INTERNATIONAL APPROACH TO MONITORING FOR RADIOACTIVELY CONTAMINATED SCRAP METAL

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ABSTRACT

The international metal processing industries are very concerned about the importation of scrap metal contaminated by radioactivity. It is estimated that through 2001, scrap yards and steel mills in North America have experienced over 10,000 detections of radioactivity in recycled scrap metal (1), as a result of accidental or intentional disposal of radioactive sources. In order to address this problem on a global scale, the United Nations Economic Commission for Europe (UNECE), with the support of the United States Environmental Protection Agency (EPA) organized a Group of Experts, which met during April 2004. Three major issues were identified by the Group of Experts that need to be addressed in the near future. First, there is a need for an internationally acceptable scrap metal radiation monitoring and response protocol. Second, international training programs are needed to address such topics as protocol implementation, optimum location of monitors, acceptable detector sensitivities, calibration and maintenance needs, incident reporting, handling radioactive materials after detection, and transportation. Third, there is a need for international information exchange within the scrap metal industry to share data and experiences on contaminated scrap incidents, especially those occurring at international borders. The "open border" policy of the European Union makes the collection and dissemination of this information-sharing particularly time critical. The results of the initial meeting (2), along with the discussions of specific country programs are available electronically at http://www.unece.org/trans/radiation/pub_managerad_2004.html under "Latest News". Work will continue during 2005 on the development of the monitoring and detection protocol.

INTRODUCTION

Worldwide, there have been over 40 deaths and 266 serious injuries as the result of uncontrolled radioactive source incidents, with some of these injuries being attributed to contaminated scrap metal (1). Aside from radiation exposure to workers and the public, this unwanted radioactive scrap material causes environmental and facilities contamination with cleanup costs that average $12–15 million per incident (1).

In the United States, it is not known if the contaminated scrap metal is coming from domestic or imported sources. Under its Clean Materials Program, EPA is conducting work on both fronts in efforts to reduce the number of radioactive sources that find their way into the scrap metal supply (www.epa.gov/radiation). EPA developed a training program for the scrap metal industry entitled "Response To Radiation Alarms at Metal Processing Facilities" to help minimize the number of sources that enter a facility. In partnership with the demolition industry, EPA has produced a CD

ROM based training program entitled " Identifying Radioactive Sources at the Demolition Site", which is being incorporated into the health and safety programs of this industry. It is anticipated that this program will make demolition workers aware of the types and locations of radioactive gauges and devices at industrial facilities, and hopefully decrease the number of these devices that are put into the outgoing scrap metal, thereby reducing the number of sources being detected at the scrap facilities.

EPA is also conducting a pilot study to determine the feasibility of monitoring imported scrap metal for radiation (2). Over 2.3 million tons of metal have been monitored at two U.S. ports during off-loading operations using grapple mounted radiation detection systems. By monitoring each small, discrete volume of scrap metal as it is taken off the ship, any radioactive material can be identified before it is transported to the metal processing facility.

INTERNATIONAL APPROACH

Recycled scrap metal is one of the most widely traded commodities worldwide and represents a multi-billion dollar industry. Many countries monitor scrap metal for radiation at their borders and individual metal processing facilities monitor the material at their gates (Figure 1). However, there was no central depository for information on the various protocols currently in use to monitor scrap metal, what regulatory programs are in force or how countries disposition (dispose, recycle or reuse) found radiation sources. Countries looking to develop a scrap metal monitoring program have no readily available information of "lessons learned" to review.

Figure 1. It is difficult to locate a radioactive source once it enters the scrap yard.

For the past eight years, EPA has been working to find uncontrolled radioactive sources and to prevent future losses. With an increasing number of these sources being detected, EPA proposed to the UNECE that a Group of Experts be convened to discuss this issue, with the emphasis on identification of internationally acceptable solutions. This meeting would build on the work previously conducted by the UNECE that resulted in the "Report on the Management of Radiation Protection Aspects in the Recycling of Scrap Metal" (3). This report recommended measures to avoid the introduction of radiation sources into the metal recycling stream. Prior to the meeting, a questionnaire was distributed by the UNECE to member nations and interested parties to determine the current state of scrap metal monitoring and regulation, particularly with respect to border crossings and points of entry. The responses to the questionnaire were compiled and analyzed for discussion at the meeting, which was held at the UNECE Headquarters in Geneva during April 2004.

QUESTIONNAIRE RESULTS

A questionnaire was developed and distributed to ascertain the current state of scrap metal radiation monitoring and regulation. Information in seven specific areas was requested:

1) existing and planned national regulatory mechanisms
2) monitoring of the movement of radioactive materials, particularly scrap metal, including training of staff involved in inspection and response
3) dispositioning (removal) of detected radioactive materials
4) contractual provisions governing purchase of scrap metal products
5) governmental and private sector response procedures and requirements
6) inter-agency cooperation in monitoring and response and
7) good (and bad) practices and lessons to be learned.

MEETING RESULTS

The Group of Experts meeting was attended by representatives from the following 20 countries including Austria; Belarus; Belgium; Bulgaria; Croatia; Cyprus; Czech Republic; Estonia; Finland; France; Italy; Kyrgyzstan; Latvia; Lithuania; Luxembourg; Romania; Russian Federation; Slovakia; Switzerland; United States of America (USA). The attendees represented governmental and customs agencies, as well as industry. The International Atomic Energy Agency (IAEA) and the World Customs Organization (WCO) also participated in the meeting. The Bureau of International Recycling (BIR) and a consultant to a scrap processing company were in attendance. The Group of Experts represented a range of monitoring expertise, from countries that have well-defined radiation monitoring programs to those wishing to initiate a program.

Each of the countries discussed their national programs and experiences, and it became clear that there was a need to standardize radiation monitoring protocols to aid in international trade of scrap metal. The Group of Experts identified the following ten issues that could be considered as a common basis for possible future work and could provide a framework for an internationally agreeable approach of monitoring scrap metal. The ultimate goal of this approach would be to minimize all problems associated with radiological contamination of scrap metal during all stages of the recycling process (demolition, procurement, handling, transport and international trade, melting).

Regulatory infrastructure:

1) Application of the International Atomic Energy Agency (IAEA) Code of Conduct for the Safety and Security of Radioactive Sources. The IAEA Code of Conduct provides principles that should be implemented by nations to ensure that the radioactive sources within their jurisdiction are under adequate control.

Monitoring:

2) Monitoring of imported and exported scrap metal

3) Location, scope and magnitude of monitoring requirements and procedures
4) Standardization of monitoring of scrap metal and response to alarms

Dispositioning:
5) Arrangement for disposal facility or return to manufacturer program
6) Application of existing regulations for the shipment of detected radioactive material
7) Mechanisms for effectively dealing with contaminated scrap metal

Contracts:
8) Strengthening of contractual requirements on the acquisition of scrap metal to require radiation monitoring prior to sale

Reporting:
9) Standardizing and strengthening reporting and investigating procedures

Experiences:
10) Establishment of a mechanism for the exchange of information on practices and lessons learned in monitoring radioactively contaminated scrap metal

RECOMMENDATIONS

The ten issues identified during the meeting fall into three major categories:

1) *Protocol:* There is a need for an internationally acceptable monitoring and response protocol. The Spanish Protocol (4), in use for the past four years, will be used as a framework from which to develop a broader based protocol. The Spanish Protocol provides for collaboration between various government agencies and industry to monitor for and dispose of unwanted radioactive materials in scrap metal.

2) *Training:* International training programs are needed to address such topics as protocol implementation, optimum location of radiation monitors, detector sensitivities, calibration and maintenance needs, incident reporting formats, the process for handling materials after detection, and transportation considerations.

3) *Information Exchange*: There is a need for an international information exchange. This can be accomplished through the development of a web portal to allow access to scrap industry data and the possible development of a database where countries can report scrap radiation incidents.

FUTURE ACTIVITIES

The final report of the initial meeting of the Group of Experts is scheduled to be published by the UNECE during November 2004. This publication includes, for the first time, a compilation of the data received from 45 countries on the monitoring, regulatory infrastructure, detection and monitoring protocols, disposition procedures, contractual, reporting and experiences relating to radiologically contaminated scrap metal. It also includes the information exchanged at the

meeting, a discussion of the issues identified, the progress of current and future work resulting from the meeting and a listing of international contacts.

The highest priority is the drafting of the international protocol and a select Group of Experts will begin work in the near future, using the Spanish Protocol as a framework. Work on the information web portal and the training programs will be conducted after the protocol is drafted, as funding permits.

REFERENCES

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