

WaterSentry™: A Practical Biosensor System for Primary-Source Water Protection

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Abstract

WaterSentry™ is an automated field-deployable real-time monitoring system for water protection that is based on the fluorescence induction properties of algae that grow naturally in primary source waters. United Defense LP has acquired an exclusive commercial license from Oak Ridge National Laboratory for this technology. We report photochemical yield analysis and dose-response sensitivity data for chlorophyll fluorescence collected from the Clinch River in Oak Ridge, Tennessee. The Clinch River is the main source of water for the City of Oak Ridge. WaterSentry™ uses naturally-occurring microscopic algae as biosensors, is fully automated and does not require consumable reagents. Moreover, this biosensor system is fully compatible with SensorNet technology. Fluorescence induction curves are used as indicators of the health of the algae. We have demonstrated that WaterSentry™ can be used by water facility managers as an early warning device. When combined with encrypted data telecommunication and a database-lookup library containing pertinent data for healthy algae, WaterSentry™ provides a practical and effective approach for the protection of sunlight-exposed primary source drinking water and regulation of water quality requirements.

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