

## The PFAS contamination to aquifers of central Veneto Region: assessing the risk and acting for solutions

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### ABSTRACT

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In 2013, a survey study undertaken by the Italian National Research Center (IRSA-CNR), triggered by the outcomes of the European PERFORCE project, revealed the high presence of perfluoro-alkyl substances (PFAS) in the waters and sediments of some very populated river basins of the North-East Italy. In particular, most of the water coming from aquifers in the Agno-Fratta Gorzone basin showed increasing concentrations of sum of PFAS well above 30.000 ng/l. The main source of contamination was identified in the Province of Vicenza, where a chemical plant was producing PFAS compounds since the early '60, mainly for the local leather industry district. The contaminated area includes 30 Municipalities, with 140.000 people directly exposed to the PFAS pollution mainly from the drinking water.

As consequences, several actions had been undertaken by Regional and Central Authorities (Health and Environmental), in coordination with Water Utilities, in order to control the diffusion of the contamination and to protect human health by substantially decreasing PFAS concentration in drinking water. The National Institute of Health (ISS), immediately recommended the need and urgency to adopt measures aimed to risk mitigation, prevention and control extended to the whole water supply chain. Water Utilities immediately went for the restraint of water contamination and the installation of active carbon filters to the water supply systems.

After the implementation of immediate mitigation measures, ISS recommended extensive PFAS risk assessments, referred to the specific local circumstances, environmental contamination, and possible exposure of population. The conclusions, based on precautionary principle, recommended short-medium and long-term actions to achieve the virtual absence of PFAS at the tap. Meanwhile, provisional treatment performance limits for PFOS, PFOA and the “sum of other PFAS<sup>1</sup>” were recommended for drinking water (0.03, 0.5 and 0.5 µg/L respectively).

At the same time, Regional Health Institutions and ISS initiated one of the worldwide largest biomonitoring survey targeting more than 90.000 people in the area to assess the potential toxicological and epidemiological links between exposure of PFAS compounds and diseases, representing an early warning to diagnosis and identifying specific care needs, while Environmental Authorities undertaken a wider monitoring campaign and modelling exercise to track the spatial evolution of the contamination plume. Moreover, through a strict cooperation between the consortium of Water Utilities VIVERACQUA, the ISS and the Regional Authorities a first WSP have been implemented to actively manage the risks related to the presence of PFAS and other compounds of emerging concern in drinking water, representing a pilot case study and reference for replication at national scale. This proactive approach proposed by the WHO in 2004, was introduced at the regulatory level in Italy with the decree of 14 June 2017 (transposition of the EU Directive 1787/2015), and will be object of 4 articles of the new EU Drinking Water Directive.

The risk assessment effort addressing drinking waters in Veneto is being done in the framework of the LIFE EU Phoenix project which aims to pilot a new inter-institutional governance system, supported by innovative forecasting tools and targeted mitigation strategies. The case of the PFAS contamination in the aquifers of the central Veneto Region, represents a prominent case to demonstrate the practical application of the quadrupole helix approach involving, respectively, the policy and decision makers (at both local, regional and national level), the industry/business communities, the research/academia institutions, the media- and culture-based public and the civil society and, finally, the water utilities playing a cross-sectorial challenging role of being in charge of the overall management of the drinking water resources.

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<sup>1</sup> At least including: PFBA, PFPeA, PFBS, PFHxA, PFHpA, PFHxS, PFNA, PFDeA, PFUnA, PFDaA.