



Information Guide for Identification of Radioactive Materials Out of Regulatory Control in Scrap Metal Sites

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1. Introduction

Radiation and radioactive materials have many beneficial applications, ranging from power generation to uses in medicine, industry, and agriculture. The radiation risks to workers, to public and to the environment that may arise from these applications have to be assessed and, if necessary, controlled. However, occasionally a lack of appropriate controls, or circumvention of those that exist, has led to sources becoming orphaned or vulnerable — with potential to cause serious radiological accidents — as well as to harmful environmental, social, and economic impacts. An orphan source is a radioactive source which is not under regulatory control, either because it has never been under regulatory control or because it has been abandoned, lost, misplaced, stolen, or otherwise transferred without proper authorization [1]. In addition to accidents [2,3,4,5], there are also growing concerns today about the possibility that an improperly stored source could be stolen and used for malicious purposes [6,7]. It should be noted that there have been several accidents involving orphan radioactive sources or other radioactive material that were inadvertently collected as scrap metal that was destined for recycling. An accident with serious consequences regarding the people and environment may occur if the radioactive material is not detected neither identified at the metal recycling and production facility [8]. The purpose of this study is to prepare a printed information guide for individuals who work at scrap metal sites, enabling the identification and recovery of radioactive materials out of regulatory control, such as orphan sources, to prevent both radiological accidents and intentional or criminal unauthorized actions involving radioactive materials.

2. Methodology

In the first step of the study, research on current international publications, news and recommendations was carried out to provide a broad overview of radiological accidents on scrap metal sites with radioactive equipment and materials that can become orphan sources. The second stage consisted on creating an informative guide based on the research, where technical data, photos of equipment, description of immediate actions and emergency communication for insertion in the guide were collected, to allow the identification, recognition, and immediate activation of competent bodies in case of identification of radioactive material present at the scrap metal site.

3. Results and Discussion

The research result reached the objective, culminating in the elaboration of the information guide for the identification of radioactive materials and equipment that may be present at scrap metal site, as shown in annex I. It is noteworthy the proposed guide made possible proper identification of radiological equipment, by using photos, for quick recognition by the individuals who work in scrapyards establishments. In addition, the information guide presents some actions that must be taken if the individual finds radioactive materials,

such as keeping as far away as possible from the materials, visually checking if the material contains symbols of danger or radiation (trefoil), isolating the area, warning all surrounding workers, and seek immediate help from regulatory and emergency agencies. Finally, the study enabled the printing of the informative guide, as a final product, to be distributed on scrap metal sites in Manaus to guide individuals working in that segment.

4. Conclusions

In the study, it was possible to elaborate a reference guide to identify several radioactive sources that can be found in scrap metal sites and that can cause damage to those who have direct or indirect contact with these materials, whether by accident or improper handling. Several radiological accidents occurred due to the inadequate handling by people who were unaware of the dangers of exposure and contamination, precisely due to the lack of necessary information. The informative guide presents itself as a simple, inexpensive, and very useful tool for individuals who work in these establishments, because through information alerts, it makes it possible to identify orphan sources, preventing the occurrence of possible radiological accidents and intentional or criminal unauthorized actions involving radioactive materials.

References

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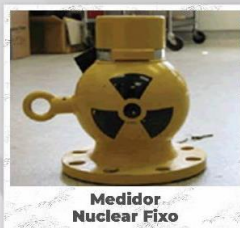
Annex I

Guia informativo

IDENTIFICAÇÃO DE MATERIAIS RADIOATIVOS EM FERROS-VELHOS



Gerador de Tecnésio



Medidor Nuclear Fixo



Pára-raios radioativo



Cabeçote de Radioterapia

Materiais radioativos que podem aparecer em ferros-velhos e pátio de sucata com ou sem identificação



Irradiador de Gamagrafia



Medidor de Densidade



Detector de fumaça



Aparelho emissor de Raio-X

Esses materiais podem conter pequenas **fontes radioativas** ou ser um aparelho **emissor de radiação**, que podem causar **sérios danos à saúde** e ao **meio ambiente**. As fontes de radiação podem ser eventualmente perdidas, extraviadas ou roubadas, permanecendo fora do controle regulatório, e muitas das vezes, acabam sendo levadas aos ferros-velhos onde são vendidos juntamente com a sua blindagem como um material metálico comum.

As fotos ajudam a identificar e detectar o material, evitando um acidente radiológico.

Ações QUE DEVEM SER TOMADAS AO ENCONTRAR MATERIAIS SUPOSTAMENTE RADIOATIVOS

- Manter a maior distância possível;
- Verificar visualmente se o material contém símbolos de perigo ou de radiação (trifólio); ☸
- Isolar a área;
- Avisar toda sua equipe de trabalho;
- Procurar ajuda imediata dos órgãos reguladores e de emergências.

TELEFONES DE emergência

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CNEN/IPEN SP: (11) 3133-9000
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