

441 G St. N.W.
Washington, DC 20548

Comptroller General
of the United States

Accessible Version

April 21, 2021

The Honorable Christopher Hanson
Chairman
U.S. Nuclear Regulatory Commission (NRC)
Washington, D.C. 20555-0001

Priority Open Recommendations: Nuclear Regulatory Commission

Dear Chairman Hanson:

The purpose of this letter is to provide an update on the overall status of the Nuclear Regulatory Commission's (NRC) implementation of GAO's recommendations and to call your personal attention to areas where open recommendations should be given high priority.¹ In November 2020, we reported that on a government-wide basis, 77 percent of our recommendations made 4 years ago were implemented.² NRC's recommendation implementation rate was 78 percent. As of March 2021, NRC had 25 open recommendations. Fully implementing these open recommendations could significantly improve agency operations.

Since our last letter in April 2020, NRC implemented one of the seven priority recommendations we reported at that time.³ Specifically, in September 2020, NRC closed one of our recommendations by issuing a risk management strategy that addresses key elements identified in our 2019 report that are foundational to effectively managing cybersecurity risks.⁴ We are not adding new priority recommendations at this time, and ask your continued attention to our six remaining priority recommendations. (See enclosure for the list of these recommendations.)

The six remaining priority recommendations fall into the following three major areas.

¹Priority recommendations are those that GAO believes warrant priority attention from heads of key departments or agencies. They are highlighted because, upon implementation, they may significantly improve government operation by, for example, realizing large dollar savings; eliminating mismanagement, fraud, and abuse; or making progress toward addressing a high-risk or duplication issue.

²GAO, *Performance and Accountability Report: Fiscal Year 2020*, [GAO-21-4SP](#) (Washington, D.C.: Nov. 16, 2020).

³GAO, *Priority Open Recommendations: Nuclear Regulatory Commission*, [GAO-20-286PR](#) (Washington, D.C.: Apr. 10, 2020).

⁴GAO, *Cybersecurity: Agencies Need to Fully Establish Risk Management Programs and Address Challenges*. [GAO-19-384](#) (Washington, D.C.: July 25, 2019).

Addressing the Security of Radiological Sources.

Four recommendations would improve NRC's ability to ensure the secure use of radiological sources.

Our July 2016 report on controls of dangerous materials contains two priority recommendations regarding licensing and accountability strategies for dangerous (category 3) quantities of radioactive materials, and our April 2019 report on combating nuclear terrorism contains one related priority recommendation. Specifically, in 2016 we reported that because some quantities of radioactive materials are potentially dangerous to human health if not properly handled, NRC should take action to better track and secure these materials. We recommended that (1) NRC take steps to include information about category 3 radioactive material and possession licenses in two databases as quickly as possible and (2) require that transferors of category 3 quantities of radioactive material confirm the validity of a would-be purchaser's license with the appropriate regulatory authority before transferring such materials. In 2019, we recommended that NRC require additional security measures for certain quantities of category 3 radioactive material and assess whether other category 3 quantities of material should also be safeguarded with additional security measures.

As of February 2021, NRC told us that it continues to consider actions to address these three recommendations, but NRC has not implemented the recommendations. In August 2017, NRC staff completed an analysis on these topics; however, the analysis recommended that the Commission not implement the recommendations from our 2016 report. The NRC staff determined that the threat, vulnerability, and consequence data do not justify the cost associated with regulatory changes. Specifically, NRC assesses the risks of radioactive material based on the potential of that material to cause prompt fatalities and deterministic health effects from radiation. Experts at a meeting GAO convened with the National Academies of Sciences generally agreed that these consequences are unlikely to result from a radiological dispersal device (RDD); two studies from Sandia National Laboratories found the same. However, the experts generally agreed that the NRC assessment of risks of radioactive material does not include all relevant criteria, including the omission of socioeconomic consequences and fatalities from evacuations. The two Sandia studies found that a large RDD could cause about \$30 billion in damage and 1,500 fatalities from the evacuation, and a considerably smaller RDD could cause \$24 billion in damage and 800 fatalities from the evacuation.

A recent accident demonstrates the damage that the release of a small amount of radioactive material can cause. In May 2019, an accidental release of a small amount of radioactive material at the University of Washington in Seattle resulted in at least \$60 million in cleanup and remediation costs, closure of the medical facility for 2 years, and ongoing negative socioeconomic impacts on researchers and medical professionals. Although the accident did not involve security failures, it illustrates the risk that would be posed by security failures associated with similar quantities of material. According to Department of Energy estimates, the quantity of radioactive material released in this accident was less than a category 3 quantity, and would thus not have been subject to NRC's enhanced security requirements nor necessarily tracked in NRC's licensing databases. NRC staff have not updated their August 2017 analysis in response to our April 2019 report on these topics or to the incident at the University of Washington.

We believe that implementing our recommendations would provide greater assurance that bad actors could not manipulate the system by, for example, altering a paper license to acquire radioactive materials in aggregate greater than the amount they are authorized to possess.

Implementing our recommendations would also help ensure that category 3 material is properly protected against theft. We encourage NRC to continue to take actions to address these recommendations.

In addition to the three recommendations described above, our April 2020 letter listed one additional priority recommendation on considering socioeconomic consequences and fatalities from evacuations as criteria for determining security measures for radioactive materials dispersed through an RDD. NRC disagreed with this recommendation, maintaining that the current regulatory requirements provide for the safe and secure use of all radioactive materials, regardless of category. We disagree with NRC's assessment. Our April 2019 report in combination with our previous reports on this topic demonstrate that there are vulnerabilities in current NRC security requirements. Further, these reports and the May 2019 incident at the University of Washington collectively demonstrate that the potential consequences of misusing these materials could be significant. We encourage NRC to take action to implement this recommendation.

Improving the Reliability of Cost Estimates.

NRC has made progress and is near to closing one recommendation that would improve the reliability of NRC's cost estimates and better ensure Commissioners have adequate information to inform their regulatory decisions. In our December 2014 report, we found that NRC's procedures did not adequately support the development of reliable cost estimates, and we recommended that NRC align its cost estimating procedures with relevant best practices identified in the *GAO Cost Estimating and Assessment Guide*.⁵ NRC issued a draft of its updated cost estimating procedures for comment in April 2017, and NRC staff further updated the draft in January 2020 to conform with agency-wide directives. However, NRC has not issued the final procedures. To fully implement this recommendation, NRC needs to complete and issue its updated cost estimating procedures to align with best practices identified in our cost estimating guide.

Improving Strategic Human Capital Management.

One recommendation would help NRC better plan for its future workload. NRC significantly expanded its workforce to meet the demands of an anticipated increase in workload to license new reactors that ultimately did not occur. We recommended in our April 2017 report that NRC set agency-wide goals for its overall workforce size and composition that extend beyond the 2-year budget cycle. In 2019, NRC established an Enhanced Strategic Workforce Planning process. As a part of this process, NRC forecasts the anticipated workload and associated skill sets needed to perform agency work. However, the process does not include a step for NRC to establish specific goals for the size of the workforce. As such, our recommendation remains open because NRC needs to ensure that it sets goals—which could be ranges—for the size and composition of its workforce, in line with the leading practices we identified in our 2017 report. Without setting such goals, NRC remains at risk of not having the right size and mix of skills it needs to meet the demand for its services, nor the time it needs to develop or obtain employees with the skills needed to complete future workloads.

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⁵GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, [GAO-20-195G](#) (Washington, D.C.: Mar. 12, 2020).

As you know, in March 2021, we issued our biennial update to our [High Risk List](#), which identifies government operations with greater vulnerabilities to fraud, waste, abuse, and mismanagement or the need for transformation to address economy, efficiency, or effectiveness challenges.⁶ Our [High Risk List](#) has served to identify and help resolve serious weaknesses in areas that involve substantial resources and provide critical services to the public.

Some of our government-wide high-risk areas have direct implications for NRC and its operations. These include (1) [the government-wide personnel security clearance process](#), (2) [ensuring the cybersecurity of the nation](#), (3) [improving management of IT acquisitions and operations](#), (4) [strategic human capital management](#), and (5) [managing federal real property](#).⁷ We urge your attention to the government-wide high-risk issues as they relate to NRC. Progress on high-risk issues has been possible through the concerted actions and efforts of Congress, the Office of Management and Budget (OMB), and the leadership and staff in agencies, including NRC.

Copies of this report are being sent to the Director of the Office of Management and Budget and appropriate congressional committees, including the Committees on Appropriations, Budget, and Homeland Security and Governmental Affairs, United States Senate; and the Committees on Appropriations, Budget, and Oversight and Reform, House of Representatives. In addition, the report is available at no charge on the GAO website at <http://www.gao.gov>.

I appreciate NRC's continued commitment to these important issues. If you have any questions or would like to discuss any of the issues outlined in this letter, please do not hesitate to contact me or Mark Gaffigan, Managing Director, Natural Resources and Environment, at GaffiganM@gao.gov or (202) 512-3841. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Our teams will continue to coordinate with your staff on all of the 25 open recommendations. Thank you for your attention to these matters.

Sincerely yours,

A handwritten signature in black ink that reads "Gene L. Dodaro". The signature is fluid and cursive, with a long horizontal stroke extending to the right from the end of the name.

Gene L. Dodaro
Comptroller General
of the United States

Enclosure -1

⁶GAO, *High-Risk Series: Dedicated Leadership Needed to Address Limited Progress in Most High-Risk Areas*, [GAO-21-119SP](#) (Washington, D.C.: Mar. 2, 2021).

⁷[GAO-21-119SP](#). See pages 174-188 for Government-wide Personnel Security Clearance Process, pages 168-177 for Ensuring the Cybersecurity of the Nation, pages 111-123 for Improving the Management of IT Acquisitions and Operations, pages 51-56 for Strategic Human Capital Management, and pages 54-62 for Managing Federal Real Property.

cc: The Honorable Shalanda Young, Acting Director, Office of Management and Budget

Enclosure - Priority Open Recommendations to the Nuclear Regulatory Commission

Addressing the Security of Radiological Sources

Nuclear Security: NRC Has Enhanced the Controls of Dangerous Radioactive Materials, but Vulnerabilities Remain. [GAO-16-330](#). Washington, D.C.: July 1, 2016.

Recommendation: Because some quantities of radioactive materials are potentially dangerous to human health if not properly handled, the Nuclear Regulatory Commission (NRC) should take action to better track and secure these materials and verify the legitimacy of the licenses for those who seek to possess them. Specifically, the NRC should take the steps needed to include category 3 sources in the National Source Tracking System and add agreement state category 3 licenses to the Web-based Licensing System as quickly as reasonably possible.

Actions Needed: NRC neither explicitly agreed nor disagreed with this recommendation but stated that it would consider our recommendation as part of a working group the agency established. In August 2017, the working group provided a staff analysis on these issues to the Commission and recommended against including category 3 sources in the National Source Tracking System and adding information on agreement state category 3 licenses to the Web-based Licensing System. We continue to believe that implementing our recommendation would provide greater assurance that bad actors could not manipulate the system by, for example, altering a paper license to acquire radioactive materials in aggregate greater than what they are authorized to possess. Moreover, in a May 2019 incident at the University of Washington in Seattle, a small amount of radioactive material was accidentally released, resulting in at least \$60 million in cleanup and remediation costs, closure of the medical facility for 2 years, and ongoing negative impacts on researchers and medical professionals. This incident demonstrates the possible damage that even a small quantity of radioactive material can cause if not properly handled. We encourage NRC to continue actions to address this recommendation.

Recommendation: Because some quantities of radioactive materials are potentially dangerous to human health if not properly handled, NRC should take action to better track and secure these materials and verify the legitimacy of the licenses for those who seek to possess them. Specifically, the NRC should at least, until such time that category 3 licenses can be verified using the License Verification System, require that transferors of category 3 quantities of radioactive materials confirm the validity of a would-be purchaser's radioactive materials license with the appropriate regulatory authority before transferring any category 3 quantities of licensed materials.

Actions Needed: NRC neither explicitly agreed nor disagreed with this recommendation but stated that it would consider our recommendation as part of a working group the agency established. In August 2017, the working group provided staff analysis on these issues to the Commission and recommended against requiring transferors of category 3 quantities of radiological material to confirm the validity of licenses before transferring any category 3 quantities of these materials. We continue to believe that implementing our recommendation would provide greater assurance that bad actors could not manipulate the system by, for example, altering a paper license to acquire radioactive materials in aggregate greater than the amount they are authorized to possess. Moreover, in a May 2019 incident at the University of Washington in Seattle a small amount of radioactive material was accidentally released, resulting in at least \$60 million in cleanup and remediation costs, closure of the medical facility for 2 years, and ongoing negative impacts on researchers and medical professionals. This

incident demonstrates the possible damage that even a small quantity of radioactive material can do if not properly handled. We encourage NRC to take action to implement this recommendation.

Combating Nuclear Terrorism: NRC Needs to Take Additional Actions to Ensure the Security of High-Risk Radioactive Material. [GAO-19-468](#). Washington, D.C.: April 4, 2019.

Recommendation: The Chairman of NRC should 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.

Actions Needed: NRC neither explicitly agreed nor disagreed with this recommendation but stated that it would consider our recommendation as part of a working group the agency has established. The working group provided a staff analysis on these issues to the Commission in August 2017, concluding that category 3 materials did not require additional security measures. However, NRC has not updated this analysis taking into account the new information we provided in our April 2019 report, such as expert views and studies on the risks of category 3 materials in a radiological dispersal device (RDD). Additionally, in May 2019, the accidental release of a small amount of radioactive material at the University of Washington resulted in at least \$60 million in cleanup and remediation costs, closure of the medical facility for 2 years, and ongoing negative impacts on researchers and medical professionals. This accident illustrates the risk that would be posed by security failures involving similar quantities of material. NRC's enhanced security requirements apply to quantities of radioactive materials greater than category 3, but the quantity of radioactive material released in the accident was estimated to be less than category 3. We continue to believe that implementing our recommendation would provide greater assurance that NRC's requirements are sufficient to help ensure all high-risk radioactive materials are protected from theft and use in an RDD. We encourage NRC to take action to implement this recommendation.

Recommendation: The Chairman of NRC should direct NRC staff to consider socioeconomic consequences and fatalities from evacuations in the criteria for determining what security measures should be required for radioactive materials that could be used in an RDD.

Actions Needed: NRC disagreed with this recommendation, maintaining that the current regulatory requirements provide for the safe and secure use of all radioactive materials, regardless of category. We disagree with NRC's assessment. About a month after we published our April 2019 report, a small amount of radioactive material was accidentally released at the University of Washington in Seattle. Although it was not an RDD, the release resulted in at least \$60 million in cleanup and remediation costs, closure of the medical facility for 2 years, and ongoing negative impacts on researchers and medical professionals. We continue to believe that by implementing our recommendation NRC would have better assurance that it considers more likely and more significant consequences of an RDD when establishing its security requirements for this material. We encourage NRC to take action to implement this recommendation.

Director: Allison Bawden, Natural Resources and Environment

Contact Information: BawdenA@gao.gov, (202) 512-3841

Improving the Reliability of Cost Estimates

Nuclear Regulatory Commission: NRC Needs to Improve Its Cost Estimates by Incorporating More Best Practices. [GAO-15-98](#). Washington, D.C.: December 12, 2014.

Recommendation: To improve the reliability of its cost estimates, as NRC revises its cost estimating procedures, the NRC Chairman should ensure that the agency aligns the procedures with relevant cost estimating best practices identified in the *GAO Cost Estimating and Assessment Guide* and ensure that future cost estimates are prepared in accordance with relevant cost estimating best practices.⁸

Actions Needed: NRC generally agreed with the recommendation. NRC took action by updating a draft of its cost estimating procedures in January 2020 and providing it to the NRC Commission for its review. To fully implement this recommendation, NRC needs to issue its update to its cost estimating procedures to align with best practices identified in our cost estimating guide.

Director: Frank Rusco, Natural Resources and Environment
Contact Information: RuscoF@gao.gov, (202) 512-3841

Improving Strategic Human Capital Management

Strategic Human Capital Management: NRC Could Better Manage the Size and Composition of Its Workforce by Fully Incorporating Leading Practices. [GAO-17-233](#). Washington, D.C.: April 27, 2017.

Recommendation: To improve NRC's ability to strategically manage the size and composition of its workforce and respond to changes in the nuclear industry, the Chairman of the Nuclear Regulatory Commission should set agency-wide goals, which could be ranges, for overall workforce size and skills composition that extend beyond the 2-year budget cycle.

Actions Needed: NRC generally agreed with the recommendation and provided information on its new workforce planning process. However, this recommendation remains open because while NRC has completed some efforts to improve planning, such as establishing an Enhanced Strategic Workforce Planning process and forecasting some workload and skill set needs on a 5-year time frame, NRC officials said that the new process does not establish specific workforce goals. To fully implement this recommendation, NRC needs to use the information from this process to develop agency-wide goals—which could be ranges—for the workforce size and skills composition that extend beyond the 2-year budget cycle, in line with the leading practices we identified in our April 2017 report. Without setting such goals, NRC remains at risk of not having the right size and mix of skills it needs to meet the demand for its services, nor the time it needs to develop or obtain employees with the skills needed to complete future workloads.

High-Risk Area: Strategic Human Capital Management

Director: Frank Rusco, Natural Resources and Environment
Contact Information: RuscoF@gao.gov, (202) 512-3841

⁸GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, [GAO-20-195G](#) (Washington, D.C.: Mar. 12, 2020).

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