UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, IL 60532-4352

March 8, 2018

Glenn Sullivan
Corporate Radiation Safety Officer and Director
Cardinal Health
Pharmacy Safety and Practice Nuclear Pharmacy Services
Nuclear Pharmacy Services, Quality & Regulatory
7000 Cardinal Pl.
Dublin, OH 43017

Dear Mr. Sullivan:

This concerns your December 8, 2017 letter (ML17345A532) requesting to add an authorization for the possession and use of IRE Galli-Eo® germanium-68/gallium-68 (Ge-68/Ga-68) generators for use under your NRC License No. 34-29200-01MD, at your East Lansing, Michigan area of use. As noted in our voicemail to you on March 8, 2018, additional information – including a valid generator return agreement between Cardinal Health and an entity authorized via U.S. NRC or Agreement State license to receive those generators and financial assurance – is necessary to complete our review. As discussed, we cannot add an authorization for possession and use of germanium-68 at the East Lansing location of use, absent additional information and clarification, at a minimum addressing the items noted below.

To resubmit your request, please send a signed and dated cover letter, addressed to our office, attention "Materials Licensing Branch," attaching documentation including:

(1) Radionuclide, form, possession limit, and use information for each requested radionuclide, including total number of generators and confirmation that the requested use authorization is specific to the IRE Galli-Eo® generator, and that use is limited to the preparation of gallium-68 radiopharmaceuticals for imaging and localization studies. When resubmitting, if no IRE Galli-Eo® Germanium-68/Gallium-68 generator guidance is available, please follow the portions of the U.S. Nuclear Regulatory Commission (NRC) licensing guidance document, "Eckert and Ziegler GalliaPharm™ Germanium-68/ Gallium-68 Pharmacy Grade Generator," dated October 17, 2016 (ML16287A403), as applicable to commercial nuclear pharmacy use, and as applicable to the IRE Galli-Eo® generators. Please highlight responses to the items below with your response:

- When applying the referenced guidance with respect to your December 8, 2017 letter, a 200 millicurie possession limit for gallium-68 and a 50 millicurie possession limit for germanium-68/gallium-68 generators. It is unclear why the possession limit would be different for the two radionuclides. In addition, it is unclear whether you wish to revise the possession limits in Items 6.P. and 6.Q. to the license, if you are adding additional line items. Please explain.

- In your letter, you indicated that "the [gallium-68] trichloride is not intended for direct patient administration." However, it is unclear whether the use of the requested generators and radiopharmaceuticals produced would be limited to non-human use. Please confirm that the requested authorization to use of the IRE Galli-Eo® and additional gallium-68 will be limited to non-human use. If the request is for human use, please clarify that use and provide supporting information with your response.

- If the chemical/physical form of the germanium-68 and gallium-68 to be authorized under the license is "any" please so state.

- Please specify the maximum quantity of germanium-68 per IRE Galli-Eo® generator, per Eckert & Ziegler Galliapharm™ generator, and the maximum numbers of each type of generator to be authorized under the license.

- Please confirm that the requested authorized use of the germanium-68 is limited to use of the IRE Galli-Eo® generator to prepare gallium-68 radiopharmaceuticals for non-human research and development use for imaging and localization studies. If for other than non-human use, additional information may be required to complete the review. If for distribution of unused generators to authorized recipients, in accordance with Title 10 of the *Code of Federal Regulations* (CFR 32.72), additional information is needed to complete the review. Please refer to NUREG 1556, Vol. 12, Appendix U and NUREG 1556, Vol. 13, rev. 1, Appendix C for a summary of information that may be needed. If for receipt of returned generators, please describe how generator possession will be limited to 50 millicuries germanium-68, and provide sample return program procedures and instructions to customers on how such generator returns will be handled.

- Please also confirm that the requested authorized use of the gallium-68 is limited to use in preparation and distribution of radioactive drugs in accordance with 10 CFR 32.72 and radiochemicals for non-medical use to authorized recipients. If for additional uses, please describe.

(2) A confirmation that all use of IRE Galli-Eo® Germanium-68/Gallium-68 generators (and associated gallium-68 radiopharmaceuticals) will be by or under the supervision of an Authorized Nuclear Physicist (ANP), as specified in 10 CFR 35.27, or otherwise provide training and experience criteria for the non-human Research & Development use only, if applicable, of the generators.

(3) A facility diagram, drawn to scale, that describes where generator(s) will be received, used, and stored, and indicates a brief description (i.e. cafeteria, offices, restrooms, inaccessible roof, etc.) of uses above, below, and adjacent to the germanium-68/gallium-68 use area. For separate generator distribution and return, waste, dispensing, and work areas, please include diagrams showing each type of area.

(4) Commitments and statements in accordance with the above-referenced NRC licensing guidance document, including confirmation that the licensee will develop and implement written procedures for the determination of breakthrough that will detect whether the eluate exceeds the manufacturer's specific percent breakthrough limit, i.e., the presence of Ge-68 in excess of a ratio of 0.01 μCi Ge-68 per mCi Ga-68, if this reflects the manufacturer's instructions.

- Regarding application of the breakthrough limit to patient administrations, this should include confirmation that the licensee will not knowingly administer to any patient or human research subject, if applicable, any material that is determined to exceed the specific limit.

- Regarding written emergency procedures, confirmation that the manufacturer's instructions will be followed to develop and implement those emergency procedures. In the alternative, an explanation as to why those instructions cannot be used.

(5) Confirmation that the licensee is not requesting authority to update Radiation Protection Programs, as they relate to the IRE Galli-Eo® Germanium-68/Gallium-68 generators, absent a license amendment incorporating such changes. Alternatively, request for such flexibility and commitments to adhere to conditions outlined in the referenced guidance document.

(6) If not submitting a Decommissioning Funding Plan (DFP) or revised DFP in support of the application, please provide supporting information as noted below:

(a) Confirmation that the licensee will not be the sole United States distributor for the generators, or other basis for applying the exemption outlined in the U.S. NRC July 29, 2016 (ML16082A415), NRC's Office of Nuclear Material Safety and Safeguards (NMSS) from DFP requirements specified in 10 CFR 30.35(a)(1).

(b) Reaffirmation that the licensee is requesting an exemption from the 10 CFR 30.35(a)(1) requirement that an applicant for a license to use and possess germanium-68/gallium-68 generators must submit a Decommissioning Funding Plan (DFP) together with financial assurance determined from the DFP; and

(c) Copy of a legally binding agreement between the licensee and the manufacturer that the licensee will return – and the manufacturer will accept – generators if they are expired, are no longer used to prepare Ga-68 radiopharmaceuticals for patients, or if the licensee ceases its preparation of Ga-68 radiopharmaceuticals; and

NOTE: Any such agreement must be signed, with legible names, titles, and signature dates. To be considered legally binding, the signing manufacturer or distributor must have a U.S. NRC or Agreement State license authorizing receipt and possession of such generators.

(d) Under separate cover letter, original Financial Assurance (FA) certification based on possession limit, as required by 10 CFR 30.35 –

(i) For up to two generators and up to 100 millicuries total (no distribution or receipt of returned generators), FA in the amount of $225,000; or

(ii) For three to twenty generators and up to 1 curie total (no distribution or receipt of returned generators), FA in the amount of $1,125,000.

(iii) For other situations, FA in amount stipulated by a DFP, including copy of DFP and an updated Standby Trust Agreement, Surety Bond, or other instrument, etc.

NOTE: For additional guidance, please refer to Appendix A, "Standard Format and Content of Financial Assurance Mechanisms for Decommissioning" of NUREG-1757, Volume 3, revision 1, "Financial Assurance, Recordkeeping, and Timeliness."

You may resubmit your request via regular mail or via facsimile to (630) 515-1078. If you have any questions concerning this letter, please do not hesitate to call me at the U.S. Nuclear Regulatory Commission, Region III office at (630) 829-9892.

In accordance with 10 CFR 2.390, a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's ADAMS, which is accessible from the NRC website at http://www.nrc.gov/reading-rm/adams.html.

Sincerely,

Sara A. Forster

Sara A. Forster, M.S.
Health Physicist
Materials Licensing Branch

License No. 34-29200-01MD
Docket No. 030-36973