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Contact for Press:

Doug Johnson

(970) 226-0344

djohnson@advancedmicrolabs.com

Advanced MicroLabs Receives Multiple Federal Grants for Breakthrough Capability in Water Quality Measurement

FORT COLLINS – A Colorado State University Startup Company wants to help conserve water while simultaneously making it safer to drink. Advanced MicroLabs, LLC was recently awarded a pair of research grants by the National Institutes of Health (NIH) Superfund Research Program and the National Science Foundation (NSF) to develop totaling \$995,000 to develop on-line analysis instrumentation and chemistry for minute traces of water impurities.

Advanced MicroLabs uses a microchip Capillary Electrophoresis with patent pending electrochemical detection technology which originated at Colorado State University plus patent pending sample delivery technology for real time analysis. “Our sensitivity typically matches, if not out performs, Ion Chromatography, and our technique is much faster, easier, and less expensive” notes Charles S. Henry, Ph.D., CEO. “Plus, we can separate and detect almost any ion in water, allowing us to address many on-line measurement needs. We are currently funded to both develop a monitor for perchlorate in ground water and to improve the water re-use and overall economics in power generating plants.”

Perchlorate is a small inorganic ion that impairs thyroid function when consumed with elderly and children being most at risk. Its appearance in ground water sources has often been associated with improper storage and/or manufacturing of rocket fuels and explosives. Many remediation efforts are underway throughout the U.S. to restore ground water for use as drinking water but these efforts lack a means of monitoring perchlorate in real time resulting in over-engineered facilities to safe guard against plant failure. An online sensor would make these efforts safer and more cost-effective. Jess Brown, Ph.D., P.E., a process design engineer with Carollo Engineers, comments: “No other analytical technologies exist that meet our on-site perchlorate monitoring needs, and therefore we are quite enthusiastic about the prospects of the Advanced MicroLabs device.”

Thermoelectric power plants utilize significant quantities of water for generating electrical energy. For example, a 500 MW power plant that employs once-through cooling uses over 12 million gallons per hour of water for cooling and other process requirements. With the electric power industry demand of conserving water and optimizing chemical usage, they find themselves challenged with the present analytical instrumentation approach. Its demand is further supported by the ever increasing requirements of applications in pure and ultra-pure waters, as found in boiler feed and condensate waters, where sub-ppb ($\mu\text{g/L}$) levels are expected and maintained. Monitoring targeted ions, such as chloride, sulfate, iron and copper will allow them to flag potential equipment failures at an early stage. In the electric power industry, malfunctioning equipment can be disastrous resulting in potential power outage. Peter Millett, Ph.D., a principal at ChemStaff and former director of water chemistry for the Electrical Power Research Institute comments: “What is needed is an online multi-parameter capillary electrophoresis analyzer that is capable of quantifying various anions and cations as low as less than one ppb would give us a chemical fingerprint, allowing us to predict potential water chemistry problems, like corrosion and scaling, and protect the downstream equipment.”

“These awards are the cornerstone of our commercial thrust, providing product development resources and validating our scientific and commercial strategies,” notes Dr. Henry. The Small Business Innovative Research (SBIR) awards will allow Advanced MicroLabs to develop prototype commercial units. With Perchlorate, detection limits below 1 part per billion (ppb) have already been demonstrated in field trials in Florida—most state regulations require maximum contamination limits between 4-15 ppb. Field trials for Nitrates, Sulfates, and Chlorides are scheduled to start in first quarter 2011 at an operating Colorado power plant.

These awards support the Research and Development efforts of 6 locally based scientists and engineers. Advanced MicroLabs occupies laboratory and office space at the newly constructed Research Innovation Center at Colorado State University. This state-of-the-art facility provides affordable laboratory space for university affiliated startup companies. Advanced MicroLabs is a member of the Rocky Mountain Innovation Initiative, Larimer County Bioscience Cluster, and the Colorado Bioscience Association.

About Advanced MicroLabs. Founded in 2003, the company develops instrumentation and application specific detection chemistries using microchip Capillary Electrophoresis with a patent pending electrochemical detection technology originated at Colorado State University. Since its founding the Company has received scientific research and development awards of nearly \$3M to further this promising technology and has filed for additional patents. Headquartered in Fort Collins, Colorado, Advanced MicroLabs is in the final stages of launching its first commercial product. For more information, please visit www.advancedmicrolabs.com.

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