

# Operation of the Register on High Activity Sealed Sources in Germany – four years of experience

*U. Häusler*  
*[uhaeusler@bfs.de]*

*Federal Office for Radiation Protection, Germany*

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# 1. Introduction

Sources with high activity  $\Rightarrow$  high radiological risk  
(accidents, orphaned sources, malicious acts, „dirty bombs“)

- **Industrial applications**

radioisotope thermoelectric generator (RTG),  
radiography, sterilisation/food irradiation,  
well logging, level/density gauges

- **Medical applications**

teletherapy, blood irradiation,  
afterloading brachytherapy



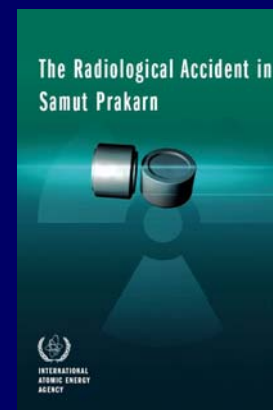
Various high energy gamma sources



Am-241/Be neutron source  
for oil well logging

# Risks from radioactive material

- **Accidents**
  - Severe injuries by temporary loss of a radiography source, i.e. Ranquil radiography accident (2005)
- **Orphaned sources**
  - Deaths and injuries by unintended damage of an orphaned source, i.e. Samut Prakarn orphaned source (2000)
- **Malicious acts**
  - Deliberate poisoning with radioactive material, i.e. London radiological homicide (2006)
- **„Dirty bomb“**
  - Use of a stolen source together with explosive material by terrorists



**International efforts to strengthen control of Sealed Radioactive Sources**

## 2. German Regulations

### IAEA recommendations

- Code of Conduct on the Safety and Security of Radioactive Sources (IAEA 2004) with additional
- Guidance on the Import and Export of radioactive Sources  
⇒ **recommendations**, but **political commitment** expressed by states



### European regulations

- Council Directive 2003/122/EURATOM of 22.12.2003 (Official Journal L 346, 31/12/2003 P. 0057 - 0064)  
⇒ „**HASS Directive**“
- Adoption into **national provisions** is **obligatory**
- Regulations concern sources with an activity  $\geq A_1/100$   
= **high-activity sealed radioactive sources (HASS)**



# European Council Directive 2003/122/EURATOM

## Main prescriptions

- Use of HASS requires license (precautions for source disposal)
- **System to ensure source traceability**
  - ⇒ **Registration of HASS** using the standard record sheet (owner, license, source characteristics, application, control, ...)
- Regular inspection of source and container (source user)
- Unique identification and documentation of HASS
- Precautions for an appropriate management of orphaned sources
- Financial precautions (orphaned sources)



# German Regulations



## 2 legal provisions for the control of HASS

- Atomic Energy Act (Atomgesetz, AtG)
- Radiation Protection Ordinance (Strahlenschutzverordnung, StrlSchV)

⇒ **Act on the Control of High-Activity Radioactive Sources**, 12.08.2005

Changes to comply with the HASS Directive:

- Identification and documentation required for HASS
- Obligation for manufacturers to recycle or dispose sources
- Financial precautions (orphaned sources)
- Central registration of all HASS at the Federal Office for Radiation Protection (BfS) ⇒ **HASS Register**
  - Notification of receipt, transfer and control of a HASS by licensees
  - Notification of im- and export by Federal Office for Economics and Export Control (BAFA)
  - Information accessible for security agencies (Federal and State Police, Secret services, ...)

## German Regulations – Specific conditions



### Federal structure of radiation protection administration in Germany

- 16 different states (Bundesländer) are responsible
- differ in organizational structure
- take responsibility for licenses

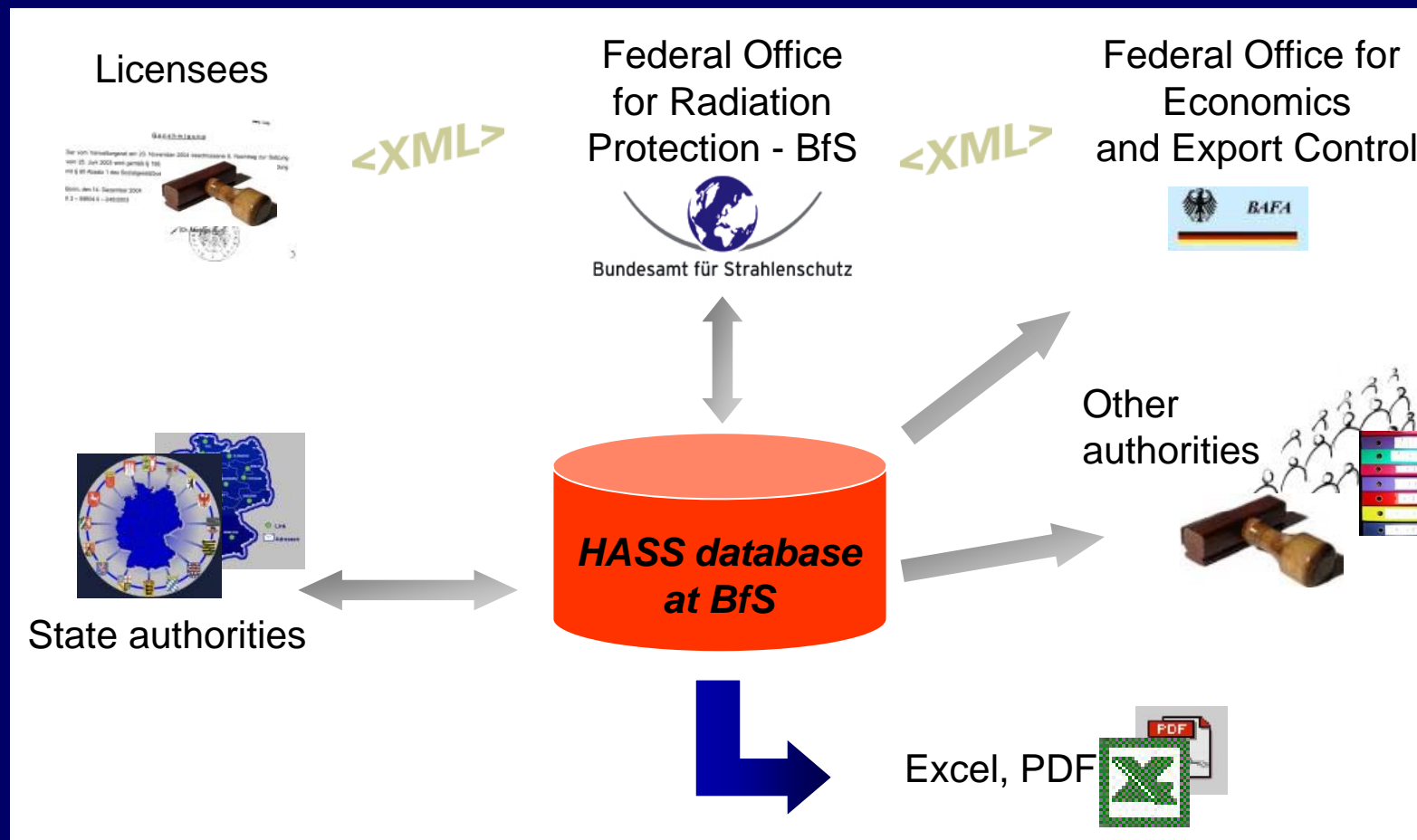
⇒ **Verification of HASS data** possible by person in charge at the **authority of the corresponding Bundesland**

### HASS register manages information between

- licensees
- local state authorities and
- central administration at BfS

### 3. Operation of the HASS Register

Communication system via encrypted internet connection between licensees, state authorities and BfS





# Responsibilities

## Licensee

- Notification of receipt, transfer and control of a HASS (incl. loss, finding)

## State authority

- Verification of the data notified by the licensee
- Notification of finding or loss of a HASS
- Reports and analysis

## Federal Office for Radiation Protection (BfS)

- Operation and maintenance of the database, reports and analysis
- Control of data (reasonableness check) and registration of notification
- User service and consultation
- Development of soft- and hardware

## Other authorities (Security)

- Reports and analysis in case of security issues (read access)

# Main menu for a licensee



The screenshot shows the main menu for a licensee in the HASS Register. The header includes the logo of the Bundesamt für Strahlenschutz (BfS) and the slogan '| Verantwortung für Mensch und Umwelt |'. The main title is 'Register über hochradioaktive Strahlenquellen'. The user is logged in as 'Angemeldeter Benutzer: Fundgenehmigungsinhaber'. There are links for 'Benutzerprofil anzeigen' and 'Abmelden'. The main content area asks 'Was möchten Sie tun?' and lists several actions:

- Eine HRQ melden (Erstmeldung)
- Verkauf / Weitergabe melden
- Kontrolle melden
- Standortänderung melden
- Meldedatei ans Register senden
- Vorlagen bearbeiten
- Verlust / Diebstahl melden
- Fund melden

# Overview for the local state authority – several notifications by licensees

**Meldungsdaten anzeigen**

**1. Unkontrollierte Meldungen**

Meldenummer	Meldungstyp	HRQ-ID	Genehmigungsinhaber	Genehmigungsnummer	Meldedatum	Meldestatus

**2. Kontrollierte Meldungen**

Meldenummer	Meldungstyp	HRQ-ID	Genehmigungsinhaber	Genehmigungsnummer	Meldedatum	Meldestatus

## Security measures

- **No direct access** to the database for a **licensee**, access via **SSL**, login with username and password to a communication client only
- Access for **state authority** via **SSL and certificate**, login with username and password, read and write access
- Access for **other authorities** via **SSL and certificate**, login with username and password, only read access
- **Staff** at BfS working with HASS database **signs secrecy agreement**
- **Computers** at BfS for the work with HASS database have **restricted access**

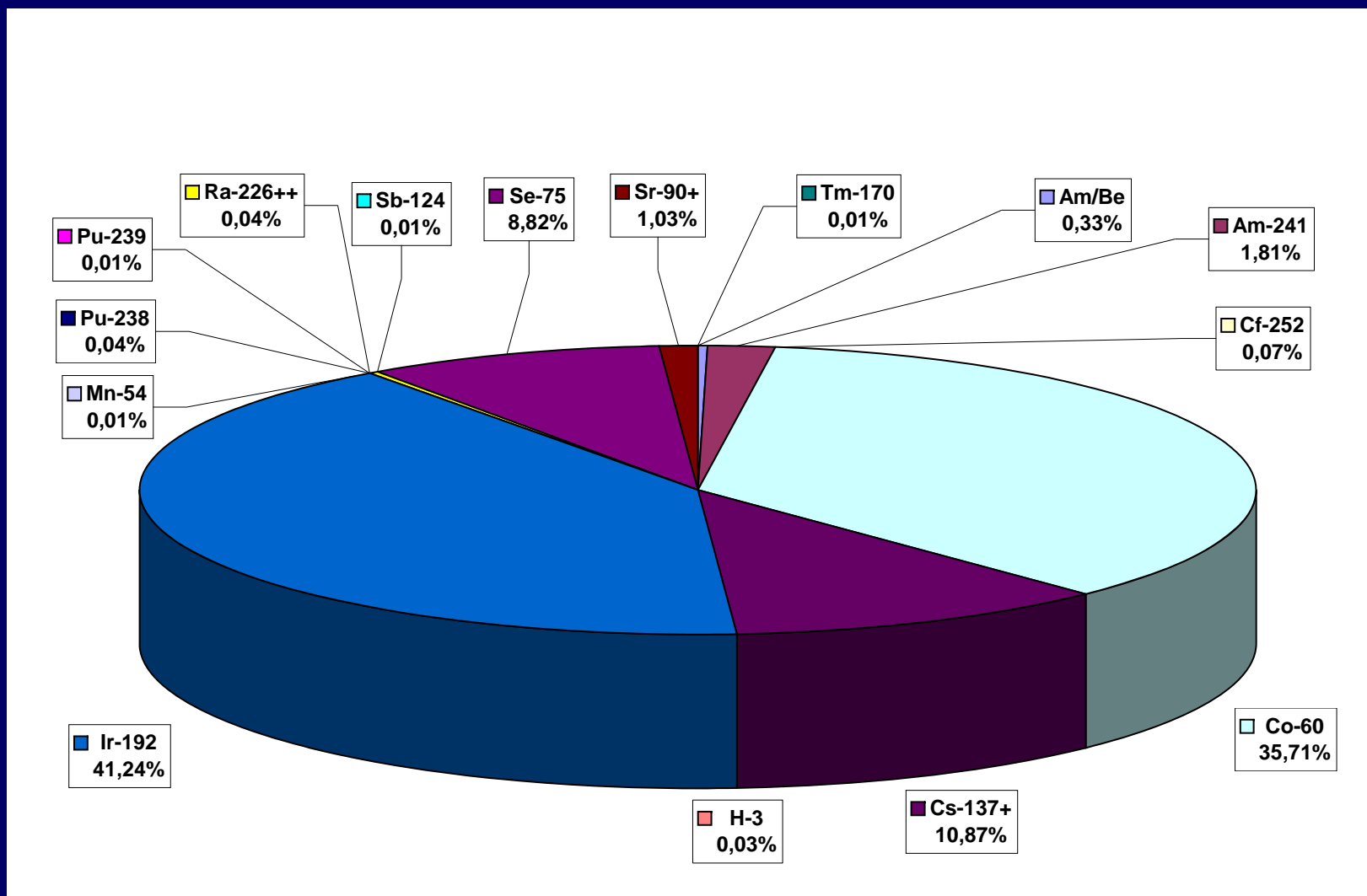
## The HASS Register is operating since 2006

⇒ almost 4 years experience

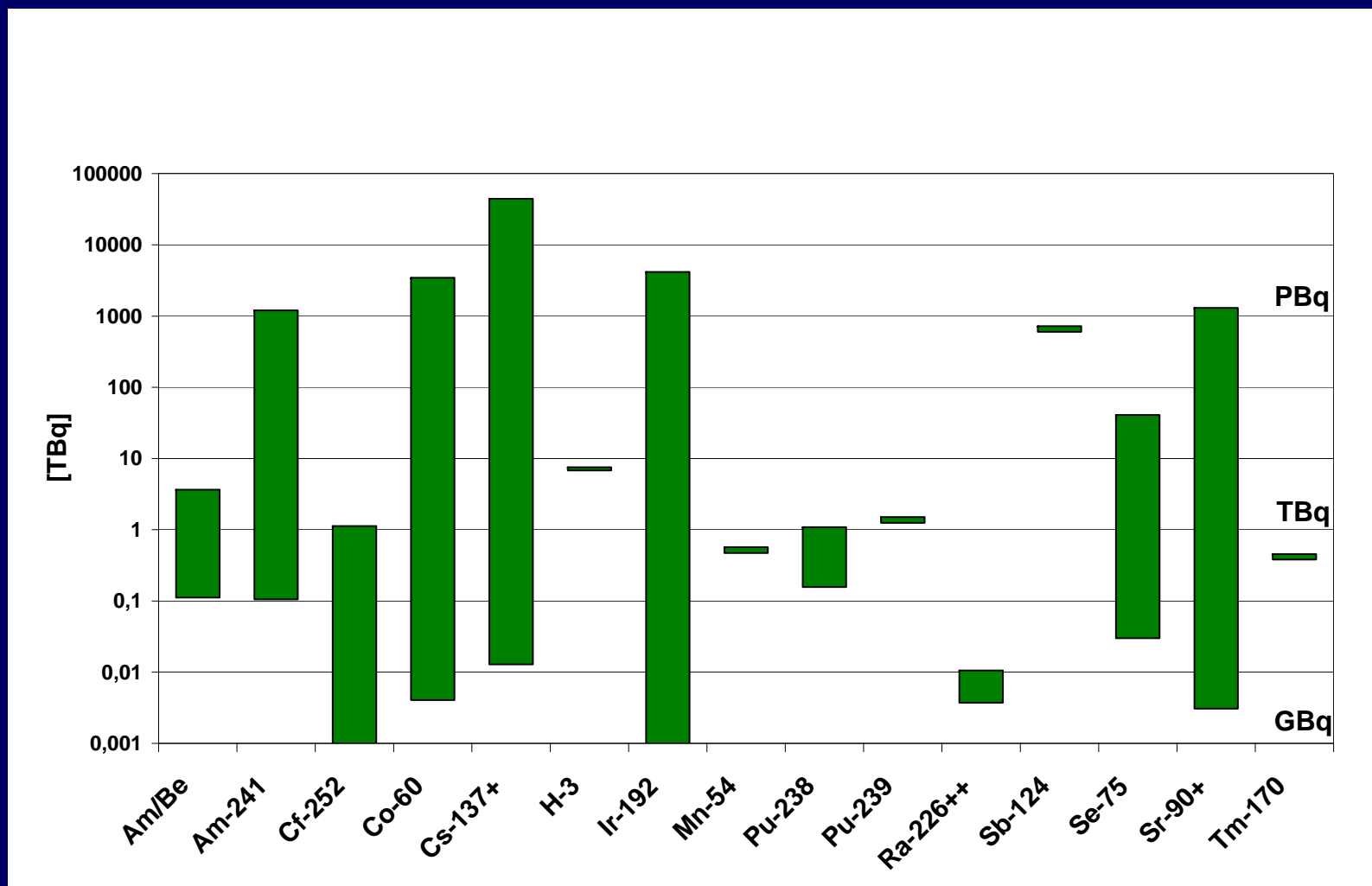
- System is established and accepted by licensees and authorities
- System manages currently (October 2009)
  - 40,000 notifications about 16,000 sources  
(37% decayed, 12% exported ⇒ no HASS formally)
  - access of 580 licensees and 100 authorities
- Current software revision 2, updated in August 2009

⇒ German HASS register complies with the requirements of the European HASS Directive and the IAEA Code of Conduct

# Current distribution of nuclides in the HASS database



# Current distribution of activity in the HASS database



## 4. Experience and Development

### Quality Control of data

#### Problem: notification of wrong data

(i.e. different source labels "A123" ↔ "A 123")

⇒ huge effort through clarification

⇒ inconsistencies of the database

#### Solution

- **Access** of **licensees** to their data
  - local file management, no direct access !
- **Unique identification system** for radioactive sources
  - Scientific investigation on sources sold on the German market
  - evt. introducing a barcode identification system
- **Periodical screening** of source data on inconsistencies
- **Information** to and instruction of **licensees** and **source manufacturers**
  - workshop with German source manufacturers (June 2008)



# Software development

## Problems

- Access to the system and display of graphics is too slow
- Notification procedure should be simplified
- Overview functionality should be improved

## Solution

- Use of a new application server (since last update)
- Improvement of the software
  - better user-friendliness
  - local file management for the licensee

⇒ **Software revision 3** is scheduled for **next year**



# European data exchange



## Problems

- Directive 1493/93/Euratom (Transfer of sources) does not include detailed information
- Similar regulations within the European Union on the basis of HASS Directive 2003/122/Euratom
- Data exchange on the basis of the standard record sheet is possible in principle, but has not yet taken place

## Solution

- Development of conditions for an international data exchange
- International cooperation between HASS registers should be deepened

⇒ **Broad political commitment** is needed

# International Harmonization

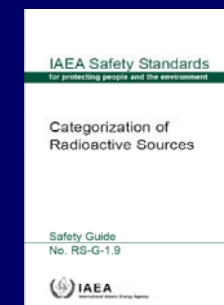
## Problems

- IAEA Code of Conduct (III. No. 11.) requires a national register of sources of category 1 ( $A > 1000 \times D$ ) and category 2 ( $A > 10 \times D$ )
- IAEA D-value (Dangerous quantities of radioactive material (D-values), IAEA 2006)
- Activity levels differ from HASS Directive (European levels are lower mostly)

## Solution

- Harmonization of the European with international regulations
- Problem well known

⇒ **New HASS Directive** will probably adopt the **D-value** regulation of the **IAEA** (incl. at least **category 3**)



## 5. Summary

### National Regulations

- **German Act** on the Control of High-Activity Radioactive Sources (2005) to implement **European Directive** 2003/122/Euratom (2003) and regulations of the **IAEA Code of Conduct** (2004)

### German HASS Register operates since July 2006

- **Communication system** via **encrypted internet connection** between licensees, state authorities and BfS
- Notification of receipt, transfer and control of a HASS by using **xml-files**
- **Main security measures**
  - Encrypted communication via SSL and certificate,
  - No direct access for a licensee

### Development

- Improvement of user-friendliness with **software revision 3**
- **Harmonization** of European with **international regulations**
- **Deepening international cooperation** between HASS registers



**Thank you very much for your attention ...**