November 7, 2002

Mr. Peter E. Katz
Vice President - Calvert Cliffs Nuclear Power Plant
Constellation Generation Group
Calvert Cliffs Nuclear Power Plant, Inc.
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT - NRC SUPPLEMENTAL INSPECTION REPORT NOS. 50-317/02-011 AND 50-318/02-011 (REFERENCE EA-02-138)

Dear Mr. Katz:

On October 11, 2002, the NRC completed a supplemental inspection at Calvert Cliffs Nuclear Power Plant Units 1 and 2. The enclosed report presents the results of this inspection which were discussed with Mr. K. Neitmann, and other members of your staff, on October 11, 2002.

This inspection was an examination of your activities associated with an inspection finding of low to moderate safety significance (WHITE) involving failure to properly prepare a package of radioactive materials for shipment such that, under conditions normally incident to transport, radiation dose rates on the external surface of the package would not exceed applicable regulatory limits (Reference EA-02-138, dated August 19, 2002). A package shipped from Calvert Cliffs on May 23, 2002, to a waste processing facility, was found to have radiation dose rates exceeding applicable regulatory limits after arrival. (Reference NRC Inspection Report 50-317/02-04; 50-318/02-04, dated July 30, 2002.) The purpose of this inspection was to assure that the causes of the performance issues associated with this finding were understood, the extent of condition had been identified, and that corrective actions were sufficient to prevent recurrence. Inspection Procedure 95001, "Inspection for One or Two White Inputs in a Strategic Performance Area," was used as guidance for the inspection. In addition, this letter acknowledges receipt and review of your September 17, 2002, reply to the Notice of Violation associated with the WHITE finding.

Our review found that, although a root cause evaluation was conducted and root and contributing cause were identified, we were not able to assure that the extent of condition of risk significant performance issues has been identified or that the corrective actions taken or planned were sufficient to address this issue including broader-based concerns identified during the inspection. We note that your Nuclear Performance Assessment Department had identified similar concerns prompting issuance of an Issue Report.

Based on discussions with your staff regarding the planned actions to address this issue, we understand that this matter will be ready for re-inspection in December 2002. Consistent with NRC Manual Chapter 305, the finding will be removed from consideration in the assessment process in June 2003, when this finding has been in the assessment program for at least four calendar quarters, provided action to address the performance issues have been completed.

In accordance with 10 CFR 2.790 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 the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web Site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Wayne D. Lanning, Director
Division of Reactor Safety

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

Enclosure: Supplemental Inspection Report Nos. 50-317/02-011 and 50-318/02-011

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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos:	50-317, 50-318
License Nos:	DPR-53, DPR-69
Report Nos:	50-317/02-011, 50-318/02-011
Licensee:	Constellation Generation Group Calvert Cliffs Nuclear Power Plant, Inc.
Facility:	Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Location:	1650 Calvert Cliffs Parkway Lusby, MD 20657-4702
Dates:	October 8-11, 2002
Inspector:	Ronald Nimitz, CHP, Senior Health Physicist
Approved by:	John White, Chief Radiation Safety and Safeguards Branch Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000277-02-011; 05000278-02-011, on October 8-11, 2002; Calvert Cliffs Nuclear Power Plant, Units 1 and 2. Actions on WHITE Finding in area of elevated radiation dose rates on package exterior.

Cornerstone: Public Radiation Safety

This supplemental inspection was performed by the NRC to assess the licensee's evaluations and corrective actions associated with a finding of low to moderate safety significance (WHITE) involving failure to properly prepare a shipment of Class 7 (radioactive) materials for shipment, on May 23, 2002, to a vendor waste processing facility located in Oak Ridge, Tennessee. The inspection was conducted in accordance with NRC Inspection Procedure 95001, "Inspection For One or two White Inputs in a Strategic Performance Area." This performance issue was preliminarily determined to be WHITE, in NRC Inspection Report 05000317-02-04, 05000318-02-04, dated July 30, 2002. The licensee did not contest the characterization of the finding and no Regulatory Conference was held. The issue received final characterization as a WHITE finding in an August 19, 2002, NRC letter to the licensee. The licensee provided its response to the WHITE finding, and associated violation, in a letter dated September 17, 2002. The inspection determined that the licensee performed an evaluation of the issue, identified root and contributing causes, and identified and implemented immediate and compensatory corrective actions to address these causes and prevent recurrence. Notwithstanding, it was not apparent that the extent of condition of risk significant performance issues had been identified or that the corrective actions taken or planned were sufficient to prevent recurrence. Specifically, multiple examples were identified where packaged radioactive materials were not properly stabilized resulting in nonconformance with applicable shipping regulations. The corrective actions taken and planned do not appear to provide assurance that the specific performance deficiency was corrected or that actions on broader issues (e.g., program procedures, human performance, or oversight activities) were sufficient to preclude recurrence of material packaging and stabilization concerns. Consequently, the inspection objectives outlined in NRC Inspection procedure 95001 could not be achieved. Further, and consistent with the guidance contained in NRC Inspection Manual Chapter (IMC) 0305, "Operating Reactor Assessment Program," this issue will remain open and will not be removed from the Action Matrix pending additional NRC inspection.

Report Details

01 INSPECTION SCOPE

This supplemental inspection was performed by the NRC to assess the licensee's evaluations and corrective and preventive actions associated with a WHITE finding in the Public Radiation Safety cornerstone of the Radiation Safety Strategic performance area. Specifically, the licensee failed to properly prepare a shipment of Class 7 (radioactive) materials for shipment, so that, under conditions normally incident to transportation, radiation dose rate levels did not exceed 200 millirem per hour at any point on the external surface of the package, in accordance with 10 CFR 71.5 and 49 CFR 173.441(a). On May 23, 2002, the licensee shipped a package of Class 7 materials (radioactive waste) to a vendor waste processing facility in Oak Ridge, Tennessee, that, after arrival, exhibited radiation dose rate levels on the external surface of the package in excess of 200 millirem per hour. This performance issue was preliminarily characterized as of low to moderate risk significance (WHITE) in NRC Inspection Report 05000317-02-04; 05000318-02-04, dated July 30, 2002. The licensee did not contest the characterization of the risk significance of the finding and declined the opportunity to discuss this issue in a Regulatory Conference. The issue received final characterization as a WHITE finding in an August 19, 2002, letter from the NRC to the licensee. The licensee replied to the WHITE finding and associated Notice of Violation in a September 17, 2002, letter. The licensee's actions, as outlined in the response letter, were included in the scope of the inspection.

02 EVALUATION OF INSPECTION REQUIREMENTS (95001)

02.01 Problem Identification

a. Determine that the evaluation identifies who (i.e., licensee, self-revealing, or NRC) and under what conditions the issue was identified.

The licensee issued an Issue Report (IR) (IR3-077-457) for this matter on May 28, 2002. The IR indicated that the licensee was notified by its waste processing vendor (GTS Duratek, Oak Ridge, Tennessee) on May 28, 2002, that shipment No. 02-087 had been received with elevated radiation dose rates on the external surface of the package in excess of 200 millirem per hour. The licensee's Causal Analysis (PD200200005) indicated that this event was identified by the vendor and that the condition was assumed to have been created while the container was being transported to the vendor.

b. Determine that the evaluation documents how long the issue existed, and prior opportunities for identification.

The licensee's Causal Analysis (PD200200005) indicated that the condition was assumed to have been created while the container was being transported to the vendor. The licensee assumed the condition to have existed upon the package leaving the Calvert Cliffs Nuclear Power Plant on May 23, 2002. The package arrived at the waste processing facility on May 24, 2002. The licensee was informed of the elevated radiation dose rates on May 28, 2002. The licensee's review concluded there were no prior opportunities for identification since there were no verifications or checks of shipment dose rates between when the shipment left the plant and its arrival at the waste processing vendor. The licensee's evaluation did identify that a previous event occurred, associated with elevated radiation dose rates on a shipping container (RCAR 94-002, 1994); that one of the eleven corrective actions for this previous event did identify the need to establish controls for packaging high radiation waste inside the plant at the point of generation; and that corrective action could have possibly helped prevent this recent event.

However, the analysis did not identify the controls established or determine if those actions would have provided a prior opportunity to identify the most recent issue.

c. Determine that the evaluation documents the plant-specific risk consequences (as applicable) and compliance concerns associated with the issue.

The licensee's Causal Analysis (PD200200005) concluded there were no plant specific risk consequences associated with the preparation of the package. The Causal Analysis indicated applicable radiological controls were implemented for the loading of the package and no increase in individual employee dose was received as a result of the incident. Consequently, there was no significant radiological risk to workers. The evaluation further indicated that no actual exposure of a member of the public was known to have occurred. The elevated radiation dose rates on the external surface of the package were not readily accessible to members of the public. Consequently, there was no significant risk to members of the public. The licensee's Issue Report (IR) (IR No. IR3-077-457) identified compliance concerns as they relate to exceeding radiation dose limits on shipping packages. The analysis did not identify if there were compliance concerns associated with corrective actions implemented for the previous event.

02.02 Root Cause and Extent of Condition Evaluation

a. Determine that the problem was evaluated using a systematic method(s) to identify root cause(s) and contributing cause(s).

The licensee used its formally documented corrective action processes to identify root and contributing causes. The licensee's procedures (QL-2-100, Rev. 15, Issue Reporting and Assessment; QL-2-101, Rev. 5, Causal Analysis; and Causal Analysis Handbook), provided guidance for this causal analysis.

b. Determine that the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem.

The root cause evaluation and corrective actions were documented via an Causal Analysis (PD200200005) (IR No. IR3-077-457), "DOT Violation Regarding Dose Rates on a Shipping Container," dated August 26, 2002. The evaluation included both root and contributing causes and focused on the probable root cause of the increased dose rates on the exterior of the shipped package of waste. The licensee attributed the unexpected increase in package radiation dose rates, at one location on the exterior of the package, as a result of shifting of a small object, with elevated radiation dose rates, within a bag of waste contained in the package. However, the Causal Analysis indicated that a definitive cause to the greater than permitted radiation dose rates on the exterior of the package could not be found.

Despite a request of the waste processor, by the licensee, to quarantine the shipment at the vendor facility and not off-load the shipment, the shipment was not quarantined and the licensee was not able to directly off-load the bags of waste, with the elevated radiation dose rates, at the waste processing facility as part of its Causal Analysis. The waste processor inadvertently partially off-loaded the shipment which included the bags of waste with elevated radiation dose rates. The bags, with elevated radiation dose rates, had been compacted by the vendor.
The licensee's root cause identified a probable cause as the shifting of a high radiation dose rate point source item within a bag of waste. The inspector questioned this probable cause in

that some of the higher dose rate points identified were contaminated rags which were unlikely to move in a container. Further, the bagged waste had been compacted. In addition, the Causal Analysis did not identify what the corrective actions for the previous event (RCAR 94-002, 1994) were or why they were inadequate to prevent a second occurrence of elevated radiation dose rates (above regulatory limits) on the exterior of a shipped package. Further, although the analysis did address, as a possible contributing cause, use of the wrong type of radiation survey meter to survey packages of radioactive, the evaluation did not address possible inadequate radiological surveys by the technicians (i.e., failure to follow prescribed radiation safety procedures) or why the technicians were using incorrect survey meters for surveying bags containing small objects with elevated radiation dose rates. The Causal Analysis did not evaluate potential causes as inadequate radiation protection program procedures or failure to implement prescribed procedures. The analysis assumed that the original radiation dose rates on the bagged waste were correct. Further, the evaluation did not discuss whether the current training program for radiation protection personnel was deficient in this area which may have contributed to the cause.

Based on the above, it was not clear that the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem.

c. Determine that the root cause evaluation included consideration of prior occurrences of the problem and knowledge of prior operating experience.

The licensee's evaluation included a review to determine if similar problems had previously been identified in the area of radioactive waste shipping. The licensee identified previous waste shipping issues but did not include them for consideration in the root cause analysis. These previous issues, in conjunction with issues that occurred subsequent to the shipment indicate other possible causes for the WHITE finding. For example, the licensee experienced a problem with elevated radiation dose rates on a shipping package in 1994 (RCAR 94-002). The corrective actions for this prior occurrence were not discussed or identified in the root cause evaluation and were not identified relative to adequacy and effectiveness of corrective actions. The analysis did identify similar prior occurrences based on review of operating experience. However, the analysis did not identify what action the licensee took on those operating experience issues or whether they were adequate.

Based on the above, it was not clear that the root cause evaluation adequately considered prior occurrences of the problem.

d. Determine that the root cause evaluation included consideration of potential common cause(s) and extent of condition of the problem.

The licensee's Causal Analysis (PD200200005) included a discussion of the extent of the problem and generic implications. However, the analysis focused primarily on the surveying of small point sources of radioactive materials as the probable cause. This issue represented a second instance of elevated radiation dose rates, above regulatory limits, attributable to shifting of materials, in a radioactive materials shipping package. Further, shortly after this May 2002 event, the licensee experienced an additional example of shifting of material within a shipping package. That example resulted in the puncture of the wall of the shipping package (Reference NRC Inspection Report 50-317/2002-005; 50-318/2002-005, dated November 6, 2002) which was also a repeat occurrence of puncture of a shipping container due to shifting or inadequately braced packaged materials. The most recent occurrence of shifting of materials occurred approximately two months after the elevated dose rate issue and involved puncture of a

package shipped to the same waste processor in July 2002 (Reference IR3-065-680). These other events were not fully aggregated to identify potential common causes (e.g., inadequacies in program procedures, lack of oversight, or human performance issues). The licensee's Nuclear Performance Assessment Department's review of radioactive waste shipping and handling activities identified concerns relative to the Causal Analysis involving an apparent performance trend issue, effectiveness of previous and planned corrective actions, and effectiveness of radiological controls oversight capabilities to pre-identify deficiencies. The review by that group prompted issuance of an Issue Report (IR4-011-551). In addition, a separate licensee technical analysis (Causal Analysis Scoresheet) of the Causal Analysis (PD200200005) also identified a number of questions and concerns relative to the adequacy of the Causal Analysis.

Based on the above discussion, the inspector did not have assurance that the root and contributing causes of risk significant performance issues, in the area of packaging and shipment of radioactive materials, were fully understood or that the extent of condition of risk significant performance issues had been identified. Consequently, the inspection objectives of Inspection procedure 95001, relative to this matter, could not be achieved.

02.03 Corrective Actions

a. Determine that appropriate corrective action(s) are specified for each root/contributing cause or that there is an evaluation that no actions are necessary.

As discussed above (Section 02.02), it was not apparent that all root and contributing cause had been identified. Consequently, the inspector could not determine that appropriate corrective action(s) are (were) specified for each root/contributing cause or that there was an evaluation that no actions were necessary.

b. Determine that the corrective actions have been prioritized with consideration of the risk significance and regulatory compliance.

The root cause evaluation and corrective actions were documented via a Causal Analysis (PD200200005) (IR No. IR3-077-457), "DOT Violation Regarding Dose Rates on a Shipping Container," dated August 26, 2002. The evaluation included both root and contributing causes and focused on the probable root cause of the increased dose rates on the exterior of the shipped package of waste. The licensee had established a schedule for these actions. In addition, the licensee had taken a number of immediate and compensatory actions to address any immediate concerns. However, as discussed above (Section 02.02), it was not apparent that all root and contributing cause had been identified. Consequently, the inspector could not determine that appropriate corrective action(s) are (were) specified for each root/contributing cause.

c. Determine that a schedule has been established for implementing and completing the corrective actions.

The Causal Analysis (PD200200005) identifies a root cause and two contributing causes. The Causal Analysis identified four Compensatory Actions and five corrective actions. The compensatory measures were complete. A schedule was established for the corrective actions.

d. Determine that quantitative or qualitative measures of success have been developed for determining the effectiveness of the corrective actions to prevent recurrence.

The licensee's Causal Analysis (PD200200005) requires the conduct of an effectiveness review of the actions taken and planned as a result of the root cause analysis. The effectiveness of the corrective actions would be measured by three methods: checking the corrective action system for indications of improperly bagging high dose rate items, performance of comparisons with the vendor of dose rates when the shipping container left and when the shipping container arrived at the vendor premises, and performance of spot checks surveys on "low dose rate" bags to determine if there were any with high dose rate items not being placed into "high dose rate" bags. The Causal Analysis identifies November 30, 2003, as the estimated completion date of the Effectiveness Review. Notwithstanding, the analysis did not identify under what conditions routine shipment of radioactive waste materials may resume.

03 MANAGEMENT MEETINGS

Exit Meeting Summary

The inspector meet with licensee representatives on October 11, 2002. The inspector summarized the purpose, scope, and findings of the inspection. The licensee acknowledged the findings.

Supplemental Information

Key Points of Contact

Licensee:

K. Neitmann, Plant General Manager
S. Sanders, General Supervisor, Radiation Safety
D. Holm, Operations Manager
T. Kirkham, Senior Plant Health Physicist
K. Skotnicki, Senior Assessor
E. Roach, Supervisor, Materials Processing
M. Yox, Engineering Analyst

Nuclear Regulatory Commission:

D. Beaulieu, Senior Resident Inspector, Calvert Cliffs

Documents Reviewed

Issue Report No. IR3-077-457
Issue Report No. IR0-0160-863
Issue Report No. IR3-065-680
Issue Report No. IR4-011-551
Licensee Memorandum, May 29, 2002, Subject: Apparent Violations of DOT Regulations on Shipment to Duratek, Inc.
Sealand Container Status Information Sheet
Causal Analysis Score Sheet: Issue Report IR3-077-457
Calvert Cliffs Training Roster: DOT Violation Regarding Dose Rates on a Shipping Container (RCAR), dated September 17, 2002
Causal Analysis PD200200005, DOT Violation Regarding Dose Rates on a Shipping Container
Review of NRC Inspection Procedure as It Applies to WHITE finding from DOT Dose Rate Limit Violation, May 2002
NRC Letter, dated August 19, 2002, Subject: Final Significance Determination for a White Finding and Notice of Violation at Calvert Cliffs Nuclear Power Plant
Licensee Letter, dated September 17, 2002, Subject: Reply to a Notice of Violation
Procedure QL-2-100, Rev. 15, Issue Reporting and Assessment
Procedure QL-2-101, Rev. 5, Causal Analysis

Acronyms Used

CFR	Code of Federal Regulations
HP	Health Physics
IR	Issue Report
QA	Quality Assurance
RCAR	Root Cause Analysis Report

INSPECTION PROCEDURES USED

IP 95001 Inspection for One or Two White Inputs in a Strategic Performance Area

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed
None

Discussed

50-317; 50-318/02-004-03	AV	Failure to prepare a shipment of radioactive material so as not to exceed the transportation radiation level limits of 49 CFR 173.441(a).