



POLICY ISSUE **(Information)**

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SECY-21-0009

FOR: The Commissioners

FROM: John W. Lubinski, Director
Office of Nuclear Material Safety
and Safeguards

SUBJECT: THE U.S. NUCLEAR REGULATORY COMMISSION IMPLEMENTATION
PLAN FOR THE RADIATION SOURCE PROTECTION AND SECURITY
TASK FORCE REPORT

PURPOSE:

The purpose of this paper is to provide the Commission with a summary of the biennial update of the "U.S. Nuclear Regulatory Commission (NRC) Implementation Plan for the Radiation Source Protection and Security Task Force Report," in accordance with Staff Requirements Memorandum (SRM) for SECY-06-0231, "NRC Implementation Plan for the Radiation Source Protection and Security Task Force Report," dated January 16, 2007 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML070170056). The enclosed implementation plan highlights the interagency efforts in the area of radiation source protection and security, including updates on the progress toward a comprehensive approach to enhance the security of cesium-137 chloride (CsCl) sources, consistent with the direction in the SRM for SECY-08-0184, "Strategy for the Security and Use of Cesium-137 Chloride Sources," dated April 15, 2009 (ADAMS Accession No. ML091050314). This paper does not address any new commitments or resource implications.

SUMMARY:

The Energy Policy Act of 2005 (EPAAct), Pub. L. 109-58, 119 Stat. 594, created an interagency Task Force on radiation source protection and security under the lead of the NRC. This Task

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Force, known as the Radiation Source Protection and Security Task Force (Task Force), provided its first draft report to the Commission in June 2006 in COMSECY-06-0032, "Draft Report to the President and the U.S. Congress on the Radiation Source Protection and Security Task Force" (ADAMS Accession No. ML061770130, non-public). After receiving the first draft report, on August 3, 2006, the Commission directed the staff in the SRM for COMSECY-06-0032 (ADAMS Accession No. ML062150520, non-public) to prepare correspondence for the Chairman's signature to transmit the report to the President and the Congress (ADAMS Accession No. ML062080366). The SRM also directed the staff to develop an implementation plan for Commission consideration, subsequent to finalization of the Task Force report, that included prioritization, cost estimates, and the staff's view on how to proceed with implementation of the recommendations in the Task Force report for which the NRC has responsibility.

The staff submitted the first implementation plan to the Commission in SECY-06-0231, "NRC Implementation Plan for the Radiation Source Protection and Security Task Force Report," dated November 22, 2006 (ADAMS Accession No. ML062430024), and continues to provide the Commission with biennial updates to the implementation plan. The implementation plan, as well as all the other updates to the implementation plan, are publicly available in ADAMS and are accessible from the NRC Web site (<https://www.nrc.gov/security/byproduct/task-force.html>). The implementation plan and its updates are used to prioritize and facilitate implementation of efforts related to the Task Force recommendations and actions, and to communicate the status of recommendations and actions to the Commission and the public on a routine basis.

BACKGROUND:

The EPAct mandated that not later than 1 year after the date of the legislative enactment of the Act, and not less than once every 4 years thereafter, the Task Force shall submit to the President and Congress a report and recommendations relating to the security of radiation sources in the United States from potential terrorist threats, including acts of sabotage, theft, or use of a radiological source in a radiological dispersal device. In 2006, the NRC submitted the first Task Force report to the President and Congress (ADAMS Accession No. ML062190349). The Task Force report contained 10 recommendations and 18 actions that addressed security and control of radioactive sources. In accordance with the EPAct, the Task Force also submitted its second, third, and fourth reports to the President and Congress on August 11, 2010, August 14, 2014, and October 17, 2018 (ADAMS Accession Nos. ML102230141, ML14219A642, and ML18309A202), respectively. The 2010, 2014, and 2018 reports addressed the status of previous reports' open recommendations and actions and any new recommendations. The 2010 report presented 11 new recommendations, several of which included actions related to CsCl sources; and closed 14 recommendations and actions.¹ The 2014 report included three new recommendations and 17 recommendations and actions were

¹ CsCl sources with activity levels associated with Categories 1 and 2 thresholds established by the International Atomic Energy Agency in its *Code of Conduct on the Safety and Security of Radioactive Sources* (i.e., above 27 curies) are widely used in self-shielded irradiators in three major modes of application: blood sterilization, bio-medical research, and calibration. CsCl is used because of the properties of cesium-137, including its desirable energy spectrum, long half-life, low cost, and moderate shielding requirements relative to other nuclides. In irradiators, CsCl is found in a compressed powder form that is double-encapsulated in a stainless steel capsule. This physical form is used because of its high specific activity (gamma emission per unit volume) and manufacturability. However, because it is highly soluble in water and is dispersible in aerosol form, it also presents security concerns. As such, the use and security of CsCl sources has been a matter of concern for the NRC and a subject of focus for the Task Force. Significant progress has been made in adequately securing and finding alternatives to these sources, as evidenced in Task Force reports and the Policy Statement issued by the NRC on this subject (76 FR 44378).

closed. The 2018 report included four recommendations and actions that were closed; and there were no new proposed recommendations.

To date, 35 recommendations and actions have been completed, and seven recommendations and actions remain open. Of the open recommendations, two remain from the 2006 Task Force report, three remain from the 2010 Task Force report (two of which involve CsCl), and two remain from the 2014 Task Force report (one of which involves CsCl). The 2021 implementation plan tracks the open recommendations and actions and defines specific tasks to be completed by appropriate agency leads in order to accomplish the recommended activity.

DISCUSSION:

Since the last updated implementation plan submitted to the Commission in SECY-19-0014, "U.S. Nuclear Regulatory Commission Implementation Plan for the Radiation Source Protection and Security Task Force Report," dated January 31, 2019 (ADAMS Accession No. ML19002A544), the Task Force met on July 30, 2019, and planned to meet again during the first calendar quarter of 2020. However, the 2020 meeting was cancelled due to the public health emergency (PHE) declared by the U.S. Department of Health and Human Services to aid the nation's healthcare community in responding to the Coronavirus Disease 2019 (COVID-19). Although no Task Force meeting was held in 2020, NRC staff has been regularly interacting with the Task Force representatives, and the Task Force agencies (including its subgroups) have been proceeding with their Task Force related subtask activities. Since the 2019 Implementation Plan, the Task Force members agreed to close four subtasks associated with three actions and recommendations from the 2006, 2010, and 2014 Task Force Reports.

The enclosed updated implementation plan includes a strategy for implementing open Task Force recommendations and actions; identifies issues that could complicate implementation; and identifies lead agencies, supporting agencies, resource estimates where appropriate, and detailed tasks necessary to implement the open recommendations and actions. While the NRC has the responsibility of serving as the overall lead for the Task Force, some of the recommendations and actions contained in the Task Force Reports have no specific actions assigned to the NRC. It is the responsibility of the agencies and organizations assigned the lead to determine how to disseminate those responsibilities within their respective agencies and organizations as well as to coordinate with agencies and organizations who have a supporting role for the recommendations and actions.

As part of the updates for the 2021 Implementation Plan, the responsible Task Force agencies have provided reports of significant progress on another eight subtasks as described in the enclosed implementation plan.

However, since the Task Force did not meet in 2020, these eight subtasks are awaiting discussion and disposition by the Task Force members. This format diverges from that of previous implementation plans given the extenuating circumstances of 2020. These subtasks will be discussed next time the Task Force meets. The enclosed implementation plan update reflects progress through December 2020.

ACCOMPLISHMENTS:

With respect to open recommendations and actions from the 2006, 2010, and 2014 Task Force Reports, since the last update submitted to the Commission in SECY-19-0014 (January 31, 2019), no recommendations have been closed; seven remain open.

SIGNIFICANT DEVELOPMENTS:

The following significant developments occurred related to Task Force recommendations and actions which remain open:

1. 2006 Action 10-2:

“The U.S. Government should encourage suppliers to provide arrangements for the return of disused sources and examine means to reduce regulatory impediments that currently make this option unavailable.”

Status: The U.S. Department of Energy’s National Nuclear Security Administration (DOE/NNSA) delivered a 435-B container along with its ancillary equipment and operating tools to the International Atomic Energy Agency (IAEA) to facilitate the repatriation of U.S. origin sources back to U.S. suppliers.

In addition, the U.S. interagency completed its review of the “Guidance on Management of Disused Radioactive Sources.” On March 2, 2020, a letter was submitted from Ambassador Jackie Wolcott to Director General Rafael Grossi where the U.S. made a political commitment to meet the intent of the supplementary guidance to the extent consistent with relevant U.S. national laws and regulations, U.S. international obligations and arrangements, and in accordance with national policies regarding nuclear nonproliferation, nuclear security, and the avoidance of malicious acts using radioactive sources.

2. 2014 Recommendation 1:

“The Task Force recommends that U.S. Government agencies assess the adequacy of and coordinate strategies for preventing and mitigating cybersecurity vulnerabilities related to Category 1 and 2 radioactive sources.”

Status: DOE/NNSA’s Office of Radiological Security (ORS) completed mapping potential cyberattack scenarios to the Office of the Director of National Intelligence Common Cyber Threat Framework (CTF). Completed in June 2019, the DOE/NNSA/ORS developed cyberattack scenarios to determine if the cybersecurity controls detailed in their best practices guide and the procurement requirements adequately addressed the postulated threat against ORS-funded security enhancements and ORS concerns about blended attacks based on CTF guidance. The NRC issued Information Notice 2019-04, “Effective Cyber Security Practices to Protect Digital Assets of Byproduct Materials Licenses,” on August 14, 2019. In addition, as provided below, DOE/NNSA/ORS has noted significant progress in their ongoing efforts to develop best practices and training materials related to cyberattacks and assist facilities in identifying and protecting themselves against cyberattacks:

- To “identify insider and technical cyberattack scenarios that could be used against ORS voluntary security enhancements installed at licensee facilities and assess how to protect against these cyberattack scenarios,” DOE/NNSA/ORS developed numerous cyberattack scenarios and evaluated whether the recommended cybersecurity controls adequately mitigated the postulated threat as defined by ORS’s Potential Adversary Capabilities. ORS utilized the adversary cyber capabilities developed for the U.S. Department of Homeland Security (DHS) by the

Homeland Security Systems Engineering and Development Institute to determine the threat level.

- DOE/NNSA/ORS developed a training course targeting site security officers responsible for the security of radioactive material and vendors that install ORS-funded security enhancements. This course focuses on ORS's cybersecurity best practices and procurement requirements.
- DOE/NNSA/ORS developed a model site cybersecurity plan template that is based on DHS guidance and the DHS Requirements Traceability Matrix.

RECOMMENDATIONS RELATED TO CESIUM CHLORIDE:

The SRM for SECY-08-0184 directed the staff to “report back to the Commission on the interagency efforts of the Radiation Source Protection and Security Task Force as progress is made towards a comprehensive approach to improve the security of Cs-Cl sources, which includes physical security upgrades, the development of a government-facilitated disposal pathway, short-term and long-term research and development of alternative technologies, and the development of a government-incentivized program for the replacement of existing sources with effective alternatives.” Consistent with this direction, the following three Task Force recommendations remain open and are relevant to interagency efforts toward a comprehensive approach to improve security of CsCl sources:

1. 2010 Recommendation 4:

“The Task Force recommends that the U.S. Government, regional compacts, and States continue to evaluate disposal options for disused radioactive sources, including options for handling a potentially large number of disused cesium chloride sources that may be replaced once viable alternatives are available.”

2. 2010 Recommendation 9:

“The Task Force recommends that the U.S. Government enhance support of short-term and long-term research and development for alternative technologies.”

3. 2014 Recommendation 3:

“The Task Force recommends that the U.S. Government, as appropriate,² investigate options such as voluntary, prioritized, incentivized, programs for the replacement of Category 1 and 2 radioactive sources with effective alternatives. The Task Force further recommends that U.S. Government agencies, where appropriate, lead by example in the consideration of and transition to alternative technologies that meet technical, operational, and cost requirements.”

Status: The Task Force continues to evaluate the impact of NRC's revised 2015 Concentration Averaging Branch Technical Position (CA BTP) on disposal of high-activity sources to determine if additional actions are warranted to promote increased awareness and/or further usage of the

² The NRC's statutory mandate precludes it from promoting one technology over another for non-safety or security reasons. The NRC would review in accordance with its procedures, any license application for new technologies.

BTP. In 2019, DOE/NNSA sponsored a second pilot demonstration using the CA BTP guidance to dispose of two high-activity Cs-137 sources at the Waste Control Specialists facility in Texas. In addition, DOE/NNSA and NRC conducted outreach in 2019 to regulatory officials in the states of Texas and Washington as well as operators of the commercial low-level waste (LLW) disposal facilities in these states. The purpose of this outreach was to obtain insights regarding CA BTP implementation to date, particularly with respect to disposal of any Category 1 or 2 sources at these facilities.

In 2020, DOE/NNSA sponsored a study by the LLW Forum Disused Sources Working Group on CA BTP use and ongoing disposal challenges for high-activity sources. This study found that, while the CA BTP has improved the process for classifying sealed sources for disposal, it has not resulted in a significant increase in sources being disposed. Cost and the limited availability of Type B containers were cited as the main barriers to disposal. While NRC does not recommend additional regulatory actions to promote the usage of the CA BTP, DOE/NNSA continues to assess whether other activities such as completing an assessment that details the economic factors that hinder commercial disposal (e.g., out of compact fees, waste surcharges, Type B container rental costs) could be beneficial in determining any potential actions that may be taken to facilitate commercial disposal.

The Task Force agencies continue to focus efforts on evaluating alternative technologies and performing research and development pertaining to new technologies. The DHS Cybersecurity and Infrastructure Security Agency (CISA) published, "Non-Isotopic Alternative Technologies White Paper," September 2019, to identify advantages and disadvantages of alternative technologies for the replacement of Category 1 and 2 radioactive sources. This paper, a joint effort led by DHS and NNSA, can be found at: <https://www.cisa.gov/publication/non-radioisotopic-alternative-technologies-white-paper>. The Interagency Working Group on Alternatives to High-Activity Radioactive Sources, co-led by DOE/NNSA and the National Institutes of Health, continued to meet during 2019; however, the COVID-19 PHE put a hold on this working group's activities during 2020.

DOE/NNSA/ORS sponsored several feasibility studies comparing Cs-137 and cobalt-60 with X-ray technologies. One such study at Lovelace Respiratory Research Institute is nearing completion, but two other studies at the University of Wisconsin-Madison and the University of Cincinnati were delayed due to researcher availability and the COVID-19 PHE. Other DOE/NNSA sponsored studies to evaluate replacement technologies for sterilization facilities, well-logging, and radiotherapy applications have also experienced delays. DOE/NNSA has awarded extensions on these projects.

In parallel to the Task Force activities, in January 2020, the National Academies of Science (NAS) commenced a study on "Radioactive Sources: Applications and Alternative Technologies." The purpose of this study is to support existing and future activities under DOE/NNSA/ORS program to reduce the use of high-risk radiological materials in commercial applications. Sponsored by Sandia National Laboratories, the NAS appointed an ad hoc committee of experts to:

1. Review (using the 2008 National Academies report "Radiation Source: Use and Replacement" as a baseline) the current industrial, research, and commercial (including medical) applications of radioactive sources, including Categories 1, 2, and 3 sources as defined by the International Atomic Energy Agency's "Categorization of Radioactive Sources," IAEA-TECDOC-1344; and

2. Identify uses for which a radioactive source can be replaced with an equivalent (or improved) non-radioisotope alternative technologies that are already available in the market and could become available in the market as next-generation or emerging technologies in the next 10 years, and assess applications for which alternative technologies do not currently exist, but which could significantly mitigate the risk associated with current technologies using high-risk radionuclides.

DOE/NNSA's Cesium Irradiator Replacement Project, involving the replacement of Cs-137 irradiators, continued and, as of December 2020, DOE/NNSA completed 156 irradiator replacements.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection.



Signed by Lubinski, John
on 02/05/21

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Enclosure:

U.S. Nuclear Regulatory Commission
Implementation Plan for the Radiation
Source Protection and Security Task
Force Report

THE U.S. NUCLEAR REGULATORY COMMISSION IMPLEMENTATION PLAN FOR THE RADIATION SOURCE PROTECTION AND SECURITY TASK FORCE REPORT DATE February 5, 2021

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