Treatment techniques for removing natural radionuclides from drinking water

Dal 1997-01-01 al 1999-06-30

Obiettivo

The overall objective of this project is to accumulate the knowledge of, test and improve methods and equipment to remove natural radionuclides from drinking water from privately owned wells or small water works. Big water works have financial as well as other resources to purify their water in case the water contains high amounts of natural radioactivity. Private families or small water works do not have the same potential and there is a need to have commercially available tested equipment to remove radon, uranium and other natural radionuclides from drinking water. A number of methods to remove natural radionuclides from water are known. However, the methods have to be tested for different types of water qualities. A method that works with soft water may not at all work for hard water etc. It is also important that the methods affect the water quality as little as possible apart from removing the radionuclides. There is a definite need to accumulate the knowledge in the field of natural radioactivity in drinking water and to find well tested methods and equipment to remove these radionuclides from both small and larger water works and from drilled wells. The measurable objectives are to produce:

- Recommendations for the most suitable methods to remove Rn-222, U-238, U-234, Ra-226, Ra-228, Pb-210 and Po-210 from drinking water of different qualities (hardness, contents of Fe and Mn, organics etc.) for small water plants and drilled wells.
- List of commercially available, reliable, low-cost, easy to use and install equipment for removing natural radioactivity from drinking water for small water plants and drilled wells.
- Guidelines for the treatment and disposal of radioactive wastes from water treatment equipment.

There are several methods known to remove radioactivity from water such as aeration to remove radon, adsorption by granular activated carbon, ion exchange methods and various adsorption methods to remove other radionuclides. Experience exists on their usability under controlled conditions but the experience is limited (except radon removal methods) in connection with private wells supporting mostly one family only. The main problem is that radionuclides to be removed differ in their chemical and physical properties and thus cannot usually be removed using the same filtering material. One more difficulty is that these radionuclides are dissolved as complexed compounds, which as well as water quality characteristics have a great effect on the removal efficiency. Thus any of these removal methods cannot be advised to be used without testing with several types of waters (such as hard, soft, salt, rich in carbonate, Fe, Mn, organics etc.). The project involves to test the known techniques (for radon different aeration techniques and activated carbon filters and for U, Ra, Pb and Po ion exchange, reverse osmosis, different specific adsorbing filters, lime etc.) to find materials and methods applicable to remove these nuclides from water and to produce prototypes of devices to be employed in private families and in small water plants. The project will also involve the treatment of radioactive wastes produced by the different removal techniques.
Coordinatore

Finnish Centre for Radiation and Nuclear Safety
4, Laippatie
00881 Helsinki
Finland
See on map

Contatto amministrativo: Martti Kalevi ANNANMAEKI
Tel.: +358-075988224
Fax: +358-075988248

Partecipanti

Budesanstalt für Lebensmitteluntersuchung und -forschung
15, Kinderspitalgasse
1095 Wien
Austria
See on map

Contatto amministrativo: Franz SCHÖNHOFER
Tel.: +43-140491520
Fax: +43-140491540
E-mail

ESWE - Institute for Water Research and Water Technology GmbH
158, Söhnleinstraße
65201 Wiesbaden
Germany
See on map

Contatto amministrativo: Klaus HABERER
Tel.: +49-6117804317
Fax: +49-6117804375

Philipps-Universität Marburg
Hans-Meerwein-Straße
35032 Marburg
Germany
See on map

Contatto amministrativo: Hartmut JUNGCLAS
Tel.: +49-6421286217
Fax: +49-6421282830