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Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
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April 20, 1998

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
Reply to Notice of Violation -- NRC Inspection Report Nos. 50-317/98-03 and
50-318/98-03

REFERENCE: (a) Letter from Mr. H. J. Miller (NRC) to Mr. C. H. Cruse (BGE), dated
March 20, 1998, NRC Inspection Report Nos. 50-317/98-03 and
50-318/98-03 and Notice of Violation

This letter provides Baltimore Gas and Electric Company's responses to Reference (a). The May 1997 airborne contamination event which is the subject of the violations in Reference (a) resulted from the same fundamental performance deficiencies and programmatic weaknesses in our radiological work controls that one month earlier had resulted in the April 3, 1997 Unit 2 spent fuel pool diving event.

Our organization is actively continuing efforts to establish and implement corrective actions to address the site performance weaknesses in radiological protection identified in the Spring of 1997. Increased management attention has been dedicated to making overall improvements in Calvert Cliffs' radiation protection program. Initiatives associated with the Radiation Protection Performance Improvement Plan are still in progress and have supported good planning for the current Unit 1 refueling outage.

As part of our radiation protection improvements, assessments of the site Radiation Protection Program were completed by the Nuclear Performance Assessment Department and by an independent consultant. The results of these assessments have been incorporated into our site improvement efforts as appropriate.

The Radiation Protection Oversight Committee chaired by the Plant General Manager establishes and communicates expectations for radiation protection at Calvert Cliffs. This committee replaced the As Low As Reasonably Achievable (ALARA) Committee and meets on a scheduled basis to review our ALARA program and also to review Radiation Protection program performance.

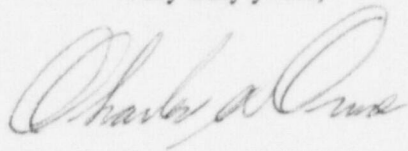
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I am dedicated to making the necessary improvements in Calvert Cliffs radiological safety performance to ensure that personnel safety and radiation safety receive the highest priority attention.

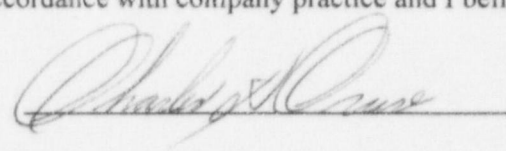
Should you have questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,



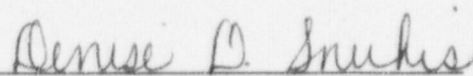
STATE OF MARYLAND :
: TO WIT:
COUNTY OF CALVERT :

I, Charles H. Cruse, being duly sworn, state that I am Vice President, Nuclear Energy Division, Baltimore Gas and Electric Company (BGE), and that I am duly authorized to execute and file this License Amendment Request on behalf of BGE. To the best of my knowledge and belief, the statements contained in this document are true and correct. To the extent that these statements are not based on my personal knowledge, they are based upon information provided by other BGE employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.



Subscribed and sworn before me, a Notary Public in and for the State of Maryland and County of Calvert, this 20th day of April, 1998.

WITNESS my Hand and Notarial Seal:


Notary Public

My Commission Expires:

2/1/2002
Date

CHC/RCG/bjd

Attachments

cc: R. S. Fleishman, Esquire
J. E. Silberg, Esquire
Director, Project Directorate I-1, NRC
A. W. Dromerick, NRC

H. J. Miller, NRC
Resident Inspector, NRC
R. I. McLean, DNR
J. H. Walter, PSC

ATTACHMENT (1)

NRC INSPECTION REPORT NOS. 50-317&318/98-03

VIOLATION NO. 98-03-01

**FAILURE TO PERFORM SURVEYS AS REQUIRED BY 10 CFR 20.1501
TO ENSURE COMPLIANCE WITH 10 CFR 20.1703(a)(3)**

During an NRC inspection conducted from January 19, 1998 - February 17, 1998, for which exit meetings were conducted on January 27, 1998, and February 20, 1998, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violations are listed below:

A. *10 CFR 20.1501(a) requires, in part, that each licensee make or cause to be made, surveys that may be necessary to comply with the regulations in this part, and are reasonable under the circumstances to evaluate the extent of radiation levels, concentrations or quantities of radioactive material, and the potential radiological hazards that may be present.*

10 CFR 20.1703(a)(3) requires, in part, that the licensee shall implement and maintain a respiratory protection program that includes air sampling sufficient to identify the potential hazard, permit proper equipment selection, and estimate exposures; and surveys and bioassays as appropriate to evaluate actual exposures.

Contrary to the above, on May 5, 1997, BG&E did not make necessary and reasonable surveys to comply with the requirements of 10 CFR 20.1703 (a)(3) and 20.1501(a) during cleaning of the Unit 2 reactor vessel flange. Specifically:

- *BG&E did not evaluate the high levels of beta, gamma, and alpha contamination present, with regard to respiratory equipment selection to establish sufficient protection of workers.*
- *BG&E's air sampling was not sufficient to identify the potential hazard, in that air sampling was not performed in the workers' breathing zone during decontamination of the reactor flange.*
- *BG&E did not perform timely surveys (i.e., evaluations) of the air samples collected during decontamination of the reactor vessel flange. The air sample from the reactor flange decontamination was not evaluated for alpha airborne radioactivity until about 8 hours after the work activity was completed. When analyzed, the sample indicated approximately 103 DAC alpha, while the respiratory protective equipment selected only offered a protection factor of 50.*
- *The refueling floor air sample (69 foot elevation), collected during the flange cleaning, was not evaluated for alpha airborne radioactivity until about 12 hours after the work activity was completed. When analyzed, the sample indicated approximately 10.6 DAC alpha, and personnel unknowingly worked in the airborne radioactivity area without the use of respiratory protective equipment. (01013)*

I. ADMISSION OR DENIAL OF THE ALLEGED VIOLATION

Baltimore Gas and Electric Company accepts the violation.

II. REASON FOR THE VIOLATION

With regard to the May 5, 1997 event described above, our staff failed to reevaluate certain radiological controls for work in the reactor cavity during cleaning of the reactor flange commensurate with the actual

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conditions indicated by the area survey due to less than adequate sensitivity to the change in anticipated radiological conditions, specifically, elevated alpha and beta/gamma contamination levels identified in the initial area survey that morning at 10:40 am. This survey identified removable alpha contamination of 150,000 dpm/100 cm² as compared to 1200 dpm/100 cm² expected. These identified elevated contamination levels were not reevaluated to determine the impact on prescribed negative pressure respiratory protection, because the staff was focused on elevated radiation levels in the work area due to a stuck incore instrument wire.

Supervisory oversight and evaluation of the area survey data did not recognize the significance of the elevated alpha activity. Historically, Calvert Cliffs had not previously experienced significant alpha activity. While concentrating on the elevated radiation levels and believing that workers would be adequately protected by prescribed respiratory protection, no additional pre-work reviews were conducted to re-evaluate the initially prescribed radiological controls.

A pre-job briefing was conducted at approximately 3:30 pm on May 5, 1997 with all required personnel attending. At the briefing, it was discussed that the elevated radiation levels (due to the stuck incore instrument wire) were much higher at waist level and above at the 44' Refueling Pool work area. The cleaners were directed to stay as low as possible throughout the work evolution. Cleaning personnel and their coverage Radiation Safety Technicians (RSTs) entered the refueling pool 44' level at approximately 6:10 pm on May 5, 1997, all wearing respirators. The task required the workers to move around the reactor vessel to clean the flange. In accordance with established procedure, the 44' Refueling Pool work area air sample was required to be representative of the workers breathing zone. Contrary to this requirement, this air sample was taken at a fixed location by lowering the sample head from the 69' Refueling Bridge to the flange area. The second air sample was drawn from the 69' elevation on the Refueling Bridge itself.

At the completion of the flange cleaning, the 44' work area air sample was field checked, determined to show elevated airborne radioactivity and sent to the Chemistry laboratory for gamma scan analysis. This 44' air sample (analyzed at about 7:19 pm on May 5, 1997) indicated about 7 derived air concentration (DAC) beta/gamma airborne contamination (as originally anticipated). This 44' air sample was returned to the Radiation Control counting room. The air sample was not counted immediately for alpha to determine alpha airborne radioactivity because: (1) radiation control personnel assumed that since the beta/gamma airborne contamination level was close to the original estimated value then the actual alpha airborne radioactivity would be close to the estimated 0.2 DAC alpha, and (2) since the air sample had such a high activity level it could adversely affect the counting room equipment and prevent other samples from being analyzed. The cleaning activity of the reactor vessel flange had produced significantly elevated alpha airborne radioactivity. When the 44' air sample was counted for alpha airborne radioactivity approximately 8 hours later (about 2:36 am on May 6, 1997) the air sample indicated about 103 DAC alpha.

The 69' Refueling Bridge air sample was collected concurrently with the 44' air sample. This 69' air sample was analyzed (at about 7:17 pm on May 5, 1997) and indicated about 0.8 DAC beta/gamma. However, this 69' air sample was not evaluated for alpha airborne radioactivity until about 12 hours later

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(approximately 6:00 am on May 6, 1997). When this 69' air sample was counted for alpha airborne radioactivity it indicated about 10.6 DAC alpha. Affected plant personnel on the 69' elevation had not been required to wear respiratory protection equipment. The 44' and the 69' elevation air samples had not been evaluated for alpha airborne radioactivity in a timely manner because our staff was less than adequately sensitive to the change in anticipated radiological conditions identified in the area survey conducted at 10:40 am on May 5, 1997.

III. CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND RESULTS ACHIEVED

- A. With regard to the May 5, 1997 event described above,
1. Upon identification of the elevated airborne radioactivity, a second ALARA evaluation was performed. We revised the ALARA review for this work activity [Special Work Permit (SWP) 97-2319] on May 6, 1997 to: (1) identify lessons learned from the previous day's event, (2) reflect the increased airborne radioactivity levels, and (3) provide specific administrative controls for air sampling and personnel exposure to alpha airborne radioactivity.
 2. The workers performing the cleaning task and support personnel in the work vicinity were whole body counted immediately following the event. Ten of the eleven whole body counts were clean. The other individual had a slight intake, confirmed with fecal analysis, that resulted in less than one percent of the limits.
 3. Our Senior Plant Health Physicist had fecal samples collected following the event. The maximum identified personnel exposure, attributable to intake of airborne radioactivity associated with the reactor cavity work was less than 1 percent of the limits established in 10 CFR Part 20.
 4. Two air samples and one smear sample of the area were sent to an offsite laboratory for isotopic analysis. The results of the laboratory analysis indicated that the majority of the alpha radioactivity was attributable to Curium 242. We recalculated the maximum airborne radioactivity concentration to be 24 DAC alpha on the 44' elevation and 2 DAC alpha on the 69' elevation. We were not aware of this lower actual DAC value at the time of the event.
 5. The ALARA review for SWP No. 97-2319 was supplemented on May 7, 1997 to provide for decontamination of the deep ends of the refueling pools.
 6. The "ALARA In-Processing/Post Report" was prepared for SWP No. 97-2319 on September 10, 1997. This report included suggestions to improve job performance and specific job observations.
 7. We initiated a Transuranic Activity Assessment and Programmatic Improvement Plan. The objective of this plan is to conduct an assessment of the higher than expected contamination

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VIOLATION NO. 98-03-01

**FAILURE TO PERFORM SURVEYS AS REQUIRED BY 10 CFR 20.1501
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levels found during the May 5, 1997 refueling pool cleaning work event (discussed above) and based upon the results of the evaluation and assessment to provide recommendations for programmatic improvements.

8. On April 1, 1998, a 1998 Unit 1 outage safety break was conducted at Calvert Cliffs. Included in this safety break for site personnel as part of the "Keys to a Safe and Successful Outage" were the following three behaviors that site personnel must follow: (1) strictly adhere to the SWPs as written for your work activity, (2) be sensitive to any real or potential change in radiological conditions, and (3) adhere to controls and barriers that protect us from unplanned entry into a high radiation area.
9. A major rewrite of Radiation Safety Procedure 1-115, "Radiological Air Sampling Program" was implemented on March 27, 1998. This rewrite revised the procedure to change the process for air sample collection/analysis and the use of an effective DAC generated from the analysis of air sample composites, to account for hard to detect radionuclides, which includes transuranics. In addition, this procedure now defines a lapel sample as a sample with the collection head attached within one foot of the worker's mouth/nose, and provides instruction for the use, field checking, and analysis of a lapel air sample. Plant procedure now requires a lapel air sample for all work requiring respiratory protection.
10. Radiation Safety Procedure 1-200, "ALARA Administrative Procedure," was revised and implemented on April 1, 1998. This revision added, in part, additional requirements for performance of ALARA reviews and ALARA In-Process/Post Reports, to include "tools" to predict levels of airborne radioactivity based on amount of contamination, nature of work, and environmental conditions.

IV. CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

- A. Complete implementation and assessment of the required actions identified in the Transuranic Activity Assessment and Programmatic Improvement Plan.
- B. Continue implementation and enhancement of our site Radiation Protection Improvement Plan.
- C. Implement the improvements to the radiological air sampling and ALARA planning procedures.
- D. Refresher training on this event will be provided, as appropriate, to Radiation Safety personnel.
- E. We will perform an effectiveness review of our corrective actions.

V. DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance was achieved on May 6, 1997 when the refueling pool area was surveyed and appropriately posted.

ATTACHMENT (2)

NRC INSPECTION REPORT NOS. 50-317&318/98-03

VIOLATION NO. 98-03-02

**FAILURE TO POST AN AIRBORNE RADIOACTIVITY AREA
AS REQUIRED BY 10 CFR 20.1902(d)**

During an NRC inspection conducted from January 19, 1998 - February 17, 1998, for which exit meetings were conducted on January 27, 1998, and February 20, 1998, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violations are listed below:

- B. 10 CFR 20.1902(d) requires that the licensee post airborne radioactivity areas as defined in 10 CFR 20.1003. 10 CFR 20.1003 defines an airborne radioactivity area, in part, as an area in which airborne radioactivity exists in concentrations in excess of the derived airborne concentrations (DACs) specified in 10 CFR 20, Appendix B.

Contrary to the above, on May 5, 1997, BG&E did not post the 44' elevation of the Unit 2 reactor cavity as an airborne radioactivity area when it was determined that airborne concentrations of Co-60 were about 5 times its DAC specified in Appendix B. (01023)

I. ADMISSION OR DENIAL OF THE ALLEGED VIOLATION

Baltimore Gas and Electric Company accepts the violation.

II. REASON FOR THE VIOLATION

At the completion of the reactor vessel flange cleaning, the air sample from the 44' Refueling Pool was field checked and found to show higher activity than expected. At this point, an adjustment to area postings should have been made. The air sample was sent to the Plant Chemistry counting room for gamma scan analysis. The air sample analysis, completed about 7:19 pm on May 5, 1997, indicated about seven derived air concentration beta/gamma as originally anticipated. The results were made known to site Radiation Control personnel. The procedure in place at the time allowed the technician posting discretion for a transient condition. We believe that the refueling pool area was posted as an Airborne Radioactivity Area on May 5, 1997; however, we could not locate any documented evidence.

III. CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND RESULTS ACHIEVED

- A. Radiation Safety Procedure 1-104, "Area Posting and Barricading," Section 6.9, "Airborne Radioactivity Areas," has been recently revised and requires that when specified listed conditions exist or have the potential to exist in an area then the area boundary is posted with a caution sign and the words "Airborne Radioactivity Area."
- B. Radiation Safety Procedure 1-114, "Radiological Survey Techniques, Evaluation, and Recording," was revised to add Section 6.4, "General Survey Practices," for documenting radiological postings.
- C. Radiation Safety Procedure 1-115, "Radiological Air Sampling Program," was recently revised, in part, to add requirements for posting based upon air sample evaluations.
- D. Appropriate Radiation Safety personnel have been trained on the revised procedures discussed in A, B, and C above.

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AS REQUIRED BY 10 CFR 20.1902(d)**

IV. CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

No additional corrective actions are necessary beyond those already taken.

We will perform an effectiveness review of our corrective actions.

V. DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance was achieved on May 6, 1997 when the refueling pool area was posted as an "Airborne Radioactivity Area." This information was documented on the job coverage record.