Apparatus and Method for Automated Biomonitoring of Water Quality

United States Army Center for Environmental Health Research

To help protect soldiers from exposure to drinking water supplies contaminated with toxic industrial and agricultural chemicals, U.S. Army Center for Environmental Health Research (USACEHR) employees Mr. Tommy Shedd, Mr. Mark Widder, and Dr. van der Shalie developed an aquatic biomonitor that continuously monitors water using live fish and rapidly identifies toxic conditions caused by a wide range of chemicals or chemical mixtures. Electrical signals generated by ventilatory or body movements of eight fish are received by remote electrodes inside an individual test chamber, conditioned, and interfaced to a computer for continuous, automatic evaluation. Water quality parameters are monitored to aid in the interpretation of fish behavior. Should abnormal activity be detected, the computer notifies appropriate personnel using an autodialer and takes a water sample for future analysis using an automated, refrigerated sampler. Biomonitor data can be remotely accessed for evaluation, and the system requires only about four hours per week of maintenance. The system responds within an hour to most chemicals at acutely toxic concentrations. Laboratory and field evaluations of the biomonitor have been augmented with support from a number of sources, including the U.S. Environmental Protection Agency, the Department of Defense Legacy Program, the U.S. Army Research Development and Engineering Command, and New York City. By providing the ability to continuously monitor water quality and provide rapid identification of developing toxic conditions, the USACEHR aquatic biomonitor significantly improves the Army's ability to protect military personnel from contamination and offers the same capability for civilian users, including water utilities. A license was executed With Intelligent Automation Corporation (IAC) in 2004. A total of 6 units have already been sold commercially and up to 14 additional units are pending future purchase from various public water utilities.

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