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January 25, 2019

Mr. David Trimble
Director, Natural Resources and Environment
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Trimble:

Thank you for the opportunity to review and comment on the United States Government Accountability Office (GAO) draft GAO-19-258SU report, "Combating Nuclear Terrorism: NRC Needs to Take Additional Actions to Ensure the Security of High Risk Radioactive Material," which the U.S. Nuclear Regulatory Commission (NRC) received on December 11, 2018. The NRC has general comments, which are provided below, and technical comments on the report, which are provided in the enclosure.

The security and appropriate control of radioactive materials is a top priority for the NRC. Together, the NRC and the Agreement States have established a strong regulatory framework that ensures the safety, security, and control of radioactive sources. This framework includes regulations that ensure the appropriate access to, secure storage of, and effective detection, assessment, and response to any unauthorized access to high-risk radioactive sources. The framework also includes robust oversight and enforcement programs.

In 2016, as required by Public Law 113-235, the NRC comprehensively reviewed the effectiveness of its regulations pertaining to risk-significant radioactive materials (see Agencywide Documents Access and Management System (ADAMS) Accession No. ML16347A398 for the NRC's Report to Congress on the Effectiveness of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 37, "Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material"). Through this effort, which included an analysis of events and inspection findings related to the security of risk-significant radioactive materials as well as the use of independent assessment consultants, the NRC determined that the requirements in 10 CFR Part 37 are effective in ensuring the security of risk-significant radioactive materials during use, storage, and transport. The NRC also identified potential enhancements to the rule and its associated guidance based on conclusions drawn from this review, and the NRC has made substantive progress in implementing these enhancements to improve the clarity of the rule and consistency in its implementation.

The NRC's mission and regulatory framework are complemented by those of several other Federal agencies. Each of these agencies, including the Department of Homeland Security (DHS), the Department of Energy, and the Federal Bureau of Investigation, plays an integral role in the domestic architecture for radioactive material security. Through forums such as the Radiation Source Protection and Security Task Force (Task Force), these agencies coordinate on a routine basis to ensure that the United States is appropriately positioned to

protect the country from potential terrorist threats, such as the use of radioactive material in a radiological dispersal device (RDD) or a radiation exposure device (RED). In October 2018, the Task Force submitted a report to the President and Congress (ADAMS Accession No. ML18276A155) in which the 14 Task Force member agencies concluded that there are no significant gaps in the area of radioactive source protection and security that are not already being addressed by ongoing efforts of the appropriate agencies.

In the subject draft report (GAO-19-258SU), the GAO staff present conclusions regarding the potential *consequences* of a RDD event without addressing the risk of such an event and use two primary reference sources to substantiate recommendations for further regulatory action. These sources include: (1) two studies that were prepared by Sandia National Laboratories (SNL) that seek to quantify the potential unmitigated socioeconomic effects of an RDD event; and (2) views expressed by members of a panel convened with the assistance of the National Academies of Sciences (NAS). In the draft report, the GAO staff concluded, based on these reference sources that the NRC's controls for protecting radioactive material from use in an RDD need to be strengthened because they were developed using the prevention of prompt fatalities and deterministic health effects as their consequence basis, rather than socioeconomic consequences. The GAO staff further concluded that the NRC should require additional security measures, in addition to the current regulations, for smaller quantities of radioactive material and circumstances in which multiple small quantities of radioactive material are collocated.

As explained below and in the enclosure, on the basis of its review, the NRC concluded that GAO's draft report and recommendations lack important context in that they focus on the potential consequences of an RDD without accounting for certain aspects of risk (i.e., threat and vulnerability), which include consideration of the probability of an event, the credible adversary capabilities, the protection afforded by the existing regulatory framework, and the sophisticated national infrastructure that is maintained under the leadership of DHS. In order to make risk-informed determinations regarding the appropriate level of safety and security controls to protect radioactive materials, it is necessary to consider all aspects of risk, and to assess the impact of any additional security measures on the beneficial use of radioactive materials.

Based on its thorough review of GAO's draft report and the Statement of Facts that preceded it, the NRC has also concluded that the GAO's primary references – namely, the two studies conducted by SNL and the views expressed during the NAS-facilitated panel – do not provide sufficient basis for the GAO's recommended regulatory and policy changes. The GAO uses malicious event scenarios from the studies, which are possible but not probable, to form the basis for the need for additional security requirements. In order to represent more realistic scenarios and outcomes, the studies should have: (1) been developed in coordination and cooperation with appropriate United States government agencies/departments; (2) used assumptions that, among other things, credit existing protective and mitigation capabilities; and (3) been subjected to a formal review and endorsement process.

The NRC also concluded that the GAO's characterization of the panel discussion did not reflect the views of all 18 panel members, and as such, the GAO's reliance on selected aspects of the panel discussion to form the primary basis for its recommendations resulted in conclusions that are not fully supported. In the NRC's view, a more balanced representation of the discussion would have: (1) included a summary of all views that were expressed

during the panel, including those that were contrary to GAO's conclusions; (2) not relied on the statements of one or two panel members to draw overarching conclusions; and (3) acknowledged that some panel members lacked expertise about the existing regulatory infrastructure and did not have sufficient information to make informed assessments about NRC regulations.

In its draft report, the GAO made three recommendations for action by the NRC. The NRC's comments with respect to the recommendations follow:

- GAO Recommendation: Direct the NRC staff to consider socioeconomic consequences and fatalities from evacuations in its criteria for determining what security measures should be required for radioactive materials that could be used in an RDD.

NRC Response: The NRC disagrees with this recommendation and maintains that the NRC's current regulatory requirements provide for the safe and secure use of radioactive materials. As noted above, the GAO's recommendation focuses only on the potential consequences of an RDD without consideration of the other aspects of risk, including threat, vulnerability, and consequence information, which account for the credibility of a given event, the existence of current regulations for the protection of sources, and the domestic detection and mitigation framework. Because the NRC views the likelihood of such a significant dispersal to be very low, the agency does not agree that the scenario in the SNL study provides a basis for regulatory action in and of itself.

The NRC notes that its requirements in 10 CFR Part 37 are in place to prevent theft or diversion of risk-significant quantities of radioactive materials and their subsequent malicious use, whether in an RED or an RDD. The public health and safety impacts of an RED are often more severe than those of an RDD; as such, the thresholds that require protection under the NRC's regulations with respect to an RED, bound the potential health and safety effects of an RDD.

The NRC's current regulations align with the recommendations and findings of the Task Force and have not required changes based on either the NRC or the Task Force's considerations of economic consequences. The protection and mitigation strategies based on the list and quantities of Category 1 and 2 sources, is adequately protective from the consequences associated with RDDs and REDs. The GAO does not account for the work of the Task Force, which was established by the Energy Policy Act of 2005 to evaluate the security of radioactive sources from potential terrorist acts, and routinely evaluates the types and quantities of radioactive materials that should be subject to enhanced security controls. In its efforts, the Task Force has considered economic consequences, such as those stemming from land contamination as the result of an RDD, and has used these consequences to determine Task Force-endorsed definitions for a significant RDD and a significant RED. The Task Force member agencies, including the NRC, subsequently used these definitions to reevaluate their protection and mitigation strategies to ensure that a cohesive, consistent approach is applied to protect against the malicious use of radioactive materials in the United States. As a result of its 2013 reevaluation of its protection strategies using the Task Force-endorsed definitions of significant RDD and RED, the NRC concluded that the Category 2 threshold is conservative. Given the membership of the Task Force and its statutory mandate, the NRC believes that GAO should consider the roles of the Task Force and its respective

member agencies, as well as the conclusions of this interagency body, as part of its evaluation.

In addition, the GAO, by adopting the conclusions made in the two Sandia studies, considers postulated fatalities that could occur during evacuations in response to the use of an RDD as part of its basis for recommending increased security measures for radioactive materials. However, the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention recommends sheltering in place during radiological emergencies. Evacuations and relocations are not the prevailing response to such emergencies. Therefore, evacuations, and any postulated fatalities resulting from those evacuations, are not likely to occur in the event of an RDD. Furthermore, the Sandia studies use the consequences of evacuation associated with events such as Fukushima to estimate fatalities due to evacuation as a result of an RDD. The circumstances surrounding the Fukushima events involved a nuclear power plant accident caused by a natural disaster. The natural disaster had severe impacts on infrastructure and the availability of public resources to assist with response efforts including evacuations. These natural disaster related impacts are not analogous to an RDD event.

- GAO Recommendation: Require additional security measures for high-risk quantities of certain Category 3 radioactive material, and assess whether other Category 3 materials should also be safeguarded with additional security measures.

NRC Response: The NRC has been considering this recommendation in connection with the agency response to GAO-16-330, "Nuclear Nonproliferation: NRC Has Enhanced the Controls of Dangerous Radioactive Materials, But Vulnerabilities Remain."

Following issuance of GAO-16-330, the NRC established two joint NRC/Agreement State working groups to evaluate and develop recommendations for enhancements to the current licensing processes for Category 3 radioactive sealed sources, and to examine license verification and transfer requirements for Category 3 licensees. The analysis and recommendations from these efforts are documented in SECY-17-0083, "Re-Evaluation of Category 3 Source Security and Accountability in Response to SRM-COMJMB-16-0001," which is currently being considered by the Commission.

While the Commission is considering enhancements to the NRC's regulations as a result of the staff's re-evaluation, it is important to note that a significant gap related to the security of Category 3 sources has not been identified. The NRC and its Agreement State partners maintain a robust, risk-informed national framework for the security of radioactive material through existing requirements for the safety and control of radioactive materials. Specifically, the requirements in 10 CFR Parts 20, 30, 31, 32, 34, 35, 36, and 39 (as applicable) include specific provisions to ensure the safety and security of all radioactive materials, regardless of category. This framework is consistent with commitments that the United States has made to the International Atomic Energy Agency's *Code of Conduct on the Safety and Security of Radioactive Sources* and meets the full scope and objectives of the associated guidance. This framework is also reflective of the agency's consideration of risk, including threat, vulnerability, and consequences, in order to balance the need for the protection of radioactive materials with their availability for beneficial uses in the medical, academic, and industrial environments.

- GAO Recommendation: Require all licensees to implement additional security measures when they have multiple quantities of Category 3 Am-241 at a single facility that in total reach a Category 1 or 2 quantity of material.

NRC Response: The NRC has taken several actions addressing aggregation of sources and disagrees with this recommendation that additional action is warranted.

The NRC has already considered the issue of aggregation of radioactive sources and has taken or is in the process of taking actions to clarify relevant guidance and procedures. The NRC first introduced the concept of aggregation with the issuance of the Increased Controls orders beginning in the mid-2000s. At that time, the NRC put into place requirements that prohibit the use or storage of lower category discrete sources in proximity to each other such that they could be aggregated to a higher category by breach of a single physical barrier. Later, with experience in implementing these requirements related to aggregation, the NRC and Agreement States again considered the appropriate security posture for licensees who stored multiple lower category sources, and determined that maintaining barriers between sources to prevent aggregation provided reasonable assurance of adequate protection of these materials. Since then, the NRC re-evaluated its approach to aggregation in response to recommendations from GAO-14-293, "Nuclear Nonproliferation: Additional Actions Needed to Increase the Security of U.S. Industrial Radiological Sources,"¹ which were considered during the above-mentioned NRC effectiveness Review of Part 37. From this review, the NRC identified actions to enhance controls for licensees who possess radioactive material in quantities that could be aggregated to meet or exceed the Category 2 threshold. These actions, which are either complete or in process, include revising: (1) licensing guidance to provide licensees with more information regarding how to comply with requirements related to aggregation; (2) inspection guidance to enable inspectors to better assess whether the licensee's practices with regard to aggregation of sources are in compliance with Part 37, and (3) licensing guidance to enable NRC and Agreement State staff to perform a more comprehensive assessment to determine whether license applicants will aggregate radioactive materials, as well as performing outreach to NRC and Agreement State license reviewers and inspectors to communicate changes to procedures and processes related to aggregation. Based on the results of the NRC's Effectiveness Review of Part 37, the GAO closed its recommendation in GAO 14-293 with respect to the issue of aggregation.

In sum, the NRC, in coordination with its Agreement State partners, has developed a robust program of security measures for radioactive materials that is focused on providing protection commensurate with the risk associated with the material. The United States was the first country in the world to require such enhanced security requirements for radioactive materials, and both Federal and State regulators actively oversee licensee implementation of these requirements to ensure that such materials remain secure. As such, the security of risk-significant radioactive materials at domestic facilities has greatly improved since the terrorist attacks of September 11, 2001. In addition, as a world leader in the regulation of nuclear and radioactive materials, the NRC will continue its efforts to improve the security of radioactive sources, in coordination with Federal, State and international partners. In

¹ In GAO-14-293, GAO recommended that the NRC "Consider whether the definition of collocation should be revised for well logging facilities that routinely keep radiological sources in a single storage area but secured in separate storage containers."

partnership with appropriate elements of the United States government, the NRC will also continue to evaluate the current domestic threat environment, to ensure its security rules and regulations are risk-informed, appropriate, and effective.

The enclosed comments from the NRC are intended to provide a more comprehensive perspective related to the conclusions and recommendations contained in the draft GAO report. Should you have any questions concerning these comments, please contact Sara Mroz at (301) 415-2900.

Sincerely,

/RA/

Margaret M. Doane
Executive Director
for Operations

Enclosure:
NRC comments on draft report
GAO-19-258SU

cc: Mr. Edwin Woodward

SUBJECT: NRC RESPONSE TO DRAFT GOVERNMENT ACCOUNTABILITY OFFICE
REPORT (GAO-19-258SU) DATE: January 25, 2019

Accession No. ML19077A341

***By email**

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