

EPA'S CLEAN MATERIALS PROGRAM- A YEAR OF PROGRESS

D. A. Kopsick and W.C. Conklin, USEPA (USA)

ABSTRACT

During the past year the U. S. Environmental Protection Agency (EPA) has made significant progress in achieving the objectives of its Clean Materials Program, designed to control the introduction of radioactive materials into the consumer metal supply. EPA is addressing the issue of radioactively contaminated scrap metal and consumer products on the international and domestic levels.

Participation on the IAEA workgroup to develop clearance values has concluded, with an issuance of an IAEA Safety Guide expected in 2001. If adopted by IAEA member states, these values will control the amount of radioactivity in scrap metals being released from nuclear facilities in these states. EPA is now focusing its efforts on working with IAEA to develop an international interception values, which will prevent radioactive material from crossing international borders. On the domestic front, EPA commenced its pilot program to collect "orphan" radioactive sources with the assistance of the Conference of Radiation Control Program Directors (CRCPD) and the Colorado Department of Public Health and Environment (CDPHE). These sources, which have fallen out of regulatory control, pose a significant threat to workers and the general public. Thirty-four of these sources, which are currently in the hands of persons not licensed to own them, are scheduled to be recycled by the manufacturer or disposed of by early 2001. An interactive CD ROM-based training program for first responders is being developed to prevent radiological exposure to those who are responsible for addressing radiation alarms at metal processing facilities. These alarms are often the result of illegal "orphan" sources in scrap metal loads.

INTRODUCTION

During the past 4 years, EPA's Radiation Protection Division has been focusing its efforts on preventing the exposure of the public to excess radiation released from uncontrolled radioactive sources. The risk to an individual from radiation release from one of these sources is significant. On a much too frequent basis, the media reports about the consequences of a person coming into contact with one of these sources. Severe chronic health problems, often resulting in death, can be the result. There have also been incidents where these sources have entered a scrap metal yard or a steel mill, contaminated the facility, exposed the workers to radiation, and closed the facility for an extended period of time for decontamination. The average steel mill cleanup is estimated to be \$12 million. The Nuclear Regulatory Commission (NRC) states that they receive about 200 reports of lost, stolen or abandoned radioactive sources a year, which NRC believes to be only a fraction of what is actually lost. As more and more metal handling facilities install radiation detection systems, the number of events involving radioactive materials at these facilities has increased. This may not indicate an increase in contaminated materials in the metal stream, but a greater ability to intercept this material. EPA's studies involving risks from radiologically contaminated materials confirmed that the greatest risk to human health and the

environment is from abandoned or “orphan” radioactive sources and contaminated imports. It is in these two areas that EPA has concentrated its resources.

SCOPE OF THE PROBLEM

In 1998, 56 million tons or 41 % of the iron and steel consumed in the U. S. was scrap metal. The U.S. both imports and exports scrap metal, as well as semi-finished and finished products. There is increasing concern in the metals recycling and metal melting industries that this material may be contaminated with radioactivity. Accounts of contaminated shipments of scrap metal and products being detected at international border crossings in Europe have become more commonplace.

There are three ways radioactive contamination can enter the metal supply. First, a sealed radioactive source can inadvertently or intentionally end up in the scrap metal stream. This can occur when industrial and manufacturing devices or medical treatment devices are not disposed of in a secure and legal manner. This has been known to occur during the remodeling of a facility, where the demolition contractor may not be aware that there are radioactive materials on site. Second, contaminated metal can be imported into the U.S. from countries that do not have the regulatory infrastructure to track or control radioactive materials. Due to increased detection capabilities at border checkpoints, it has become clear that contaminated products have been crossing borders for some time. Third, radionuclides may be deposited on or incorporated into metal as the result of an industrial or medical process, such as deposition of naturally occurring radioactive material on pipe and the activation of metals at nuclear facilities. EPA has determined that the amount of scrap metal being generated by U.S. nuclear facilities accounts for only 0.1% of the annual supply of metal used in the U. S.

Based on the significant threat that lost, stolen or abandoned sources may pose to human health and the increasing detection of contaminated metal crossing international borders, EPA chose to redirect its efforts to these two areas. EPA's Clean Materials Program is composed of two initiatives. These include the Foreign Trade and Imports Initiative, focused on the control of contaminated materials being released from international nuclear facilities and the movement of contaminated materials across international borders, and the Orphan Source Initiative, which are focused on the control of “orphan” radioactive sources. EPA is not currently working on a domestic clearance standard, having determined that a much greater threat is presented by orphan sources and contaminated imports.

EPA'S FOREIGN TRADE AND IMPORTS INITIATIVE

Since the U.S. is a large importer of scrap metal and semi-finished and finished products, internationally released contamination has the potential for entering U.S. products. In order to reduce the possibility of radiologically contaminated materials entering the United States, EPA has been working with the International Atomic Energy Agency (IAEA) and the European Economic Commission (EEC) to develop a consistent international clearance standard. Inconsistent standards between nations may allow for contaminated materials to be released into commerce. EPA has been participating on an

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IAEA workgroup to revise IAEA TECDOC-855, entitled *Clearance Levels for Radionuclides in Solid Material (Application of Exemption Principles-Interim Report for Comment)* published in 1996. This document contains interim international clearance levels for solid waste materials containing radioactive materials. The final meeting of the full workgroup was held in October 2000, with consensus being reached on the majority of the radionuclides. It is anticipated that IAEA will publish a Safety Guide, updating the information in TECDOC 855, in 2001.

EPA worked with the NRC to provide a unified U.S position. Consistent normalized doses were agreed upon by the two agencies. EPA's *Technical Support Document (TSD) on the Evaluation of the Potential for Recycling of Scrap Metals From Nuclear Facilities*, originally completed in 1997 for carbon steel, was revised to include copper and aluminum. This document characterizes scrap quantities, levels of contamination, and options for disposition. Scenarios were selected and characterized for individual radiation exposures. Models were developed to evaluate individual doses and risks from the exposure scenarios. Factors that might affect the potential for dilution and distribution of radionuclides in various material streams such as metal, slag and off-gas were identified. The TSD presents an assessment of normalized doses and risks from each radionuclide of concern. The updated TSD will be available on EPA's website at <http://www.epa.gov/cleanmetals/publications.htm> in July, 2001.

EPA's efforts are now concentrated in developing interception levels, or the levels of radioactivity that are allowable in traded metals and metal products moving across international borders, including importation into the U.S. Interception radionuclide concentrations for the imports of metals into the U.S. are being formulated and will include 1) radiological health impacts (absorbed dose and lifetime risk of cancer) on reasonably maximally exposed (RME) individuals from both peak year and lifetime exposures and 2) corresponding health impacts from the import of radioactively contaminated semi-finished metal products into the U.S.

As part of this effort, EPA is investigating the consequences and benefits of an international interception standard. This study is examining the economic impacts at the market level, as well as the facility level. Sealed sources, naturally occurring radioactive material (NORM) and scrap metal from nuclear facilities are included in the study. In order to accomplish this, domestic release standards in selected countries, as well as border practices related to detection of radiation are being studied.

At the present time, it is not clear if an international interception standard will be effective in preventing radioactive materials accidents from occurring. However, increased monitoring and more sensitive detection instruments will prevent this contaminated material from entering the U.S. consumer metal stream. IAEA is scheduled to meet in early 2001 to begin the process of achieving international convergence on normalized doses for radionuclides of concern and determining the relationship of the normalized doses with achievable detection levels.

EPA'S ORPHAN SOURCE INITIATIVE

In 1997, EPA formed a partnership with the Conference of Radiation Control Program Directors (CRCPD) to address the problem of uncontrolled radioactive sources in the public domain. CRCPD formed the E-34 Committee to promote legal reuse, recycle and disposal of unwanted sealed sources. Funded by EPA, the first task of the committee was to conduct a nationwide survey of all unwanted sealed sources in the custody of states or known by the states to be in jeopardy of falling out of regulatory control. Of the 48 unwanted sources identified, 22 of these were located in the state of Colorado, which volunteered to be the pilot state for the radioactive orphan source round-up program.

A website at www.crcpd.org (Look under *What's New*) was launched to provide public access to information on source disposition options, such as reuse, recycle or legal disposal. A listing of licensed brokers, the geographic area they serve, and the type of materials they accept is available. A clearinghouse of information and individualized advice on the correct disposition option for each unwanted device is available through a toll-free number (1-800-594-6129). Contact information is maintained for people who are looking for a source, as well as those who have a source they can no longer use.

EPA is also funding a pilot round-up of orphan or unwanted cesium and cobalt sources, which is being conducted by the CRCPD and CDPHE. The initial steps of the pilot program involved investigation of disposal options, availability of permits for multiple source disposal and liability issues. In October, 2000, a contract was signed between the CRCPD and CDPHE which authorized the pilot program to be initiated. The custodians of the identified unwanted sources were notified of their eligibility to participate in the program. Waste brokers were contacted to obtain proposals for recycle and disposal costs. Licensees in the state and consumers of scrap metal, who may have had an unwanted source enter their facility, were notified of the program to see if any additional sources could be identified. The majority of the sources identified were recycled, saving disposal costs. Recycle or reuse is the preferred disposition option, due to limited low-level waste disposal capacity and cost of disposal. All the sources were secured in March 2001. Based on the outcome of the pilot program and the lessons learned, a national round-up of sealed sources is planned.

In addition, a training program is being developed to help educate state response personnel and industry workers in the appropriate way to handle the discovery of an unwanted source. EPA is developing an interactive CD ROM training tool for workers at a steel mill. The tool is a consequence-based program where the trainee makes decisions based on information presented and subsequent events occur as a direct result of their decisions. The purpose of the training will be to train the responders in the correct procedures to follow a radiation alarm is triggered, reducing radiation exposure of the workers and contamination of the commercial metal supply. First responders who have to address these alarms, which may be caused by a hidden sealed source, need to be adequately trained to respond quickly yet correctly, without exposure to uncontrolled radiation. These responders may not be trained in radiation and its hazards. The metals industry, the public, the states and Federal

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agencies, including EPA, NRC, and DOE, have all expressed concern about abandoned sealed radioactive sources contaminating scrap yards and steel mills. There are documented accounts of radioactive sources having entered a facility undetected, been breached or melted, and radiation incorporated into consumer products, exposing workers. The public's trust in clean consumer products has been diminished. This scenario can be prevented with better detection and increased vigilance at the entry points to these facilities which the training will promote.

EPA is working with the CRCPD Committee to finalize the agenda for a ½ day training for state personnel to be given in conjunction with NRC's NMED training. NMED is the Nuclear Materials Event Database which captures data on lost, stolen or abandoned radioactive sources, including international events. The CRCPD training will cover radiation monitoring basics and the limitations of monitoring instruments, the correct use of the Department of Transportation (DOT) shipping exemption for radioactive material detected at metals facilities, landfills and incinerators, and the resources relating to sealed sources available through CRCPD.

EPA's Orphan Source Initiative is one effort to reduce the threat from uncontrolled radioactive sources. Our efforts, combined with the Department of Energy's Off-Site Source Recovery Project to collect and secure greater-than-Class-C (GTCC) sources and the Nuclear Regulatory Commission's new regulations for generally licensed sources, with increased penalties for illegal disposal, will reduce the number of uncontrolled sources available to enter the U.S. metal supply.

FUTURE ACTIVITIES

There are four activities planned for the future:

- 1) EPA will continue to work with IAEA and other members of the interception workgroup, which is scheduled to start activities in February, 2001. Development of interception numbers should help stem the movement of radiologically contaminated materials across international borders, including importation of these materials into the U.S. The economic impact of an international interception number will continue to be researched.
- 2) EPA will provide support activities for nationwide round-up of radioactive sources, patterned after the lessons learned from the Colorado pilot round-up. Cobalt and cesium are the primary radionuclides responsible for steel mill contaminations. It is estimated that there are 50,000 gauge sources in the workplace. This nationwide program will help stop abandoned sources from reaching the scrap yard or steel mill.
- 3) An inventory of unwanted sources in the possession of non-licensed persons throughout the U.S. will be developed to determine whether these sources may be eligible for inclusion in the nationwide round-up.

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4) Continued training will be offered to the states, the metals industry and others who may come into contact with lost, stolen or abandoned sources. A potential area of training includes

developing workshops for demolition companies to recognize radioactive gauges and instruments abandoned in facilities being torn down for scrap.