedures for Transient and Accidents," stated that EOPs contained insufficient information to assess the extent of multiple failures. NUREG-0737 further stated that the single failure criterion

was not considered appropriate for the development of EOPs and concluded that EOPs should consider the occurrences of multiple and consequential failures. Contrary to this guidance, CENG did not consider the consequential failure of the ADVs for a design basis SGTR event with a LOOP and did not provide alternative actions to cool down the RCS following identification and isolation of the affected SG. An alternative action could consist of additional methods within EOP-6 for cool down or an exit criterion to a procedure (e.g. EOP-8, "Functional Recovery") which has additional methods to cool down the RCS if the ADVs are not available.

The inspectors determined that CENG had reasonable opportunities to identify the issue associated with EOP-6. Calvert Cliffs' procedure PR-1-100, "Preparation and Control of Calvert Cliffs Procedures," Section 5.3, Procedure Periodic Review, Step 1, states that EOP reviews shall be performed no less than every two years. The periodic review ensures that the procedure remains technically and functionally accurate. The inspectors noted that CENG biennial reviews did not identify this issue.

Immediate corrective actions included entering this issue into their CAP (CR-2013-004965). Corrective actions planned include revising EOP-6 to address the identified deficiency. In addition, CENG established interim administrative controls of the ADVs to ensure that appropriate remedial actions are taken if the ADVs are out of service and is evaluating adding the ADVs to their technical specifications (CR-2013-005020).

Analysis: Constellation's failure to consider the occurrences of multiple and consequential failures of the ADVs in EOP-6 contrary to the requirements of TS 5.4.1.b was a performance deficiency that was within Constellation's ability to foresee and correct and should have been prevented. This finding is more than minor because it is associated with the procedure quality attribute of the Barrier Integrity cornerstone and affects the cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, during a SGTR event with a LOOP and the failure of the unaffected SG ADV, EOP-6 guidance does not provide an alternative action to cool down the RCS which could result in the inability to terminate the primary to secondary leak and the cycling of the affected SG ADV to control the SG level. The operation of the ADV would result in release of radioactivity to the environment until an adequate method to cool down the RCS has been established. The inspectors evaluated the significance of this finding using IMC 0609, Appendix A, "The Significance Determination Process for Findings at Power," Exhibit 3, "Barrier Integrity Screening Questions." The inspectors determined that this finding was of very low safety significance (Green) because the finding does not represent an actual open pathway in the physical integrity of reactor containment. Also, the finding did not involve an actual reduction of hydrogen igniters in the reactor containment.

The inspectors determined that the finding has a cross cutting aspect in the area of Human Performance, Resources, because CENG did not ensure that personnel, equipment, procedures, and other resources are available and adequate to assure nuclear safety. Specifically, CENG did not ensure that EOP-6 was complete, accurate, and up-to-date through required periodic reviews. [H.2(c)]

Enforcement: Technical Specification 5.4.1.b, states in part, "Written procedures shall be established, implemented and maintained covering the following activities: Emergency operating procedures required to implement the requirements of NUREG-

0737 and to NUREG-0737, Supplement 1, as stated in Generic Letter 82-33." NUREG-0737 states, in part, that EOPs should consider the occurrences of multiple and consequential failures and should address alternative actions that should be performed to mitigate the event should these systems fail. Contrary to the above, prior to June 7, 2013, CENG did not consider the consequential failure of the ADVs for a design basis SGTR event with a LOOP and, as a result, did not provide alternative actions in EOP-6 to cool down the RCS following identification and isolation of the affected SG. Without an alternative action to cool down the plant, this could result in the inability to terminate the primary to secondary leak and the cycling of the affected SG ADV to control the SG level. The operation of the ADV would result in release of radioactivity to the environment until an adequate method to cool down the RCS is established. Immediate corrective actions included entering this issue into their CAP (CR-2013-004965). Corrective actions planned include revising EOP-6 to address the identified deficiency. In addition, CENG established interim administrative controls of the ADVs to ensure that appropriate remedial action is taken if the ADVs are out of service and is evaluating adding the ADVs to their technical specifications. Because this violation was of very low safety significance (Green) and has been entered into CENG's CAP, this violation is being treated as an NCV, consistent with Section 2.3.2a of the NRC Enforcement Policy (**NCV 05000317/318/2013003-02: Inadequate Steam Generator Tube Rupture Emergency Operating Procedure**)

1R05 Fire Protection

.1 Resident Inspector Quarterly Walkdowns (71111.05Q – 6 samples)

a. Inspection Scope

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

- Intake structure, fire area IS, room IS on April 30, 2013
- Unit 2 27', switchgear room, fire area 18, room 311 on May 1, 2013
- Unit 2 45', switchgear room, fire area 25, room 407 on May 1, 2013
- Unit 1, No. 11 emergency core cooling system (ECCS) pump room, fire area 4, room 119 on May 7, 2013
- Unit 1, No. 12 ECCS pump room, fire area 3, room 118 on May 7, 2013
- Unit 1, main plant equipment exhaust and equipment room, fire area 11, room 524 on June 19, 2013

b. Findings

No findings were identified.

.2 Fire Protection – Drill Observation (71111.05A – 1 sample)

a. Inspection Scope

The inspectors observed an unannounced fire drill conducted on April 25, 2013, that involved a fire in the security diesel building. The inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that CENG personnel identified deficiencies, openly discussed them in a self-critical manner at the debrief, and took appropriate corrective actions as required. The inspectors evaluated specific attributes as follows:

- Proper wearing of turnout gear and self-contained breathing apparatus
- Proper use and layout of fire hoses
- Employment of appropriate fire-fighting techniques
- Sufficient fire-fighting equipment brought to the scene
- Effectiveness of command and control
- Search for victims and propagation of the fire into other plant areas
- Smoke removal operations
- Utilization of pre-planned strategies
- Adherence to the pre-planned drill scenario
- Drill objectives met

The inspectors also evaluated the fire brigade's actions to determine whether these actions were in accordance with CENG's fire-fighting strategies.

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

Annual Review of Cables Located in Underground Bunkers/Manholes

a. Inspection Scope

The inspectors conducted an inspection of underground bunkers/manholes subject to flooding that contain cables whose failure could affect risk-significant equipment. The inspectors performed walkdowns of risk-significant areas, including manholes MH-9, MH-21, and MH-24, containing EDG cables to verify that the cables were not submerged in water, that cables and/or splices appeared intact, and to observe the condition of cable support structures. When applicable, the inspectors verified proper sump pump operation and verified level alarm circuits were set in accordance with station procedures and calculations to ensure that the cables will not be submerged. The inspectors also ensured that drainage was provided and functioning properly in areas where dewatering devices were not installed.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (711111.07A – 1 sample)

a. Inspection Scope

The inspectors reviewed the No. 21 ECCS pump room air cooler to determine its readiness and availability to perform its safety functions. The inspectors reviewed the design basis for the component and verified CENG's commitments to NRC Generic Letter 89-13. The inspectors observed actual performance tests for the heat exchangers (HXs) and/or reviewed the results of previous inspections of the No. 21 ECCS pump room air cooler and similar HXs. The inspectors verified that CENG initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the HX did not exceed the maximum amount allowed.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11Q – 2 samples)

.1 Quarterly Review of Licensed Operator Requalification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator simulator training on April 3, 2013, which included shutdown operations, implementation of Abnormal Operating Procedure (AOP)-3B, "Abnormal Shutdown Cooling Conditions" and AOP-7A, "Loss of Saltwater." The inspectors evaluated operator performance during the simulated events and verified completion of risk significant operator actions, including the use of AOPs and EOPs. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the technical specifications action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors observed and reviewed various activities conducted in the main control room, including the Unit 2 reactor start up from mode 3 to mode 1 on May 8, 2013 and again on May 23, 2013. Additionally, the inspectors observed procedure use and adherence, crew communications, and coordination of activities between work groups to verify that established expectations and standards were met.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 4 samples)

a. Inspection Scope

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

- Unit 2 SG AFW flow control valve (2-CV-4512) failure to shut on February 7, 2013
- No. 23 HPSI pump discharge check valve (2-SI-405) stuck open on March 2, 2013
- No. 21 SG ADV (2-CV-3939) leaking by on March 24, 2013
- No. 22 MSIV limit switch striker arm struck scaffold on May 29, 2013

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 7 samples)

a. Inspection Scope

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

- Emergent repairs on No. 11 saltwater pump discharge drain valve on April 24, 2013
- Planned maintenance on 0C diesel generator (Units 1 and 2) on May 10, 2013
- Planned maintenance on No. 11A service water HX and pipe rupture logic instrument calibration for No. 12 SG AFW motor train on May 15, 2013
- Planned maintenance on No. 22 HPSI pump and No. 22 AFW pump on May 16, 2013
- Planned maintenance on No. 22A service water HX and No. 21 saltwater pump on May 30, 2013
- Severe weather alert, tornado watch on June 10, 2013
- Emergent maintenance on the No. 12 saltwater pump discharge check valve with No. 11 saltwater pump inoperable on June 21, 2013

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 5 samples)

a. Inspection Scope

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

- No. 14 battery charger AC input breaker tripped (CR-2013-003157) on April 1, 2013
- No. 23 HPSI pump discharge check valve found stuck open (CR-2013-001973) on April 6, 2013
- 1A EDG radiator fans design vulnerability during high sustained winds on May 13, 2013 (CR-2013-004310)
- 0C station blackout diesel generator indications on 0C1 cylinder head on May 8, 2013 (CR-2013-004151)
- No. 12 saltwater pump discharge check valve leakage on June 21, 2013 (CR-2013-005306)

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

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 2 samples)

Permanent Modifications

a. Inspection Scope

The inspectors evaluated the permanent modifications listed below to determine whether the modifications affected the safety functions of systems that are important to safety. The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modifications. In addition, the inspectors reviewed modification documents associated with the upgrade and design changes, including operational impact design evaluation, installation and testing instructions, and drawings changes associated with the modifications.

- ECP-10-000798, replace 12 switchgear heating, ventilation, and air conditioning fan, motor sheaves, and belts
- ECP-09-000135, ADV capability calculation

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 5 samples)

a. Inspection Scope

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

- No. 12 saltwater pump replacement on April 16, 2013
- No. 23 service water pump motor replacement on April 18, 2013
- Unit 1 AFW turbine pump steam admission by-pass valve opening delay relay replacement on April 19, 2013
- 1A EDG fuel injection pipe assemblies replacement on May 17, 2013
- No. 12 battery replacement on June 13, 2013

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 6 samples)

a. Inspection Scope

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

- STP-M-662-2, Integrated leak rate test Unit 2 containment on April 22, 2013
- STP-O-065H-1, Unit 1 Pressurizer power-operated relief block valves quarterly operability test on April 25, 2013 (in-service test)
- STP-F-492-0, Common Halon system tank level and pressure verification on May 13, 2013
- STP-O-08A-1, Test of 1A EDG and 14 kV bus loss of coolant incident sequencer on May 22, 2013
- STP-O-087-1, Unit 1 Borated water source seven day operability verification, May 29, 2013
- STP-M-550-1, No. 12 Station battery test on June 14, 2013

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

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

a. Inspection Scope

The Office of Nuclear Security and Incident Response headquarters staff performed an in-office review of the latest revisions of various Emergency Plan Implementing Procedures and the Emergency Plan located under ADAMS accession number ML 13004A005 as listed in the Attachment.

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

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06 – 2 samples)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine CCNPP emergency drill on April 3, 2013, to identify any weaknesses and deficiencies in the classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator and technical support center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the station drill critique to compare inspector observations with those identified by CENG staff in order to evaluate CENG's critique and to verify whether CENG staff was properly identifying weaknesses and entering them into the CAP.

b. Findings

No findings were identified.

.2 Training Observation

a. Inspection Scope

The inspectors observed a simulator training evolution for licensed operators on June 8, 2013, which required emergency plan implementation by an operations crew. CENG planned for this evolution to be evaluated and included in performance indicator data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the post-evolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the crew's performance and ensure that CENG evaluators noted the same issues and entered them into the corrective action report.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Public Radiation Safety and Occupational Radiation Safety

2RS7 Radiological Environmental Monitoring Program (71124.07 – 1 sample)

a. Inspection Scope

During May 6 - 10, 2013, the inspectors verified that the radiological environmental monitoring program (REMP) quantifies the impact of radioactive effluent releases to the environment and sufficiently validates the integrity of the radioactive gaseous and liquid effluent release program.

The inspectors used the requirements in 10 CFR 20; 10 CFR 50, Appendix A, Criterion 60, "Control of Release of Radioactivity to the Environment;" 10 CFR 50, Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operations to Meet the Criterion 'As Low as is Reasonably Achievable' (ALARA) for Radioactive Material in Light-Water- Cooled Nuclear Power Reactor Effluents;" 40 CFR 190, "Environmental Radiation Protection Standards for Nuclear Power Operations;" 40 CFR 141, "Maximum Contaminant Levels for Radionuclides;" the guidance in Regulatory Guide (RG) 1.23, "Meteorological Measurements Program for Nuclear Power Plants;" RG 4.1, "Radiological Environmental Monitoring Programs for Nuclear Power Plants;" RG 4.15, "Quality Assurance for Radiological Monitoring Programs;" NUREG 1301, "Offsite Dose Calculation Manual (ODCM) Guidance: Standard Radiological Effluent Controls;" applicable industry standards; and CENG procedures as criteria for determining compliance.

Inspection Planning

The inspectors reviewed CCNPPs' Annual Radiological Environmental Operating Reports for 2011 and 2012 for comparison, and the results of any CENG assessments since the last inspection to verify that the REMP was implemented and reported in accordance with requirements. This review included changes to the ODCM, sampling locations, monitoring and measurement frequencies, land use census, inter-laboratory comparison program, and analysis of data.

The inspectors reviewed CCNPPs' ODCM and UFSAR for information regarding the environmental monitoring program and meteorological monitoring instrumentation.

The inspectors reviewed quality assurance audits and technical evaluations performed on the vendor analytical laboratory program.

The inspectors reviewed CCNPPs' 2011 Annual Radioactive Effluent Release Report and the most recent results from waste stream analysis, to determine if CENG is sampling and analyzing for the predominant radionuclides likely to be released in effluents.

Site/Environmental Inspection

The inspectors walked down four air sampling stations and four thermoluminescent dosimeter (TLD) monitoring stations.

For the air samplers and TLD stations selected, the inspectors reviewed the calibration and maintenance records to verify that they demonstrate adequate operability for these components. Additionally, the review included the calibration and maintenance records of two composite water samplers.

The inspectors performed an assessment of whether CENG has initiated sampling of other appropriate media upon loss of a required sampling station.

The inspectors observed the simulated collection and preparation of two environmental vegetation and soil samples to verify that sampling is representative of the release pathways as specified in the ODCM and that sampling techniques are in accordance with procedures.

Based on direct observation and review of records, the inspectors assessed whether the meteorological instruments were operable, calibrated, and maintained in accordance with procedures. The inspectors assessed whether the meteorological data readout and recording instruments in the control room and at the meteorological tower were operable and were reading the same values.

The inspectors evaluated whether missed and/or anomalous environmental samples were identified and reported in the Annual Radiological Environmental Operating Reports. The inspectors selected two events that involved a missed sample, inoperable sampler, lost TLD, or anomalous measurement to verify that CENG has identified the cause and has implemented corrective actions. The inspectors reviewed the assessment of any sample results detected above the lower limits of detection and reviewed CENG's evaluation of any associated radioactive effluent release data.

The inspectors selected five SSCs that involve the potential for radioactive material to reach ground water. The inspectors assessed whether CENG has implemented a sampling and monitoring program sufficient to provide early detection of leakage from these SSCs.

The inspectors evaluated whether decommissioning records of leaks, spills, and environmental remediation since the previous inspection are retained in the 10 CFR 50.75(g) decommissioning file.

The inspectors reviewed any significant changes made by CENG to the ODCM as the result of changes to the land census, long-term meteorological conditions (three year average), or modifications to the sampler stations since the last inspection. The inspectors reviewed technical justifications for any changes.

The inspectors assessed whether the detection sensitivities for environmental samples were below the lower limits of detection specified in the ODCM. The inspectors reviewed the results of the vendor's quality control program, including the inter-laboratory and intra-laboratory comparison data.

Identification and Resolution of Problems

The inspectors assessed whether problems associated with the REMP are being identified by CENG at an appropriate threshold and appropriate corrective actions are assigned for resolution in CENG's CAP.

b. Findings

No findings were identified.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08 – 1 sample)

a. Inspection Scope

During the week of April 8 - 12, 2013, the inspectors verified the effectiveness of CENG's programs for processing, handling, storage, and transportation of radioactive material. The inspectors used the requirements of 10 CFR 20, "Standards For

Protection Against Radiation," 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste," and 10 CFR 71, "Packaging and Transportation of Radioactive Material," and 10 CFR 50, Appendix A, Criterion 63, "Monitoring Fuel and Waste Storage," and CENG procedures required by the Technical Specifications/Process Control Program as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the solid radioactive waste system description in the UFSAR, the Process Control Program (PCP), and the recent radiological effluent release report for information on the types, amounts, and processing of radioactive waste disposed.

The inspectors reviewed the scope of quality assurance audits performed for this area since the last inspection. The inspectors reviewed the results of the audits performed since the last inspection of this program and evaluated the adequacy of CENG's corrective actions for issues identified during those audits.

Radioactive Material Storage

The inspectors inspected areas where containers of radioactive waste were stored, and verified that the radioactive materials storage areas were controlled and posted as appropriate.

The inspectors verified that CENG had established a process for monitoring the impact of long-term storage sufficient to identify potential unmonitored, unplanned releases, or nonconformance with waste disposal requirements. The inspectors verified that there were no signs of swelling, leakage, or deformation.

Radioactive Waste System Walkdown

The inspectors walked down accessible portions of liquid and solid radioactive waste processing systems to assess that the current system configuration and operation agree with the descriptions in the UFSAR, ODCM, and PCP.

The inspectors identified radioactive waste processing equipment that was not operational and/or was abandoned in place, and verified that CENG had established administrative and/or physical controls to ensure that the equipment would not contribute to an unmonitored release path and/or affect operating systems or be a source of unnecessary personnel exposure.

The inspectors reviewed the adequacy of any changes made to the radioactive waste processing systems since the last inspection. The inspectors verified that changes from what was described in the UFSAR were reviewed and documented.

The inspectors identified processes for transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers. The inspectors verified that the waste stream mixing, sampling procedures, and methodology for waste concentration averaging were consistent with the PCP, and provided representative samples of the waste product for the purposes of waste classification.

For those systems that provide tank recirculation, the inspectors verified that the tank recirculation procedure provided sufficient mixing.

The inspectors verified that CENG's PCP correctly described the current methods and procedures for dewatering waste.

Waste Characterization and Classification

The inspectors identified radioactive waste streams, and verified that CENG's radiochemical sample analysis results were sufficient to support radioactive waste characterization. The inspectors verified that CENG's use of scaling factors and calculations to account for difficult-to-measure radionuclides was technically sound and based on current analyses.

For the waste streams identified, the inspectors verified that changes to plant operational parameters were taken into account to (1) maintain the validity of the waste stream composition data between the annual or biennial sample analysis update, and (2) verified that waste shipments continued to meet applicable requirements.

The inspectors verified that CENG had established and maintained an adequate Quality Assurance Program to ensure compliance with applicable waste classification and characterization requirements.

Shipment Preparation

The inspectors reviewed the records of shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and CENG's verification of shipment readiness. The inspectors verified that the requirements of any applicable transport cask certificate of compliance had been met. The inspectors verified that CENG was authorized to receive the shipment packages.

The inspectors determined that the shippers were knowledgeable of the shipping regulations and that shipping personnel demonstrated adequate skills to accomplish the package preparation requirements for public transport. The inspectors verified that CENG's training program provided training to personnel responsible for the conduct of radioactive waste processing and radioactive material shipment preparation activities.

Shipping Records

The inspectors identified non-excepted package shipment records and verified that the shipping documents indicate the proper shipper name; emergency response information and a 24-hour contact telephone number; accurate curie content and volume of material; appropriate waste classification; transport index; and shipping identification number. The inspectors verified that the shipment placarding was consistent with the information in the shipping documentation.

Identification and Resolution of Problems

The inspectors verified that problems associated with radioactive waste processing, handling, storage, and transportation, were being identified by CENG at an appropriate

threshold, were properly characterized, and were properly addressed for resolution in CENG's CAP. The inspectors verified the appropriateness of the corrective actions for a selected sample of problems documented by CENG that involve radioactive waste processing, handling, storage, and transportation. CENG generated six CRs to document material condition deficiencies identified during this inspection.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151 – 3 samples)

.1 RETS/ODCM Radiological Effluent Occurrences (1 sample)

a. Inspection Scope

The inspectors reviewed relevant effluent release reports for the period of January 1, 2012, through December 31, 2012, for issues related to the public radiation safety performance indicator. To determine the accuracy of the performance indicator data reported during those periods, inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6.

b. Findings

No findings were identified.

.2 Safety System Functional Failures (2 samples)

a. Inspection Scope

The inspectors sampled CENG's submittals for the Safety Systems Functional Failures performance indicator for both Unit 1 and Unit 2 for the period of July 1, 2012, through June 30, 2013. To determine the accuracy of the performance indicator data reported during those periods, inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73." The inspectors reviewed CENG's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, CRs, event reports and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

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

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

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

b. Findings and Observations

No findings were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a semi-annual review of site issues, as required by Inspection Procedure 71152, "Problem Identification and Resolution," to identify trends that might indicate the existence of more significant safety issues. In this review, the inspectors included repetitive or closely-related issues that may have been documented by CENG outside of the CAP, such as trend reports, performance indicators, major equipment problem lists, system health reports, maintenance rule assessments, and maintenance or CAP backlogs. The inspectors also reviewed CENG's CAP database for the first and second quarters of 2013 to assess CRs written in various subject areas (equipment problems, human performance issues, etc.), as well as individual issues identified during the NRC's daily CR review (Section 4OA2.1). The inspectors reviewed CENG's quarterly trend reports for the first quarter of 2013, conducted under CNG-CA-1.01-1007, "Performance Improvement Program Trending and Analysis," to verify that CENG personnel were appropriately evaluating and trending adverse conditions in accordance with applicable procedures.

b. Findings and Observations

No findings were identified.

In general, CENG identified trends and appropriately addressed the trends within their CAP. The inspectors evaluated a sample of departments that are required to provide input into the quarterly trend reports, which included maintenance, engineering, and operations. This review included a sample of issues and events that occurred over the course of the past two quarters to objectively determine whether issues either were appropriately considered or ruled as emerging or adverse trends, and in some cases, verified the appropriate disposition of resolved trends. The inspectors verified that these issues were addressed within the scope of the CAP, or through department review and documentation in the quarterly trend report for overall assessment. No trends were noted that indicated a potentially safety significant issue. Examples of new trends

identified by CENG were adverse trends in the areas of human performance for component mis-positionings/configuration control and the use of operating experience. For both of these identified trends, CENG has established corrective actions to mitigate and eliminate these adverse trends.

.3 Annual Sample: 21 Containment Spray Pump Bearing Failure

a. Inspection Scope

The inspectors performed an in-depth review of CENG's evaluation and corrective actions associated with a December 16, 2012 catastrophic failure of the No. 21 containment spray (CS) pump outboard journal (thrust) bearing during quarterly pump testing. CENG declared the pump inoperable and remained in the Action Statement of Technical Specification 3.6.6, "Containment Spray and Cooling Systems," while the thrust and radial bearings, as well as the pump shaft, were replaced. CENG completed an apparent cause analysis and determined that the probable cause of the bearing failure was poor storage and handling that led to false brinelling (i.e., damage caused by fretting, vibration) of the bearing.

The inspectors assessed CENG's apparent cause evaluation (ACE), extent of condition review, completed and proposed corrective actions, and the prioritization and timeliness of actions to determine whether the corrective actions were appropriate (CR-2012-011302). The inspectors interviewed engineers and reviewed CENG's evaluation of the issue and corrective actions taken to ensure they met the requirements of their CAP. Specifically, the inspectors reviewed CENG's actions to determine whether storage and handling weaknesses, as well as additional corrective actions to address other probable and contributing causes identified in the ACE, had been corrected. These additional causes included increased bearing loading during minimum flow pump operations and the installed configuration of the bearing. The inspectors reviewed the results of bearing failure analysis, conducted by an independent vendor, to evaluate the analysis and to determine whether appropriate recommendations were incorporated into CENG's CAP. The inspectors reviewed CCNPP CS pump test results over the last several years and trend graphs of relevant parameters, such as bearing temperature during pump operation, to assess whether additional factors may have contributed to the 21 CS pump bearing failure. Finally, the inspectors toured the CCNPP CS pump rooms to evaluate the material condition of the pumps and associated equipment.

b. Findings and Observations

No findings were identified.

The inspectors determined that CENG's ACE and extent of condition review were thorough, and the probable and contributing causes were reasonable and well supported given the catastrophic nature of the failed bearing preventing CENG from identifying a definitive cause. The inspectors also determined that the corrective actions were reasonable and addressed the identified probable and contributing causes.

CENG's ACE identified that prior CS pump bearing failures occurred in 2006 (12 CS pump) and in 2009 (22 CS pump). Following both failures, CENG had noted deficiencies in storage and handling of the bearings (prior to bearing installation). However, CENG's ACE determined that the 2009 evaluation did not identify that the 21

CS pump was from the same purchase order as the prior two failures. Although CENG's prior actions, including changes to the manner in which rotating equipment is stored and handled, were adequate in preventing similar problems with future bearing replacements, the inspectors observed that the 2009 ACE (22 CS pump bearing failure) could have more effectively postulated that a similar failure mechanism may have been present in the 21 CS pump since both the 22 and 21 CS pump bearings were from the same purchase order.

CENG's current extent of condition required that a sample of installed bearings in other safety-related critical pumps be removed from service and analyzed (material analysis) to ensure the correct failure mechanism is addressed. The inspectors concluded that CENG's evaluation and corrective action efforts associated with this event were appropriate and thorough.

.4 Annual Sample: Unexpected Low Thrust Margin for Emergency Core Cooling System Minimum Flow Motor-Operated Valves

a. Inspection Scope

The inspectors performed an in-depth review of CENG's evaluation and corrective actions associated with a self-identified deficiency associated with ECCS minimum flow motor-operated valves (MOV) 659 and 660 on both units. Specifically, on December 4, 2012, CENG identified that the maximum expected differential pressure (MEDP) value used to calculate MOV thrust was non-conservative. The MOVs are located in series and provide the ECCS minimum flow return path to the refueling water storage tank. The MOVs are normally open but have a containment isolation safety function to close during the transition from the injection phase to the recirculation phase of postulated design basis accidents. CENG discovered that the MEDP value, 2 psid (differential pressure), should have been about 1250 psid to accommodate closing the valves against an operating HPSI pump. When the proper MEDP value was entered into the thrust calculation, it yielded negative margin in the thrust required to close the valves.

The inspectors interviewed engineers and reviewed CR-2012-010978 associated with the issue, the associated evaluation, and operability determination, the completed and proposed corrective actions, and the prioritization and timeliness of actions to determine whether the actions were appropriate. Finally, the inspectors conducted a plant tour to evaluate the material condition of the valves and associated equipment.

b. Findings and Observations

No findings were identified.

The operability determination that originally supported a reasonable expectation of MOV operability for both units was based upon several factors, including the prior performance of dynamic testing for these valves and conservative assumptions in the associated calculations. Subsequently, CENG upgraded the spring packs and adjusted the torque switch settings for the Unit 2 MOVs and conducted post-modification dynamic testing. The testing results demonstrated sufficient and positive thrust margin for both Unit 2 MOVs.

In addition, based upon the results of the Unit 2 dynamic testing and revising some of the conservative assumptions in the existing Unit 1 calculations (valve type and application are identical for both units), calculations were revised for the Unit 1 MOVs, and the results similarly yielded positive thrust margin. CENG plans on implementing similar spring pack and torque switch MOV modifications for the Unit 1 MOVs during the upcoming refueling outage to gain further functional margin for these valves.

Based upon the existing positive margin in all four MOVs, the operability determinations were closed and no compensatory actions were required to ensure MOV operability. The inspectors concluded that CENG's actions in response to this self-identified deficiency were timely and appropriate.

.5 Annual Sample: Diesel Fuel Oil Net Positive Suction Head (NPSH) Calculation

a. Inspection Scope

The inspectors performed an in-depth review of CENG's evaluation and corrective actions associated with CENG's calculation for the DFO transfer pumps NPSH. During the NRC Component Design Basis Inspection performed during the summer of 2012, the inspectors requested the NPSH calculation for the DFO transfer pumps. At the time of this request, CENG was not able to locate the calculation and performed a preliminary calculation which showed that the DFO system provides more than the minimum NPSH required for the DFO transfer pumps. CENG initiated CR-2012-006002 to document the lack of a calculation and initiated corrective actions to complete a formal calculation. The inspectors reviewed CR-2012-006002 associated with this issue to verify the calculation results. The inspectors conducted walkdowns of the DFO system, validated calculation assumptions, and discussed the results with design engineers.

b. Findings and Observations

No findings were identified

The inspectors determined that CENG's NPSH calculation had a very conservative approach. The assumptions were intended to show worst case conditions and most limiting system configuration. However, the inspectors identified that a swing check valve, from the No.11 FOST, and the DFO pump suction strainers were not accounted for in the calculation. Both of these components add significant head losses to the system and make the system configuration from the No.11 FOST to the EDGs the most conservative line up for the calculation. The calculation was revised to include both components. The results still showed significant margin between the available NPSH and the required NPSH for the DFO transfer pumps.

The inspectors determined that adequate design control measures were not provided for verifying the adequacy of the DFO transfer pumps design as required by 10 CFR 50, Appendix B, Criterion III, "Design Control." However, the issue was determined to be a minor because it is similar to example 3.a of IMC 0612, Appendix E, "Example of Minor Issues," in that, the calculation errors were minor and the DFO transfer pumps NPSH positive margin was not significantly challenged or in question. CENG entered this deficiency in their CAP (CR-2013-005408).

4OA3 Followup of Events and Notices of Enforcement Discretion (71153 – 3 samples)

.1 Plant Events

a. Inspection Scope

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

- Unit 2 automatic high pressurizer pressure reactor trip due to main turbine valve controls malfunction on May 8, 2013
- Unit 2 manual reactor trip due to No. 22 steam generator feed pump overspeed trip on May 21, 2013

c. Findings and Observations

No findings were identified

.2 (Closed) Licensee Event Report (LER) 05000317/318/2012-001-00: Valve Surveillance Requirement Not Met Due to Legacy Issues

On May 18, 2012, CENG determined that a condition prohibited by technical specifications existed because surveillance requirement (SR) 3.5.2.1 was not fully met. SR 3.5.2.1 requires the low pressure safety injection (LPSI) flow control valve on each unit to be verified in the open position with power removed from the valve operator. Valves 1CV306 for Unit 1 and 2CV306 for Unit 2 are air operated flow control valves in a common discharge header for both LPSI pumps on each unit. CENG verified the valves were in the open position with power removed every 12 hours by verifying that electrical power to the valve's current to pneumatic (I/P) transducer was removed with a key switch located in the control room. This method left air pressure supplied to the I/P and the valve positioner. On December 1, 2010, an operator inadvertently bumped into the I/P transducer for 2CV306. An output control air signal was sent to the valve positioner causing the valve to partially shut.

In November 2011, NRC inspectors questioned the adequacy of the method used by CENG to remove power from the air operated valve 2CV306 and opened unresolved item (URI) 05000317/318/2011005-05, "Single Failure Vulnerability for Low Pressure Injection Flow Control Valve CV306," in inspection report 2011005. In December 2011, CENG decided to isolate instrument air to CV306 by locking shut its instrument air supply manual valve in addition to removing electrical power. The action to isolate the air supply placed a more robust method of removing power from the valve operator and

provided greater margin in assuring CV306 remained in the full open position. On August 24, 2012, inspection report 2012007 closed URI 0500317/318/2011005-05 with no performance deficiency.

Although the NRC closed the URI, CENG determined they had operated in a condition prohibited by technical specifications, and appropriately submitted an LER. The inspectors reviewed the LER for accuracy, the appropriateness of corrective actions, historical equipment operating experience, violations of requirements, and generic issues. CENG determined that the method used prior to December 2011, to remove power from the LPSI flow control valves; although consistent with licensing documents and submittals, was a non-conservative interpretation of the language in SR 3.5.2.1. Specifically, the term 'power' should have been interpreted as 'motive force' vice electrical power supply. In addition to isolating the instrument air to CV306 valve positioner, corrective action included changing technical specification bases for SR 3.5.2.1 to identify the acceptable method to remove 'power' from CV306 valve operator. The enforcement aspects of this LER are discussed in Section 4OA7. This LER is closed.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On July 11, 2013, the inspectors presented the inspection results to George Gellrich, Site Vice President, and other members of the CENG staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee-identified Violations

The following Severity Level IV violation of NRC requirements was identified by CENG and met the criteria of the NRC Enforcement Policy for being disposition as an NCV.

- On May 18, 2012, CENG determined that a condition prohibited by technical specifications existed because SR 3.5.2.1 was not fully met. SR 3.5.2.1 requires the LPSI flow control valve on each unit to be verified in the open position with power removed from the valve operator. Contrary to the above, prior to December 2011, CENG did not remove all sources of power to the air operated CV306 valves. The inspectors determined that removing electrical power only to CV306 was not inconsistent with the licensing documents and submittals which are the basis for SR 3.5.2.1, and correspondence between CENG and the NRC did not specify a method to remove "power" from CV306. Therefore, no performance deficiency was identified because it was not reasonable for CENG to foresee and prevent the issue in this case. The inspectors reviewed LER 2012-001-00 and determined that traditional enforcement applies in accordance with IMC 0612, section 0612-09 and 0612-13 and Enforcement Policy section 2.2.4.d, because a violation of NRC requirements existed without an associated significance determination process performance deficiency. Correspondence between CENG and the NRC did not specify a method to remove "power" from CV306. The inspectors determined that removing electrical

power only to CV306 was not inconsistent with the licensing documents. This issue was considered to be a Severity Level IV NCV of Technical Specification SR 3.5.2.1 in accordance with Enforcement Policy section 6.1.d. In addition, IMC 0612, Appendix B, Figures 1 and 2, "Issue Screening," were referenced in documenting this Severity Level IV licensee-identified NCV. This severity level IV licensee-identified NCV was entered into CENG's CAP as CR-2012-005390.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

CENG Personnel
G. Gellrich, Site Vice President
M. Flaherty, Plant General Manager
A. Barnett, Chemist
K. Bodine, Supervisor, Component Engineering
H. Crockett, In-Service Testing Engineer
K. Eiane, Pump Engineer
H. Enoch, Buried Pipe Engineer
B. Erdman, Acting Radiation Protection Manager
J. Gaffey, Senior Design Engineer
J. Gaines, General Supervisor, Shift Operations
K. Gould, General Supervisor, Radiation Protection
S. Henry, Manager, Operations
J. Ihnacik, Principal Engineer
P. Jones, Health Physicist
D. Lauver, Director, Licensing
J. Lenhardt, Radwaste Shipping
W. Lepson, Chemistry Technician
S. Loeper, Principal Engineer
D. Merryman, Licensing Engineer, Environmental
C. Neyman, Senior Engineering Analyst, Licensing
L. Rush, Engineer Systems
A. Simpson, Supervisor, Licensing
J. Stanley, Manager Engineering Services
T. Unkle, Licensing Engineer
J. York, General Supervisor Chemistry

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

05000317/318/2013003-01	NCV	Failure to Establish a Test Program for DFO Check Valves (Section 1R04)
05000317/318/2013003-02	NCV	Inadequate Steam Generator Tube Rupture Emergency Operating Procedure (Section 1R04)

Closed

05000317/318/2012-001-00	LER	Valve Surveillance Requirement Not Met Due to Legacy Issues (Section 4A03)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
NO-1-119, Seasonal Readiness, Revision 00601
AOP-7M, Major Grid Disturbance, Revision 1
OAP- 92-9, Cold Weather Operations, Change 7
ERPIP-3.0, Immediate Actions, Revision 05101
EP-1-108, Severe Weather Preparation, Revision 00700

Work Order
C91862485

Miscellaneous
AI-2012-001534, Pre-Summer Assessment 2013
SA-2012-000125, Post-Summer Assessment 2012

Section 1R04: Equipment Alignment

Procedures
OI-21A-2, 2A Diesel Generator, Revision 20
OI-21B-1, 1B Diesel Generator, Revision 19
OI-29, Saltwater System, Revision 65
OI-5A, Containment and Cavity Cooling, Revision 17
OI-8C-1, Main Steam and MSR Vents and Drains, Revision 30
OI-8C-2, Main Steam and MSR Vents and Drains, Revision 20
OI-8E-1, MSIV Actuator System, Revision 25
OI-32A, Auxiliary Feedwater System, Revision 24
EOP-6-1, Steam Generator Tube Rupture, Revision 17
EOP-6-TB, Steam Generator Tube Rupture Technical Basis, Revision 18
EOP-8-1, Functional Recovery Procedure, Revision 31
MS-7129, Hydrostatic, Pneumatic and Functional Test Procedure for the Calvert Cliffs Main Steam Isolation Valve Actuators, Revision 9

Condition Reports

CR-2009-005956	CR-2010-001596	CR-2010-001878	CR-2011-002984
CR-2009-005955	CR-2011-003198	CR-2009-001835	CR-2011-000467
CR-2010-010219	CR-2012-002600	CR-2013-003548	CR-2008-003150
CR-2010-005838	CR-2013-003132	CR-2012-010814	CR-2009-002168
CR-2010-005544	CR-2009-001502	CR-2012-009889	CR-2013-004965
CR-2010-006897	CR-2013-002897	CR-2012-009887	CR-2013-005020
CR-2011-001483	CR-2011-001485	CR-2012-000054	CR-2013-004937
CR-2010-003403	CR-2010-002156	CR-2011-008229	CR-2013-004476

Drawings
60708Sh0001, Circulating Salt Water Cooling System, Revision 112
62700Sh0001, Main Steam and Reheat, Revision 49

60977Sh0001, Loop Diagram 11 & 12 Main Steam Line Atmos Dump and Turbine Bypass 1PT4056, Revision 13
60712Sh0003, Compressed Air System Instrument Air & Plant Air, Revision 111
60747, Hydraulic Schematic Main Steam Isolation Valves 11 & 12, Revision 31
15382-0026Sh0001, General Assembly of Main Steam Isolation Valve Flite Flow Bi-Directional Rockwell Actuator Model A-180, Revision 5
15382-0032, Wiring Diagram and Air/Hydraulic System Schematic, Revision 12
60706Sh0002, Service Water Cooling System Auxilary Building and Containment, Revision 77
60727Sh0002, Diesel Generator Cooling Water, Starting Air, Fuel, & Lube Oil Diesel No.1B, Revision 63
60727Sh0001, Diesel Generator Cooling Water, Starting Air, Fuel, & Lube Oil Diesel No.2A, Revision 61
63029Sh0002, Block Diagram Plant Protection, Revision 6

Miscellaneous
CCNPP Procurement Engineering Specification, Service-MSIV (A-180) Valve Actuator, Revision 25, Date 11/15/12
RAL-5282, Instruction Manual for the A-180 Actuator at Calvert Cliffs Nuclear Power Plant, Revision 9
CA07039, Atmospheric Dump Valve (ADV) AOV Capability Calculation, Revision 0
CA07358, Atmospheric Dump Valve Weak Link Analysis, Revision 0
SP-6750-M-292, Specification for Atmospheric Dump and Turbine Bypass Control Valves, Revision 3

Section 1R05: Fire Protection

Procedures
FP-0002, Fire Hazards Analysis Summary Document, Revision 0
SA-1-100, Fire Prevention, Revision 01800
SA-1-102, Fire Protection/Appendix R Compensatory Actions, Revision 00400
SA-1-105, Fire Brigade Training, Revision 00300
OI-20A, Fire Protection Performance Evaluations and Fire Systems Inspections, Revision 01801

Section 1R06: Flood Protection Measures

Procedures
CNG-AM-1.01-1029, Medium Voltage Cable Program, Revision 00100
CNG-AM-1.01-1033, Low Voltage Cable Program, Revision 00000

Work Orders
C91857187
C91759548

Section 1R07: Heat Sink Performance

Work Order
C91778914

Section 1R11: Licensed Operator Requalification Program

Procedures
AOP-3B-1, Shutdown Cooling Abnormal Conditions, Revision 02500
AOP-7A-1, Loss of Saltwater, Revision 01407

Section 1R12: Maintenance Effectiveness

Procedures
CNG-AM-1.01-1023, Maintenance Rule Program, Revision 00201
NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Revision 2

Condition Reports
CR-2013-001025
CR-2013-001337
CR-2013-001973
CR-2013-002897
CR-2013-005503

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
Maintenance Rule Risk Assessment Guideline, Revision 7
CNG-OP-4.01-1000, Integrated Risk Management, Revision 00900
EOOS Guidelines – Dominant Risk Activities, Revision 0
OAP 02-02, Protected Equipment Program, Revision 30
EOOS Risk Monitor Guidelines – Senior Reactor Operators, Revision 1
OI-29, Saltwater System, Revision 65
OI-5A, Containment and Cavity Cooling, Revision 17
OI-32A, Auxilary Feedwater System, Revision 24
ERPIP-3.0, Immediate Actions, Revision 05101
EP-1-108, Severe Weather Preparation, Revision 00700

Condition Reports
CR-2013-001025

Section 1R15: Operability Determinations and Functionality Assessments

Procedures
CNG-OP-1.01-1002, Conduct of Operability Determinations / Functionality Assessments, Revision 00201
CNG-CA-1.01-1000, Corrective Action Program, Revision 00900
STP-O-065-2, HPSI and LPSI CKV Closure Test, Revision 04102
STP-O-067G-2, Safety Injection Check Valve Cold Shutdown Test, Revision 5
STP-O-007A-2, “A” Train Engineered Safety Features Logic Test, Revision 05905
STP-O-007B-2, “B” Train Engineered Safety Features Logic Test, Revision 05906

Condition Reports
IR3-083-183
CR-2013-001973

CR-2013-003157
CR-2013-004151
CR-2013-004310
CR-2013-005306

Drawing
62731sh0001, Safety Injection & Containment Spray Systems, Revision 77
62731sh0002, Safety Injection & Containment Spray Systems, Revision 44
62731sh0003, Safety Injection & Containment Spray Systems, Revision 28

Miscellaneous
ES200200115, HPSI Suction Piping Overpressurization, Revision 1

Section 1R18: Plant Modifications

Procedure
CNG-CM-1.01-1004, Temporary Plant Configuration Change Process, Revision 00201
NEI 96-07, Guidelines for 10 CFR 50.59 Implementation, Revision 1
CNG-CM-1.01-1003, Design Engineering and Configuration Control, Revision 00601

Drawing
62700Sh0001, Main Steam and Reheat, Revision 49
12312-21, Diaphragm Operator Assembly Model D-100-100 ¾" Stem Size, Revision 18
12312-0002, Model D-100-100 Oper. 5" – 600lb. U.S.A. STD Valve Assembly (Tandem Trim), Revision 16

Miscellaneous
CA07039, Atmospheric Dump Valve (ADV) AOV Capability, Revision 1
CA07538, Atmospheric Dump Valve Weak Link Analysis, Revision 0
12312-010-1003, Copes-Vulcan Type D-100 Diaphragm-Operated Control Valve
TR107322, Guidelines for Evaluating Air-Operated Valve Uncertainties and Actuator Setup Parameters

Section 1R19: Post-Maintenance Testing

Procedures
CNG-OP-1.01-1007, Clearance & Safety Tagging, Revision 01000
CNG-MN-4.01-GL002, Post Maintenance Test and Post Maintenance Operability Test Requirements Guideline, Revision 00000
NO-1-208, Calvert Cliffs Operability and Maintenance Testing, Revision 01900
E-10, Testing and Adjustment of Agastat Relays, Revision 00500
STP-O-067B-1, Auxiliary Feedwater/Main Steam Check Valve Test, Revision 9
EDG-13, 24 Month Inspection of SACM Diesel Generator, Revision 00600
STP-O-073B-2, Service Water Pump Performance Test, Revision 01405
PUMP-3A, Saltwater Pump Removal and Replacement, Revision 00103
STP-O-073A-1, Saltwater Pump and Check Valve Quarterly Operability Test, Revision 02301

Condition Reports
CR-2010-012455
CR-2013-003420
CR-2010-012687

CR-2010-012785
CR-2010-012784

Work Orders
C91859244
C91093904
C91099363
C91101169
C91410255
C92007246
C220075262
C120091446

Section 1R22: Surveillance Testing

Procedures
STP-O-087-1, Borated Water Source 7 Day Operability Verification, Revision 18
STP-O-008A-1, Test of 1A DG and 11 4KV Bus LOCI Sequencer, Revision 28
STP-O-065H-1, Presurized Power-Operated Relief Block Valves Quarterly Operability Test, Revision 00400
STP-M-662-2, Integrated Leak Rate Test Unit 2 Containment, Revision 00903
EN-4-105, Containment Leakage Rate Testing Program, Revision 00602
STP-F-492-0, Halon System Tank Level and Pressure Verification, Revision 00800
STP-M-550-1, 12 Station Battery Test, Revision 01000

Work Orders
C9119909166
C1200604765
C219914686
C119909167
C219914689

Condition Reports
CR-2013-004024
CR-2013-003880
CR-2012-002806

Drawing
92820, Refueling Water Tank No. 11 – 21, Revision 5
98611BSh0020, No.11 Refueling Water Tank Narrow Range 201-52-1LT4142, Revision 5
61017Sh0002, Single Line Diagram Reactor 480V MCC 114R, Revision 45
61017Sh0001, Single Line Diagram Reactor 480V MCC 104R, Revision 41

Miscellaneous
I-94-003, Refueling Water Tank Level, Revision 2
ANSI/ANS-56.8-1994, Containment System Leakage Testing Requirements
NEI 94-01, Industry Guideline for Implementing Performance-Based Option of 10 CFR 50, Appendix J, Revision 0, July 26,1995

Section 1EP4: Emergency Action Level and Emergency Plan Changes

Procedures:
Evacuation Time Estimate Study Update

Section 2RS7: Radiological Environmental Monitoring Program

Procedures:
CNG-EV-1.01-1000, Radiological Environmental Monitoring Program (REMP), Revision 00001
CP-0224, Monitoring Radioactivity in Systems Normally Uncontaminated, Revision 01601
CP-0234, Specification and Surveillance for the Radiological Environmental Monitoring Program, Revision 00800
CP-0501, Liquid and Steam Sampling Techniques, Revision 01600
MN-1-319, Structure and System Walkdowns, Revision 00802

Exelon Industrial Services Procedures:
11-13, Air Iodine and Air Particulate Sampling, Revision 0
11-14, Beta Counting using the Tennelec LB 5100, Revision 0
11-15, Sample Collection for Gamma Counting: Soil, Vegetation and Water, Revision 0
11-16, Sample Preparation for Gamma and Beta Counting, Revision 0
11-17, Gamma Counting Using a HPGe Detector and the GENIE PC Counting System, Revision 0

Condition Reports:

CR-2011-003910	CR-2011-005952	CR-2011-007269
CR-2011-007273	CR-2011-008808	CR-2012-007768
CR-2012-007773	CR-2013-003060	CR-2013-003669
CR-2013-004079		

Calibration Records:
2012 Detector #1, #2, #3 Energy and Geometry Efficiency Calibrations (Fort Smallwood Lab)

Other:
Sampling and Locations Observed: A1, A2, A3, SFA 4

Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

Condition Reports

CR-2011-003882	CR-2011-006093	CR-2011-010724	CR-2012-010074
CR-2011-005200	CR-2011-007202	CR-2011-010778	CR-2012-010289
CR-2011-005576	CR-2011-007782	CR-2011-011207	CR-2012-010393
CR-2011-005623	CR-2011-008022	CR-2011-011397	CR-2013-002007
CR-2011-005626	CR-2011-009616	CR-2011-011937	CR-2013-002403
CR-2011-005 855	CR-2011-009676	CR-2012-000125	CR-2013-003326
CR-2011-006694	CR-2011-010159	CR-2012-004799	CR-2013-003421
CR-2011-006082	CR-2011-010283	CR-2012-008232	

Procedures
CNG-RP-1.01-3002, Revision 0, Sampling and Analysis for 10 CFR 61 Waste Classification
CH-1-110, Revision 0, Process Control Program

CP-616, Revision 0, Shipment of Radioactive Materials Definitions
CP-617, Revision 0, Shipment of Radioactive Materials General Requirements
CP-618, Revision 00102, Packaging for Shipment or Transportation of Radioactive Materials
CP-619, Revision 0, Radioactive Material Quantification, Identification and Waste Characterization
CP-620, Revision 1, Shipment of Radioactive Material, Excepted Package, Limited Quantity of Material
CP-621, Revision 0, Shipment of Radioactive Material, Excepted Package, Instruments or Articles
CP-622, Revision 0, Shipment of Radioactive Material (Type A or Type B)
CP-623, Revision 0, Shipment of Radioactive Material, Excepted Package, Empty Package
CP-0624, Revision 00100, Shipment of Radioactive Material, LSA
CP-0625, Revision 00100, Shipment of Radioactive Material, SCO
CP-626, Revision 00003, Shipment of Radioactive Material Shipping Papers
CP-627, Revision 0, Control and Operation of Radioactive Material Management Software
CP-628, Revision 00102, Solid Waste Processing Resin Transfer
CP-631, Revision 1, CNS 8-120A Cask Handling Procedure
CP-0632, Revision 00400, CNS 8-120B Cask Handling Procedure

Audits, Self-Assessments, and Surveillances
Self-Assessment # SA-2012-000069, Radioactive Waste; SA-2011-000096, Radioactive Waste
QPA Assessment Report 2011-031, CCNPP – Interim Storage of low-level waste
Audit RPP-11-01-C, Radiation Protection Program

Miscellaneous
GEL Laboratories Analytical Results for: Degas Filter Clippings; PZR Heater Smear; DAW Smears; NUKEM Resins, Primary Resins (March 2012)
Radioactive Material Shipments Nos.: 13-001; 12-096; 12-081; 12-080; 12-071
NRC Quality Assurance Program Approval No. 0383, Revision 7

Section 4OA1: Performance Indicator Verification

Procedures
NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 6

Miscellaneous
Calvert Cliffs Unit 1 Safety System Functional Failures 2Q/11 to 1Q/13
Calvert Cliffs Unit 2 Safety System Functional Failures 2Q/11 to 1Q/13
LER 05000317/318 2012-001-00, Valve Surveillance Requirement Not Met Due to Legacy Issues
LER 05000317 2012-002-00, Reactor Coolant Pressure Boundary Leakage Due to Tubing High Cyclic Fatigue
LER 05000317 2012-003-00, Plant Shutdown Completed due to Control Element Assembly Misalignment
LER 05000318 2013-001-00, Reactor Coolant System Pressure Boundary Leakage in Valve Leakoff Line Weld
LER 05000318 2013-002-00, Pressurizer Safety Valve Setpoint High Due to Time-Related Drift

Section 4OA2: Problem Identification and Resolution

Condition Reports:
CR-2012-010978
CR-2012-011302
CR-2012-006226
CR-2012-006002

Procedures:
CNG-CA-1.01-1000, Corrective Action Program, Revision 00801

Drawings:
OM-462SH0003, Safety Injection and Containment Spray Systems, Revision 28
OM-462SH0001, Safety Injection and Containment Spray Systems, Revision 78
12047-0007, Containment Spray Pump, Revision 6
FSK-MP-2678, Fuel Oil Transfer Pump to Day Tank Diesel Generator No.2A, Revision 2
60484Sh0001, Fuel Oil Storage Piping Plan & Selections, Revision 12

Miscellaneous:
ECP-13-000113, Replace Spring Pack for 1(2)MOV659/660, Revision 0
Bearing Temperature Data, 11 and 21 Containment Spray Pump Tests, 2006 – 2013
Quarterly IST Results, 11 and 21 Containment Spray Pumps, March 2008 to February 2013
Biennial IST Results, 11 and 21 Containment Spray Pumps, March 2006 to March 2013
SR-1475, Bearing Life Analysis of Containment Spray Pumps, Revision 5
Exelon Generation Report 13-0002, 21 Containment Spray Pump Bearing Failure, dated January 30, 2013
13-001R ETP, Differential Pressure Testing of 2 MOV659 and 2MOV660, performed on March 18, 2013
CA07792, No.11 and No.21 FOST Transfer Pump Available NPSH, Revision 0
ECP-12-000580, Emergency Diesel Generator Transfer Pump Vendor Technical Manual
CA00067, Emergency Diesel Generator Fuel Oil Consumption Rate & Tank Capacity Calculatio, Revision 0

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

Procedure
CNG-OP-1.01-1006, Post Trip Review, Revision 00200
2C04-ALM, Aux Feedwater and Computer Alarm Manual, Revision 41
OP-2, Plant Startup from Hot Standby to Minimum Load, Revision 45
NEOP-302, Estimated Critical Condition, Revision 00700
CNG-OP-1.01-1001, Operational Decision Making, Revision 00700

Condition Reports
CR-2012-005390

Miscellaneous
Alarm Message Report 5/08/2013
SOE Message Report 5/08/2013
Alarm Message Report 5/21/2013
SOE Message Report 5/21/2013

LIST OF ACRONYMS

AC	alternating current
ACE	apparent cause evaluation
ADAMS	Agency-Wide Documents Access and Management System
ADV	atmospheric dump valve
AFW	auxiliary feedwater
AOP	abnormal operating procedue
CAP	corrective action program
CCNPP	Calvert Cliffs Nuclear Power Plant
CENG	Constellation Energy Nuclear Group, LLC
CFR	*Code of Federal Regulations*
CR	condition report
CS	containment spray
DFO	diesel fuel oil
ECCS	emergency core cooling system
EDG	emergency diesel generator
EOP	emergency operating plan
FOST	fuel oil storage tank
HPSI	high pressure safety injection
HX	heat exchanger
IMC	Inspection Manual Chapter
I/P	current to pneumatic
kV	kilovolt
LER	licensee event report
LOOP	loss of offsite power
LPSI	low pressure safety injection
MEDP	maximum expected differential pressure
MOV	motor-operated valves
MSIV	main steam isolation valve
NCV	non-cited violation
NPSH	net positive suction head
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PARS	publicly available records
PCP	process control program
RCS	reactor coolant system
RG	regulatory guide
REMP	Radiological Environmental Monitoring Program
SG	steam generator
SGTR	steam generator tube rupture
SR	surveillance requirement
SSCs	structures, systems, and components
TLD	thermoluminescent dosimeter
UFSAR	Updated Final Safety Analysis Report