Radiological assessment of drinking water in France

Jean-Luc Godet, Delphine Caamaño (ASN), Laëtitia Guillotin, Béatrice Jédor, Henri Davezac (DGS), Raphaël Tracol (ARS de Basse Normandie) and Jeanne Loyen (IRSN)

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The French Nuclear Safety Authority (ASN), the Directorate General for Health (DGS) and the French Institute for Radiological Protection and Nuclear Safety (IRSN) carried out an assessment of the radioactivity in french drinking water (2008-2009), based on the results of official monitoring program.

Official monitoring program of radioactive substances

Fundamentals

The official monitoring program of radioactive substances in drinking water has been implemented by Regional Health Agencies since 2005 in accordance with the provisions laid out in directive 98/83/EC. The screening strategy includes :

- measurement of 3 indicators : gross alpha activity, gross residual beta activity and tritium to indicate the presence of of radioactivity;
- analysis of specific radionuclides and calculation of total indicative dose (TID) if at least one of the parametric values is exceeded for these 3 indicators (0.1 Bq/L, 1 Bq/L and 100 Bq/L respectively);
- comparison of the TID value with the parametric value of 0.1 mSv/year.

Implementation of official monitoring program (2005-2009)

Official monitoring program is in operation. It covers the entire country with around 12000 samples collected each year.

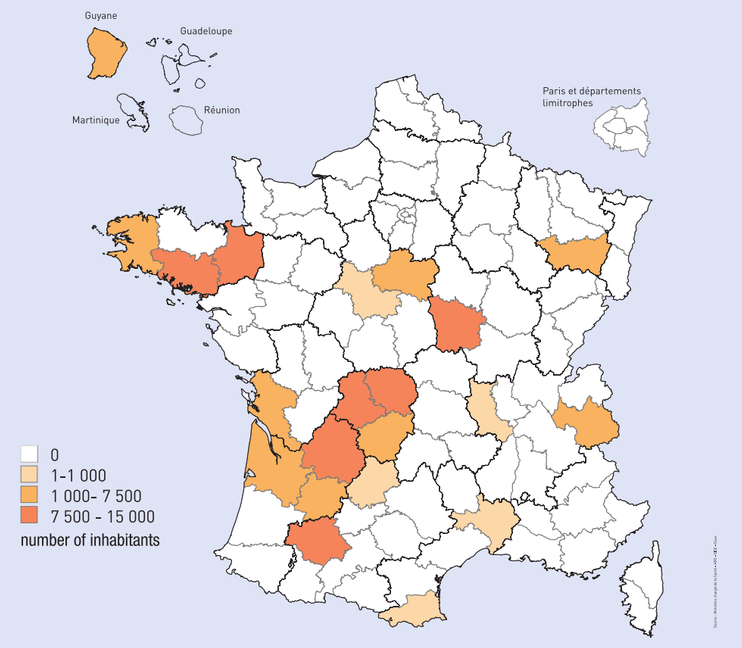
Handling of non-compliant cases

The doctrine established by the ASN adopts a pragmatic, prudent approach, and applies the principle of optimisation in radioprotection.

Radioactive substances in drinking water

Main results (2009)

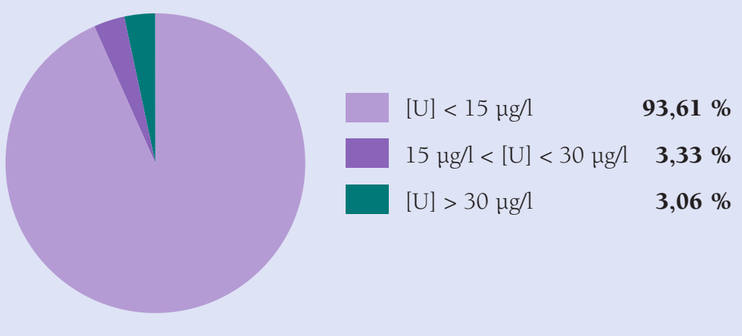
- An overall satisfactory water quality
- 99.83% of the population was supplied with water whose quality (TID) was permanently compliant.
- Non-compliance (gross alpha activity) was always due to natural radionuclides, mainly radium-226, uranium-234 and 238 in natural radioactivity prone areas.



Population supplied with water with an average TID > 0.1 mSv/year

Presence of uranium in drinking water (2008 – 2009)

3% of non-compliant samples in terms of gross alpha activity had a mass concentration of uranium > 30 µg/L.
This guidance value is proposed by the WHO (2011) due to the chemical toxicity of uranium. It leads to an annual dose of a few µSv.



Distribution of mass concentrations of uranium with a gross alpha activity above 0.1 Bq/L from 360 samples of drinking water (IRSN measurements)

Presence of radon in drinking water (1977 – 2003)

High radon measurements were mostly found in the *départements*[1] selected for monitoring radon in buildings. 4% of the results are above 1000 Bq/L; remedial actions deemed to be justified on radioprotection grounds where radon concentration exceed this value.

Distribution of significant values for radon 222 activity in the water resources used for the production of drinking water (IRSN measurements)

[1] Administrative region headed by a *préfet*.

The french monitoring program, in operation since 2005, is consistent with the future council directive laying down requirements for the protection of the health of the general public with regard to radioactive substances in water intend for human consumption. The very rare non-compliant cases are well indentifed and treated following the national doctrine established by ASN.

Main author: Jean-Luc Godet (French Nuclear Safety Authority) - jean-luc.godet@asn.fr - www.asn.fr - March 2012