CABOT

Performance
Materials

Mr. John D. Kinneman, Chief
U.S. Nuclear Regulatory Commission, Region I
475 Allendale Road
King of Prussia, PA 19406-1415
December 20, 2001

Docket No. 04006940 License No. SMB-920

RE: Reply to Notice of Violation, Inspection 04006940/2001001

Dear Mr. Kinneman:

In compliance with 10 CFR 2.201, Cabot Performance Materials, Inc. (CPM) hereby submits its written response to the Notice of Violation dated October 23, 2001 for license No. SMB-920. It is CPM's primary objective to maintain our operations in compliance with regulatory requirements and our license conditions, and to ensure a safe environment for our employees and the community. Our responses to the three violations noted in your report have been carefully considered with that objective in mind.

We are proceeding with the corrective actions described in the attached response in order to quickly resolve this Notice of Violation. I am available to discuss any part of our response and the on-going actions to resolve the issues identified in your report and answer any questions you may have. Thank you for your thorough inspection of our operations, and the resulting improvements in our radiation safety programs.

Sincerely,
Cabot Performance Materials

Martin O'Neill, Director
Safety, Health, and Environmental Affairs

cc:
US. NRC, Attn: Document Control Desk, Washington, DC 20555
Timothy Knapp, Cabot Performance Materials, Inc.

Cabot Performance Materials
Boyertown, PA
Response to NRC Notice of Violation
December 20, 2001

The following information is provided in response to the Notice of Violation, Inspection 04006940/2001001 dated October 23, 2001.

A. **Inspection Finding**: "*...the licensee performs annual whole body counts of individuals exposed to airborne radioactive materials. However, because of the minimum detectable activity of these counts and the behavior of Th-232 when it is deposited in the body, these counts are not adequate to detect a hypothetical intake of Th-232 if the intake occurred greater than several days before the whole body count.*"

Response: The finding may be technically correct; however, CPM questions its applicability and appropriateness to our operations. The finding addresses a hypothetical acute intake that would not be detected by an annual whole body count. An acute exposure from a single intake typically is not addressed by an annual bioassay.

Although urinalysis on monthly or quarterly intervals is often employed to mitigate that concern, CPM discontinued urinalysis based on the results of a study conducted by an independent consultant at our plant in response to a Confirmatory Action Letter (CAL) from the NRC dated February 9, 1995. One of the conclusions of that study indicated "...no one probably exceeded the 10% threshold for exposure tracking and reporting." The NRC concurred with the results of that report and accepted it as part of the corrective actions that allowed closure of the CAL.

Our programs have addressed hypothetical exposures that we considered to be valid and potential risks based on our daily activities and conditions at the plant. An acute exposure from a single intake was not considered to present a significant risk to our workers; therefore, our programs addressed potential chronic exposures, such as those that might result from inadequate respiratory protection. The following conditions at the plant supported our focus on chronic exposures:

1. We receive low-level radioactive materials and do not concentrate them as a uranium mill does.
2. The isotope of concern, Th-232, is present in low concentrations.
3. Workers perform routine activities under consistent conditions while wearing designated protective equipment, and the radiological conditions in work areas of concern are continuously monitored to ensure that unexpected changes in work area conditions are quickly determined.
4. CPM implements the ALARA principle by conservatively employing respiratory protection in work areas where airborne radioactive particulates have the potential to be present.

Air monitoring is used to detect a potential exposure to our workers, and annual whole body counting is used as verification that the most likely exposure scenario, chronic low-level exposures resulting from a hypothetical breakdown in our protection protocols, had not developed. However, we should have a written technical basis for our current bioassay program. Cabot proposes to conduct the necessary analysis and document the results, as described in our response to Finding B, below. The results of the analysis will be used to respond to this Finding, to obtain the concurrence of the NRC with our approach, and to provide clear justification for our programs that will be available for future NRC inspections.

B. Inspection finding: "*...the licensee did not make adequate surveys to assure compliance with 10 CFR 20.1201(a)(1)(ii), which limits the annual occupational dose to individual adults to the sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye to 50 rems (0.5 Sv). Specifically, the licensee failed to adequately assess airborne concentrations of natural uranium and thorium to which workers were exposed in Building 73. Lapel air samplers were not used to estimate the airborne radioactive material concentration in the breathing zones of workers that performed duties in Building 73. The licensee used airborne concentration levels measured at a single general area air sampler located on the first floor of Building 73 to calculate the concentrations of airborne radioactivity that workers were exposed to throughout the building.*"

Response: CPM confirmed at the time of the inspection it had not performed lapel air sampling for workers in Building 73 during recent years. However, the current practice of using general area air samplers to determine if airborne radionuclide concentrations in Building 73 approach regulatory limits was established after CPM hired an independent consultant to review monitoring programs in response to a CAL from the NRC dated February 9, 1995. The evaluation of our Occupational Air Sampling and Bioassay programs concluded "not only was no one at Cabot exposed in 1994, but also no one probably exceeded the 10% threshold for exposure tracking and reporting. Also, Cabot performed bioassay measurements using whole body counting to assess any internal deposition. The results of the counting indicated no deposition above the minimum detectable activity of 1.0 nCi for the system."

We thought that any technical concerns regarding our programs were adequately covered by the previous evaluation and in recent years we have based some minor adjustments to our programs on its conclusions. However, thanks to Mr. Reber's observations and concerns, we now realize that the previously developed report did not clearly address some aspects of our monitoring and bioassay programs and can not serve as the technical foundation for our programs.

We propose to submit to the NRC a technical report evaluating the conditions in our plant, including direct comparison of lapel sample results that coincide in time and location with general area air sample results. In addition, we will provide a technical evaluation to determine if bioassay sampling is required to meet regulatory requirements, or if trigger values can be established for our air sampling programs, below which no bioassay would be required. The necessary studies will be completed and the technical report provided to the NRC for concurrence no later than April 30, 2002. The final document will include changes agreed upon with the NRC and will serve as the basis for our ongoing monitoring programs.

C. **Inspection Finding**: "*...from at least 1999 to August 15, 2001, the licensee did not use a self-absorption factor, F of 0.85 when analyzing air samples. ...so these samples underestimated the amount of airborne activity by 15%. Also, the licensee misapplied this factor to air samples from their background air sampler at Walker Road (i.e., upwind from the facility) and to air samples drawn at the Boiler House and County Line Road, which are located at the site boundary. In these cases, the licensee used a factor of 1.15 and airborne radioactivity concentrations were underestimated by 26%.*"

Response: Two problems are identified; a self-absorption factor was not applied when analyzing occupational air samples, and that factor was inappropriately applied when analyzing environmental air samples. Both problems resulted from incomplete implementation of technical information obtained by the Radiation Safety Officer (RSO) from an outside resource employed to ensure that programs were objectively reviewed.

The RSO developed two spreadsheets; one for occupational air samples and another for environmental samples, to ensure that consistent and efficient calculations were performed on raw sample data. During the creation of these spreadsheets the self-absorption factor was incorrectly applied in the efficiency algorithm.

The problem was corrected in the following manner immediately after Mr. Reber identified it.

- The spreadsheets that are used to convert raw counting data into units that compare to regulatory limits were modified to correctly apply the 0.85 self-absorption factor.
- The data from 1999 to the most recent were recalculated and corrected on existing data sheets.

The specific problem has been corrected so that future calculations using the spreadsheets will be accurate. The revised results did not indicate any excursions above administrative or regulatory limits, and there is no need for further actions with workers. Incorrect versions of the spreadsheets have been deleted or destroyed. Final versions of tools such as these spreadsheets will undergo independent technical review prior to implementation in order to prevent similar mistakes in the future.