

UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D.C. 20555-0001

February 5, 2021

Ms. Ourania Kosti, Ph.D. National Academies of Sciences, Engineering, and Medicine Nuclear and Radiation Studies Board 500 Fifth Street, NW, Washington, DC 20001

SUBJECT: NUCLEAR REGULATORY COMMISSION RESPONSES TO QUESTIONS FROM THE COMMITTEE ON RADIOACTIVE SOURCES: APPLICATIONS AND ALTERNATIVE TECHNOLOGIES

Dear Ms. Kosti:

The Nuclear Regulatory Commission provides the below answers to questions posed by the Committee via your letter of January 13, 2021.

1. What is the overarching goal of NSTS, when was tracking implemented, and what is the first year of tracking complete data?

NSTS is a highly secure, accessible and easy-to-use computer system that tracks risk significant (i.e., Category 1 and Category 2) radioactive sources from the time they are manufactured or imported through the time of their disposal or export, or until they decay below the Category 2 threshold. Early data was transferred from an interim database of sources. The Interim Data Base (IDB, created in 2005) was a precursor to NSTS designed to collect a one-time inventory of devices and their sources containing the materials of greatest concern. This inventory was developed to create a snapshot of licensees, facilities, and the sources they possess. Licensee reporting to IDB was voluntary and licensees were allowed to report information on discrete sources or activity by device (e.g., 2 irradiators with 500 Ci of cesium-137 in each)

Data from the IDB was transferred to the new NSTS in late 2008 and about 1,300 licensees began reporting their Category 1 and Category 2 source information in the NSTS in January 2009.

2. What information is the system tracking? For example, number of sources and associated activity, number of devices for specific applications (e.g., number of CsCl blood and cesium irradiators and other devices), other?

NSTS accounts for Category 1 and Category 2 discrete sources of the isotopes listed in <u>10 CFR</u> <u>Part 20, Appendix E, Nationally tracked source thresholds</u>, only and has both required data fields and voluntary data fields. Required data is listed in <u>10 CFR 20.2207, Reports of</u> <u>transactions involving nationally tracked sources</u>. Licensees may also choose to submit additional information on their sources to NSTS. The voluntary fields allow a licensee to indicate that a source is in long-term storage, meets a Greater-than-Class-C waste (GTCC) threshold, provide information on a device, and/or describe the physical and/or chemical form of a source.

O. Kosti

3. Does the U.S.NRC publish reports on aggregated data on sources to inform Congress, federal partners, and others about trends in inventory of radioactive sources? If the reports are public, please provide the links.

No, the NRC does not issue public reports on NSTS data. To support situational awareness, data from NSTS is shared routinely with various federal partners including the National Nuclear Security Administration, Department of Homeland Security, and Federal Bureau of Investigation.

4. How does the U.S.NRC ensure consistency in the reporting of the sources by the Agreement States? Are there any known inconsistences in data reporting, and if yes, what are they and how would they affect the estimate of the total source inventory? The requirements to report source data to NSTS applies to both NRC and Agreement State licensees. The final rule on NSTS reporting in 10 CFR 20.2207 (72 FR 59163, Oct. 19, 2007) is classified as Compatibility Category "B." The NRC program elements in this category are those that apply to activities that have direct and significant transboundary implications and so all Agreement State have adopted requirements that are essentially identical to those of NRC.¹ NRC follows up on transaction reporting discrepancies throughout the year and licensees are subject to regular inspections that include verification of source inventories and usage.

5. How many Category 1 and how many Category 2 sources are being tracked today by NSTS?

The exact number fluctuates as new sources are added and some (particularly iridium-192) decay below the Category 2 threshold. As of January 2021, NSTS contains ~80,000 total, 52% Category 1 and 48% Category 2. The majority of sources are cobalt-60.

6. The U.S.NRC reported ~40,000 Category 1 and 2 sources in 2007 and ~75,000 in 2020. How is this increase explained? For example, is the increased trend observed due to increases in some specific source applications? If yes, what are those applications? What radioisotope accounts for most of the increase?

From 2004-2008 the NRC maintained the IDB of sources under the regulatory authority of the NRC and Agreement States. This database consisted of an annual "snapshot" of information collected from licensees voluntarily. An additional difference in the increased numbers can be attributed to reporting to NSTS by the Department of Energy.

7. Has the U.S.NRC made any changes in the implementation or interpretation of the NSTS since its initial requirements that would result in different number of sources being reported over time? If yes, what are these changes?

No, the NRC has not made any changes to the implementation or interpretation of the regulations requiring reporting to NSTS.

8. What are the projected future trends in Category 1 and 2 source inventories for the next 5 to 10 years based on trends you observe in incoming licensing requests?

The number of materials <u>licensees</u> has experienced a slight decline over the past few years and the NRC and Agreement States expect that general trend to continue. However, this slight decline in number of licensees hasn't necessarily translated to a consistent decline in the numbers of Category 1 and 2 radioactive sources from year to year. There are a few likely reasons for this. One reason can be observed in medical facilities: as facilities merge and

¹ See Management Directive 5.9 Adequacy and Compatibility of Program Elements for Agreement State Programs, available at <u>https://www.nrc.gov/docs/ML1808/ML18081A070.pdf</u>.

consolidate they become a single larger licensee but the number of sources they utilize does not decrease. Industrial licensees' source inventories often fluctuate with market changes in the energy, construction, or manufacturing sectors. Thus, while snapshot numbers may go up and down, if trended over years the inventories are fairly consistent. Beyond these observations, the NRC has no additional insights into potential market forces that would drive use up or down.

The committee understands that Category 3 sources are not tracked by NSTS. What is your best estimate regarding the number of Category 3 sources in the United States?
By 2008 the NRC had performed a one-time data collection and estimated the number of Category 3 sources in the US to be approximately 5,200. No other formal, published, estimate or accounting of Category 3 sources is available.

10. In your view, what would be the challenges and possible reasons of opposition related to tracking Category 3 sources today?

A discussion of this topic is included in SECY-17-0083, *Re-Evaluation of Category 3 Source Security and Accountability in Response to SRM-COMJMB-16-0001*, and its enclosures. See especially Enclosure 2 for a discussion of pros and cons of various options and Enclosure 3 for a summary of stakeholder comments. These products can be accessed at https://www.nrc.gov/docs/ML1718/ML17188A249.html.

11. What percent of the global inventory of Category 1 and 2 sources do you estimate resides in the United States?

The NRC has no specific data upon which to make such an estimate.

12. What percent of the global inventory of Category 3 sources do you estimate resides in the United States?

The NRC has no specific data upon which to make such an estimate.

13. The committee observed that Canada and the United States are reporting about the same size of inventory for Category 1 and Category 2 sources in recent years— approximately 70,000 sources. One would expect that the inventory in the United States would be larger (perhaps by a factor of 10) given the larger population. Can you please comment on this apparent discrepancy?

The NRC has no specific data upon which to speculate.

14. Similarly, the ratio of Category 1 versus Category 2 sources in the U.S. (about 1:1) is different from that in Canada (about 1:10). Can you please comment on this apparent discrepancy?

The NRC has no specific data upon which to speculate.

15. From your experience, would you conclude that the footprint of radioactive sources in the United States is increasing or decreasing?

Over the years, the total number of discrete sources and the aggregate activity has fluctuated. Graphing the rough numbers over the years of NSTS data indicate fairly consistent numbers of discrete sources but a slightly declining aggregate total activity. Beyond these observations, the NRC has no additional insights into potential market forces that would drive use up or down.

The Nuclear Regulatory Commission appreciates the opportunity to support the work of the Committee.

O. Kosti

If you have any questions regarding this correspondence, please contact Margaret Cervera, of my staff, at (301) 415-5649 or <u>Margaret.Cervera@nrc.gov</u>.

Sincerely,

George Smith, branch chief (acting) Source Management and Protection Division of Materials Safety, Security, State, and Tribal Programs Office of Nuclear Material Safety and Safeguards O. Kosti

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