September 19, 2012

Christian Einberg
U.S. Nuclear Regulatory Commission
Mail Stop T8E24
11545 Rockville Pike
Rockville, Maryland 20852

Deepika Jalota, PharmD
Bayer HealthCare Pharmaceuticals Inc.
Global Regulatory Affairs, Specialty Medicine
Montville, Building 100 / Office 268
340 Changebridge Road
Pine Brook, New Jersey 07058

Dear Dr. Jalota,

As previously discussed, NRC staff is requesting additional information with regard to radium-223 dichloride. Specifically, staff is requesting Bayer responses to the items listed below. Responses should be written in a publicly available format that does not include sensitive or proprietary information.

1. Please provide data to support the use of ion chamber dose calibrators for activity measurements of radium-223 dichloride. In addition, please provide the standard dose calibrator procedure that will be supplied to clients that includes guidance on:
    a. Determination of the energy setting that will be used for dose calibrator measurements.
    b. Geometrical testing for glass vials and plastic syringes used for radium-223 dichloride.
    c. Description of NIST traceable radium-223 calibration standard provided to clients for measurement (e.g., liquid radium-223 glass vial).

2. Please provide data on the efficiency and sensitivity of instruments commonly used in U.S. nuclear medicine departments for area surveys, wipe testing, and measurement of waste held for decay-in-storage prior to disposal to the normal trash. For instance, Geiger-Mueller (GM) detectors with a pancake probe such as a Ludlum 44-9 or equivalent are traditionally used for area surveys and sodium-iodide well counters are traditionally used for analysis of contamination wipes. In addition, please take into consideration that typical survey instruments in a medical setting are calibrated using cesium-137.

3. Please provide data to support that there are no long lived contaminants in radium-223 dichloride.

4. Please provide data to support that radium-223 dichloride is not volatile or easily respirable due to the low inhalation Annual Limit on Intake (ALI) stated in Title 10 Code of Federal Regulations (CFR) Part 20.

5. Please provide data to support that patients administered radium-223 dichloride are releasable in accordance with 10 CFR 35.75.

6. Please provide information on the expected activity radium-223 dichloride that is:
    a. Shipped from the manufacturer in Norway. (What is the activity on day 1?)
    b. Distributed to U.S. customers. (What is the activity upon arrival at the end user facility?)

7. Please describe the procedure for adjusting the standard dosage provided by the manufacturer to obtain the dosage to be administered to the patient, which includes:
    a. A description of when and where the dosage will be transferred from the vial to the syringe.
    b. A description of the typical personnel safety measures suggested when preparing dosages.
    c. A step-by-step procedure for administering dosage to a patient.

8. Please describe the additional training necessary for an Authorized User and individuals working under the supervision of an Authorized User to safely handle and administer radium-223 dichloride.

9. Please describe how medical use licensees determine doses (sievert), not dosages (becquerels), to the target and to other organs/tissues.

If you have any questions or need clarification, please contact Ashley Cockerham of my staff at (240) 888-7129 or Ashley.Cockerham@nrc.gov.

Sincerely,

Christian E. Einberg, Chief
Radioactive Materials Safety Branch
Division of Materials Safety
and State Agreements
Office of Federal and State Materials
and Environmental Management Programs

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Sincerely,

/RA/

Christian E. Einberg, Chief
Radioactive Materials Safety Branch
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and State Agreements
Office of Federal and State Materials
and Environmental Management Programs

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