

**Zimoch, I. Analysis of Operational Safety as a Tool for Controlling the Functioning of a Water Treatment Plant. *Ochrona Srodowiska* 2011, Vol. 33, No. 2, pp. 39–44.**

**Abstract:** A crucial factor in guaranteeing a correct operation of the water treatment plant is the ability to predict such operating conditions for the treatment train (events) that might produce a risk of operational safety loss or, in extreme circumstances, cause the water treatment plant lose its operational safety. It is imperative that the methods used for a comprehensive analysis of operational safety should entail not only the reliability of the treatment train's functioning but also a probabilistic characterization of water quality safety. With the method proposed here for the comprehensive analysis of the operational safety of a water treatment plant it is possible to interpret the operational safety in terms of an integrated parameter, *i.e.* in terms of the availability of operational safety. Thus, based on the standard operating parameters of the water treatment plant, as well as on the quality parameters of the water being taken in, it is possible to obtain further information on the course of the water treatment process. It has been demonstrated that the use of relatively simple statistical tools enables the following additional parameters of assessment to be evaluated: a generalized safety factor ( $B_{ZOW}^{JW}$ ), the probability of technological error ( $P_{BT}$ ), and the probability of technological efficiency being unavailable ( $P_{BST}$ ). These parameters allow a full identification of the conditions and operational correctness for the water treatment plant, thus providing a basis for the development of procedures for Water Safety Plans in order to minimize the operational risk for the water intake and water treatment systems. The method of operational safety analysis proposed in this paper for a water treatment plant is versatile and applies to real water treatment plants under conditions of diverse water quality parameters.

**Keywords:** Water treatment, water supply system, safety analysis, reliability, risk, Water Safety Plans.