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# ACTIVITIES OF THE ENRESA “RADIATION PROTECTION TECHNICAL UNIT” RELATED TO RADIOACTIVE WASTE MANAGEMENT



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## Introduction

ENRESA is the national company in charge of radioactive waste management in Spain and carry out the removal and conditioning of the radioactive wastes generated at the nuclear and radioactive facilities and those produced at non-regulated installations. The company has a Radiological Protection Technical Unit (RPTU) that was set up in 1990 in response to a requirement of the Nuclear Safety Council (the Spanish regulatory body), thus has more than 20 years of experience.

## Missions of the RPTU

- Segregation, conditioning and radiological characterization of radioactive waste (measurements, calculations...).
- Evaluation of the methods used by in the radioactive facilities to waste management.
- Radiological risk assessment.
- Establishment of radiological protection measures (cordoning off of areas, radiological surveillance, protective equipment, working time...) for the recovery and removal of radioactive material.
- Radiological control of personnel.
- Emergency response.
- Personnel training.

## RPTU activities

More than 4000 interventions in radioactive and non-regulated facilities from 1989, 409 at metal industries from 1998.

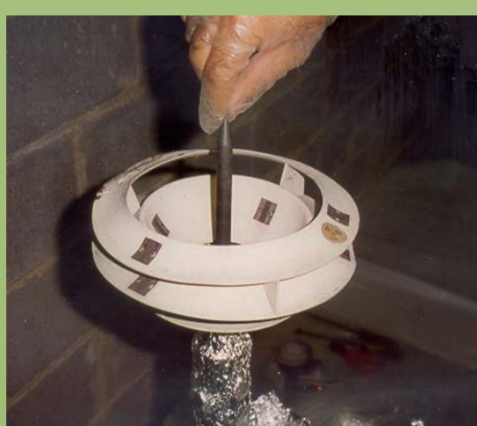
## RPTU human and technical resources

- Experts (3) and technicians (4) qualified in radiological protection and specialized in radiological measurements.
- Radiation and contamination detectors (ionization chambers, Geiger-Müller, proportional counters, plastic scintillation detectors...).
- Portable spectrometric equipments (scintillation and germanium).
- Digital dosimeters with alarm.
- Air samplers and continuous air monitors.
- Vehicle used as mobile laboratory.



## Disassembly and conditioning of radioactive lightning rods (1993-200)

- Removed more than 22000 units.
- Contamination controls and decontaminations.
- Activity evaluations.
- Conditioning for transport.



## Removal of ion smoke detectors (1996-2000)

- Removed more than 18000 units.
- Activity was stopped due to recycling of electronic devices.
- Dismantles sources are collected by ENRESA.



## Removal of radioactive wastes from radioactive facilities

- Evaluation of management methods and activity calculations.
- Radiological characterization of radioactive waste generated.
- Contamination controls.
- Report evaluations and technical visits.



## Removal of radioactive sources from radioactive and non-regulated facilities

- Radiological characterization of all the sources (radionuclide, activity, doses rate...).
- Campaign of searching of orphan sources.
- Dismantling of the equipment and removal of the source.
- Conditioning of the equipment for safe transportation.
- Contamination controls.



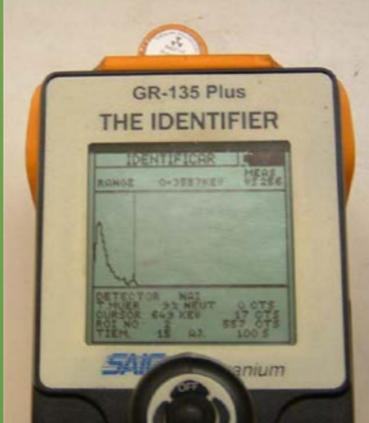
Radioactive sources



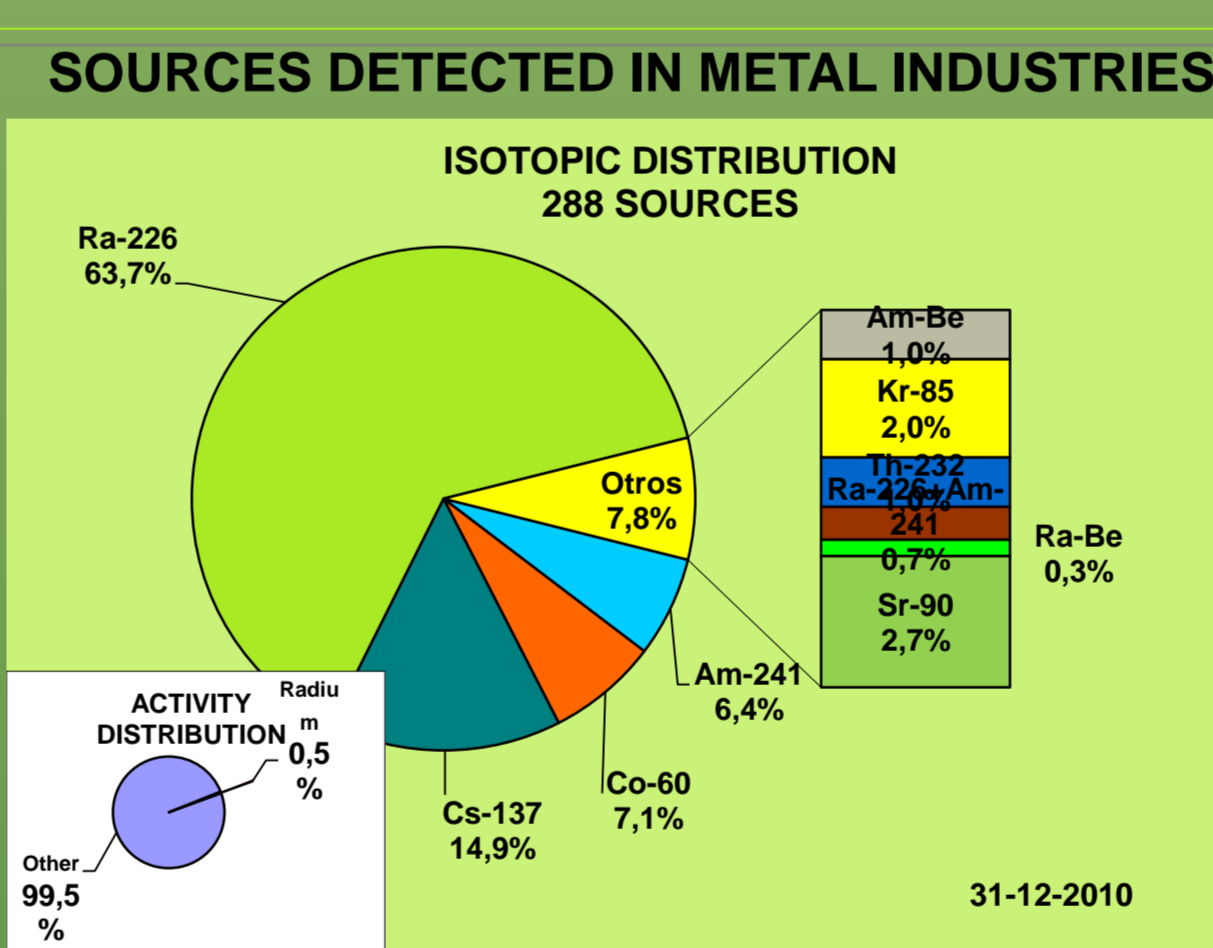
Sources dismantling



Radiological measurements



Activity estimation



## Venting of Kr-85 sources

- Specific authorization (source activity < 37 GBq)
- Prior inspection to performing radiological characterization of the source.
- Venting control and certification of venting.



Venting cell



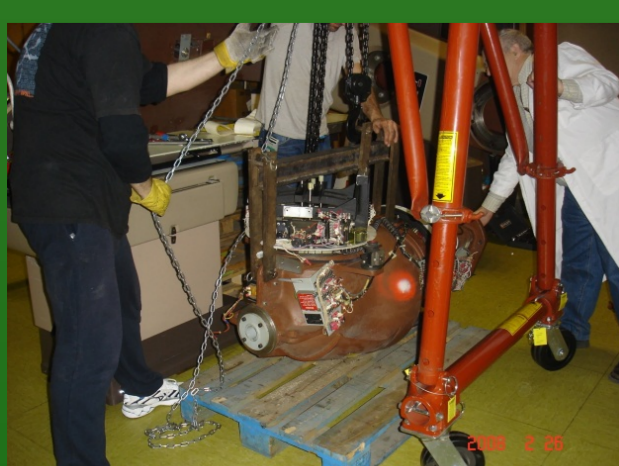
Release system to the atmosphere



Release system control

## Removal of disused teletherapy units

- Specific authorization.
- Prior inspection to radiological characterization of the equipment.
- Instructions preparation.
- Control of the transfer and removal.
- Accompaniment of the transport.

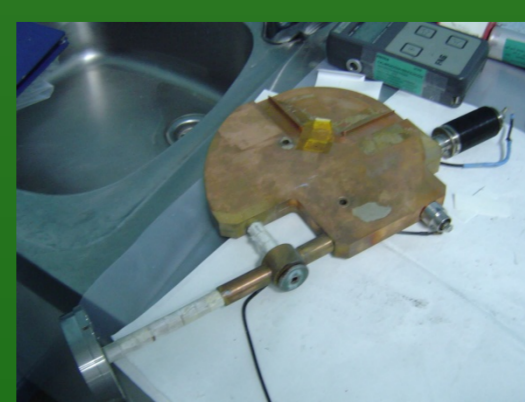


## Characterization of activated pieces from linear accelerators

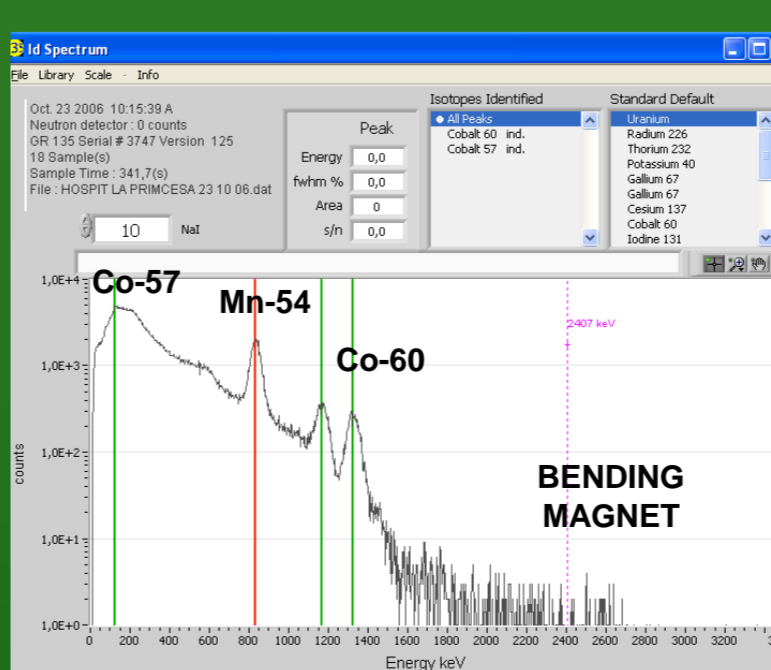
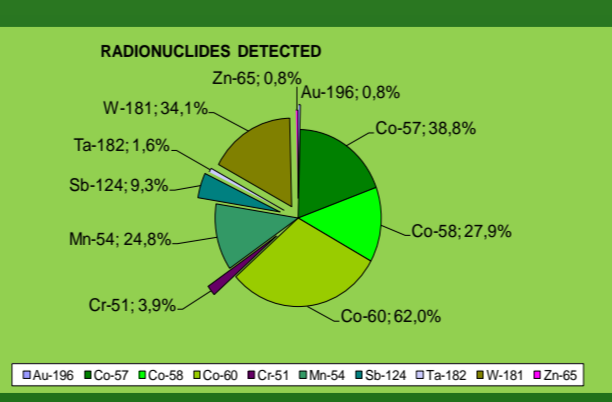
- Activation of the parts with isotopes of short life.
- Presence of Co-60 and others than not allow the clearance of the pieces.
- Possible alarms on the portal monitors of metal industry.
- Radiological characterization of the pieces and activity estimation.



Different pieces

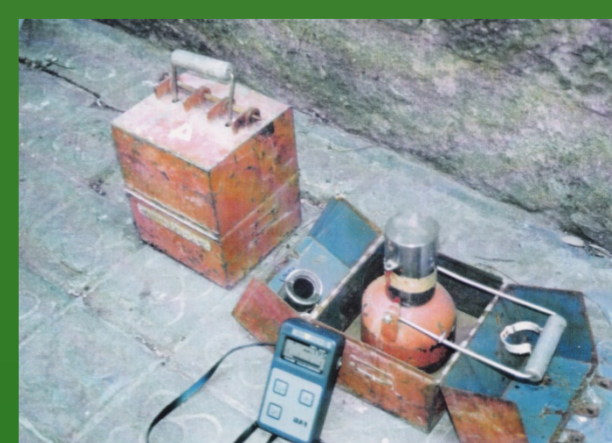


Deviation chamber



## Special activities

- Removal of radioactive wastes after incidents.
- Removal of radioactive abandon materials.
- Removal of radioactive sources from closed installations.



Removal of abandon radioactive material on the road



Recover of radioactive sources after a fire



Location of lost un-shielding radioactive sources