February 11, 2005

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

SUBJECT: CALVERT CLIFFS NUCLEAR GENERATING STATION – NRC SUPPLEMENTAL INSPECTION REPORT 05000318/2005006

Dear Mr. Vanderhayden:

On January 28, 2005, the U.S. Nuclear Regulatory Commission (NRC) completed a supplemental inspection at the Calvert Cliffs Nuclear Power Plant, Unit 2. The enclosed report documents the inspection results that were discussed on January 28, 2005, with you and other members of your staff.

The NRC performed this supplemental inspection to assess your evaluation of a low to moderate (White) safety significant finding involving a reactor regulating system (RRS) relay failure that prevented the RRS from properly regulating the reactor coolant temperature after the Unit 2 reactor trip on January 23, 2004. The supplemental inspection was conducted to determine if the root and contributing causes of the White finding were understood, to assess the extent of condition review, and to determine if the corrective actions were sufficient to address causes and prevent recurrence. The inspection was conducted in accordance with Inspection Procedure 95001, “Inspection for One or Two White Inputs in a Strategic Performance Area,” and 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.

Based on the results of this inspection, we concluded that you have adequately completed a root cause analysis of the performance deficiency and have identified appropriate corrective actions. No findings of significance were identified. Given your acceptable performance in addressing the RRS relay failure, the White finding associated with this issue will only be considered in assessing plant performance for a total of four quarters in accordance with the guidance in Inspection Manual Chapter (IMC) 0305, “Operating Reactor Assessment Program.”

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html (The Public Electronic Reading Room).

Sincerely,

/RA/

John F. Rogge, Chief
Electrical and Fire Protection Branch
Division of Reactor Safety

Docket No. 50-318
License No. DPR-69

Enclosure: Inspection Report 05000318/2005006
w/Attachment: Supplemental Information

cc w/encl:
M. J. Wallace, President, Constellation Generation
J. M. Heffley, Senior Vice President and Chief Nuclear Officer
President, Calvert County Board of Commissioners
J. M. Petro, Esquire, Constellation Energy Group, Inc.
J. E. Silberg, Esquire, Shaw, Pittman, Potts and Trowbridge
Director, Nuclear Regulatory Matters
R. McLean, Manager, Nuclear Programs
K. Burger, Esquire, Maryland People's Counsel
State of Maryland (2)

Distribution: (via e-mail)
S. Collins, RA
J. Wiggins, DRA
S. Lee, RI OEDO
R. Laufer, NRR
R. Guzman, PM, NRR
R. Clark, PM, NRR
P. Tam, PM, NRR (Backup)
J. Trapp, DRP
N. Perry, DRP
M. Giles, DRP, Senior Resident Inspector
J. O'Hara, DRP, Resident Inspector
C. Newgent - Resident OA
W. Lanning, DRS
J. Rogge, DRS
J. Bobiak, DRS
Region I Docket Room (with concurrences)

SISP Review Complete: JFR

DOCUMENT NAME: E:\Filenet\ML050420274.wpd
After declaring this document "An Official Agency Record" it **will** be released to the Public.
To receive a copy of this document, indicate in the box: "**C**" = Copy without attachment/enclosure "**E**" = Copy with attachment/enclosure "**N**" = No copy

OFFICE	RI/DRS		RI/DRS		RI/DRS			
NAME	JBobiak/*JAB*		JTrapp/*JMT*		JRogge/*JFR*			
DATE	02/10/05		02/10/05		02/10/05			

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.	50-318
License No.	DPR-69
Report No.	05000318/2005006
Licensee:	Constellation Generation Group, LLC
Facility:	Calvert Cliffs Nuclear Power Plant, Unit 2
Location:	1650 Calvert Cliffs Parkway Lusby, Maryland 20657-4702
Dates:	January 24 - 28, 2005
Inspector:	Jennifer Ann Bobiak, Reactor Inspector, DRS
Approved by:	John F. Rogge, Chief Electrical and Fire Protection Branch Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000318/2005006; 01/24/2005 - 01/28/2005; Calvert Cliffs Nuclear Power Plant, Unit 2; Supplemental Inspection; IP 95001, "Inspection for One or Two White Inputs in a Strategic Performance Area."

The inspection was conducted by one regional inspector. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

Cornerstone: Mitigating Systems

The NRC performed this supplemental inspection, in accordance with Inspection Procedure 95001, to assess the licensee's evaluation associated with the reactor regulating system (RRS) relay failure on January 23, 2004. This performance issue was previously characterized as having low to moderate risk significance (White) in NRC Inspection Report 05000318/2004008.

Constellation's evaluation of the issue included performing a formal root cause analysis to identify the root and contributing causes associated with the RRS relay failure and to identify corrective actions to address these causes. Revision 1 of this analysis sufficiently considered both equipment-related and human performance-related issues and sufficiently addressed the weaknesses of Revision 0 noted in Inspection Report 05000318/2004008.

Based on the results of this inspection, the inspector concluded that Constellation adequately completed a root cause evaluation of the performance deficiencies associated with this finding and completed and planned corrective actions were reasonable to address the related causes. Given Constellation's acceptable performance in addressing the RRS relay failure, the White finding associated with this issue will only be considered in assessing plant performance for a total of four quarters in accordance with the guidance in IMC 0305, "Operating Reactor Assessment Program."

REPORT DETAILS

01 INSPECTION SCOPE

The U.S. Nuclear Regulatory Commission (NRC) performed this supplemental inspection to assess Constellation's evaluation of the root and contributing causes specific to the January 23, 2004, reactor regulating system (RRS) relay failure. This performance issue was previously characterized as White in NRC inspection report number 05000318/2004008 and is related to the mitigating systems cornerstone in the reactor safety strategic performance area. The inspector performed a walk-down of the RRS, completed interviews with selected Constellation staff, and reviewed documents pertaining to the root cause and corrective actions of the event. The inspector reviewed the facts associated with the event to assess whether Constellation's evaluations had considered and develop effective corrective actions for both the root and contributing causes for the performance deficiencies identified.

02 EVALUATION OF INSPECTION REQUIREMENTS

02.01 Problem Identification

a. Determination of who identified the issue and under what conditions

The relay failure was a self-revealing finding resulting from the January 23, 2004, Unit 2 reactor trip. After the trip, the RRS controlled the removal of stored energy in the reactor coolant system (RCS) and the secondary system with the quick-open signal, which opened the turbine bypass valves (TBVs) and atmospheric dump valves (ADVs). The quick-open signal is designed to have the TBVs and ADVs initially full open, then modulate to automatically control RCS temperature. In this event, however, the TBVs and ADVs remained full open, causing a rapid overcooling and depressurization of the RCS. This failure to close was later attributed to the underrating of contacts of the RRS K7 relay.

b. Determination of how long the issue existed and prior opportunities for identification

Constellation's evaluation determined that the Unit 2 K7 contacts would have probably failed upon their first actuation following the May 28, 2003, reactor trip. This was the last time the K7 contacts were known to function properly. The inspector agreed with Constellation's evaluation. Constellation's evaluation also correctly includes that a missed opportunity to identify the underrated contacts occurred during the 1992 modification of the RRS quick-open circuit, as was identified in NRC inspection report 05000318/2004008.

The evaluation also identifies two instances where Constellation could have prevented the event but would not have uncovered the underrating. An improper handling of operating experience (OE) report 15841 neglected to respond to the implications of the OE on the RRS. Proper response could have led to an evaluation of relay replacement. Also an informal recommendation in a field assistance report (FAR) to replace all the K relays in the RRS system following a 2003 failure of a K1 relay was never acted upon.

The inspector determined that Constellation conducted a thorough evaluation of prior opportunities to identify this condition.

c. Determination of the plant-specific risk consequences and compliance concerns associated with the issue

Constellation's root cause Analysis Report Rev. 1 determined that if the K7 relay was degraded from May 28, 2003, to January 23, 2004, then the increase in core damage frequency (CDF) was approximately 9E-6. The NRC's risk evaluation reached similar conclusions.

02.02 Root Cause and Extent of Condition Evaluation

a. Evaluation of methods used to identify root cause and contributing causes

To evaluate this issue, Constellation used a modified Kepner-Tregoe Problem Analysis for the equipment-related analysis. They used Barrier Analysis, Why Staircase, Problem Analysis, and Potential Cause Analysis for the human performance-related analysis. The inspector determined that Constellation followed its procedural guidance for performing root cause analysis and used appropriate methods to identify the root and contributing causes.

b. Level of detail of the root cause evaluation

The inspector determined that the root cause analysis was conducted to a sufficient level of detail for the significance of the issue. Besides the equipment-related root cause of the underrated contacts, Constellation's evaluation also identified human-performance weaknesses in the areas of training and communications and programmatic weaknesses in the preventive maintenance program and the FAR process.

c. Consideration of prior occurrences of the problem and knowledge of prior operating experience

Constellation's evaluation included an adequate consideration of prior occurrences of similar problems and other operating experience. No prior occurrences of underrating were found. While the OE 15841 did involve a relay failure, it was not an instance of underrating. Also, no adverse trends in vendor engineering product errors were found.

d. Consideration of potential common causes and extent of condition of the problem

The inspector found that Constellation's evaluation properly addressed extent of condition for both the equipment issues and the human performance issues. Constellation's review included verification of relay ratings for both RRS and safety-related systems, including the reactor protection system, engineered safety features actuation system, and auxiliary feedwater actuation system. No other underrated contacts were found. Multi-system OE was reviewed for other instances of poor screening and missed opportunities. None were found. Field assistance reports were

reviewed to make sure all recommendations were acted upon. One other minor example of a missed recommendation, besides the recommendation to replace the K relays, was found. Appropriate corrective actions were initiated.

02.03 Corrective Actions

a. Appropriateness of corrective actions

Constellation took immediate corrective actions to replace all K7 relays in both Unit 1 and Unit 2 RRS with relays in stock at their warehouse. This was followed by a replacement with "factory fresh" relays as soon as they were available from the vendor. Unit 1 has already received the modification for an appropriately rated relay and the modification for Unit 2 is scheduled for the next refueling outage (Spring 2005). The immediate relay replacement will insure the Unit 2 quick-open circuit can perform its intended function until the modification can be performed. Training was provided on proper OE screening and further written guidance in the form of Plant Engineering Standing Order 04-0001 was introduced. Training was also provided for the communication of FAR recommendations and written guidance was created, as this was before an informal process. Constellation is also developing guidance to risk inform their owner's acceptance review process. The inspector agreed that the proposed corrective actions were appropriate.

b. Prioritization of corrective actions

The inspector reviewed the prioritization of corrective actions and verified that actions of a generally higher priority were scheduled for completion within a reasonable time frame. The immediate corrective action of replacing all the K7 relays was sufficient to ensure that they could perform their attended function if called upon until the modifications to the quick-open circuit could be completed.

c. Establishment of schedule for implementing and completing the corrective actions

Constellation's evaluation provided dates for completion of corrective actions. The inspector reviewed the schedule and determined that the corrective actions could reasonably be accomplished by the dates specified.

d. Establishment of quantitative or qualitative measures of success for determining the effectiveness of the corrective actions to prevent recurrence

The inspector determined that Constellation's root cause report contained sufficient methods for determining the effectiveness of corrective actions. The report includes an action to perform an effectiveness review per their procedures of the completed and proposed corrective actions. This will review the corrective actions at a later date and will also revisit the effectiveness of the OE screening and FAR processes.

03 MANAGEMENT MEETINGS

Exit Meeting Summary

The results of this inspection were discussed with Mr. George Vanderheyden and other members of the Calvert Cliffs staff at the conclusion of this inspection on January 28, 2005. Following the exit meeting, a Regulatory Performance Meeting was conducted in accordance with Inspection Manual Chapter 0305, “Operating Reactor Assessment Program,” and focused on the performance deficiencies associated with this issue and proposed corrective actions. Constellation's slides from this meeting are included as Attachment B to this report. No proprietary information was discussed.

ATTACHMENT A

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

NRC Personnel

Mark Giles, Senior Resident Inspector, Calvert Cliffs
John Richmond, Reactor Inspector, DRS
Jim Trapp, Chief, Projects Branch 1

Licensee Personnel

Steve Dobler, System Engineer
Lou Larragoite, Director of Licensing
Bruce Montgomery, Engineering Manager
Kevin Nietmann, Plant Manager
Art Simpson, Senior Engineer, Regulatory Matters
Mark Simpson, Principal Engineer, Plant Engineering Section
George Vanderhayden, Vice President

ITEMS OPENED, CLOSED, AND DISCUSSED

Closed

05000318/2004008-01	FIN	Failure to Adequately Implement Modification Design Review of the Reactor Regulating System Quick Open Circuit

DOCUMENTS REVIEWED

Drawings
61069, Rev. 22, “Schematic Diagram Turbine Steam Dump and Bypass Controls”
86923, Sheet 01X/02X, Rev. 4/1, “RRS Cabinet Schematic Unit-1 Channel X 1C31"
86924, Sheet 01X/02X, Rev. 3/0, “RRS Cabinet Schematic Unit-2 Channel X 2C31"

Issue Reports
4-022-946
4-022-947
4-022-948
4-025-059
4-028-082
IRE-000-973
IRE-000-987

Maintenance Orders
ESP 200400086, “Installation of Auxiliary Relay”
MO 1200400668
MO 1200400669
MO 2200400659
MO 2200400660

Miscellaneous
CCNPP Causal Analysis Handbook, Rev. 7
Category 1 Root Cause Analysis Report IR 200400047, Rev. 0/1, “Failure of Atmospheric Dump Valve Quick-Open Override Relay (K7)”
Design Change Notice 61069-2003 SH 0001, 0002
FCR 85-0068
Plant Engineering Standing Orders 04-0001, “Industry OE Analysis / Use Expectations”
Preventive Maintenance Template for Control Relays, Rev. 0
Reasonable Expectation of Continued Operability, RRS K7 Relays, 02/11/04
Training, “Industry Operating Experience Reviews,” March 2003

Operating Experience
OE 15841, “Millstone 2 Unit Trip While Performing RPS Matrix Testing”
OE 17663, “Preliminary - Unit 2 Automatic Trip on Low Steam Generator Level”
OE 17827, “Update to OE 17663"

Procedures
EN-1-100, Rev. 17, “Engineering Services Process Overview”
ES-021, Rev. 4, “Design Input Requirements Preparation”
ME-001, Rev. 1, “Wiring Verification,” Completed 04/29/04
NS-1-100, Rev. 6, “Use of Industry Operating Experience”
PEG-30, Rev. 0, “Plant Engineering Field Assistance Reports”
QL-2-100, Rev. 19, “Issue Reporting and Assessment”
QL-2-101, Rev. 9, “Causal Analysis”

Rep Task
10561008
10561010
10561012
10831074
20561010
20561012

LIST OF ACRONYMS

ADV	Atmospheric Dump Valve
CDF	Core Damage Frequency
DRS	Division of Reactor Safety
FAR	Field Assistance Report
IMC	Inspection Manual Chapter
NRC	Nuclear Regulatory Commission
OE	Operating Experience
RCS	Reactor Coolant System
RRS	Reactor Regulating System
TBV	Turbine Bypass Valve

ATTACHMENT B

REGULATORY PERFORMANCE MEETING
JANUARY 28, 2005

ATTACHMENT 'B' - ADAMS ML050400034