

The Protocol, based on the existence of a Register of ascribed companies, establishes commitments of the different signatories. It also states the need of monitoring the materials at the entrance of the facility, as well as the final products and wastes, and the actions to be taken when radioactivity is detected.

The installed detection systems may be automatic measuring the radiation when each scrap metal consignment passes through, activating the alarms when anomalous radiation levels are detected. These systems are extraordinarily sensitive, and therefore the alarms are activated even by minimum radioactive contents, much lower than the levels harmful for the health. These systems are complemented by more precise manual and analytical equipment, able to detect the radioactivity during the melting process with the double aim of providing redundancy for the factory radiological safety and improving the product quality assurance.

#### • Actions in case of radiation detection

When the presence of radioactive material is detected upon arrival to the facility, the following must be done:

- Verify the alarm.
- Isolate the consignment
- Measure the consignment radiation levels to locate the radioactive material.
- Segregate, store and guard the detected radioactive material in safe condition until its removal by ENRESA,.
- Urgently notify the CSN when the radiation levels are high.

When radioactive material is detected in the final products or by-products, the following must be done:

- Stop production
- Evaluate the situation
- Notify the CSN
- Prepare and carry out a programme to collect the radioactive material and cleanse the area.

Radiation measurements and radioactive material handling must be done by personal with expertise in radiation protection matters; therefore each facility must have specialized technical support in radiation protection to act on the suspicion of the presence of radioactive material that requires implementation of special precautions and measures.

#### • Training and information

However, these detection systems do not constitute a warranty of absolute effectiveness and, therefore, the collaboration of all workers is necessary and essential to increase the safety of the facility.

For this reason, the Protocol includes a training and information programme that encompasses all personnel from the highest management to those responsible for the operation of the detection equipment to ensure that every person in the facility knows the actions he must perform.

Visual identification of the suspicious parts that may require a more detailed investigation is everyone's concern and is beneficial for all personnel.

Communications must be addressed to

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These actions and the publication of this brochure are part of a more extensive programme that has been promoted jointly by the metal industry, the recovery sector, the Ministry of Industry, Tourism and Trade and the Nuclear Safety Council. The final objective is to warrant the radiological safety of the Spanish metallurgic industry and the metal recovery sector and to assure that their products warrant the absence of radioactivity as requested by their customers.

## RADIOACTIVITY IN SCRAP METAL

Information for  
workers of the  
metallurgical  
industry and metal  
recovery sector



#### • The use of radioactive materials

The ionising radiations emitted by radioactive materials are used in different health, industrial, agricultural and scientific activities, since they constitute the best way to diagnose and cure some diseases, to find and analyse defects in materials, to inspect welds, to locate water leaks in reservoirs and gas leaks in piping, to investigate new substances and processes, to eradicate insect pests or to disinfect surgical material, etc. The facilities where these activities are carried out are called **radioactive facilities**.

The radioactive material could be inside a stainless steel or wolfram capsule that is hermetically sealed to avoid the material dispersion. This capsule is called **radioactive source** and usually it is inside a **container** of greater density and thickness that acts as **shielding**, reducing the radiation to harmless levels.

Besides, there are the so called **nuclear facilities** (nuclear power plants, research centres, nuclear fuel manufacturing plants, etc.) that use large quantities of radioactive substances for their processes, which are usually non-encapsulated and may contaminate the tools and equipment they get in contact with during their handling. Although less known, there are other industrial activities such as: the production of natural gas and oil; ceramic factories; production of pigments for paints; production of fertilizers; and some mining activities, etc., which manipulate minerals, products or by-products of the activities that contain **materials with radioactivity of natural origin** in very low concentrations.

The use of radioactive materials in nuclear and radioactive facilities must be carried out in accordance with the strict legislation that exists in all countries to avoid damage to the workers, public and environment, which would occur if not correctly used. This means that the radioactive material must be managed only by **authorized people in authorized facilities**, even when these materials are waste products.

#### • The Protocol for collaboration on radiation monitoring of metallic materials

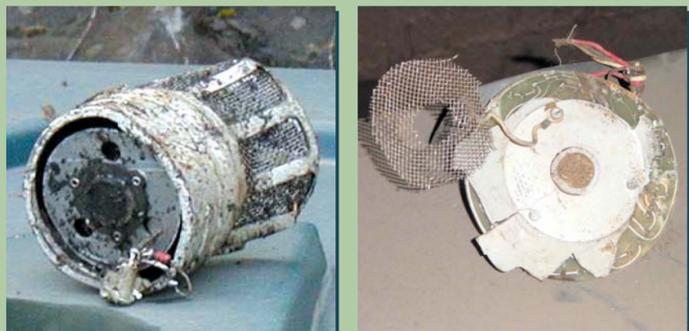
In spite of these controls, the presence of radioactive material has been sporadically found outside the established system; in particular, in the process of **recovery and melting metallic materials**. Even if the possibility is remote, when large quantities of radioactive material are involved, important disorders may appear for the metallurgical industry entailing economic damages to the companies and, in extreme cases, risk to the health of workers, public or environment.

To reduce as much as feasible the probability of occurrence of such situations in the metallurgical sector, the **Ministry of Industry and Energy** (today **Ministry of Industry, Tourism and Trade**), the **Ministry of Civil Works**, the **Nuclear Safety Council (CSN)**, the **National Company for Radioactive Waste (ENRESA)**, the **Union of Iron and Steel Companies**, the **Spanish Federation for Metal Recovery (FER)**, the **Mining, Iron and Steel Federation of the Workers Commissions (CC.OO)**, the **National Federation of Metal, Construction and related activities of the Workers General Union (UGT)** have signed an agreement (**Protocol**) on the **monitoring and detection of radioactivity** in the storage facilities and industries where **scrap metal** is handled as raw material. Afterwards, the **Spanish Association of Aluminum Refiners (ASERAL)**, the **National Union of Copper Industries (UNICOBRE)**, the **Union of Lead Industries (UNIPLOM)**, and the **Spanish Federation of Melters Associations (FEAF)**, also adopted the Protocol.

Lighting rods



Ionic smoke detectors



Indicators with luminous paints



Lenses or alloys with Th-232



# Radioactive elements found in scrap metal



Equipment with radioactive sources

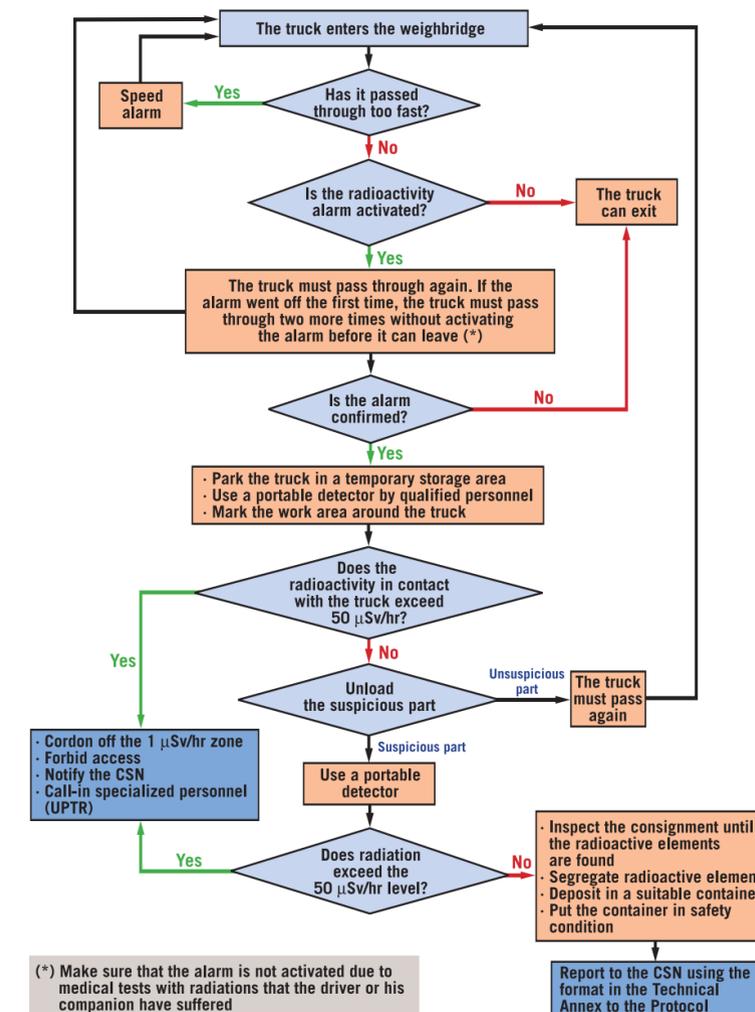


Unshielded sources



## ACTIONS

- Carefully revise the scrap metal.
- Isolate the suspicious containers or equipment.
- Do not open, nor destroy them under any circumstance, it may be dangerous for you, your fellow workers and the public.



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