

Radiological assessment of drinking water in France

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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 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.

Handling of non-compliant cases

0,1 mSv/year

0,3 mSv/year

Remedial actions not necessarily recommended

Search for remedial actions , taking into account existing local context
Restrict consumption

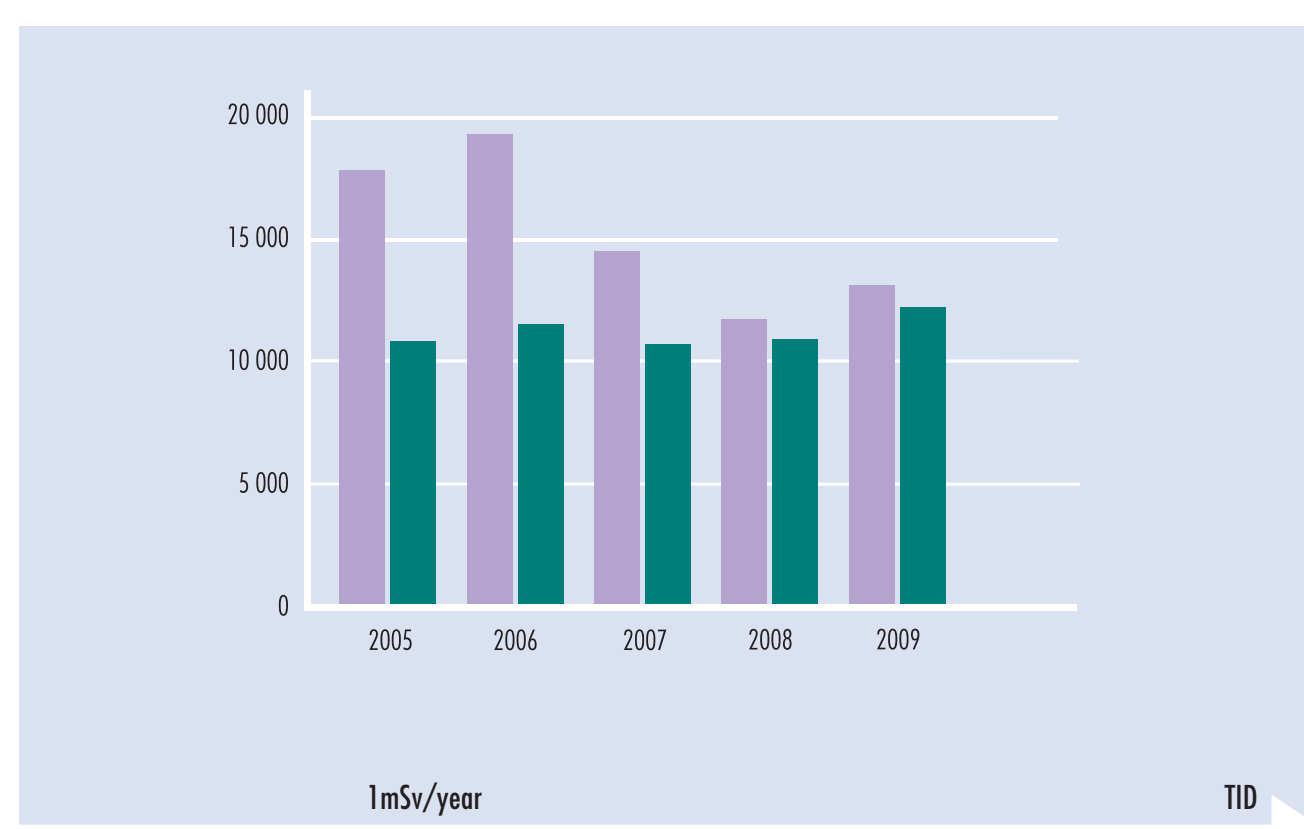
Search for remedial actions as a matter of urgency
Restrict consumption

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

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.

- Number of samples (gross alpha activity)
- Number of samples (tritium activity)



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.

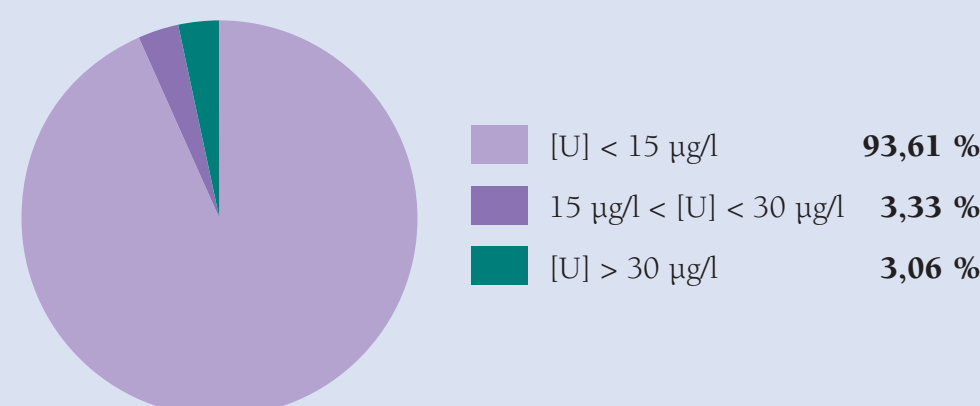
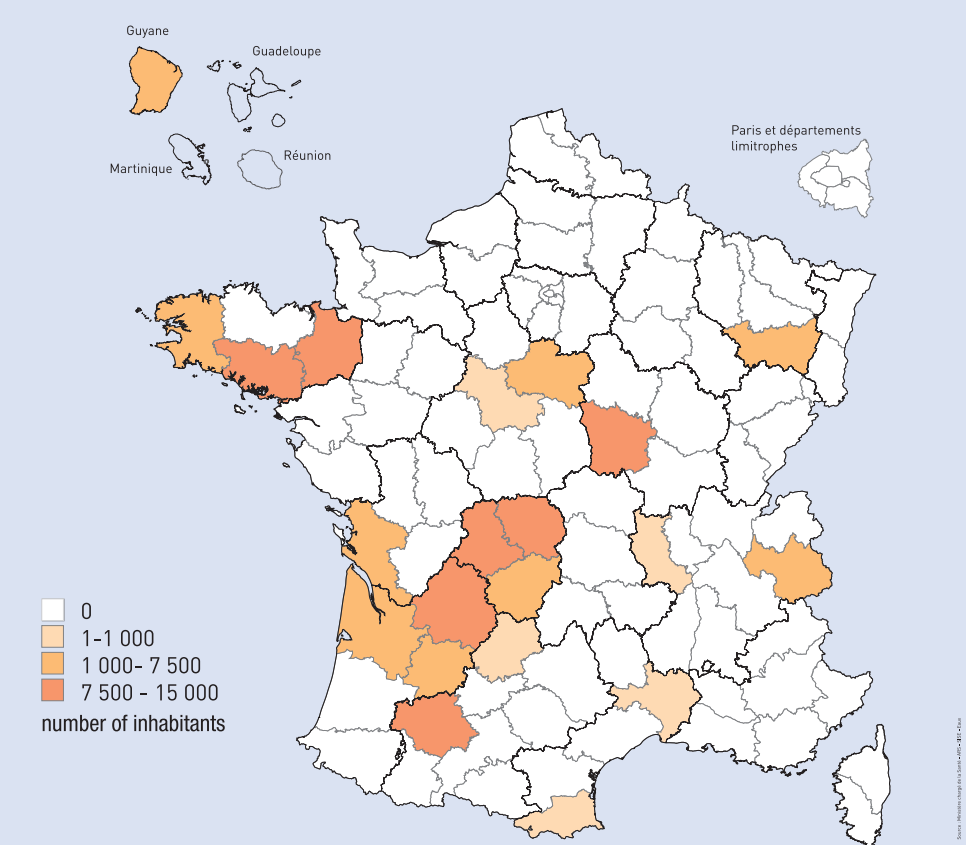
Population supplied with water with an average TID > 0.1 mSv/year

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.

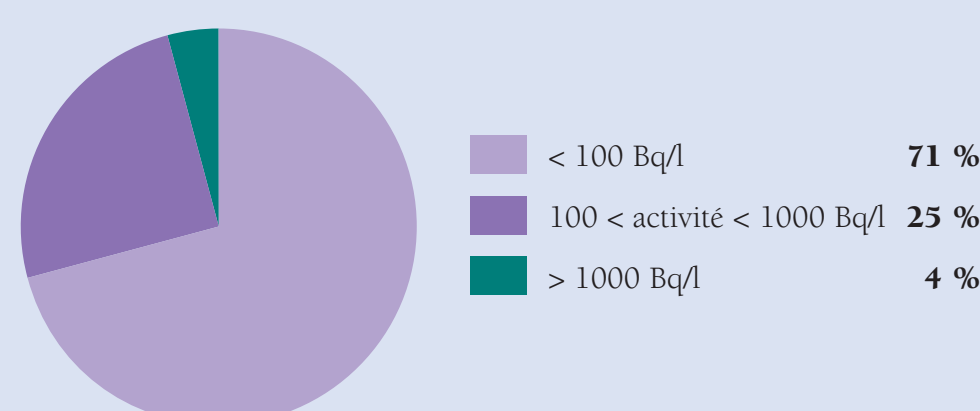
Distribution of mass concentrations of uranium with a gross alpha activity above 0.1 Bq/L from 360 samples of drinking water (IRSN measurements)



Presence of radon in drinking water (1977 – 2003)

High radon measurements were mostly found in the départements¹ 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 indentified and treated following the national doctrine established by ASN.