



# HEALTH PHYSICS SOCIETY

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*Specialists in Radiation Safety*

Health Physics Society Comments In Response to the  
Nuclear Regulatory Commission Request for Comments  
on the Security and Continued Use of Cesium-137  
Chloride Sources in the  
Federal Register, Vol. 73, No. 148/Thursday,  
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Docket No. NRC-2008-0419

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The following comments are provided on behalf of the Health Physics Society<sup>1</sup> (HPS) in response to the Nuclear Regulatory Commission (USNRC) request for comments on the security and continued use of Cesium-137 Chloride (CsCl) sources in Federal Register Volume 73, Number 148, Thursday, July 31, 2008, Notices (FRNv73n148) pages 44780-44783. The comments are based on official position statements of the HPS, as referenced where appropriate. Comments that are specific to an issue in the issues paper contained in FRNv73n148 will indicate the specific issue number or question number.

## **Comment Summary**

Following is a summary of the fundamental positions and comments that are discussed further in the detailed comments.

1. Any action to discontinue or replace radionuclide radiation sources that meet the fundamental radiation protection principle of justification, i.e., that the net benefit versus risk of using the source is positive, must comply with the recommendation of the National Academy of Science (NAS) National Research Council that replacement of the source should be done with caution, “ensuring that the essential functions that the radionuclide radiation source performs are preserved” (NRC 2008).
2. The method of evaluation of alternative technologies for radiation sources and the implementation of the regulatory system for replacing the sources must be established in a manner that ensures resulting processes exist into the foreseeable future.
3. Federal and state regulatory agencies should adopt as licensing policy a requirement that license applicants for a new use of a Category 1, 2, or 3 radioactive source examine alternative technologies including, but not limited to, different source forms that are technically and economically feasible and whose alternative use would result in an equal or greater net benefit than from the use of the source (HPS 2006).

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<sup>1</sup> The Health Physics Society is a nonprofit scientific professional organization whose mission is excellence in the science and practice of radiation safety. Since its formation in 1956, the Society has grown to approximately 6,000 scientists, physicians, engineers, lawyers, and other professionals representing academia, industry, government, national laboratories, the Department of Defense, and other organizations. Society activities include encouraging research in radiation science, developing standards, and disseminating radiation safety information. Society members are involved in understanding, evaluating, and controlling the potential risks from radiation relative to the benefits. Official position statements are prepared and adopted in accordance with standard policies and procedures of the Society. The Society may be contacted at 1313 Dolley Madison Blvd., Suite 402, McLean, VA 22101; phone: 703-790-1745; fax: 703-790-2672; email: HPS@BurkInc.com.

4. A licensee should present the evaluation supporting the lack of an acceptable technology for a specific use of a radioactive source when required by the USNRC. The evaluation can be based on findings and recommendations from expert committees or organizations, like the NAS and the Radiation Source Protection and Security Task Force (Task Force), and from guidance provided by the USNRC, but should be specific to the intended use of the source (Toohey 2008).
5. The decision to discontinue use or to replace a source with an alternative technology should be made on a source-by-source basis, considering the specifics of the security and protection measures in place for the source.
6. A requirement should be incorporated into the licensing process that an owner of Category 1, 2, or 3 sources must provide financial surety for disposal of the sources (HPS 2006).
7. Congressional action is needed to authorize programs and appropriate sufficient funds on an ongoing basis to maintain a robust national capability for the recovery and disposition of vulnerable sources, orphan sources and sources replaced by alternative technologies within the United States and abroad (HPS 2006).
8. The regulatory framework for management and disposal of low-level radioactive waste in the United States needs a complete and coordinated overhaul in order to ensure there are appropriate disposal options for sources that are discontinued or replaced (HPS 2005a).

## **Comments**

### **Issue No. 3.1: Potential Rulemaking Issues and Justification for Regulatory Change.**

The justification for regulatory change results from the fundamental radiation protection principle of justification.

The principle of justification requires that any decision that alters the radiation exposure situation should do more good than harm. The International Commission on Radiological Protection (ICRP) recognizes that “The consequences to be considered are not confined to those associated with the radiation – they include other risks and the costs and benefits of the activity” (ICRP 2007). If a proper and appropriate evaluation of all the consequences of discontinuing the use of, or replacing a specific source with another technology

results in a determination that more good than harm is done by that action, then that is justification for a regulatory change.

Q3.1-5.(a) Should the USNRC discontinue all new licensing and importation of these sources and devices?

No. These sources should be subject, through licensing actions, to the evaluation of justification to determine if the source is justified to be licensed for use.

Any action to discontinue or replace radionuclide radiation sources that meet the fundamental radiation protection principle of justification, i.e., that the net benefit versus risk of using the source is positive, must comply with the recommendation of the National Academy of Science (NAS) National Research Council that replacement of the source should be done with caution, “ensuring that the essential functions that the radionuclide radiation source performs are preserved” (NRC 2008).

The USNRC should have a requirement that license applicants for a new use of a Category 1, 2, or 3 radioactive source examine alternative technologies including, but not limited to, different source forms that are technically and economically feasible and whose alternative use would result in an equal or greater net benefit than from the use of the source (HPS 2006).

The decision to discontinue use or to replace a source with an alternative technology should be made on a source-by-source basis, considering the specifics of the security and protection measures in place for the source. An evaluation for a specific source and source use would essentially be a documentation of justification for the use of the source that supports the decision on whether or not to allow use of, or to require replacement of the source.

A licensee applying for a new license for a Category 1, 2, or 3 source should present the evaluation supporting the need for using the source and the lack of an acceptable technology for the source; and, the USNRC, in its regulatory role should accept or deny the results of the evaluation. The evaluation should be based on findings and recommendations from expert committees or organizations, like the NAS report and the Task Force, and from guidance provided by the USNRC, but should be specific to the intended use and site-specific conditions of the source (Toohey 2008). The evaluation should address both the state-of-the-art knowledge about alternative technologies and a risk-benefit analysis (the risk analysis part is discussed below). The expert guidance on state-of-the-art knowledge about alternative technologies should be updated

on a regular basis, such as every 5 to 10 years, to support decision making into the foreseeable future.

Source-by-source evaluations can take into consideration source and site specifics that affect the probability term in the risk formula as given in the NAS report, i.e.,  $\text{Risk} = \text{Probability} \times \text{Consequence}$ . For example, a non-destructive testing radiography camera that is stored and used entirely on a military facility that has security requirements for protecting against enemy entry onto the facility has a greatly reduced probability of having the source taken by a terrorist as compared to one that is transported in a truck to a remote location by two civilian radiographers. Or, a large, well-established company, hospital, etc. has a greatly reduced probability of going out of business and leaving the source as an orphan source as compared to a small, independent firm, clinic, etc. Therefore, a generic banning of a categorical use of sources, i.e., radiography or blood irradiating sources, may not be appropriate for all sources and site-specific conditions.

#### Q3.1-5.(b) What is the regulatory basis?

See the discussion of regulatory justification above.

#### Q3.1-5.(c) Who (NRC, DHS, or jointly) should conduct the risk analysis?

A risk analysis that supports the decision that a specific source license is appropriate should be a key part of the evaluation discussed above and should be the responsibility of the licensee. However, a licensee will clearly need supporting guidance from the USNRC on how to apply risk factors to their specific evaluation. The USNRC guidance should use whatever resources are appropriate and available, like the Department of Homeland Security, Federal Bureau of Investigation, the National Nuclear Security Administration (NNSA), etc. The guidance for a specific license risk analysis should derive from a generic risk analysis.

A generic risk analysis of source types and materials is necessary for the purpose of identifying any high-risk sources that need particular attention for security, and for guidance on how to apply a risk analysis for a specific licensed source. This generic risk analysis is appropriate to be done, or commissioned by the USNRC or Task Force, much like the NAS report, which resulted in identifying CsCl sources as a high priority at this time. A generic risk analysis should be performed on a regular basis, such as every 5 to 10 years, to support decision making into the foreseeable future.

#### Q.3.2-3.(b) What disposition options are needed in the United states?

The appropriate long-term disposition option for decommissioned high-risk sources, like CsCl, is disposal. However, the regulatory framework for management and disposal of low-level radioactive waste (LLRW) in the United States needs a complete and coordinated overhaul in order to ensure there are appropriate disposal options for sources that are discontinued or replaced. The fundamental changes in the regulatory system that are needed to open all appropriate disposal options are those that provide for: (1) a national hazardous waste disposal system that is risk-based and integrated for all hazardous waste, i.e., radiological and non-radiological waste, (2) access for non-Department of Energy (DOE) waste generators to all existing licensed and permitted disposal facilities including those owned and operated by the DOE, and (3) a new waste-disposal capacity for all LLRW at a facility currently operated by DOE or by private industry on land owned by the federal government, if needed. Details and further discussion on the need for an overhauled LLRW management system can be found in the HPS position statement “Low-Level Radioactive Waste Management Needs A Complete And Coordinated Overhaul” (HPS 2005a) and its background information document (HPS 2005b).

In the short-term, disposition of high-risk sources should be done by the appropriate U. S. federal agency, such as the NNSA. Congressional action is needed to authorize programs and appropriate sufficient funds on an ongoing basis to maintain a robust national capability for the recovery and disposition of vulnerable sources, orphan sources and sources replaced by alternative technologies within the United States and abroad (HPS 2006).

In order to support disposal/disposition, a requirement should be incorporated into the licensing process that an owner of Category 1, 2, or 3 sources must provide financial surety for disposal of the sources (HPS 2006). Inclusion of financial surety in the licensing requirements will support available disposal options into the foreseeable future.

Q3.4-1. How can the U.S. prevent recovered sources from decommissioned devices (or the devices themselves) from being sold outside the U.S.?

The USNRC should make it a license condition that these sources be dispositioned by the appropriate federal agency or disposed of in an appropriate disposal facility, as discussed in Q3.2-3. (b) above.

Q3.4-2. (a) If the U.S. decides to ban the use of CsCl sources, should the U.S. have a position in denying or eliminating after-market sales of CsCl irradiators outside the U.S.?

Yes. The U.S. should work to have the security and protection requirements for sources that are adopted in the U.S. or proposed by the International Atomic Energy Agency (IAEA) be adopted in the rest of the world.

Q3.4-2. (b) Would this be potentially denying medical care to developing countries?

The U.S. should work to provide developing countries with the same methods of medical care it uses, such as allowing for after-market sales of the alternative technologies it has adopted. Ensuring medical care in developing countries at the cost of increasing the probability of reduced security in the U.S. is not appropriate.

Q3.4-3. What should the role of the International Atomic Energy Agency (IAEA) be in assisting the U.S. in ensuring the safe and secure use of CsCl sources and devices?

The IAEA and the United States should both work together co-operatively, as they have been doing, to help ensure that:

1. existing Category 1, 2 and 3 CsCl sources are identified (inventoried) and that regulations and standards for the safety and security of these sources be adopted throughout the world that are at least as stringent as those adopted in the U.S. or proposed by the IAEA;
2. disused CsCl sources are collected, then safely and securely dispositioned;
3. new CsCl purchases are justified (see previous discussion); and,
4. import or export of CsCl sources follows the Code of Conduct guidance document on the subject.

Q.4.2. Should the NRC and Agreement States require more stringent security measures for lower than Category 2 CsCl sources and devices (e.g. Category 3 sources)?

The HPS believes that a Category 3 source has the potential for unacceptable personal injury, economic, or social consequences from mismanagement or poor security (HPS 2006).

The HPS believes Category 3 sources should be subject to the license requirement for an evaluation of alternative technologies and should be included in the National Source Tracking System (NSTS), unless an analysis can demonstrate that the large number of such sources and the economic cost for tracking them would be overly burdensome (HPS 2006).

In implementing the license requirement for alternative technology evaluation the detail and depth of analysis and justification should be commensurate with the source activity. That is, for Category 3 sources the simple documentation that licensees have investigated and thought about alternative technologies may be sufficient without a detailed risk analysis and engineering evaluation. The USNRC implementation guidance document can detail to what degree a Category 3 evaluation must be done.

For both alternative technology evaluation and the NSTS, inclusion of Category 3 sources should be done in a time and manner that supports implementation for Category 1 and 2 sources in an expeditious manner, while Category 3 sources can be take a longer time to address. For example, things like real-time tracking of Category 3 sources, if real-time tracking is to be part of the NSTS, is expected to take a lower priority than getting a basic tracking system in place for Category 1 and 2 sources.

Beyond the alternative technology evaluation and NSTS, any other “more stringent measures” would need to be evaluated on a case-by-case basis as to whether they should apply to Category 3 sources.

Q5.1 (a) How should the NRC determine the economic and social disruptions/impacts to the public, licensees, and the environment? (b) How should these factors be measured in decision making?

This should be the subject of expert panel reports conducted or commissioned by the USNRC or Task Force.



## REFERENCES

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