

# **The role of Institute of Public Health as a technical support organization in radiation monitoring of scrap metal shipments in Republic of Macedonia**

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**Abstract.** Sealed radioactive sources are widely used in industry, medicine and research. The risks that a sealed radioactive source becomes orphan i.e. is no more under regulatory control is equally an important source of concern. Mismanagement of these sources may lead to acute exposure of workers and members of the public and in some cases to significant contamination of the environment. In addition, possible malevolent use of sealed radioactive sources is currently raising a lot of concern amongst the countries as well.

## **1. Introduction**

Recycled scrap metal is increasingly used in metal production. In 2004, the worldwide consumption of scrap metal was of the order of 440 million tones out of which around 184 million tones were traded internationally. In the case of steel, the proportion of steel products now made from scrap is more than one half. The rise in the importance of scrap metal as a resource has been paralleled by an increase in the frequency that radioactively contaminated scrap metal, activated scrap metal and scrap metal with radioactive source(s) or substances contained within it is detected in scrap metal shipments.

While the potential environmental and health risks of the incidents involving radioactive scrap metal are usually not very high due to the relatively low radiation levels involved, the economic and financial consequences of such incidents for the metal processing industry are always very serious. The detection of radioactive materials in processed metal almost always results in the lost of confidence of the involved facilities and usually requires expensive clean-up action

## **2. Initiative at the national level**

After several cases of melting orphan sources from radioactive lightning conductors, in 2000 the Macedonian Ministry of Environment and Spatial Planning took a national initiative aimed at countering the problems associated with radioactive scrap metal.

The first measures were a Ministerial requirements of radiation detection of imported scrap metal shipments at the border check points as well domestic metal scrap at the entrance of melting factory and certificate of the level of radioactive contamination of imported scrap and for final steel products, issued by Institute of Public Health.

Institute of Public Health as a national TSO for radiation detection and protection issues, through its specialized departments was engaged in:

- rising awareness of the hazards (health, environmental, security ..) associated with

radioactive sources in the scrap

- expert advisory services to Ministry of Environment in developing the program for efficient protection of the national environment and human health from radioactive contamination from metal scrap origin,
- expert advisory services to the Government and to Customs department for the need of developing a broader program for prevention of illicit trafficking of radioactive materials and non-proliferation of weapons of mass destruction (WMD), and counter-terrorist activities
- working together with major melting factory in the designing and participating the radiation monitoring program from the entrance of the factory to the final product and selection of the gate monitoring systems
- Establishing the national register of radioactive sources.

During the past decade, the efforts of the country resulted in enacted Radiation Protection and Safety Act (2002) and its amendment in 2007, established Radiation Safety Directorate (RSD) as an independent regulatory authority, implemented system of regulatory control of radiation practices through registration, authorization, inspection and enforcement, state support to the Code of Conduct on the Safety and Security of Radioactive Sources and ratification of the international conventions particularly: The Convention on Nuclear Safety, The Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency and the Convention on Early Notification of a Nuclear Accident, The Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency, The Convention on Early Notification of a Nuclear Accident, Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management and The Convention on the Physical Protection of Nuclear Material.

Adequate arrangements are made for the notification, reporting and information exchange between RSD, Customs department, Institute of Public Health, law enforcement agencies and emergency service organizations for cases of detected radioactive material in scrap metal shipment

### **3. International assistance**

Through IAEA's technical assistance projects, five border crossings were equipped with portal monitors, customs personnel received training and instructions on the use of the radiation detection equipment and to be able to investigate vehicles and cargo safely.

Through International Counter Proliferation Program of the U.S. Department of Defense, Customs Department, Border Police, Institute of Public Health and Radiation Safety Directorate were equipped with different types of hand-held survey meters, alarm monitors, spectroscopy analyzers, protective cloths and received specialized training for the enhance national ability to counter the threat posed by the flow of weapons of mass destruction, and related materials and technologies, across international borders

#### **4. Institute of Public Health – Technical Support organization**

Within the past decade, Institute of Public Health as a national TSO and independent from Regulatory Authority, upgraded and strengthened its services for radiation detection, dosimetry, laboratory analysis, calibration of radiation protection instruments, as well as consultation and training in radiation protection.

All these services are available to all counterparts dealing with orphan sources within scrap and combating the illicit trafficking of radioactive and nuclear material. The special task team within the IPH- Ionizing Radiation Department is available 24 hours a day for radiation monitoring, consultancy, detection and issuance of certificates of the level of radioactive contamination at border crossings.

These specialists are qualified to verify the alarm and assess the radiological hazard of the situation. In addition, a designated expert on a 24 hour/day basis can be reached for immediate advice (over the phone or otherwise) from other national authorities for managing serious incidents and routine incidents when there is any doubt or ambiguity in making the initial hazard assessment

#### **5. Cooperation at the national level**

The implementation of measures and activities in the system of Integrated Border Management (IBM) in Republic of Macedonia (from 2005 – 2008) has enabled the establishment of a system that developed a border management database within the Information System for IBM for the purpose of access to and exchange of information between state bodies that have border management competences.

In cases of found radioactive material by customs officers, border police or Institute of Public Health, this information is promptly reported to RSD and to the Information System of IBM.

If the radioactive material is orphan source in scrap metal shipment, Institute of Public Health:

- performs radiation monitoring of the scrap metal shipment or the affected processed metal in detail until the part or parts containing the radioactive substance have been located, taking due care to ensure that all persons involved are adequately protected from radiation during the measurements ( their exposures are kept ALARA);
- determine the radionuclides (and their approximate activities) contained in the unprocessed metal scrap in the shipment, the processed material, the melt or the production waste;
- check to determine if any radioactive substances have been dispersed in the local area and assess the likelihood of any other area being affected prior to the arrival of the shipment;
- draw up a report describing the actions taken, the results of the investigation and
- gives advice for the safe transport of recovered radioactive sources

The responsibility of the RSD as a regulatory authority is to issue special authorizations, as needed, for the safe transport of the recovered material or radioactively contaminated scrap

metal or product and of any radioactive waste and/or facilitate the return of radioactive scrap metal and of any radioactive waste across national boundaries, where this is appropriate and to send report to IAEA Illicit Trafficking Database.

## 6. Conclusion

Nuclear and radiation safety are based on technical, managerial, administrative, economic and organizational requirements. In this respect, the role and quality of technical and scientific expertise in national regulatory system and system dealing with illicit trafficking of radioactive materials are of fundamental importance

## REFERENCES

- [1] Bureau of International Recycling, <http://www.bir.org/pdf/wsif2006-x.pdf>
- [2] Law on Ionizing Radiation Protection and Radiation Safety, Official Gazette No. 48/02, June, 2002.
- [3] INTERNATIONAL ATOMIC ENERGY AGENCY, Code of Conduct on the Safety and Security of Radioactive Sources, IAEA, Vienna (2004).
- [4] Measures to Strengthen International Cooperation in Nuclear, Radiation, Transport Safety and Waste Management, Code of Conduct on the Safety and Security of Radioactive Sources: Guidance on the Import and Export of Radioactive Sources, GOV/2004/62–GC (48)/13, IAEA, Vienna (2004).
- [5] Non-proliferation of Weapons of Mass Destruction, Security Council S/RES/ 1540, United Nations, New York (2004).
- [6] INTERNATIONAL ATOMIC ENERGY AGENCY, Prevention of the Inadvertent Movement and Illicit Trafficking of Radioactive Material, IAEATECDOC- 1311, IAEA, Vienna (2002).
- [7] INTERNATIONAL ATOMIC ENERGY AGENCY, Detection of Radioactive Material at Borders, IAEA-TECDOC-1312, IAEA, Vienna (2002).
- [8] INTERNATIONAL ATOMIC ENERGY AGENCY, Response to Events Involving the Inadvertent Movement or Illicit Trafficking of Radioactive Material, IAEA-TECDOC-1313, IAEA, IAEA, Vienna (2002)