The New Orphaned Radioactive Sources Program in the United States

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ABSTRACT

Exposure of the public to uncontrolled radioactive sources has become an significant concern to the United States (US) Government because of the continuous increase in the number of sources that are being found, sometimes without proper radiation markings. This problem is primarily due to inadequate control, insufficient accountability, and improper disposal of radioactive materials. The US Environmental Protection Agency (EPA) has funded a cooperative "orphaned" source initiative with the Conference of Radiation Control Program Directors (CRCPD) to bring under control unwanted sources and thus reduce the potential for unnecessary exposure to the public, workers and the environment. The program is being developed through the cooperative efforts of government agencies and industry, and will provide a quick and efficient method to bring orphaned sources under control and out of potentially dangerous situations.

1. BACKGROUND

The United States (US) uses about 90 million metric tons of steel annually. About half of that metal comes from recycling. It is important that the metal be as free from contamination as possible. US Department of Energy (DOE) facilities and nuclear power plants which are decommissioned are potential sources of millions of tons of metal that could be recycled. In addition, there are nuclear facilities around the world that are being dismantled, and the metal sold for scrap.

The US Environmental Protection Agency (EPA) has a mission to protect people and the environment, and so began a study to determine any potential effects on the public of recycling the metal from these facilities. As EPA investigated the domestic metal recycling process, they became more concerned about two additional potential sources of contamination in metals: contaminated metal from foreign countries, and sealed radioactive sources, both domestic and foreign, that become mixed into the scrap metal stream (orphaned sources). This paper discusses a new program that is intended to reduce the number of radioactive sources that enter the scrap metal stream in the US.

2. PROBLEMS WITH SEALED RADIOACTIVE SOURCES

Sealed sources in the US are the responsibility of the Nuclear Regulatory Commission (NRC) and individual states which have assumed this authority (NRC Agreement States), and fall into either of two categories: (1) specifically licensed devices, and generally licensed devices. Generally licensed devices, in contrast to the specifically licensed devices, are subject to minimal regulatory oversight, and sometimes, inadequate control. As a result, there could be as many as 30,000 radioactive devices lost or otherwise unaccounted for ("orphaned") in the US today (exact figures are not available since there is no comprehensive registry). Some of these orphaned sources find their way into the general public domain or commercial scrap metal stream, while others may end up in municipal waste disposal facilities. Scrap metal handlers and some landfill operators have installed radiation detectors in an attempt to locate these orphaned sources before they enter the facilities. The EPA is concerned that the lack of uniform guidance and regulatory control of all radioactive devices have caused unnecessary contamination as a result of improper disposal by the source owners. This carelessness has caused injuries to workers and members of the US public has while costing millions of dollars for remediation.

Since 1994 over 2,500 incidents of radioactive material found by the metal recycling industry have been reported. Since 1995 there have been about 50 sealed sources found annually in the US by members of the public. Although over half of the radioactive material found in recycled metal scrap is in the form of naturally occurring radioactive material (NORM), this effort is mostly concerned with sealed radioactive sources or discrete radioactive sources that would, when breached, potentially pose significant risk for the unsuspecting members of the public or industry workers. Recently in the US, industrial radiography devices containing ^{60}Co and ^{192}Ir sources were stolen and sold as scrap metal. People who were exposed unnecessarily to the source may have received doses up to 100 mSv (10 rem).

The US has an emergency response program to ensure that radiation sources that pose an immediate danger are brought under control. Fortunately, most sources are discovered before they become a health threat. In the US, the individual who discovers a source is responsible for the disposal of the source, unless he can find the owner. Because of the lack of a nationwide coordinated program to find economical reuse or disposal options for sealed sources, government agencies have begun to find sources lying along highways, discarded on vacant land, or intentionally hidden by scrap metal while being sent to recyclers.

3. NEW ORPHANED SOURCES PROGRAM

The EPA decided that a better system was needed to protect the public. EPA discovered that the Conference of Radiation Control Program Directors (CRCPD), an organization of state and local government personnel responsible for radiological health programs in the US, had begun a program to help find new owners for unwanted sources. EPA teamed with the CRCPD and provided funding to expand that program nationwide to include all "orphaned" sources. CRCPD, with assistance from Federal and State agencies and industry, is developing and will administer the program. The major planned activities include the following:

(a) Conduct a survey to identify sealed source types and potential quantities;

(b) Investigate source management problems and find alternatives to present systems for control and disposition of sources;

(c) Develop a user friendly and easily maintained nationwide sources database;

(d) Develop a program for efficient and cost effective disposition of orphaned sources; and

(e) Expand outreach to the widest possible audience for source identification, availability of sources no longer needed by the current owner, and disposal options for sources.

3.1 Progress to Date

In October 1997, a committee was formed of state and federal personnel to develop a streamlined approach to disposition orphaned sources by reuse, legal transfer, or burial. First, a definition for orphaned sources was developed: an orphaned source is a discrete source of radioactive material that is either (1) in the possession of an unlicenced entity; (2) in the possession of a licensee not authorized for the material; (3) in the possession of a licensee, but there is little confidence that the source will remain secure (e.g., bankrupt licensee), or (4) has no legal disposal option.

Next, the committee conducted a survey of sealed sources which had been found and stored on an interim basis awaiting final disposition either through reuse or burial. The survey is intended to establish a source inventory for disposal prioritization. If no responsible party can be identified with resources for disposition then a determination is made by the committee about whether to fund the disposition based upon a qualitative assessment of stability (containment, shielding, form of source, and leakage/contamination) and the capability of the custodian to maintain the source.

The committee has begun work on a single database which will be used to track all orphaned sources found in the US. This database will be accessible via the Internet for government officials, waste brokers, and qualified licensees seeking sources. In addition, it is envisioned that owners will post information about lost sources, allowing authorities and scrap brokers to be on the lookout for the missing devices. The database is expected to be operational by the fall of 1998. EPA is also working with other US federal agencies to provide better detection capabilities for sources misplaced in scrap metal.

3.2 Upcoming Work

The next phase of the orphan source initiative is to provide extensive outreach programs though the Internet, hand books and magazines to increase awareness of both industrial organizations and the public about the dangers of sources, and the availability of resources for the proper disposal of sources. US industry is cooperating by providing

information they have developed on identifying sources, which will be combined with government materials and guidance on using the newly developed procedures for source disposal. The outreach program will include information to help identify radioactive sources even in cases where the warning markings have been removed.

4. OTHER ORPHANED SOURCES INITIATIVES

In addition to the primary orphaned source initiative described above, the NRC is working to tighten its regulatory oversight of generally licensed devices for better accountability by 6,000 general licensees. A proposed rule is being developed that will require licensees to pay fees for future disposal, require permanent labeling, impose civil penalties for lost devices that will be greater than disposal cost, and apply more stringent housekeeping inspection requirements of licensees with general licenses. However, several NRC Agreement States have already imposed stricter requirements, and have seen a noticeable improvement in source accountability.

5. RELATED ACTION NEEDED

World-wide markets and distribution of raw materials and finished goods have resulted in problems going beyond national borders. Further, countries increasingly are becoming concerned about potential terrorist use of radioactive materials. It is important for all nations to become more aware of the need to control radioactive sources, and to take measures to ensure their control. In addition, an international clearance standard implemented by all nations is needed for addressing allowable clearance levels for radioactivity in metal.

6. CONCLUSION

The orphaned sources program being developed in the US will provide a timely and efficient method for bringing orphaned sources under control. The dissemination of information to the public and industry will increase awareness of the problem and help to ensure that sources are brought under control promptly. The improved oversight of licensed devices by the NRC and the NRC Agreement States will, over time, help reduce the number of sources that become orphaned. However, while improvements in licensee and regulatory performance with respect to control and accounting will be expected as a result, given the huge population of radioactive devices in the US, the total elimination of all incidents pertaining to the loss of control of radioactive devices is not realistic. Awareness and vigilance by the public and industry must increase, and the continuation of the CRCPD program will remain a vital component of radiation safety for the public. Finally, international action is necessary by all nations to control sources and for addressing allowable clearance levels for radioactivity in metal.

For more information on these issues please contact EPA's world wide web site on the Internet at http:/www.epa.gov/radiation/scrap.