**U.S. Nuclear Regulatory Commission Comments on (GAO-17-58), "Radioactive Sources: Opportunities Exist for Federal Agencies to Strengthen Transportation Security"**

The U.S. Nuclear Regulatory Commission (NRC) staff's comments on the draft report, for the Government Accountability Office's (GAO's) consideration, are as follows:

## A. Significant issues:

The draft report included three recommendations. The NRC staff disagrees with the first recommendation, agrees with the second recommendation, and is not opposed to the third recommendation. Because the NRC staff has no significant issues with the second or third recommendation, they are not discussed in this section.

This section provides comments on the first recommendation, which stated:

> *1. To improve the awareness of how risk-significant active sources are transported within the United States and to better determine whether it is meeting its goal of providing reasonable assurance for preventing the theft or diversion of these dangerous materials, we recommend that the Chairman of the Nuclear Regulatory Commission take actions to collect information from licensees on the number of shipments and mode of transport for such sources for inclusion in NRC's [National Source Tracking System] NSTS.*

Based on their assessment last year of the effectiveness of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 37, the NRC staff is confident that the security requirements in this regulation provide reasonable assurance of adequate protection of this material. Therefore, we disagree with this recommendation. Following the terrorist attacks of September 11, 2001, the NRC took steps to strengthen the security of risk-significant radioactive materials, including addressing the potential vulnerabilities associated with the use and transport of these materials. The NRC implemented a number of measures in coordination with Federal and State agencies to ensure adequate protection of radioactive sources. The NSTS is just one of those measures. NSTS provides an accounting function for Category 1 and 2 sources with respect to their manufacture, transfer, receipt, disassembly, or disposal. To provide background for the basis of the NRC staff's disagreement, the following framework for transactions and shipments involving Category 1 and 2 sources is provided:

- Accounting for the number of shipments and mode of transport (road, rail, etc.) for Category 1 and 2 source transfers in NSTS would not provide any information that could be used to prevent the theft or diversion of Category 1 and 2 materials.

- Licensees are required to report some source shipment information in NSTS for Category 1 and 2 source transfers, including the shipping date and estimated date of arrival. For waste shipments, the waste manifest number and the container identification must be recorded in NSTS. The reporting of this information is all done post-shipment.

- Due to the sensitivity of the information, NSTS is not the appropriate system to track the mode of transport and shipment information for transfers of Category 1 and 2 sources, nor was it designed to track such information. If this information were to be tracked in NSTS, a new security categorization evaluation would need to be performed, and it is likely that the results would necessitate designation of a higher security categorization for the system. This would result in challenges in a number of areas, such as measures needed to provide licensees with access to the system.

- The NRC established the requirements for the NSTS through a notice and comment rulemaking and in close coordination with other Federal and State agencies involved with the safety and security of radiation sources and transportation of hazardous materials. The rulemaking process considered a broad range of comments and suggestions (71 FR 65686; November 8, 2006). Imposing a requirement for licensees to provide information in the NSTS on the mode of transport and shipment information for each source would require rulemaking. Such a rule is not likely to result in significant improvements in safety or security that would form a basis to justify a rulemaking and the additional reporting and recordkeeping burden.

- As required by 10 CFR20.2207, licensees must report transactions involving Category 1 and 2 sources no later than the close of business the day after a source transaction occurs. Transactions include the manufacture, transfer, receipt, disassembly, or disposal of sources.

- In accordance with 10 CFR 37.77, licensees must provide advance notification of shipments containing a Category 1 quantity of material to the NRC (and the governor of any State through which the transport travels). This report must include information related to the material being transported, shipper and receiver, and anticipated departure and arrival times. The report must also provide a point of contact for obtaining current information on the shipment.

    - The “RAMQC” database is maintained by NRC to track advance notifications of Category 1 shipments.
    - The RAMQC database is not accessible by licensees or other outside entities. NRC provides reports from the RAMQC database to other Federal agencies, as appropriate (e.g., Customs and Border Protection) to assist them in verifying the secure, legitimate transport of hazardous materials in the United States.

- NRC has Memorandums of Understanding (MOUs) with the Department of Homeland Security and the Department of Transportation to ensure appropriate regulatory oversight of radioactive material shipments.

- The NRC currently requires licensees to comply with specific security measures under 10 CFR 37.79 for shipments by road or rail. For example:

    - For Category 1 shipments by road: Licensees or carriers must use movement control centers to maintain position information from a remote location, establish redundant communications that allow the transport to contact the escort vehicle

(when used), and movement control center at all times; use telemetric positioning systems to continuously monitor shipments; provide a second individual to accompany the driver for "long drive time" shipments; and have procedures for normal and contingency situations (including responding to actual or attempted theft or diversion of a shipment).

- For Category 2 shipments by road: Licensees must maintain constant control and/or surveillance during transit and have the capability for immediate communication to summon appropriate response or assistance. Alternately, licensees may use carriers with established package tracking systems that maintain constant control/surveillance during transit and have the capability to summon local law enforcement agencies.

The NRC staff also suggests that using the term "radioactive sources" instead of "active sources" in the first sentence of this recommendation may make the intent of the statement more clear

In addition, NRC staff disagrees with the following statement included in the draft report on pages 34 and 35:

> *Not having information on all shipments of risk-significant sources or the mode by which they were transported could, in certain situations, complicate NRC's efforts to secure risk-significant sources and thereby inhibit the agency's ability to meet its objective of providing reasonable assurance of preventing their theft or diversion.*

NRC licensees possessing an aggregated Category 1 or Category 2 quantity of radioactive material are required to comply with Part 37. The NRC verifies licensee compliance with requirements through its oversight program. This enables the NRC to meet its objective of providing reasonable assurance of safety and security of radioactive materials consistent with its mission. The NRC staff believes that the specific situation cited by GAO in support of this statement is not an issue that is solved by collecting post-shipment information, but is instead best addressed by ensuring compliance with existing regulations through appropriate coordination between the NRC and DOT. Therefore, the NRC suggests that GAO consider deleting or editing this statement

The NRC staff is confident that the security requirements in 10 CFR Part 37 are adequate to protect against theft, sabotage, or diversion. We do not believe that adopting this recommendation would result in significant improvements in safety and security. This conclusion is supported by the NRC staff's recent assessment, which concluded that the regulation is effective in achieving its objective of "providing reasonable assurance of the security of Category 1 or 2 quantities of radioactive material by protecting these materials from theft or diversion."

**B. <u>Minor comments</u>:**

1. Inside cover page, gray left hand column, revise or provide clarifying language to the final sentence/statement in the sentence above "What GAO Recommends."

**Comment:** The current statement ends with ". . . and two manufacturers identified as the largest."

**Explanation:** For clarity and consistency, consider adding language similar to that found on page 6 related to "largest manufacturers."

2. Inside cover page, figure includes the text "Pipelines and Hazardous Materials Safety Administration."

   **Comment:** The correct name is "Pipeline and Hazardous Materials Safety Administration."

3. Cover page and page 4, Figure 1 provides the regulatory authority for transit of radioactive sources.

   **Comment:** The figure should be clarified, either as a footnote or by expanding the NRC regulatory authority banner, to acknowledge that there are NRC security requirements/ regulations (10 CFR Part 37, Subpart D) for the in-transit portion of ground transportation.

   **Explanation:** 10 CFR Part 37, Subpart D, requires security for the in-transit portion of movement by both road and rail. The NRC also regulates transportation by private carriers (e.g., licensees transporting a source in their own vehicle).

4. Page 2, footnote 1, and identically stated on page 8, footnote 14:

   **Comment:** The NRC recommends the following changes: *A radionuclide is an unstable, radiation-emitting nuclide. A nuclide is particular atomic form of an element distinguished from other nuclides by its number of neutrons and protons, as well as ~~by the amount of energy it contains~~* ***by its energy states.***

   **Explanation:** Nuclides are correctly defined using energy state rather than amount of energy.

5. Page 3 states:

   "NRC data indicates that from January 2010 through September 2015, there were 14 incidents involving 23 risk-significant sources that were reported lost or stolen during transport in the United States. Of these, 22 sources were found within the same day, and 1 was found 5 days after it was declared missing."

   **Comment:** Consider (1) clarifying text to identify that these reports include lost, missing, or stolen sources and (2) adding a footnote to clarify that "lost or missing" sources includes sources in shipment that are not received by their expected arrival time.

   **Explanation:** The reporting criteria for radioactive material require reports to be made when a package fails to arrive at the designated time identified by the shipper. As stated

in NUREG-2155, "Implementation Guidance for 10 CFR Part 37, 'Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material'": *Lost or missing licensed material means licensed material whose location is unknown. It includes material that has been shipped but has not reached its destination and whose location cannot be readily traced in the transportation system.* The clarification is needed to provide context with respect to the transport events noted in the quoted text because without the clarification, the reader may be left with the impression that these sources were lost rather than being in the shipping company's possession and delayed in transit. Additionally, these shipping incidents represent a relatively small amount of the approximately 36,000 transfers of Category 1 and Category 2 sources in the United States each year.

6. Page 4 states:

   "In 2006, an NRC-led task force on radioactive source security evaluated Federal transport programs for radioactive materials, including risk-significant sources, and concluded that safety regulations provided a "level of protection" from the security risks associated with the transport of these materials."

   **Comment:** Recommend also identifying supporting language from the 2006 Task Force report, which states that "The safety regulations are widely implemented, and the level of compliance is high."

7. Page 6, the sentence after footnote 12 states;
   ". . . representatives with responsibility of the security of radioactive sources . . .".

   **Comment:** Recommend changing "responsibility of the security" to "responsibility for the security."

8. Page 9, Table 1 provides thresholds for classifying quantities of radionuclides as Category 1 and 2.

   **Comment**: Table 1 is from 10 CFR Part 37. Recommend including the NSTS table in Part 20 Appendix E, which contains different nuclides.

   **Explanation**: Based on the context of pages 8-9 of the draft report, Table 1 should contain the NSTS table in Part 20 Appendix E.

9. Page 11, footnote 22 includes reference to 49 CFR 173.411.

   **Comment:** Within the stated footnote 22, remove "173.411", as this reference is for Industrial packages (i.e., IP-1, IP-2, and IP-3).

   **Explanation:** 49 CFR 173.411, "Industrial packages", are unrelated to Type A packages. The other references in this footnote adequately support the discussion related to Type A packages.

10. Page 12 states that:

    *GAO states "There is no limit on the transport index for a vehicle used exclusively to transport packages of radioactive material."*

    **Comment:** This statement may be misleading; consider providing clarity.

    **Explanation:** While technically correct, the transport index is a measure for non-exclusive use transport. Exclusive use vehicles have radiation limits established for the safe transport of packages. The way the language currently reads, it implies that the public may be exposed to excessive amounts of radiation.

11. Page 12, the bullet related to Highway Route Controlled Quantity (HRCQ) includes a statement, "Shipments of radioactive material that meet or exceed this threshold are defined as HRCQ."

    **Comment:** In 49 CFR 173.403, the definition of HRCQ indicates "A quantity within a single package *which exceed*s …" Recommend revising this statement to reflect the Department of Transportation (DOT) definition.

    **Explanation:** The HRCQ definition does not indicate "equals or exceeds." Thus, revising this statement to read "Shipments of radioactive material that exceed this threshold are defined as HRCQ" will make the statement accurate to reflect the current regulations.

12. Page 14, footnote 35, provides language related to transuranic waste:

    **Comment:** Recommend providing definition of transuranic waste.

    **Explanation**: Transuranic waste is defined in NRC Glossary (http://www.nrc.gov/reading-rm/basic-ref/glossary/transuranic-waste.html).

    "Material contaminated with transuranic elements - artificially made, radioactive elements, such as neptunium, plutonium, americium, and others -that have atomic numbers higher than uranium in the periodic table of elements."

13. Page 16, footnote 40, is related to fissile materials:

    **Comment:** Recommend the footnote be deleted.

    **Explanation:** The term "fissile" is not included in the draft report.

14. Page 17, last paragraph, the report states, "…adopt measures to ensure the physical protection of such sources during their use and transport via motor carrier or rail."

    **Comment**: Consider changing sentence to read: "….physical protection of such sources during transport."

**Explanation**: The language would encompass both road and rail modes, which 10 CFR Part 37, Subpart D addresses.

15. Page 18, includes a paragraph that begins: "In addition, NRC Part 37…." includes a sentence "Specifically, licensees shipping Category 1 quantities must…"

    **Comment**: Recommend changing to read: "Specifically, licensees shipping Category 1 quantities of radioactive sources ***by road*** must:"

    **Explanation**: Regulations described here are those necessary for road shipments – not necessarily for rail shipments.

16. Page 19, at the top of the page, provides requirements for the shipment of Category 2 quantities of radioactive sources:

    **Comment**: Recommend including the third requirement and ordering the requirements as follows:

    - Use carriers that have established package tracking systems. An established package tracking system is a documented, proven, and reliable system routinely used to transport objects of value. In order for a package tracking system to maintain constant control and/or surveillance, the package tracking system must allow the shipper or transporter to identify when and where the package was last and when it should arrive at the next point of control;

    - Use carriers that maintain constant control and/or surveillance during transit and have the capability for immediate communication to summon appropriate response or assistance; and

    - Use carriers that have established tracking systems that require an authorized signature prior to releasing the package for delivery or return.

    **Explanation**: The draft report cites two requirements for the shipment of Category 2 quantities of radioactive sources, but the regulations have three requirements.

17. Page 18 states that "provide an individual – such as a second driver – to accompany the primary driver for shipments with a long drive time."

    **Comment:** To clarify "long drive time" and to provide reference to established thresholds that would require use of an additional individual to accompany the primary driver, suggest changing to "provide an individual – such as a second driver – to accompany the primary driver for shipments exceeding the maximum number of driving service hours as established by the Federal Motor Carrier Safety Administration (FMCSA)."

    **Explanation:** The regulation in 10 CFR 37.79(a)(iv) specifies the need to provide an individual to accompany the driver for highway shipments with a driving time period

greater than the maximum number of allowable hours of service in a 24-hour duty day as established by the FMCSA.

18. Page 19 states that "In response to IAEA guidance in its Code of Conduct and agency requirements in the Energy Policy Act of 2005, the NRC implemented the NSTS."

    **Comment:** Recommend revising the sentence to read: "In response to IAEA guidance in its Code of Conduct and ~~agency~~ requirements in the Energy Policy Act of 2005, the NRC implemented the NSTS."

    **Explanation:** The Energy Policy Act is a law, not an NRC requirement.

19. Page 20 states that "Transaction reports include information, such as shipping and receiving licensee numbers, the radioactive material in the source, and the radioactivity level of the source being transferred."

    **Comment:** Suggest changing the word "radioactivity" to "activity".

    **Explanation**: Provides more accurate terminology.

20. Page 20, the main paragraph, includes the term "RAMQC" several times.

    **Comment:** Recommend using "RAMQC database."

    **Explanation:** The clarity of the second sentence in this paragraph may be improved by revising the sentence to read ". . . the original purpose of the RAMQC database was to have . . ." This revision could also be made in other similar phrases in this same paragraph.

21. Page 20 states that "Applicants for licenses and current authorized licensees can use the web-based licensing (WBL) to apply for licenses and initiate other license-related actions."

    **Comment:** Suggest deleting this sentence.

    **Explanation:** The functionality for applicants and licensees to use WBL to initiate license-related activities is currently not active. Although the NRC is working toward offering this functionality for the future, applications for new licenses or amendments to existing licenses are currently submitted to NRC via mail, fax, or email.

22. Page 28 second paragraph, fourth sentence, and page 29 first paragraph, second line, in part needs to be updated to reflect the 2015 Memorandum of Understanding (MOU) activities related to the secure transport of radioactive materials signed by the NRC, DOT and the Department of Homeland Security (DHS).

    **Comment:** For clarity the NRC suggests the following edits in the statements.
    Page 28:
    "… ~~An enclosure to the~~ The MOU states that agencies will ~~promote coordination among themselves and their component agencies regarding inspection and~~

~~enforcement activities, with the objective of optimizing available resources and maximizing communications on areas of mutual interest~~ address twelve topical areas of coordination and collaboration. The MOU also specified that the agencies will establish the working arrangements between the NRC and the relevant component agencies within DOT and DHS in order to implement the MOU provisions."

For clarity the NRC suggests the following edits in the statements.
Page 29:

"…In January 2016, the working group presented a draft multi-year action plan that included **how to address the** 12 topical areas **described in the MOU**…"

**Explanation**: The proposed changes to the draft report are intended to reflect the current status of the MOU and the interagency efforts to coordinate activities and share information between their relevant component agencies.

23. Pg. 33, penultimate sentence:

**Comment:** Suggest inserting "sometimes" or "on occasion" before "another".

**Explanation:** The draft report states that other Federal agencies perform inspections on our behalf. While this may be true in specific situations, the sentence is written very broadly and could be interpreted as meaning we always transfer our inspection responsibilities.

24. Pg. 34, middle of paragraph contains language regarding the RAMQC database:

**Comment:** The draft report mentions the RAMQC database and in discussing it, states that "NRC requires licensees to provide advance notification for shipments of Category 1 sources, including the mode by which sources are transported." Recommend changing to "NRC collects information including the information that would indicate the mode of transport".

**Explanation:** NRC regulations do not require the collection of mode of transportation. However, in practice, mode and routing are two items of information collected during daily database formulation that indicate the mode of transport for the shipments listed in the RAMQC database.

25. Appendix II provides a table that presents the NRC's requirements for Category 1 and 2 material in transport:

**Comment:** The NRC staff has three recommendations for this table: (1) revise the table to include all requirements as well as a delineation between those for road and rail; (2) remove or edit the statement that written reports are required for suspicious activity; and (3) delete sentence 2 of footnote (b).

**Explanation:** (1) Throughout the table, there is no distinction between the items that are for road transport as opposed to rail transport. Also, although the table identifies some of the requirements for road transport, it does not include them all. (2) The table in

Appendix II states that written reports are required for suspicious activity. In accordance with 10 CFR 37.81(g), such reports are not required. (3) Footnote (b) is potentially misleading. The text in the right-hand column of the table under "During shipment" adequately describes the difference between licensee transport, and motor carrier transport.

**Administrative Comments**

1. Table 1 provides radionuclides of concerns and thresholds in terabecquerels (see comment 10 from previous section, which recommends including the table from part 20 Appendix E instead; if GAO keeps this table, please see below):

   **Comment:** Recommend adding the curie values to the table as the caption mentions the conversions of terabecquerels to curies.

   **Explanation:** Although the NRC regulatory standard is given in terabecquerels, for convenience, the NRC also provides the curie values in its regulations (10 CFR Part 37).

2. Page 34, footnote 71 states that "According to NRC officials, the Canadian licensee the sole NRC licensee outside the United States…"

   **Comment:** Recommend inserting the word "is," so the sentence will read: "According to NRC officials, the Canadian licensee is the sole NRC licensee outside the United States…"

3. Page 36 states "This information may give NRC greater confidence that is achieving its goal of having reasonable assurance of preventing theft or diversion of these sources."

   **Comment:** Recommend inserting the word "it," so the sentence will read: "This information may give NRC greater confidence that it is achieving its goal of having reasonable assurance of preventing theft or diversion of these sources."

4. Page 11, footnote 23 uses "A1 or A2" in a statement.

   **Comment:** Suggest deleting these, and replace with "$A_1$ or $A_2$". That is, show the numeral following "A" as sub-script.

   **Explanation:** This change supports the standard format for how these quantities are represented in both 10 CFR and 49 CFR.