

IRSN

INSTITUT
DE RADIOPROTECTION
ET DE SÛRETÉ NUCLÉAIRE



THE RADIOTOXICOLOGICAL MEASUREMENT SERVICE

Certain professional activities involve the use of unsealed radioactive sources or presence at sites potentially contaminated by radioactive products. This exposure carries a risk of internal contamination of employees by inhalation, ingestion or transcutaneous passage.

YOUR OBLIGATION (EMPLOYERS AND OCCUPATIONAL HEALTH PHYSICIANS)

In accordance with the regulations set out in the French Labour Code, any organisation whose staff is subject to a risk of internal contamination by radionuclides must monitor its employees using appropriate means and methods. Each organisation has the option of using a radiotoxicology bioassay laboratory and/or an anthroporadiometric measurement laboratory.

**TALK TO YOUR
RADIOPROTECTION ADVISER!**

THE RADIOTOXICOLOGY BIOASSAY

The radiotoxicology bioassay is a **biomedical procedure**, performed upon the prescription of a physician. It involves **measuring the radioactivity contained in the natural excreta** of a person having incorporated radionuclides.

Depending on the type of items handled at the place of work, a one-day urine collection and/or a three-day stool collection is recommended. The techniques implemented at the **Radiotoxicological Medical Analysis Laboratory (*Laboratoire d'Analyses Médicales Radiotoxicologiques - LAMR*)** make it possible to detect and quantify all types of emitters: α , β and γ .

Radiotoxicological bioassays are complementary to anthroporadiometry bioassays, with the advantage of being able to detect α and β contaminations with great sensitivity.

The radionuclides present are identified and quantified (in Bq/l) using radiochemistry protocols and specific nuclear measurement techniques (germanium diode gamma spectroscopy, liquid scintillation, silicon diode alpha spectrometry, mass spectrometry, etc.).

The report of the analyses carried out is sent to the occupational health physician, who may consult the LAMR's specialised medical laboratory medicine doctors to obtain answers to any questions they may have.

The LAMR's medical laboratory medicine doctors and the IRSN's dosimetry experts are available to assist the occupational health physicians with the evaluation of the dose in Sieverts.

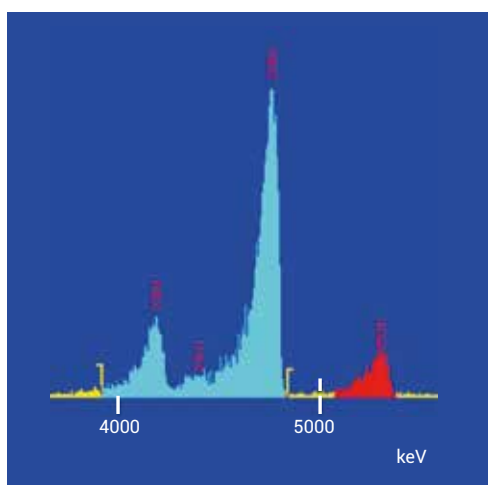
With rare exceptions, the examinations carried out by the LAMR receive accreditation from the COFRAC (French Committee of Accreditation) in accordance with standard NF EN ISO 15189 (accreditation no. 8-1884, the scope of which can be consulted at www.cofrac.fr).



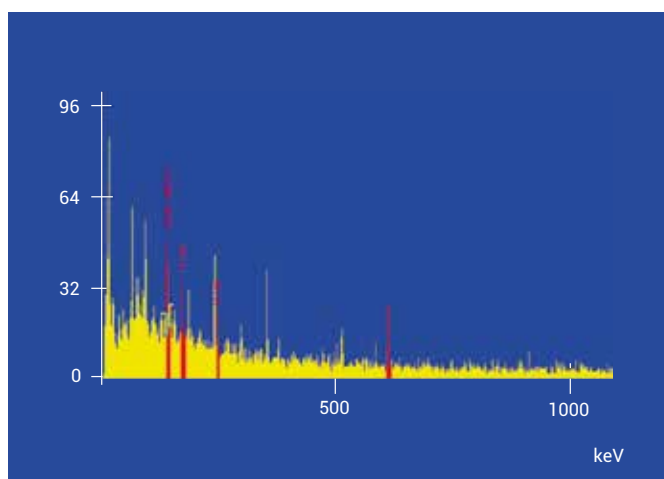
Examples of at-risk jobs: researchers (molecular labelling in 'hot' laboratories), radiochemical handlers and **radiopharmacists** (nuclear medicine departments), **employees of decontamination companies** working at contaminated sites, etc.

SERVICES OF THE IRSN'S RADIOTOXICOLOGICAL MEDICAL ANALYSIS LABORATORY

- ➔ The IRSN's Radiotoxicological Medical Analysis Laboratory studies your needs in consultation with you, and **advises you** on the choice of the most appropriate techniques and frequency of monitoring for your employees.
- ➔ The IRSN's LAMR is available, in case of emergency, to manage urine samples as soon as they arrive at the Vésinet laboratory.
- ➔ The IRSN's LAMR helps you interpret your results, by placing its experts at your disposal.
- ➔ The IRSN's LAMR offers four levels of monitoring (task-related, confirmatory, routine and special monitoring) for the radiotoxicology bioassay of human excreta, according to the recommendations of the employee monitoring standards in force.
- ➔ The IRSN's LAMR offers measurements of a very wide array of radionuclides, including all types of emitters, for *in vitro* radiotoxicology bioassays.
- ➔ A specific, short protocol exists for **nuclear medicine services**: find out more!



> Example of detection of uranium contamination on a stool sample.



> Example of detection of indium-111 (lines at 171 and 245 keV) and Technetium-99m (line 140 keV) on a urine sample of a doubly-contaminated employee.

SMER/MKT/005 Ind1 - NOVEMBER 2018 - Photo credit: E. Riche / E. Thibaud - IRSN Media library.

THE IRSN, AN EXPERT IN RADIOPROTECTION

The IRSN is the public expert in managing nuclear and radiological risks.
Radiation protection is at the heart of our work.

The IRSN is certified according to the ISO 9001 Quality Management Standard.



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