

5. FRENCH ACTION REGARDING ORPHAN SOURCES

In 2011, France signed an agreement with the IAEA that helped to locate French-origin high-activity radioactive sources in States with insufficient resources to store them in a safe and secure way. France repatriated 20 sources that could not be secured on site from 5 States in Africa and the Middle-East.

French assistance also helped to secure on site 30 sources in Latin America, Asia and the former USSR. New operations are planned in 2016-2018 to repatriate a dozen of French-origin sources from States in the Middle-East and Africa.

Since 2003, France has dedicated 6.5 million US\$ to actions regarding the security of radioactive sources. 25% of this total was contributed via the IAEA's Nuclear Security Fund.

6. FRANCE'S EFFORTS REGARDING TECHNOLOGIES NOT USING HIGH-ACTIVITY SOURCES

France is also active to reduce the uses of high-activity radioactive sources when technically and economically feasible. From 2006 to 2016, the French authorities progressively phased out isotopic medical gamma blood-irradiators to replace them by X-ray devices.

France also co-chairs with the United States an ad hoc working group of States involved with technological alternatives to high-activity radioactive sources. While reminding that such decision must remain the responsibility of each State, this group enables technical discussions on how to spread such technologies in an economically and technically realistic way. It will be gathered once a year under American-French chairmanship in 2016 and 2017.

7. FRENCH SUPPORT TO THE RELEVANT INTERNATIONAL FRAMEWORK

In 2015, France carried out 40 diplomatic demarches to encourage States that had not yet done so to ratify the ICSANT as well as to make a political commitment towards the Code of Conduct.

French experts are involved in the elaboration of IAEA recommendations – guidance on the end of life of disused radioactive sources or on the security of nuclear and other radioactive materials in transport – or in their revision – as the nuclear security series (NSS) 9 and 11.

France is also involved in expert seminars or workshops on the security of radioactive sources, either to deliver lectures or to propose expertise (IAEA or Interpol events) and to organize some (workshop held in September 2014 on the end of life management of radioactive sources).

THE SECURITY OF RADIOACTIVES SOURCES A FRENCH PRIORITY



1. WHAT ARE RADIOACTIVE SOURCES AND WHAT ARE THEY USED FOR?

A/ Radioactive sources are substances that contain radionuclides which generate ionizing radiation. They may be found naturally as minerals with a very low radioactive activity. Radioactive sources may also be artificially produced from natural minerals to obtain specific. Radioactive sources may be distinguished according to

- Their physical and chemical form – under solid (bloc or dust) or liquid form;
- Their radioactive half-life – i.e. the time for half the radioactive nuclei to undergo radioactive decay, which generates radiations of low, medium or high activity;
- Whether they are sealed or not - whether their packaging prevents (sealed) or not (non-sealed) radioactive dispersion in the environment in normal use conditions.

Example: cobalt may be found as ore and can be refined to raw metal. Irradiating such refined cobalt produces cobalt 60 – a radioactive source with a medium half-life (5.27 years) and a high radioactive emission (2.509x10¹⁵ Becquerel / mole).

B/ Thousands of high activity sealed radioactive sources (HASS) are currently used for a large range of civilian activities that have a beneficial added-value in daily life:

- **In agriculture:** mainly to sterilize products and suppress insects, microbes and bacteria;
- **In industry:** for non-destructive testing or quality controls in production processes, to develop artificially-produced materials, or for industrial radiography on crucial components;
- **In the oil, gas and mining sector:** to detect leaks or corrosion on pipelines, to assess sensitive welds, or to operate equipment used to carry out soil analyses;
- **In space technologies:** with radioisotopes thermoelectric generators to power satellites.
- **In medicine:** to cure cancers (radiotherapy and teletherapy), to detect heart disease, to sterilize equipment or tools, to develop new molecules and medicines etc.
- **In scientific research:** to operate 3D imaging equipment, to carry out high-precision analyses of substances or to realize observations in infinitely small scale.

2. THE RISKS ASSOCIATED WITH RADIOACTIVE SOURCES

High-activity radioactive sources can cause death or serious injuries in case of direct exposure with no adequate protection. Some accidents in their management have already illustrated their possible human impact – the most famous being the Goiania incident in 1987.

This sanitary risk can incite malicious actors to try to illicitly acquire radioactive sources. Some criminal acts involving sources have confirmed the potentialities of such malicious uses. Most of these acts involved poisoning of individuals but a high-activity radioactive source could be combined with a classical explosive in a “dirty bomb”.

Radioactive sources have triggered relatively less international efforts in the field of security, though the focus of the international community has grown more and more important since the 1990s.

This focus targets more specifically radioactive sources withdrawn from service, as States with limited resources may experience difficulties to store them in a safe and secure way. These sources may then ultimately become “orphan” and, consequently, a security risk – as malicious actors could divert them.

3. INTERNATIONAL EFFORTS REGARDING THE SECURITY OF RADIOACTIVE SOURCES

The security risks associated with radioactive sources have been an issue of concern since the 1980s. The first IAEA guidance on this topic were adopted in the 1990s, especially after the Dijon Conference of 1998 organized by France. This event eventually led to the adoption of the IAEA Code of Conduct on the safety and security of radioactive source (2000).

The terrorist attack of September 11th, 2001 led to a stronger international focus on the security of radioactive sources. The Code of Conduct was updated (2003) and a Supplementary guidance on the import and export of radioactive sources was adopted (2005). These efforts were complemented, in the United Nations, with the adoption of the *International Convention on the Suppression of Acts of Nuclear Terrorism* (ICSANT, 2005).

Many States also took concrete actions to identify and secure orphan radioactive sources or to help States with limited resources to secure them. Such programs were undertaken thanks to the IAEA’s assistance to requesting States, the United Nations’ 1540 Committee and the G7 Global Partnership against the spread of weapons and materials of mass destruction (G7GP).

4. FRENCH EFFORTS IN FAVOR OF THE SECURITY OF RADIOACTIVE SOURCES (2016)

During the Nuclear Security Summit held in Washington D.C. in 2016, France promoted a gift basket “*Strengthening the security of high activity sealed radioactive sources (HASS)*”. Twenty-eight States and Interpol co-sponsored the joint statement and affirmed their commitment to encourage and support such an effort through the following scope of work :

- Strengthening further the international framework applicable to radioactive sources ;
- Supporting the development of non-HASS technologies (whether isotopic or not) through research and development, and promoting them as far as technically and economically acceptable ;
- Deepening further international cooperation to better manage the end of life of HASS.

France will actively promote such actions in the IAEA, and other competent forums, after the end of the NSS process. At the 2016 United Nations General Assembly, France and Germany thus presented a resolution aimed at preventing the acquisition of radioactive sources by terrorists, which was adopted by consensus.