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DEVELOPMENT AND IMPLEMENTATION OF A WATER SAFETY PLAN FOR THE DRINKING WATER SUPPLY SYSTEM OF FLORENCE, ITALY

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Abstract

The adoption of the Water Safety Plan (WSP) approach, as recommended by the World Health Organization, represents the most effective means to guarantee public health protection and improve drinking water safety. WSP is a risk assessment and management approach applied to all phases of the water supply chain. This study presents the development and implementation of the WSP for the municipality of Florence. The Florence drinking water supply system (DWSS) has two drinking water treatment plants and supplies a population of about 380 000 inhabitants. The main water resource is the River Arno, characterised by high seasonal and daily variations of water quality and quantity and by extensive anthropogenic contamination. The results of our case-study allowed the identification of more than 70 hazardous events including source water contamination, treatment failures, sedimentation in storage tanks, biofilm erosion in the network. The phases with the highest percentage of hazardous events are the catchment and the treatment steps. According to the risk analysis results, the main corrective actions identified are the installation of an early warning station in order to forecast the changes in the source water quality, the analysis of the main contaminants of emerging concern in the source and treated water, the installation of turbidity probes in the pipes with the lowest flow velocity. The implemented WSP enabled an assessment of the DWSS performance. Moreover, it represents a useful tool for the water manager to improve system management and control, to increase consumer confidence and to reduce the risk of water contamination.

Key words: drinking water, risk assessment, risk management, water safety plan, water treatment plant

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