Request for Additional Information

Cardinal Health – Ra-223 Radium Dichloride Xofigo® Manufacturing Facility
Indianapolis, IN (CN 588680)

This RAI follows a site visit conducted on December 11, 2015.

NOTE: All references to the "application" in the items below refer to Cardinal's license application dated August 28, 2015.

Participants:

NRC: ***Patty Pelke, Chief, Materials Licensing Branch, Region III***
Bryan Parker, Health Physicist, Lead Reviewer, Region III
Sara Forster, Health Physicist, Reviewer, Region III

Applicant: ***Scott Claunch, Corporate RSO***
Glenn Sullivan, Manager, HP
Cami Still, Site RSO (proposed)
Henry Padgett, Director, Chemistry

Other Cardinal personnel provided information during tour of the facility.

Also, 2 representatives from Bayer and 1 from Algeta were present: Chris Vasco (Bayer), Shaemus Gleason (Bayer), and Haavar Gausemel (Algeta).

DISCUSSION ITEMS

RADIOACTIVE MATERIALS USE DESCRIPTION:

1. Please provide a narrative overview of requested use of radioactive materials. The written description should be sufficiently detailed for NRC staff to discern the receipt of radioactive material (including initial possession at U.S. airports), transportation to the Cardinal facilities, radioactive material handling in Hot Cells, Quality Assurance & Quality Control, labeling and packaging, shipping and distribution, and waste program, etc.

2. Please provide updates to Items listed on page 5-1 of the application as needed: (a) please confirm/clarify maximum possession limits for Items A and B; (b) please confirm that in lieu of current wording in Items C and D, an authorization for sources in 35.65 (all) will suffice; and (c) please provide make and model numbers for the Am-241 source listed in Item E.

PERSONNEL:

3. Please provide a Memorandum of Understanding/Delegation of Authority (MOU/DOA) document for the proposed Radiation Safety Officer (RSO) Cami Still, as noted on page

7-1 of the application. The document must be signed by both Ms. Still and a senior management official.

4. Please clarify that Ms. Still is to be added as an Authorized User (AU) to the AUs listed in the application. Please clarify what licenses she is currently and previously listed on and include a clarifying statement regarding her name (i.e., the RSO listed in the Kentucky license attached to the application indicates "Cami O'Connor").

5. Please clarify the training and experience of Glenn Sullivan as an AU. The application requests his addition as AU, but the Illinois license submitted only lists him as RSO.

6. To add additional AUs to those listed in the application, please provide those individuals' names, proposed authorized uses of radioactive materials, and training and experience for each requested AU.

7. To add Henry Padgett, Ph.D., as an AU, please provide a copy of the Agreement State radioactive materials license CA 6738-19, which was referenced on page 7-2 of the application. Also, a signature is needed on the "Statement of Training and Experience" provided in the application for Dr. Padgett.

TRAINING:

8. Please expand the description of your radiation safety training program as described on pages 7-2 and 7-3 of the application and in Attachment B to your November 20, 2015 letter. The expanded response should include a breakdown by functional area (e.g. Hot Cell 5, Hot Cells 1-4, IPL, waste, quality control, etc.) for all individuals included in the program. For each group, include the minimum training content to be completed, training frequency, instruction format, instructor qualifications, evaluation criteria, length and quantity of training, and how training records will be maintained.

FACILITIES AND EQUIPMENT:

9. Please update the facility descriptions in Item 9 of the application (pages 9-2 to 9-3). Please provide further description of the CAP88 program as well as the data and input values used to arrive at the calculated results. Please clarify "nearest physical receptor" versus "maximum exposed individual (MEI)." Also, "MEI" needs to be defined in your list of acronyms.

RADIATION SAFETY PROGRAM:

10. Please resubmit a comprehensive respirator program. The submitted program should include both routine and emergency use applications, and provide sufficient detail for NRC staff to determine the adequacy of the program. For detailed elements to be included in the program, please refer to NRC's Regulatory Guide (RG) 8.15, "Acceptable Programs for Respiratory Protection." As noted in the guidance, the submitted program should – at a minimum – outline your ALARA evaluations, procedures & programs (such as routine and emergency use applications), respiratory equipment, respirator user

qualifications (including but not limited to medical evaluation, training, fit-testing, etc.), and safety measures. RG 8.15 may be found at the link: http://pbadupws.nrc.gov/docs/ML0037/ML003739528.pdf.

11. Please provide anticipated dose rates to individuals in areas including, but not limited to, Hot Cells 1 through 5 and radioactive waste holding areas. Please provide an analysis supporting anticipated dose rates. Such analysis may be provided via either calculations or data from analogous operations at other radioactive materials use facilities. The analysis should be sufficient to demonstrate the adequacy of shielding materials and other safety systems.

12. Please describe survey procedures to evaluate both internal and external radiation surveys. The submitted survey program should be sufficient to discern bioassay program requirements, areas where contamination surveys will be performed (including diagrams and/or room numbers), the frequency at which bioassays and contamination surveys will be performed, action levels for any required surveys, and the minimum number of years records of such surveys will be retained. For additional guidance, please refer to the following volumes regarding surveys, which can be found at the following link:

    http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1556

    a) NUREG 1556, Vol. 12, "Program-Specific Guidance About Possession Licenses for Manufacturing and Distribution," Appendix P;
    b) NUREG 1556, Vol. 11, "Program-Specific Guidance About Licenses of Broad Scope," Appendix S; and
    c) NUREG 1556, Vol. 7, "Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope," Appendix Q.

13. Please describe your preventive maintenance programs including the frequency of certain checks (e.g. airlock interlocks), scope of review, action levels, and corrective actions.

14. Please describe your audit programs including routine and non-routine audits to be completed by the RSO, Cardinal Health management, Bayer HealthCare, and external entities. Include the scope and frequency of audits and how findings are reported and addressed. Please refer to NUREG 1556, Vol. 12, "Program-Specific Guidance About Possession Licenses for Manufacturing and Distribution," Section 8.10.1, at:

    http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1556

15. Please clarify your security procedures including but not limited to storage of quality control samples and waste products and to site access controls.

16. Please define any abbreviations (e.g. "Maximum Exposed Individual" for "MEI") not previously provided in either the application or your November 20, 2015 letter.

17. Please provide an analysis verifying that the decay plenum will perform as designed by delaying the release of radioactive gaseous effluents (i.e., radon-219) for a minimum of 80 seconds as noted in your application in Item 9, page 9-19.

RADIOACTIVE WASTE PROGRAM:

18. Please update the description of the proposed waste effluent stream including the diagram found on Page 11-2 of the application.

EMERGENCY PLAN:

19. Please note that the review of the Emergency Plan (EP) submitted as Attachment A to the November 20, 2015 letter is ongoing, and a written request for additional information will be provided at a later time. However, in preparation for that supplemental request for additional information, please: (a) prepare legible facility diagrams with sufficient size and detail that such diagrams may be used during an actual event; (b) review RG 3.67, "Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities," and (c) prepare to discuss RG 3.67 EP elements (e.g. facility description, accident types, accident classifications & notifications, responsible entities & responsibilities, emergency response measures, emergency response equipment & facilities, maintaining emergency preparedness capability, records & reports, and recovery & restoration). RG 3.67 may be found at the weblink: http://pbadupws.nrc.gov/docs/ML1033/ML103360487.pdf.

Parker, Bryan

From: Parker, Bryan
Sent: Tuesday, December 15, 2015 4:00 PM
To: 'Sullivan, Glenn'
Cc: 'Claunch, Scott'; Pelke, Patricia; Forster, Sara
Subject: Cardinal RAI from 12/11 site visit
Attachments: Cardinal Health Ra-223 manuf license RAI from 12.11.15 site visit.docx

Hey Glenn,

Attached is the RAI as discussed at the site visit last Friday 12/11. Thanks again for hosting us and for the very informative tours and discussion. As discussed, these items comprise many of the areas we have reviewed so far and more may follow as the review continues.

Please let me know if you have any questions on these. We look forward to hearing from you so that we may continue our review.

Happy Holidays!!
Bryan

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