

IAEA Draft Safety Guide DS-454

Predisposal Management of Radioactive Waste from the Use of Radioactive Materials in Medicine, Industry, Agriculture, Research and Education

Comments from the Disused Sources Working Group

The following comments are provided on behalf of the Disused Sources Working Group (DSWG) in regard to the International Atomic Energy Agency (IAEA) Draft Safety Guide DS-454 titled, *Predisposal Management of Radioactive Waste from the Use of Radioactive Materials in Medicine, Industry, Agriculture, Research and Education*.

The general IAEA principles of managing radioactive waste in a safe manner have been set out in the IAEA Safety Fundamentals publication entitled Fundamental Safety Principles. Draft Safety Guide DS-454 is concerned with the application of these principles to the management of radioactive waste prior to disposal. The objective of Draft Safety Guide DS-454 is to provide guidance on the safe management of radioactive waste arising from the use of radioactive materials in medicine, industry, agriculture, research and education.

The DSWG operates as a working group of the Low-Level Radioactive Waste Forum (LLW Forum), which is a non-profit organization of industry stakeholders seeking to assist states and compacts in fulfilling their obligations pursuant to the Low-Level Radioactive Waste Policy Act of 1980 and its 1985 amendments.

During its first phase, the DSWG developed a report identifying issues, findings and recommendations related to the management and disposition of disused sources. The DSWG report is available for downloading on the LLW Forum's web site at <http://www.llwforum.org/pdfs/LLW%20Forum%20DSWG%20Report%20Final%203.19.14.pdf>.

During its second phase, the DSWG is reaching out to stakeholders to educate them about the DSWG report and encourage them to implement the associated recommendations. The second phase of the DSWG includes representatives designated by Governors and low-level radioactive waste compact commissions representing the Appalachian Compact/Pennsylvania, South Carolina, Central Midwest Compact/Illinois, Northwest Compact/Washington, Utah, Rocky Mountain Compact, Nevada, Southeast Compact, Southwestern Compact, Texas Compact, and Texas.

Disclaimer: Please note that this document is a compilation of all of the comments submitted by individual DSWG members. As such, each comment may not express the opinions and perspectives of each and every individual DSWG member.

Specific Section-by-Section Comments

The following DSWG comments and questions are being offered for specific individual sections of Draft Safety Guide DS-454:

1. Introduction

Background

1.3 – The last sentence is a broad statement with which many industry stakeholders would agree; however, there are some stakeholders that believe that there are those radioactive wastes that should not be regulated as Atomic Energy Act (AEA) low-level radioactive waste in this country.

1.4 – The last sentence would be viewed as a good statement by many stakeholders; however, it may be problematic for a number of facilities in that they may generate a waste in a form that is not amenable to storage, transport, treatment, or disposal. Obviously, this is problematic and then requires the facility to embark on a waste treatment research project. This is not something all facilities are capable of doing.

1.5 – Define small amounts? Is the definition based on volume or curies?

1.9 – Add a comment that disused sealed sources are at increased risk for being used for malevolent purposes that threaten security.

Scope

1.18 – Why does Draft Safety Guide DS-454 not cover the safe predisposal management of radioactive waste generated at nuclear fuel cycle research and development facilities?

1.19 – Why aren't the larger and most dangerous quantities of these radioactive wastes addressed in the same manner as the addressed wastes?

2. Protection of Human Health and the Environment

Radioactive Waste Management

2.1 – The inclusion of "associated transport" could present a problem as the normal radiation regulators are cut out of regulating the transport of radioactive material in America. This creates a disconnect at times with regulating such transport.

2.4 – Add threats due to malevolent uses to the list of items that must be addressed.

Environmental Monitoring

2.29 – "However, a limited amount of monitoring may sometimes be adequate for public assurance purposes." This statement appears to promote doing just enough to assuage the public, whereas it should require the facility to demonstrate it is not violating the release limits. Suggested new language would state, "Monitoring is required, commensurate with the potential for release to ensure adequate protection of the public."

Control of Airborne and Liquid Discharges to the Environment

2.31 – Add to last sentence the phrase, "provided ALARA constraints are practiced."

Removal of Regulatory Control from Materials

2.35 – "Material may be cleared without further consideration provided that in all reasonably foreseeable situations the effective dose expected to be incurred by any member of the public due to the cleared material is of the order of 10 μ Sv or less in a year." It is assumed that the " μ " here is supposed to be "micro" symbol—i.e., 10 microSv per year or 1 mrem per year.

2.37 – Should read: "Information (e.g., survey results, sampling data, etc.) on materials from which regulatory control has been removed must be retained a minimum of 10 years and provided to the regulatory body on request."

Removal of Regulatory Control from Buildings and Sites

2.38 – The phrase "prior of removal of the regulatory control," should be re-written as "prior to removal of the regulatory control ..."

3. Responsibilities Associated with the Predispositional Management of Radioactive Waste

National Policy and Strategy on Predispositional Management of Radioactive Waste

Requirement 2: National Policy and Strategy on Radioactive Waste Management

3.16 – The lists of costs to be covered should include the long-term management and disposal of disused sealed sources.

3.18 – In addition to performing an inventory, the Government must also conduct a study on the availability of suitable shipping containers for waste disposal. This study must focus particularly on the availability of Type B shipping containers. The

Government must then ensure that a sufficient number of containers are available and certified in accordance with international standards.

In addition to the proposed policies and strategies, in cases where a waste management or disposal facility exists, there needs to be a strategy for ensuring that the waste is transferred to those facilities in a timely manner. That strategy may include volume and time limits (i.e., a 2-year limit and/or limits on accumulation volume) for storage of waste and disused sources. Additional fees may be charged to encourage disposal of waste and disused sources that are kept in storage at the user's facility.

A policy and strategy must also be developed for the reuse and recycling of disused sources and reusable radioactive material waste. This effort should include the development of a national source exchange program or the participation in the development or use of a multi-national source exchange program.

Requirement 3: Responsibilities of the Regulatory Body

3.22 – In addition to the proposed requirements, the regulatory body needs to be responsible for taking a lead role in educating users of radioactive material about the lifecycle costs of possessing and using radioactive material including the storage, management and disposal costs.

Requirement 4: Responsibilities of the Operator

In the first paragraph add a statement that the operator should consider alternative technologies as a replacement for radioactive material in particular Category 1, 2 and 3 sources.

3.26 – The operators have responsibility to dispose of waste in a timely manner when there is a disposal pathway rather than focus on long-term storage. They also have the responsibility to reuse and recycle their disused sources and material as much as practical. For instance, the Conference of Radiation Control Program Directors (CRCPD) has developed Suggested State Regulations for the Interim Storage of Radioactive Waste. In addition, South Carolina regulations state that one must have a license to store waste, but it only applies to facilities that do not have a disposal pathway. Options for disposal can change at any time, so it is important to have regulations like these in place that at least set out requirements for interim storage.

3.30 (d) – This should address a waste management and disposal strategy including disused sealed sources.

3.30(q) – The financial assurance mechanism must take into account the operator's responsibilities for both management and disposal and must take into account each radioactive waste stream including sealed sources. The use of the term "all phases" is a little too non-specific without additional clarification.

Requirement 5: Requirements in Respect of Security Measures

In addition to the proposed requirements, there needs to be a requirement to develop a system to track all sources and containers of waste that exceed IAEA Category 3 at the national level.

3.45 through 3.50 – In the United States, security has been used in many situations to mask inadequate regulation of radiation activities. In addition, in many situations it is used to trump the adequate regulation of certain activities. This is especially onerous in non-government private facilities handling government radioactive wastes. Workers, safety personnel, and even management are constrained from reporting issues of concern by "secrecy issues."

4. Steps in the Pre-Dispositional Management of Radioactive Waste

Requirement 8: Radioactive Waste Generation and Control

4.6 – Specify that the alternative provisions considered should include alternative technologies that do not use radioactive material.

Processing of Radioactive Waste

Requirement 10: Processing of Radioactive Waste

Pre-Treatment

4.31 - In addition to segregation of high activity waste, consideration should be given to segregation of sealed sources.

4.34 – Add a remark that if sealed sources must be removed from their original packaging, then a person who is authorized by the regulatory body must perform the work. This is already required in the United States in accordance with the sealed source and device registry documents for each registered sealed source.

4.36 – Waste and sealed sources requiring enhanced security—i.e., Categories 1, 2 and 3—should be segregated from other wastes.

Disused Sealed Radioactive Sources

4.75 - In addition to the threat of radiation induced injury, this section should mention the risk of sources being used for malevolent purposes that threaten security.

4.76 – Note that the operator should not attempt to remove a source from its holder unless authorized by the regulatory body.

Orphaned Sources

4.85 – Add reuse as a possible way to disposition an orphaned sealed source.

Generation of Radioactive Waste from Accidents or Incidents

4.86 – Loss of sources can give rise to accidents or malevolent uses resulting in radiation exposure.

Off-site Transport

4.91 – For shipments containing Category 1 and 2 quantities of radioactive material, the shipper must confirm with the regulatory body that the recipient is properly licensed to receive the material.

4.94 – Add a comment that a person who is authorized by the regulatory authority must perform removal of the source from the original manufacturer's packaging.

Storage of Radioactive Waste

Requirement 11: Storage of Radioactive Waste

The first paragraph should include that the waste should be secured from unauthorized access.

4.106 – Add an item (h) requiring that security be evaluated when storing Category 1, 2 or 3 quantities of radioactive waste or disused sealed sources.

5. Safety Case and Safety Assessment

Additional comments regarding the prevention of unauthorized access to radioactive materials and waste need to be added throughout this section.

6. Development and Operation of Predispositional Radioactive Waste Management Facilities

General

6.3 add a section (d) to include measures to protect the radioactive waste and in particular Category 1, 2 and 3 sealed sources from unauthorized access.

General Comments

In reviewing Draft Safety Guide DS-454, the DSWG raises the following general comments and questions:

- The DSWG strongly supports Section 3.16 on financial assurance and Section 3.18 on performing an inventory, both of which are similar to recommendations contained in the DSWG report dated March 2014.
- Why is Draft Safety Guide DS-454 limited to certain classes of radioactive waste?
- Why is it not applicable to all radioactive waste?
- What waste is not covered and why?
- How will that waste be handled?

Background Information on the DSWG Report

In September 2011, at the request of the National Nuclear Security Administration/Global Threat Reduction Initiative (NNSA/GTRI), the LLW Forum formed the DSWG. The original working group, which was comprised of eight Directors of the LLW Forum, solicited input from a broad range of stakeholders at 19 meetings over a 30-month period.

Following the formation of the DSWG, significant advancements occurred regarding the disposal of sealed sources. The Texas Low-Level Radioactive Waste Disposal Compact (Texas Compact) commercial low-level radioactive waste disposal facility began operation in 2012, including the disposal of sealed sources from within and outside the Texas Compact region. With this facility, licensees in all states now have the ability to dispose of most disused sources. In September 2013, the Clive facility began accepting certain Class A sealed sources under a State of Utah approved limited one-year variance. The Branch Technical Position on Concentration Averaging and Encapsulation (CA BTP) being developed by the U.S. Nuclear Regulatory Commission (NRC) may provide for the acceptance of additional high activity sealed sources at the South Carolina, Texas, and Washington state disposal sites. While disposal is now possible for most disused sources, however, there has not been a dramatic increase in disposal activity.

Issues for Consideration While society derives many benefits from the use of sealed sources, the national security threats posed by certain sealed sources requires that the nation reexamine the way in which such sources are managed. The current paradigm for the management of sealed sources does not fully reflect the reality of the post-9/11 threat environment. The magnitude of the disused source problem is large. There are approximately two million sealed sources and tens of thousands of disused sources in the United States; however, the exact number and location of the disused sources are unknown. The existing data systems do not inventory all sealed sources or track all

disused sources in the U.S. that pose a threat to national security. While most licensees manage their disused sources in a responsible manner, there remains a national security concern because of the potential for malevolent use.

Once used for their original purpose, many sources are stored indefinitely. Contributing to the accumulation of disused sources is the fact that the cost of the eventual shipment and disposal of sources is not included in the purchase price; and in most states, financial assurance is not required. Therefore, some users are unaware of these costs. When considering the purchase of a new sealed source, the buyer is not required to consider the overall life-cycle cost of properly managing the source and most do not budget for its ultimate disposal. Thus, as currently configured, the economics of sealed source ownership do not motivate owners toward prompt end-of-life disposition, resulting in thousands of sealed sources being stored indefinitely. Since the purchase price of sources does not reflect the full life-cycle costs, users purchase more sources than they would if the total life-cycle costs were internalized.

Contributing Factors The working group identified six major factors contributing to the disused source problem including:

- the life-cycle costs of managing and ultimately disposing of sealed sources are not internalized;
- the practices of the NRC and the NNSA do not fully reflect a consistent view of what sources pose a threat to national security;
- the regulatory system is not adequate for the post-9/11 threat environment;
- there are no financial incentives for disused sources to be reused, recycled, or disposed in a timely manner;
- the opportunities for recycling and reusing sealed sources are being underutilized; and,
- Type B shipping containers needed to transport certain high activity sealed sources are in short supply and are very expensive.

Findings and Recommendations The NRC considers only Category 1 and Category 2 sealed sources to present a national security risk. However, the DSWG received input from NNSA that some Category 3 sealed sources pose a threat to national security. Accordingly, the working group concluded that the U.S. Government should reach an agreement across agencies regarding which sealed sources pose a threat to national security.

The DSWG also recommends that licensees should be informed about alternative technologies and the actual costs of reusing, recycling, or disposing of sources when they are no longer needed. Research on alternative technologies to replace sealed sources should be a priority of the federal government and the private sector.

While recognizing that the current regulatory system was developed to primarily protect health and safety, the DSWG advocates that NRC and the Agreement States should enhance the system to fully address the national security threat of sealed sources.

According to the DSWG, a Specific License (SL) should be required for all Category 1 through 3 sources and all such sources should be tracked in the NRC's National Source Tracking System (NSTS). The DSWG also recommends that the regulatory system should be restructured to provide economic incentives for the prompt reuse, recycle, or disposal of disused sources. In its report, the working group states that financial assurance requirements should be broadened to cover all Category 1 through 3 sources and increased to cover the full cost of transportation and disposal. Licensees should be required to pay an annual possession fee for each sealed source in inventory.

In addition, the DSWG recommends that the NRC and the Agreement States should develop a comprehensive regulation to limit the storage of disused sources to two years and authorize regulators to require the disposition of sources in storage for more than two years unless there is a demonstrated future use. The working group also contends that inventories of disused sources at sealed source manufacturers, suppliers, and waste brokers should be reduced. And, the DSWG states that NRC should reconsider its decision to allow foreign sources that may not have a commercial disposal pathway to be imported. The financial needs of the Agreement States should also be addressed.

According to the DSWG, federal and private research funding organizations should require grantees to budget for the disposal of sealed sources when they no longer are needed by the grantee.

In addition, the working group concludes that the reuse and recycling of sealed sources should be promoted. In this regard, they recommend that a study on measures to promote the reuse and recycling of sealed sources should be conducted by an agency such as the U.S. Environmental Protection Agency (EPA). They also argue that a sealed source "exchange" program should be established to facilitate the transfer of sources between those no longer needing sources and those looking to acquire sources.

In regard to issues related to Type B shipping containers, the DSWG advocates that NNSA undertake a market analysis of the demand for Type B shipping containers and take additional steps to encourage the private sector to increase the supply of commercially available Type B shipping containers. In addition, the working group recommends that NNSA identify several internationally-certified Type B shipping containers that would have widespread applicability to disused sources in the U.S. and submit applications to have these packages certified by NRC for domestic use. And, the DSWG states that the NRC should continue to expeditiously review applications for Type B shipping containers and should aggressively notify licensees and the Agreement States well in advance of the expiration of shipping container certifications.

An outreach program should be established, according to the DSWG, to assist licensees in identifying resources to assist with packaging, transport, and disposal of disused sources.

The working group also suggests that states with disposal facilities licensed to accept Class B and Class C low-level radioactive waste should examine their waste acceptance

criteria and policies, including the alternative approaches provision in the revised CA BTP to facilitate the disposal of certain high activity sealed sources. The DSWG contends that the existing NRC-Conference of Radiation Control Program Directors (CRCPD) program should be adequately funded to address orphaned and abandoned sources and individual states should retain the ability to operate their own orphaned and abandoned source programs. In addition, the Texas Compact should continue to allow the disposal of sealed sources from outside the Texas Compact region.

The DSWG report acknowledges that NNSA needs to maintain the ability to recover orphaned and abandoned sources that present a national security threat for the foreseeable future. It also recognizes that the CRCPD Source Collection and Threat Reduction (SCATR) program has been effective in collecting and disposing of thousands of disused sources over the last seven years. Nonetheless, the DSWG argues that the long-term solution to the disused source problem is to hold the licensees who have purchased and obtained the economic benefit from the sources responsible for the proper reuse, recycling, or disposal of the sources when they become disused. To this end, the working group recommends that the NNSA should ensure that its programs do not provide a disincentive for licensees to properly reuse, recycle, or dispose of disused sources in a timely manner.

The DSWG report is available for downloading on the LLW Forum's web site at <http://www.llwforum.org/pdfs/LLW%20Forum%20DSWG%20Report%20Final%203.19.14.pdf>.

For additional information regarding the DSWG report, please contact LLW Forum Executive Director Todd D. Lovinger at (754) 779-7551 or LLWForumInc@aol.com.

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