

Kowalski, D., Kowalska, B., Kwietniewski, M., Musz, A. Reverse Flow in Branched Water Distribution Network. *Ochrona Srodowiska* 2010, Vol. 32, No. 4, pp. 31–36.

Abstract: Changes in the flow direction in water distribution networks may cause the pipe incrustation to tear off, thus inducing self-contamination and deteriorating the quality of the water supplied to the user. So far, the occurrence of changes in the flow direction has been regarded as inherent in looped water distribution networks. However, in-situ measurements and simulations performed by the authors of this paper have revealed short periods of reverse flow also in branched water distribution networks. Furthermore, the results obtained have demonstrated that reverse flow occurs not only after a failure (as can be inferred from the investigations reported in the literature), but also during short-term pressure head variations induced (for example) by water hammer or by the change in water demand. The results of simulations indicate that the occurrence of reverse flow in the branched water distribution network is of a short duration. The observed period of the wave of reverse and return flow averaged 4.5 s and did not depend on the drop in the pressure which forces reverse flow. It may well be assumed that this period fails to depend on the geometry of the system being studied. The paper also presents the attempt to describe the phenomenon with the specialized FLUENT software, which is used when modeling the dynamics of fluids.

Keywords: Reverse flow, water distribution network, branched network, water quality deterioration.