

## IDENTIFYING RADIOACTIVE SOURCES AT THE DEMOLITION SITE

Deborah Kopsick and Renelle Rae  
Office of Radiation and Indoor Air  
United States Environmental Protection Agency

### ABSTRACT

Radioactive sources are being incorporated into the world's scrap metal supply. In order to prevent this unwanted radioactive material from entering metal processing sites, some facilities have voluntarily installed radiation monitoring devices at the entrance to their facilities (Figure 1). However, this monitoring does not guarantee that all radioactive sources will be detected in scrap metal loads. Shielding of the sources by the metal scrap, location of the source within the scrap load and the location and sensitivity of the monitoring system will determine if the source is detected. To date, there have been 83 meltings of radioactive sources in metal processing facilities (1), with site cleanups averaging \$12 – 15 million (1). One facility, the site of a melted a radiation source, has incurred cleanup costs in excess of \$26 million (1). The U.S. Environmental Protection Agency (EPA), in a cooperative partnership with the scrap metal industry, developed a CD ROM based training program to provide a protocol for response to facility radiation alarms (2). This training enables site workers to identify and properly manage radioactive sources after they have been detected in the scrap metal supply. In order to prevent these sources from becoming uncontrolled, it is necessary to identify and manage these radioactive sources before they get placed in the scrap metal supply. A CD ROM based training program entitled "Identifying Radioactive Sources at the Demolition Site" is designed to address this problem and help the demolition industry secure radioactive gauges and devices at their point of installation.



**Figure 1 Radiation Portal Monitor at entrance to scrap yard**

## INTRODUCTION

There are many industrial uses for gauges and devices utilizing radioactive sources. These devices are used to measure thickness of metal and paper, the volume of fluids and the fluid flow in a pipe, the fill level in cans and bottles and the density of various materials including tobacco products. Industries that routinely use these devices include the automotive, paper manufacturing, sewage treatment, cigarette manufacturing and metal fabrication. These gauges and devices containing radioactive sources are licensed by the Nuclear Regulatory Commission, and must be disposed of properly. One of the inherent problems lies in the efficiency of these devices, in that they can perform their jobs for long periods of time with very little or no maintenance. The gauges and devices are often painted over during renovations, obscuring any radiation warnings or symbols or when taken off-line, they are put into storage and forgotten. Radioactive markings become obscured and the institutional knowledge of these devices is gradually lost (Figure 2). As facilities change hands, the information on the gauges and devices containing radioactive sources is not often transferred to the new owner, as required.



**Figure 2** Examples of radioactive sources from demolition sites

Demolition sites are a major supplier of the world's scrap metal supply. When a demolition contractor is scheduled to take down a building, they may not be notified about the presence of radioactive materials at the site. The gauge or device may inadvertently be put into the outgoing scrap metal shipments. The ability of the demolition contractor to identify these devices at the demolition site will greatly enhance the securing and safe handling of these materials, and reduce the number of these devices that show up at scrap yards and metal melting facilities.

## PROGRAM STRUCTURE

The EPA training program is composed of five modules that are designed to gain the voluntary assistance of the demolition manager and worker in identifying radioactive sources and ensuring their proper disposal. The program stimulates opportunities for identifying radioactive sources, outlines best practices, and allows the student to test their understanding of the material. In its entirety, the main program will take up to three hours to complete, however it may be completed in multiple sessions. The Worker Toolbox

can be incorporated into the job-site training programs and will take one hour to complete. The program is structured as follows:

**Introduction:** describes the purpose of the program, the presentation goals, the use of best practices and program navigation.

**You Need To Know:** describes physical characteristics of tritium exit signs and gauges and devices that contain radioactive sources and identifies industries where these devices most commonly occur, discusses exposure pathways and risks, and explains why it is so important to “do the right thing”.

**Opportunities:** presents a typical demolition timeline and identifies ways to locate radioactive gauges and devices during each phase. Each of these phases, from initial client contract thru job closeout, presents opportunities to find and properly handle these materials. The goal is to identify these gauges and devices as early as possible in the demolition process to prevent exposure of workers and contamination of the scrap metal supply.

**Test Your Knowledge:** questions and answers to review course information and test the understanding of the student.

**Resources:** presents information for use in handling and disposing of radioactive materials, including state radiation program contact information, information on available transportation and disposal options for radioactive material, tritium exit sign manufacturer buy-back programs, and Material Safety Data Sheets for the more common radionuclides.

Throughout the **You Need to Know** and the **Opportunities** modules, various gauge and device manufacturers, State officials, Federal officials and a representative of the demolition industry share their insight and perspective on managing radioactive sources, and present ways to properly dispose of this material. Case studies of improperly handled sources, including the consequences of these actions, are also presented. This material is complimented by video footage of a radioactive material “discovery”.

## **PROGRAM SPECIFICS**

The program is designed for two audiences. The longer, more in-depth version is written for the demolition manager, site supervisor, health and safety officer and estimator. The ideal time to identify any on-site radioactive materials is during the initial client contact, however if the building owner has no knowledge or shares no knowledge about on-site radioactive material, the job estimator needs to be alert during the walk-through in order to identify these materials. The National Demolition Association has added the category of “radioactive material” to the environmental issues section of their Engineering Survey form, which includes other site hazards such as asbestos, lead-based paint and hazardous chemicals. (3)

The Worker Toolbox Module is written for the worker who may come across suspicious material during the course of demolition, perhaps a gauge or device that escaped detection during the walk-through. The module describes the characteristics of radioactive material that should alert the worker to a potentially dangerous situation. The worker is instructed to notify his supervisor, who will take the appropriate action to secure the material. The worker program is approximately one hour in length and is designed to be one of the tools available for the periodic on-site safety trainings.

Both programs are available in English and Spanish on the same CD, to facilitate the transfer of knowledge. The program also complies with Section 508 of the Rehabilitation Act and can accommodate hearing and vision-impaired persons.

## CONCLUSIONS

The National Demolition Association, with its 1050 member companies, has joined in a voluntary partnership with the EPA to “Do the Right Thing” relating to radioactive materials found at demolition sites. The demolition industry is aware that radioactive materials are being found at scrap metal facilities. EPA has worked with the scrap metal industry to properly respond to these radioactive detections. Since not all radioactive material is being detected before the metal is melted, it is important to identify this material before it ever enters the scrap metal supply. In order to prevent contamination of the domestic scrap metal supply, the National Demolition Association has participated in the development of training for their managers and workers to increase awareness of the existence of these gauges and devices. By managing these materials correctly, hazards to the demolition workforce, the public, and the environment can be reduced and the integrity of the demolition and metal recycling industry can be maintained. Homeland security can also be enhanced by regaining control of unsecured radioactive materials that could be used in the manufacture of a “dirty bomb”. The demolition contractors are the last line of defense before these materials leave the demolition site and enter the U.S. scrap metal supply.

To obtain a copy of this training program, free of charge, please contact Deborah Kopsick at [kopsick.deborah@epa.gov](mailto:kopsick.deborah@epa.gov), or (202) 343-9238.

## REFERENCES

- 1) Ray Turner, River Metals Recycling, Ft. Mitchell, KY, 11/15/04, personal communication.
- 2) U.S. Environmental Protection Agency, *Responding to Radiation Alarms at Metal Processing Facilities*, CD ROM based training program, 09/17/02, contact [kopsick.deborah@epa.gov](mailto:kopsick.deborah@epa.gov).
- 3) National Demolition Association, Doylestown, PA, Demolition Safety Manual, Engineering Survey form (Chapter 3).