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March 10, 2017

Cindy Bladey
Office of Administration
Mail Stop OWFN-12-H08
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Docket ID NRC-2016-0276

Dear Ms. Bladey:

Thank you for the opportunity to provide a response to the Nuclear Regulatory Commission (NRC) Federal Register Notice (FRN) requesting stakeholder comment in the Federal rulemaking Docket ID NRC-2016-0276, "Category 3 Source Security and Accountability". The security of radioactive material is critical to national security and the safety of the public.

This response to the FRN will be presented in an order that does not follow the order of the questions posed by the NRC. It seemed more appropriate to start with the "big picture" questions before addressing the others.

License Requirement for Category 3 Radioactive Sealed Sources:

The fundamental question posed by the NRC in this FRN is the last one. Question 2 in the "Other Questions" section reads:

2. Some Category 3 sources are covered under a general license (10 CFR 31.5). Should the NRC consider establishing maximum quantities in general licensed devices, thereby reserving authorization to possess Category 1, 2, and 3 quantities of radioactive material to specific licensees?

My response to this question is yes, the NRC should require the specific licensing of Category 1, 2 and 3 quantities of radioactive material. The main reasons for requiring licensing for Category 1, 2 and 3 quantities include:

- The International Atomic Energy Agency (IAEA) has determined Category 3 sources and quantities to be dangerous
- General licensees have no training in radiation safety
- Dangerous discrete sources and quantities should be possessed by persons properly trained.

The IAEA has established, for certain radioisotopes, a normalizing factor to define the associated risk. For each isotope they have determined a “D” factor which is the activity corresponding to a dangerous source. The IAEA defines a dangerous source as:

“A dangerous source is defined as a source that could, if not under control, give rise to exposure sufficient to cause severe deterministic effects. A deterministic effect is defined as a health effect of radiation for which generally a threshold level of dose exists above which the severity of the effect is greater for a higher dose. Such an effect is described as a severe deterministic effect if it is fatal or life threatening or results in a permanent injury that reduces the quality of life.”¹

The threshold for Category 3 sources is at the D value. Category 2 source threshold is 10 times the D value while Category 1 source threshold is 1,000 times the D value. Category 3 radioactive sealed sources are considered dangerous by the IAEA.

There is no real competency standard or verification required for a general license. With regard to generally licensed devices, the NRC states on their website:

“The device is designed with inherent radiation safety features so that it can be used by persons with no radiation training or experience. Consequently, the general license simplifies the licensing process so that a case-by-case determination of the adequacy of the radiation training or experience of each user is not necessary.”²

Some generally licensed devices contain Category 3 radioactive sealed sources. Persons who possess these devices do not need radiation safety training or experience. There is no demonstration of competency to a regulatory authority. There are no follow-on compliance inspections. There are minimal requirements for general licensees which are contained in 10 CFR 31.5.

Regardless of the inherent safety of the device, it still contains a Category 3 radioactive sealed source. Dangerous sources and quantities should require management by persons who are properly trained. In determining the D values, the IAEA used the following dose criteria:

¹ IAEA “Categorization of Radioactive Sources”, Safety Guide No. RS-G-1.9, 2005, pg. 43.

² <https://www.nrc.gov/materials/miau/general-use.html>

Table I.1. Reference doses for D-values³

Tissue	Dose criteria
Bone marrow	1 Gy in 2 days
Lung	6 Gy in 2 days from low LET radiation 25 Gy in 1 year from high LET radiation
Thyroid	5 Gy in 2 days
Skin/tissue (contact)	25 Gy at depth of 2 cm for most parts of the body (e.g., from a source in a pocket) or 1 cm for the hand for a period of 10 hours
Bone marrow	1 Gy in 100 hours for a source that is too big to be carried

The potential doses used to determine the threshold for a dangerous source can result in a significant health impact. As the NRC staff mentioned in SECY-08-0137, these Category 3 sealed sources can be aggregated to a higher IAEA Category quantity. This increases the potential hazard.

The potential hazards associated with Category 3 radioactive sealed sources or quantities are significant. A person wanting to possess these items should have to demonstrate a basic knowledge of the hazard and demonstrate the competence to safely manage the risk. It should take more than a checkbook and a pulse to secure a Category 3 sealed source.

If the determination is made that Category 3 sources can continue to be secured through a general license then the rest of the FRN is immaterial. It doesn't make much sense to place the same requirements for Category 1 and 2 radioactive sealed sources on material that can be acquired through a general license.

Physical Security Requirements for Category 3:

Question 1 in the "Other Questions" section reads:

1. Should physical security requirements for Category 1 and 2 quantities of radioactive material be expanded to include Category 3 quantities?

Ideally, the answer to this questions is yes. However, from a practical standpoint given all the various devices that use Category 3 sealed sources (or lower category sealed sources aggregated to a Category 3 quantity) it may be difficult or impossible to achieve the same level of access control. A specific license issued to cover the possession of Category 3 sealed sources and quantities can address the physical security requirements on a case-specific basis with the goal of being as close to same requirements as required for Category 1 and 2 sealed sources.

³ IAEA "Categorization of Radioactive Sources, IAEA-TECDOC-1344, July 2003, pg. 12.

General Questions Related to License Verification:

The FRN asked several general questions related to the use of the License Verification System (LVS) for the transfer of Category 3 sealed sources. Using the LVS to verify a transferee's authorization to receive a Category 3 source is a good idea. However, the success of using the LVS is subject to the specific licensing of Category 3 sealed sources, the NRC and Agreement State's use of the NRC's Web Based License (WBL) system for these licenses and the inclusion of Category 3 sealed sources in the National Source Tracking System (NSTS) .

The LVS is a front-end verification system that relies on the associated components of the WBL and NSTS. At the time of source transfer, the transferor will use the LVS to verify a transferee's ability to receive a Category 3 sealed source. The LVS will query the WBL to return a copy of the license and the NSTS to determine the current sealed source inventory. Since some Category 3 sealed sources are generally licensed, there will be no license in the WBL for the system to query. In addition, if Category 3 sealed sources are not reported to the NSTS, the LVS will not be able to indicate the transferee's current inventory.

The use of the LVS streamlines the verification process. It reduces the workload on the regulatory agency to verify each transfer of a Category 3 sealed source and speeds the process for the transferor. But the use of the LVS to verify a recipient's ability to receive a Category 3 source requires specific licensing for Category 3 sealed sources and reporting Category 3 sealed sources to the NSTS.

General Questions Related to the NSTS

The FRN posed several general questions related to reporting Category 3 sealed sources to the NSTS. As mentioned in the previous section, reporting Category 3 sealed sources to the NSTS is critical to the use of the LVS for the transfer of Category 3 sealed sources. The reporting requirements should be the same as currently required for Category 1 and 2 sealed sources. Consistency in reporting requirements will aid the regulatory programs as they verify the information reported.

It is difficult to define the increase in safety and security associated with the inclusion of Category 3 sealed sources in the NSTS. The primary increase in safety and security is the ability for the NRC or Agreement State program to have immediate access to information on the inventory of sealed sources at the facility. There are times that this prompt knowledge can assist with response actions such as a fire or other emergency at the facility.

Reporting source transfers to the NSTS should be completed as close to the time of transfer as possible. This keeps the inventory of the NSTS current and accurate.

Ms. Bladey
March 10, 2017

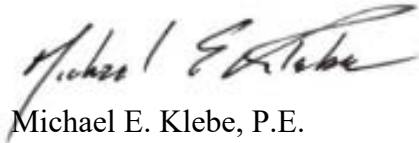
Page 5

Specific Questions to Licensees and Agreement State Programs

The FRN has a series of specific questions for licensees and Agreement State Programs on the level of effort associated with the issues discussed above. I represent neither category and therefore am not providing a response to those specific questions.

Thank you again for the opportunity to provide input to the NRC on the safety and security of Category 3 sealed sources. If you have any questions pertaining to this submittal please do not hesitate to contact me at michael@michaelklebe.com or 217-622-8807.

Sincerely,

A handwritten signature in black ink that reads "Michael E. Klebe". The signature is written in a cursive style with a large, sweeping initial "M".

Michael E. Klebe, P.E.