

**POLICY ISSUE**  
**Information**

April 7, 2016

SECY-16-0046

FOR: The Commissioners

FROM: Victor M. McCree  
Executive Director for Operations

SUBJECT: RESULTS OF THE BYPRODUCT MATERIAL FINANCIAL SCOPING  
STUDY

PURPOSE:

To provide the Commission with the results of the staff's byproduct material financial scoping study and recommendations for next steps.

SUMMARY:

The U.S. Nuclear Regulatory Commission (NRC) regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) 30.35, "Financial Assurance and Recordkeeping for Decommissioning," require a fixed dollar amount of financial assurance or a Decommissioning Funding Plan (DFP) for licensees possessing byproduct material with a half-life greater than 120 days and at activity levels above certain thresholds. The thresholds in 10 CFR 30.35 that require financial assurance for sealed radioactive material are seven orders of magnitude higher than for unsealed material. As a result, many licensees that possess byproduct material Radioactive

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Sealed Sources (RSS), including many Category 1 and 2 RSSs,<sup>1</sup> are not required to provide financial assurance for decommissioning. If financial assurance is required, it is intended to support site decommissioning, not necessarily the disposition of an individual RSS that has become disused or unwanted. Adequacy of financial planning for disposition of disused RSSs has been raised in a number of external reports issued over the past decade.

The NRC staff has completed a scoping study to determine whether financial planning requirements for decommissioning and end-of-life management for some radioactive byproduct material, particularly RSSs, are necessary. The staff conducted its analysis based on a review of the NRC regulations and guidance, relevant internal and external reports, and stakeholder feedback collected through the scoping study. Based on its analysis, the staff believes that the financial assurance requirements in 10 CFR 30.35 should be expanded to include all byproduct material Category 1 and 2 RSSs tracked in the National Source Tracking System (NSTS). Per recent Commission direction,<sup>2</sup> the staff plans to develop a rulemaking plan SECY paper to propose initiating rulemaking. The SECY paper will also include a discussion of other regulatory options. The staff plans to provide the SECY paper to the Commission in the fourth quarter of FY 2016.

#### BACKGROUND:

The NRC regulations in 10 CFR 30.35 require a fixed dollar amount financial assurance or a DFP for licensees possessing byproduct material with a half-life greater than 120 days and at activity levels above certain thresholds. Activity thresholds are provided in 10 CFR 30.35 for both unsealed and sealed byproduct material. The thresholds in 10 CFR 30.35 that require financial assurance for sealed radioactive material are seven orders of magnitude higher than for unsealed material. As a result, many licensees that possess byproduct material RSSs, including many Category 1 and 2 RSSs, are not required to provide financial assurance for decommissioning. For licensees possessing multiple RSSs subject to the requirements in 10 CFR 30.35, the “sum of fractions” rule applies when determining whether financial assurance is required.<sup>3</sup> If financial assurance is required, it is intended to support site decommissioning, not necessarily the disposition of an individual RSS that has become disused or unwanted.

Adequacy of financial mechanisms for end-of-life management of disused Category 1 and 2 sealed sources was raised in a 2006 Radiation Source Protection and Security Task Force (Task Force) Report (Agencywide Documents Access and Management System (ADAMS) Accession Number ML062190349). The Task Force, comprised of 14 Federal agencies and the Organization of Agreement States (OAS), was created by the Energy Policy Act of 2005 to evaluate the status of various factors affecting the security of Category 1 and 2 sealed sources

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<sup>1</sup> The International Atomic Energy Agency (IAEA) Safety Guide No. RS-G-1.9, Categorization of Radioactive Sources, identifies five categories of RSSs. The categorization system is based upon the relative health hazard a RSS would present if not kept under adequate controls. Category 1 and 2 RSSs present the greatest health hazard and are considered the most risk significant.

<sup>2</sup> In the Staff Requirements Memorandum (SRM) for SECY-15-0129, “Commission Involvement in Early Stages of Rulemaking,” dated February 3, 2016 (ADAMS Accession No. ML16034A441), the Commission approved institution of a streamlined rulemaking plan requirement in the form of a SECY paper that would request Commission approval to initiate all rulemakings not already explicitly delegated to the staff.

<sup>3</sup> For example, a fixed financial assurance amount of \$113,000 applies to 10 CFR Part 30 licensees who are authorized to possess or use a combination of sealed sources with a half-life greater than 120 days if R divided by  $10^{10}$  is greater than 1 (where R is defined as the sum of the ratios of the quantity of each isotope to the applicable value in Appendix B to 10 CFR Part 30).

and provide recommendations to the President and Congress not less than every 4 years. The 2006 Task Force report recommended that the NRC "...evaluate the financial assurance required for possession of Category 1 and 2 radioactive sources to assure that funding is available for final disposition of the sources." In the NRC staff's 2007 "Strategic Assessment of the U.S. Nuclear Regulatory Commission's Low-Level Radioactive Waste Regulatory Program" (ML071350291), financial assurance scoping for byproduct material was identified as one of seven high priorities.

To address the financial assurance recommendation in the 2006 Task Force Report, the NRC established an Interagency Working Group (IWG) on Financial Assurance for Disposition of Category 1, 2, and 3 Radioactive Sealed Sources in December 2008. In March 2010, the IWG issued its final report (ML100050105), which contained numerous recommendations including that the NRC develop risk-based financial assurance requirements and lower financial assurance thresholds in 10 CFR 30.35 to capture all Category 1, 2, and 3 RSSs. The 2010 Task Force Report (ML102230141) summarized the recommendations of the IWG, and further stated that the NRC would have to determine whether and when to pursue rulemaking to implement these regulatory changes.<sup>4</sup>

The 2014 Task Force report (ML14219A642) highlighted that significant progress has been made to address the commercial sealed source management and disposal challenges identified in the 2006 and 2010 Task Force reports. The report noted that although disposal options for many sealed sources are now available, there are currently few incentives for licensees to dispose of their disused sealed sources in a timely fashion. The report recommended that the NRC, "...evaluate the need for sealed source licensees to address the eventual disposition/disposal costs of Category 1 and 2 quantities of radioactive sources through source disposition/disposal financial planning or other mechanisms. Disposition costs should include the cost of packaging, transport, and disposal (when available) of these sources."

Recommendations for the NRC related to financial assurance were also provided in a March 2014 report issued by the Low-Level Radioactive Waste Forum Disused Sources Working Group (ML14084A394). The report cites numerous factors that it contends have contributed to the large number of disused radioactive sources that remain in storage, including a lack of financial incentives for disused sources to be dispositioned in a timely manner, underutilization of opportunities for recycling and reuse, and the fact that the full life-cycle costs of managing and ultimately disposing of sealed sources are not reflected in the purchase price. The report recommended that the NRC, "...develop robust financial assurance requirements for all licensees with sources that pose a threat to national security (Categories 1 through 3)."

In a September 18, 2014, Commission briefing on management of low-level waste (LLW), high-level waste, and spent nuclear fuel, the NRC staff noted that, given recent interest in financial planning for RSS disposition as expressed in the Task Force and Low-Level Radioactive Waste Forum reports, it would be timely for the staff to revisit the issue. In response, the Commission directed the staff in SRM-M140918 (ML14267A365), to "...provide the Commission with the results of the byproduct financial scoping study and provide recommendations on next steps." The results of the staff's byproduct material financial scoping study are provided in Enclosure 1.

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<sup>4</sup> 2010 Task Force Report, p.36

## DISCUSSION:

### Stakeholder Outreach

To help solicit broad stakeholder input, the staff issued a *Federal Register* notice (FRN) on August 3, 2015 (80 FR 46057, ML15120A342). The FRN noted that the NRC staff was conducting a financial scoping study to determine if financial planning requirements for decommissioning and end-of-life management for some radioactive byproduct material are necessary. The FRN further stated that recent reports addressing this topic had been generated by a limited group of Federal and state stakeholders, and that the views and perspectives of important external stakeholders such as industry, users groups, and current licensees were needed to fully inform the scoping study and any subsequent NRC staff recommendations. Staff also convened a public meeting and webinar at the NRC headquarters on October 7, 2015, to obtain stakeholder input on the NRC staff's scoping study.<sup>5</sup> Meeting participants included representatives of the U.S. Department of Energy's National Nuclear Security Administration (DOE/NNSA), the National Institutes of Health, the Low-Level Radioactive Waste Forum, several state regulatory agencies, the nuclear industry, public advocacy groups, members of the public, and NRC staff.

Staff also conducted targeted outreach activities to certain stakeholder groups with a known interest in this matter. On August 21, 2015, staff issued a letter (STC-15-065, ML15219A465) to State Liaison Officers of all Agreement and Non-Agreement States to notify them of the staff's scoping study and the associated FRN. Staff attended meetings of the Low-Level Radioactive Waste Forum, the Conference of Radiation Control Program Directors (CRCPD), the Health Physics Society, and the Task Force in 2015 to raise awareness of the scoping study and FRN. In addition, staff reached out to other stakeholders including the OAS, DOE/NNSA, the Nuclear Energy Institute and other industry representatives, radioactive materials user groups, and prior attendees of certain NRC public meetings with a related focus.

Eleven commenters responded to the FRN with significant sets of comments on a variety of relevant issues. Comments are summarized by topical area in Enclosure 1. Most commenters were generally supportive of some type of increased financial planning requirements for RSSs. Opinions differed regarding the range of sources that should be covered, the appropriate time frame for disposition of unwanted sources, whether or not generally-licensed sources should be subject to financial planning, and what types of financial planning mechanisms would be appropriate under various licensing circumstances.

To provide additional context on the current environment for RSS disposition, the DOE/NNSA shared information with the NRC regarding its Off-Site Source Recovery Project (OSRP) and the Source Collection and Threat Reduction (SCATR) Program, which is funded by DOE/NNSA and administered by CRCPD. A summary of this information and associated recommendations from the DOE/NNSA is provided in the non-public Enclosure 2. The OSRP and SCATR programs are described further in Enclosure 1.

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<sup>5</sup> Meeting summary can be found in ADAMS at Accession No. ML15310A369.

### Relationship of Financial Assurance to Safety and Security

Numerous studies have noted the potential increased safety and security risks that may arise when disused sources are not promptly dispositioned. Guidance issued by IAEA<sup>6</sup> notes that:

Disused sources represent the largest pool of vulnerable and potential orphan sources. History has shown that many accidents involving orphan sources come about because sources that are no longer in use are eventually forgotten, with subsequent loss of control years later. To this end, it is beneficial from both a safety and security viewpoint for all disused sources to be identified and to undergo proper disposition.

IAEA's *Code of Conduct on the Safety and Security of Radioactive Sources*, Paragraph 22(b), notes that every State should ensure that its regulatory body "ensures that arrangements are made for the safe management and secure protection of radioactive sources, including financial provisions where appropriate, once they have become disused."

A 2005 report by the U.S. Government Accountability Office (GAO)<sup>7</sup> stated that, "...[a]lthough NRC does not place time limits on the storage of radioactive materials as long as they are safe and secure, greater quantities and longer periods of storage, particularly of unwanted sealed radiological sources, will likely increase safety and security risks." The GAO report also provided an example where DOE incurred costs of approximately \$581,000 to recover and dispose of sources that had accumulated at a bankrupt firm in Pennsylvania.

The 2006 Task Force report noted that some NRC licensees, "...may not have sufficient funds set aside to cover the costs of disposal or other appropriate disposition, potentially resulting in prolonged storage and possible misuse or abandonment." The report also noted that high disposal costs may prompt licensees to delay disposal either by choice or economic necessity. The 2010 Task Force report reiterated that, "...while secure storage is a temporary measure, the longer sources remain disused or unwanted the chances increase that they will become unsecured or abandoned." This position was repeated in the 2014 Task Force report. The 2014 report further stated that financial assurance requirements, "...are likely to decrease the time that commercial sealed sources remain in storage because the funds necessary for source disposal will be immediately or quickly available."

While acknowledging the safety and security concerns associated with disused sources, comments provided by the DOE/NNSA in response to the staff's FRN (ML15310A044) noted that increased government involvement in efforts to address RSS management and disposal is not sustainable. The DOE/NNSA stated that additional financial planning requirements could help facilitate the use of available commercial disposal options, thereby reducing the funding required for programs such as the OSRP and SCATR. In FY 2015, the SCATR program facilitated the disposal of 6,074 RSSs (primarily Category 3 and lower sources for which commercial disposal is available) while the OSRP recovered 2,305 RSSs. Based on the reports cited above, there is at least some potential for increased safety and security risks in the

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<sup>6</sup> IAEA-TECDOC-1388, *Strengthening Control Over Radioactive Sources in Authorized Use and Regaining Control Over Orphan Sources* (February 2004).

<sup>7</sup> GAO-05-967, *DOE Needs Better Information to Guide Its Expanded Recovery of Sealed Radiological Sources* (September 2005).

absence of adequate financial planning for RSS disposition. In any event, the current role (and associated costs) of the DOE/NNSA in providing for recovery and disposition of some RSSs, particularly those with commercial disposal options, will likely need to transition at some point to either private industry or other Federal and state entities.

### Scoping Study Results

In addition to considering stakeholder feedback, the staff reviewed current NRC regulations and guidance in the area of financial assurance, relevant internal and external reports, and information obtained through discussions with subject matter experts. This information is summarized in Enclosure 1. Enclosure 1 provides a discussion of numerous technical issues important to byproduct material financial planning as well as other issues such as relevant national and international activities, compatibility with Agreement State requirements, and implementation considerations.

After initial consideration, unsealed byproduct material was not evaluated further in the staff's scoping study. Due to the significantly lower threshold for unsealed byproduct material financial assurance in 10 CFR 30.35, the staff concluded that these requirements did not need to be revisited at this time. In addition, stakeholder feedback as well as the recommendations of internal and external reports reviewed by the staff focused almost exclusively on financial assurance for RSSs.

End-of-life costs for byproduct material RSSs can be significant and unpredictable. The costs associated with end-of-life disposition may include interim storage, packaging and conditioning, transportation, and costs associated with the selected disposition option. Disposition may include options such as return to the manufacturer or supplier for reuse or recycling, transfer to another licensee, disposal as LLW, or, for some short half-life material such as Iridium-192 sources, decay in storage for subsequent management and disposal. While the overall cost of disposition may be substantial and subject to considerable uncertainty, licensees are responsible for the safe and secure end-of-life management of their licensed material regardless of cost.

Licensees are not required to declare when RSSs in their possession are unwanted, nor are they required to provide for prompt disposition. If a licensee has not anticipated and planned for the cost of disposition, this may represent a significant financial burden. For some RSSs, disposal may not be a viable option for a variety of reasons, including lack of access to a LLW disposal facility that can accept the material or a lack of a certified shipping container to transport the material. As a result, licensees may choose indefinite long-term secure storage as the most practical management option. The staff recognizes that, while early financial planning (ideally prior to acquisition of a RSS) is a best management practice and should facilitate timely, safe and secure disposition, long-term storage of RSSs in accordance with applicable NRC requirements is also an acceptable management practice.<sup>8</sup>

Staff reviewed the current financial assurance requirements for Category 1 and 2 RSSs that are tracked in the NSTS. The NSTS tracks more than 76,000 Category 1 and 2 RSSs held by about

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<sup>8</sup> See SECY-11-0182, Annual Review of the Need for Rulemaking or Regulatory Guidance on Extended Storage of Low-Level Radioactive Waste (ADAMS Accession No. ML113120130).

1,400 NRC and Agreement State licensees. While more than 99 percent of RSSs tracked in the NSTS are byproduct material, a small percentage are special nuclear material or source material.<sup>9</sup> Of the 17 byproduct material radionuclides tracked in the NSTS, a fixed dollar amount financial assurance of \$113,000 would be required for 10 of these radionuclides at the threshold level for a Category 1 source.<sup>10</sup> No financial assurance would be required for seven of the byproduct material radionuclides tracked in the NSTS at the threshold level for a Category 1 source (including Cobalt-60 and Cesium-137, two of the most widely used RSSs), nor for any of the byproduct material radionuclides tracked in the NSTS at the threshold level for a Category 2 source.

After conducting its scoping study, the staff agrees with the assessments of numerous state and Federal partners, organizations such as OAS and CRCPD, the Task Force, and other commenters that providing financial assurance for disposition of RSSs supports safety and security goals, helps facilitate timely disposition of disused RSSs, and ensures that the full cost of using these RSSs is appropriately considered by licensees. Financial assurance requirements ensure that licensees have anticipated and are prepared to address disposition costs when they arise.

In considering whether to expand the existing financial assurance requirements in 10 CFR 30.35, the staff believes it is appropriate to initially focus on the byproduct material Category 1 and 2 RSSs tracked in the NSTS. Category 1 and 2 sources have the highest risk significance and are generally the most likely RSSs to pose disposition challenges. As a group, disposition costs are likely to be higher for Category 1 and 2 sources compared to other source categories. Requiring financial assurance for byproduct material Category 1 and 2 RSSs may help reduce the use of long-term storage as a management option, supporting Commission policy that disposal is preferred to storage.<sup>11</sup> In addition, requiring financial assurance for these sources should reduce the likelihood that some licensees will be unprepared for end-of-life disposition costs due to limited financial resources or other unforeseen circumstances. Finally, requiring financial assurance would help ensure that disposition costs related to the use of byproduct material Category 1 and 2 RSSs are borne by those who receive the associated economic benefits, reducing the need for programs such as the OSRP administered by the DOE/NNSA. Based on its analysis, the staff believes that the financial assurance requirements in 10 CFR 30.35 should be expanded to include all byproduct material Category 1 and 2 RSSs tracked in the NSTS. The staff plans to develop a rulemaking plan SECY paper to propose initiating rulemaking as noted in the section below entitled “Next Steps.”

Staff considered whether to further evaluate rulemaking to expand financial assurance requirements to other categories of RSSs such as Category 3 (and below) sources, as suggested by several stakeholders. However, staff elected to focus on byproduct material Category 1 and 2 RSSs at this time. If rulemaking were to be implemented, developing the necessary regulatory infrastructure to require financial assurance for all of the byproduct

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<sup>9</sup> Plutonium-238 and Plutonium-239 sources are tracked in the NSTS and are special nuclear material. Thorium-228 sources are tracked in the NSTS and are source material.

<sup>10</sup> See Table 1 in Enclosure 1. For example, the Category 1 threshold for Cesium-137 is 2700 Ci, but financial assurance of \$113,000 is only required by 10 CFR 30.35 for a Cesium-137 RSS exceeding 100,000 Ci. In contrast, the Category 1 threshold for Americium-241 is 1600 Ci, and financial assurance of \$113,000 is required by 10 CFR 30.35 for any Americium-241 RSS exceeding 100 Ci.

<sup>11</sup> “Low-Level Radioactive Waste Management and Volume Reduction,” 77 FR 25760 at 25781 (May 1, 2012).

material Category 1 and 2 RSSs tracked in the NSTS would be a complex and resource intensive task. Staff believes that the most prudent use of Federal and state resources would be to focus on these RSSs, which present the highest risk. Experience in developing and implementing requirements for byproduct material Category 1 and 2 RSSs could be used to more effectively and efficiently develop similar requirements for lower category sources in the future, if warranted. In addition, Agreement States could continue to implement more comprehensive financial assurance requirements for RSSs, including Category 3 and lower sources, based on current compatibility categories with NRC financial assurance requirements.

Any proposed expansion to the financial assurance requirements in 10 CFR 30.35 would not apply to production and utilization facility licensees which are licensed under 10 CFR Part 50. These licensees are already required to demonstrate financial assurance for construction, operation, and decommissioning, including the disposal of any byproduct material Category 1 and 2 RSSs possessed under their license.

### Next Steps

Based on its analysis, the staff believes that the financial assurance requirements in 10 CFR 30.35 should be expanded to include all byproduct material Category 1 and 2 RSSs tracked in the NSTS. Accordingly, the staff plans to develop a rulemaking plan SECY paper per the recent direction in SRM-SECY-15-0129, "Commission Involvement in Early Stages of Rulemaking," to propose initiating rulemaking. Per the rulemaking plan template, the SECY paper will include a discussion of the estimated schedule for rulemaking, preliminary priority, relationship to the NRC's Strategic Plan, costs and benefits, cumulative effects of regulation, and Agreement State considerations, among other topics. The SECY paper will also include a discussion of other regulatory options.

### COMMITMENT:

Listed below are the actions or activities committed to by the staff in this paper.

The staff will develop a rulemaking plan SECY paper to propose initiating rulemaking to require financial assurance for all byproduct material Category 1 and 2 RSSs tracked in the NSTS. The staff plans to provide the SECY paper to the Commission in the fourth quarter of FY 2016.

### CONCLUSION:

The staff has completed a scoping study to determine whether financial planning requirements for decommissioning and end-of-life management for some radioactive byproduct material, particularly RSSs, are necessary. As described in this paper, the staff conducted an analysis based on a review of NRC regulations and guidance, relevant internal and external reports, and stakeholder feedback collected as part of the scoping study. Based on its analysis, the staff believes that the financial assurance requirements in 10 CFR 30.35 should be expanded to include all byproduct material Category 1 and 2 RSSs tracked in the NSTS. The staff plans to develop a rulemaking plan SECY paper per the recent direction in SRM-SECY-15-0129, "Commission Involvement in Early Stages of Rulemaking," to propose initiating rulemaking.



The Commissioners

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COORDINATION:

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

***/RA Glenn Tracy Acting for/***

Victor M. McCree  
Executive Director  
for Operations

Enclosures:

1. Financial Planning for Radioactive  
Byproduct Material – Scoping Report
2. Summary of Information and Associated  
Recommendations Provided by the  
Department of Energy, National Nuclear  
Security Administration

stakeholder feedback collected as part of the scoping study. Based on its analysis, the staff believes that the financial assurance requirements in 10 CFR 30.35 should be expanded to include all byproduct material Category 1 and 2 RSSs tracked in the NSTS. The staff plans to develop a rulemaking plan SECY paper per the recent direction in SRM-SECY-15-0129, "Commission Involvement in Early Stages of Rulemaking," to propose initiating rulemaking.

COORDINATION:

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

***/RA Glenn Tracy Acting for/***

Victor M. McCree  
Executive Director  
for Operations

Enclosures:

1. Financial Planning for Radioactive Byproduct Material – Scoping Report
2. Summary of Information and Associated Recommendations Provided by the Department of Energy, National Nuclear Security Administration

<b>ML16067A367 (Package)</b>				<b>SRM-M140918-1</b>		
<b>OFFICE</b>	DUWP:PM	DUWP:PM	DUWP:LA	DUWP:BC	DUWP:D	MSTR:D
<b>NAME</b>	R. Whited	J. Shaffner	T. Moon	G. Suber	J. Tappert	D. Collins
<b>DATE</b>	3/24/16	3/8/16	2/18/16	3/4/16	3/16/16	3/15/16
<b>OFFICE</b>	OGC (NLO)	NSIR:D	NRR:D	NMSS	NMSS:D(A)	EDO
<b>NAME</b>	E. Houseman	B. Holian (G. Purdy for)	B. Dean	W. Moore	S. Moore (J. Munday for)	V. McCree
<b>DATE</b>	3/23/16	3/21/16	3/18/16	3/24/16	3/29/16	04/07/16

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