

Decontamination procedures of water distribution systems

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Summary of presentation

Water distribution networks are potential objects for deliberate contamination. After the latest terrorist attacks to public facilities several proactive approaches, that are intended to decrease the risk of sabotage, are being continuously implemented (e.g. as a part of Water Safety Plan) in many countries. However, up to now, there is no scientifically justified methodology available about approaches for dealing with removal of chemical, biological, radiological or nuclear (CBRN) agents from the distribution networks after the events of the contamination. It is not known in which situations (depending on age of the network, type of pipes, diameter of pipe, type of CBRN) what methods (flushing, swabbing, chemical treatment or other) should be used and what technical parameters (flow rate, doses, contact times) should be applied. Thus, operational procedures for decontamination of water infrastructures are needed to restore quickly the functionality of the distribution system after deliberate contamination.

One of the major aims of the FP7 EU-project SecurEau (<http://www.secureau.eu/>, 2009-2013) is to test applicability of conventional cleaning and develop new decontamination procedures (efficient and realistic) of the distribution system, *i.e.* adapted to size, age, architecture of the network, including the treatment of water extracted from the system and used for washing the pipe wall.

The expected impacts adaptation of cleaning and neutralisation techniques of the water and network pipe walls which take into account the nature of the contaminants and the diversified and complex characteristics of the pipe wall surface and presence of loose deposits.

SecurEau will test comparatively several procedures of decontamination (flushing, swabbing, oxidation etc) as well as the water. The challenge is to develop combined actions for water decontamination and pipe walls, which are made of plastics, or corroded material. The knowledge and experimentations carried out by SecurEau partners will allow a classification of the best cost-effective procedures of cleaning and a realistic evaluation of the negative effects of the treatment (accelerated corrosion, red water, leakages...) and its limits (mainly linked to the accessibility of the small diameter pipes). Specific technologies and methods which are being developed are chemical methods for removal of radioactive agents, air scouring technique for removal of contaminated deposits with minimal water consumption during air-water flushing, hydrodynamic cavitation (in combination with chemical methods) for removal resistant microbial agents, novel release agent to aid pathogen disinfection in biofilm, application of FeS to adsorb aqueous or biofilm - released radionuclides, and advanced oxidation (AOP) and photo-Fenton process for handling of residues after cleaning.