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 (NRC). 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. The NRC works with domestic and international organizations on a variety of initiatives to make risk-significant radiation sources more secure and less vulnerable to terrorists.

While the NRC has focused its efforts on securing 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. 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 is currently developing reports on cesium chloride and alternative technologies.

- 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. Most of the issues raised in the report are already being addressed through the Radiation Source Protection and Security Task Force.

- The Department of Energy was also directed to report to Congress on alternative technologies. DOE's report was submitted in 2006.

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

The NRC believes any effort to replace radiation sources with alternative technologies should proceed with caution in order to minimize disruption in vital areas of industry, medicine and research.

The radiation sources in question are used to treat millions of patients each year in diagnostic and therapeutic medical procedures. They provide critical capabilities in the oil and gas, electrical power, construction and food industries, and are used in technology research and development. In the United States, about 2,000 licensees possess the radiation sources considered the most sensitive from a security perspective.

Alternative Technologies

Figure 1 - Blood Irradiator

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.

Figure 2 - Radiography Camera

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 have driven demand for the use of radiation sources and their alternatives in devices.

While alternative technologies are being studied, the NRC continues to strengthen the security of the most sensitive radiation sources. Securing 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 for 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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