E.coREADi: Automated Microbiological Water Analysis

Nathaniel Talley | *Luna Innovations Inc.*

Identifying microbiological contamination is critical to evaluating the safety of potable water. The ability to detect viable indicator organisms, including *E. coli* and coliform bacteria, in near real-time has been identified as critical to mission success by the U.S. military. There is a defined need by the U.S. Army for analysis technologies that reduce the time-to-detection (standard EPA test methods are currently 18-24 hours), as well as a need for improved operational characteristics to enable portability for field use and operation by non-experts. To meet this need, Luna Innovations is developing the E.coREADi™ technology for the presence/absence detection of viable coliforms and *E. coli* in drinking water. The E.coREADi technology integrates proprietary enzyme-substrate based detection methods within a disposable and low-cost microfluidic cassette, with an E.coREADi instrument operating the cartridge and enabling complete automation of the water analysis for the end-user. The system is being designed to be portable (less than 2 cubic feet and 20 pounds), battery-operable, and allows analysis of up to 16 samples simultaneously. To date, Luna has demonstrated presence/absence detection capabilities in 10 hours with chlorine-stressed bacteria using the E.coREADi method. Prototype automated systems and microfluidic cassettes are currently being manufactured for final validation work prior to submission of a study plan for EPA Alternative Test Protocol (ATP) testing and approval. With complete automation, rapidity, and minimal operator training requirements, the E.coREADi technology is anticipated to have private sector applications in municipal water facilities, environmental testing laboratories, disaster relief missions, and food and beverage manufacturing facilities