U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

FACT SHEET

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Radiation Source Security and Replacement

The security of radiation sources has been and continues to be a top priority for the Nuclear Regulatory Commission. The NRC's efforts have been effective, keeping incidents involving radiation sources and radioactive materials to a minimum and their potential consequences low. Most lost or stolen sources are quickly recovered, resulting in minimal or no radiation exposures or contamination. There have been no security incidents involving risk-significant radiation sources. The NRC continues to work with domestic and international organizations on a variety of initiatives to make risk-significant radiation sources even more secure and less vulnerable to terrorists.

Over the past five years, the NRC and state agencies have issued and inspected new requirements that have substantially improved the security of these sources. These requirements include:

- Access controls, including fingerprinting and background checks for personnel with access to the materials;
- Detection, assessment and response capabilities;
- Transportation controls; and
- Information protection.

The NRC has also deployed its National Source Tracking System to follow inventories and transactions involving the most risk-significant radioactive materials; tightened its process for issuing licenses for radioactive materials; and strengthened requirements for import and export of radioactive materials.

While the NRC has focused its efforts on security of radioactive sources so they may continue to be used in medicine, industry and research, concern that these materials could be used by terrorists in a so-called "dirty bomb" has prompted calls for alternative technologies to replace certain radioactive materials, primarily cesium chloride. However, there currently are no viable alternative sources or technologies available that would provide the same benefits to society.

The NRC believes banning these sources from commercial use before alternatives are available would be premature. Such an action could deprive medical patients of vital diagnostic procedures and therapies, hamper academic research efforts, and reduce the capability of emergency responders to deal with radiological incidents. In April 2009, the Commission directed the NRC staff to continue its focus on enhancing the security of these materials, while encouraging long-term research to develop alternatives.

The Search for Alternatives

In the Energy Policy Act of 2005, Congress mandated three examinations of potential alternative technologies:

- The Radiation Source Protection and Security Task Force, comprised of 14 federal agencies including the NRC, was created by the act to examine the security of radioactive sources and potential alternative technologies. The task force recently endorsed a report on cesium chloride and is developing reports on alternative technologies and radiation sources.
- The NRC was directed to contract with the National Academies for an independent study of alternative technologies for certain radioactive sources. The National Academies report was released in February 2008.
- The Department of Energy was also directed to report to Congress on alternative technologies. DOE's report was submitted in 2006.

The NRC believes certain radiation sources should not be banned for security reasons before alternatives are available, because these sources provide significant societal benefits in medicine, industry, research and emergency response.

In addition, the Environmental Protection Agency, the Defense Sciences Board and the Department of Homeland Security have studied alternative technologies to certain radiation sources.

The radiation sources in question are used to treat millions of patients each year in diagnostic and therapeutic medical procedures and to sterilize medical supplies. They provide critical capabilities in the oil and gas, electrical power, construction and food industries, and are used in technology research and development. In emergency response, they are used to calibrate radiation detection equipment – a vital resource in responding to any potential dirty bomb incident.

Alternative Technologies

Alternative technologies to radiation sources may include the replacement of a radiation source with an equivalent (or improved) process that does not require the use of radionuclides. Another approach is to replace a radiation source with a different radiation source that poses a lower risk to public health and safety if it were involved in an accident or used in a terrorist attack. The majority of these sources are cobalt-60, cesium-137, or iridium-192 used in medical applications, such as gamma knives and blood irradiators, and industrial and research applications, such as radiography cameras, well logging, and industrial and research irradiators.

Blood Irradiator

The NRC welcomes recommendations to enhance the safety and security of radiation sources and lower the potential risk of terrorist use of radiation sources. Alternative technologies to radiation sources may be one approach to accomplishing this goal. However, the NRC bases its licensing decisions on whether its requirements have been met, without evaluating whether other technologies could have been used. Traditionally, market forces, not security considerations, have driven demand for the use of radiation sources and their alternatives in devices.

Radiography Camera

While alternative technologies are being studied, the NRC continues to strengthen the security of the most sensitive radiation sources. Security of these materials can be an inexpensive and effective way of ensuring that society continues to reap their benefits while reducing the potential for their misuse.

For more information on radiation source replacement and alternative technologies, see NRC's Web page on Security of Radioactive Materials.

> *"The security of radioactive sources is a top priority for the NRC. Along with state agencies and our federal partners, we have taken strong steps to reduce the danger of these materials falling into the wrong hands. Our constant vigilance in this area will help maintain the beneficial uses of these materials as the federal government, states and industry explore potential alternatives."*
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> *- NRC Chairman Dale E. Klein*

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