VERIFIGLOBAL NEWSLETTER

Comprehensive performance verification with global market reach

Accurate, Reliable, Credible

PFAS - Health and Environmental Risks

Per- and polyfluoroalkyl substances (PFAS) are among the most widespread and persistent environmental pollutants. There are more than 3,000 PFAS chemicals that are or have been in use for industrial and consumer applications, including firefighting foams, non-stick cookware, food packaging and water- and stain-resistant fabrics.

PFAS has come under increasing scrutiny due to the persistence and potential risks of these substances to human health and the environment. Analysis of monitoring data is reporting elevated levels of PFAS in groundwater and surface water associated with industrial plants producing or using PFAS, military bases and airports using PFAS for firefighting applications, and at water treatment facilities.

There is no single solution to the PFAS problem. These difficult-to-treat substances persist and are found in complex matrices with co-contaminants. Thus it is necessary to develop and implement effective PFAS risk management tools and technologies, including:

1. PFAS Analytical Methods - To measure PFAS in various environmental matrices.

2. Site Characterization and Source Identification – To obtain reliable data on PFAS environmental concentrations and sources.

3. Treatment and Remediation Technology Development and Verification – To develop and verify the performance of innovative technologies for treatment and remediation of PFAS-contaminated environmental media.

4. Technical Support for PFAS Risk Management – To support government and industry efforts in evaluating analytical methods, characterizing sites/sources, and assessing and verifying treatment/remediation options for PFAS contamination.

It is expected that the outcomes from these actions would facilitate informed, evidence-based decisions and cost-effective strategies for addressing PFAS contamination.

DECEMBER 2018

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VerifiGlobal and its Alliance members create value through informed decisions and sustainable results

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Battelle has extensive experience in designing and implementing effective approaches to characterize and remediate PFAS-contaminated sites. This includes feasibility studies to evaluate the cost and effectiveness of different remediation options based on site characteristics, contaminant levels and cleanup goals.

B**attelle** is also at the forefront of advanced treatment methods required to address PFAS compounds. Government, industry and water utilities need assistance in making informed decisions about treatment options for PFAS removal. This includes assessing the treatability of variable PFAS concentrations in water, testing and verifying the performance of cost-effective technologies and examining different regeneration and disposal options.

Battelle PFAS-related services and expertise encompass analytical chemistry, environmental science, toxicology and data analytics, with extensive experience in sampling, handling and analyzing these challenging substances. This goes beyond standard practices, incorporating new methods and technologies for characterizing and mitigating PFAS contamination.

To learn more about effective PFAS solutions, contact Amy Dindal of Battelle at: DindalA@battelle.org

Progress on Water Resiliency, Adaptation and Sustainability

Resilient, sustainable water management is a continuum, which both supports and depends upon decisions and subsequent actions based on measurement, analysis and feedback. Society expects project proponents and solution providers to deliver results that reduce or eliminate negative ecological impacts, provide superior performance, and/or use fewer resources relative to conventional practices.

Defining performance objectives for innovative water solutions and verifying their performance helps municipalities, utilities and other water sector stakeholders make informed choices. It also benefits technology companies seeking market acceptance of their innovative solutions.

Last year, VerifiGlobal launched a collaborative initiative to better understand and address water resiliency, with the objective of strengthening global capacity to undertake performance benchmarking, testing and verification in the water sector. A key objective is to ensure that performance reporting on water technologies and infrastructure solutions is clear, complete and useful to interested parties.

Market acceptance and adoption of innovative water solutions is most likely to succeed through an iterative approach that demonstrates tangible benefits in the context of climate and environmental change, taking into account requirements for long-term adaptive management. The selection and implementation of innovative water solutions requires reliable science-based information on the performance of operating systems, processes and networks, including the technologies, sensors and other sub-components that enable them.

VerifiGlobal's market-driven collaborative initiative provides access to a robust, quality-assured testing and verification platform comprised of competent organizations that offer technical services based on established methods and procedures following the requirements of the internationally recognized ISO 14034 standard.

This December 2018 issue of the VerifiGlobal Newsletter highlights progress to date and opportunities for continued strengthening of collaboration moving forward.

Contact VerifiGlobal to learn more about the water resiliency and sustainability collaborative initiative.

Stormwater Technology Verification

Various municipalities and government agencies are implementing policies to provide direction on how to manage stormwater on a watershed basis. Key drivers are the estimated 85% of water quality impairments attributed to nonpoint discharges, including agricultural and urban stormwater runoff, as well as the growth of cities and surrounding communities often contributing to increased flooding and deterioration of water quality.

The identification and implementation of appropriate solutions to address infrastructure needs can benefit from comprehensive, evidence-based performance benchmarking and verification. A guiding principle is that stormwater should be managed at source as a first priority and that the quality of runoff from development sites should be improved.

In order to comply with water quality objectives, developers and design engineers often propose the installation of stormwater devices on development sites. However, it can be difficult for permitting and approvals agencies to independently assess whether a particular device is adequate at different flow rates. Furthermore, reported removal rates of sediments and other materials differ depending on the technology and the manufacturer.

VerifiGlobal Alliance member organizations, **GHL (Good Harbour Laboratories)** and **(TRCA (Toronto and Region Conservation Authority)** are familiar with this issue and have been communicating with regulatory agencies and stormwater companies to determine how best to verify technology performance data in accordance with ISO 14034 requirements.

The overall response has been positive, as stakeholders strive to obtain market acceptance and regulatory approval of innovative stormwater management technologies based on clear, complete and objective performance data. The benefits of this include:
- Greater market awareness and acceptance of innovative solutions that effectively address environmental priorities;
-The establishment of an inventory of verified stormwater filtration technologies that municipalities and other stakeholders can draw upon; and
- Reduction in the potential environmental impacts of stormwater through an evidence-based process that encourages the adoption and use of independently verified innovative environmental technologies.

The International Organization for Standardization (ISO) Environmental Technology Verification (ETV) Standard, **ISO 14034**, is a documented process upon which credible performance monitoring, testing and verification of innovative infrastructure solutions can be based. As an internationally recognized standard, ISO 14034 can:

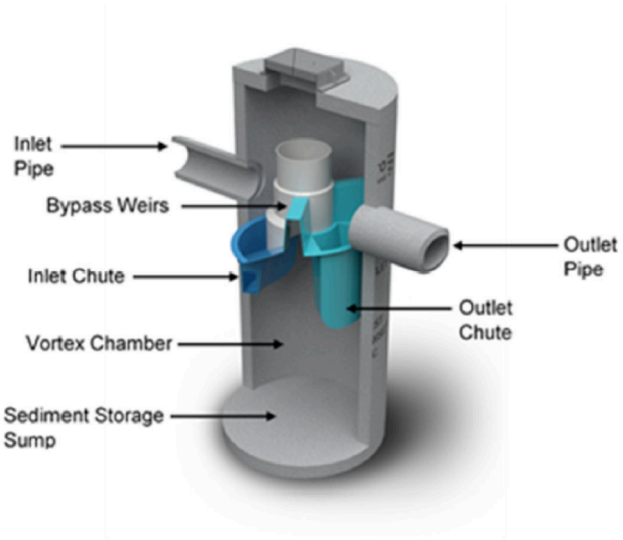
- Assist decision-makers in determining which technology and infrastructure options are viable and sustainable over the long-term;

- Make it easier for local governments, agencies and the private sector to integrate innovative decentralized options with existing technology and infrastructure in ways that optimize the intrinsic strengths of existing infrastructure and ensure that new proposed solutions are secure, resilient and reliable;

- Facilitate the tracking and demonstration of technology applications and infrastructure options, and the measurement and verification of their performance;

- Encourage broader acceptance of sustainable infrastructure solutions by strengthening the business case for users, operators, regulators and investors to invest in and implement innovative solutions.

Contact VerifiGlobal to find out how ISO 14034 and VerifiGlobal Alliance members are supporting performance verification and market acceptance of effective stormwater management technologies and best practices.



Technology Focus

Toronto and Region Conservation Authority (TRCA) in Ontario Canada conducted the Hydro International First Defense® Oil Grit Separator verification in accordance with ISO 14034:2016, and the VerifiGlobal Performance Verification Protocol.

Hydro International First Defense® Oil Grit Separator

The Hydro International First Defense® Oil Grit Separator (OGS) is designed to remove oil, sediment, trash and debris from stormwater and snowmelt runoff as well as other pollutants that attach to sediment particles, such as nutrients and metals.

The First Defense® Oil Grit Separator can be used as a stand-alone stormwater treatment technology, depending on water quality objectives, or as a pretreatment component in a treatment train when higher TSS removals are required and polishing or volume reduction best management practices (BMPs), such as infiltration or bio-infiltration, are installed downstream.

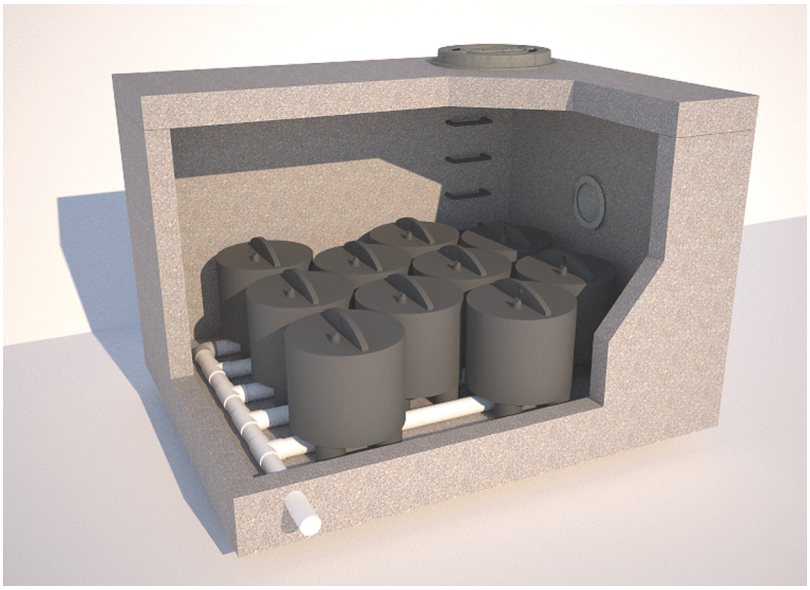
First Defense® Oil Grit Separator applications include: stormwater treatment at the point of entry into the drainage line; sites constrained by space, topography or drainage profiles with limited slope and depth of cover; retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line; pretreatment for filters, infiltration, other sedimentation BMPs and storage.

As shown in the illustration above, the patented flow modifying internal components are designed to be inserted into standard precast concrete manholes where they collect and treat runoff as part of the drainage system. Flow entering the manhole via an inlet pipe or inlet grate is diverted into a vortex chamber beneath a separation module that includes both inlet/outlet chutes and bypass weirs. The internal bypass weirs divert flows greater than the maximum design treatment flow rate over the separation module and away from the vortex chamber where oil, sediment, debris and attached pollutants are accumulating. This function prevents high velocities from re-suspending previously captured pollutants during large storm events.

The First Defense® Oil Grit Separator can be designed and sized to function effectively in either online or offline configurations.

The Hydro International First Defense® Oil Grit Separator was tested by Good Harbour Laboratories Inc. (GHL), Mississauga, Ontario, Canada in 2018. The performance test results were verified by Toronto and Region Conservation Authority (TRCA), Vaughan, Ontario, Canada following the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol.

For more information on the Hydro International First Defense® technology verification:
Visit the VerifiGlobal website - http://verifiglobal.com/
or Contact Dave Scott - dscott@hydro-int.com



Technology Focus

Good Harbour Laboratories (GHL) in Ontario Canada conducted the BaySaver BayFilter™ Enhanced Media Cartridge (EMC) verification in accordance with ISO 14034:2016, and the VerifiGlobal Performance Verification Protocol.

BaySaver BayFilter™ Enhanced Media Cartridge (EMC)

The BayFilter™ system is a stormwater quality treatment device that removes contaminants from stormwater runoff via media filtration.

The BayFilter™ technology has proven effective at removing sediments, nutrients, heavy metals, and a wide variety of organic contaminants. The target pollutants, hydraulic retention time, filter media, pretreatment, and flow rate all affect the removal efficiency of the BayFilter™

As shown in the illustration above, BayFilter™ cartridges are enclosed in a housing, which may be a vault, manhole, or other structure. This structure contains the inlet and outlet pipes, as well as an internal manifold that delivers treated water to the outlet of the BayFilter™ stormwater filtration system. Stormwater runoff enters the manhole or concrete vault via an inlet pipe and begins to fill the structure. Coarse sediments typically settle on the floor of the vault. When the water surface elevation in the vault/manhole reaches operating level, water flows through the BayFilter™, driven by hydrostatic head.

Within the BayFilter™, the water flows through an enhanced filter medium, and drains via a vertical pipe. The vertical drain is connected to the under-drain system, which conveys filtered water to the outfall. System design is offline with an external bypass that routes high-intensity storms away from the system to prevent sediment re-suspension. Flow through the filter cartridge is gravity-driven and self-regulating.

The BayFilter™ relies on a vertically configured, spiral-wound construction that optimizes the potential filter media area in a horizontal plane. Media area and media composition, with flow regulation, control the particle and nutrient removal efficiency, total load of removed material, and life cycle of the filter. BayFilter™ cartridges come in a variety of sizes and use approximately 0.5 gpm/ft^2 (0.34 L/s/m^2) of media area to determine the operating flow rate.

The BaySaver BayFilter™ Enhanced Media Cartridge (EMC), commercial unit model 545, was tested at the Mid-Atlantic Storm Water Research Center (MASWRC), under the supervision of Boggs Environmental Consultants, Inc. The performance test results were verified by Good Harbour Laboratories Inc. (GHL), following the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol.

For more information on the BaySaver BayFilter™ Enhanced Media Cartridge (EMC) verification:
Visit the VerifiGlobal website - http://verifiglobal.com/
or Contact Dan Figola - dfigola@ads-pipe.com

Good Harbour Laboratories at Canadian Stormwater Institute Conference

Greg Williams of GHL shares his perspective on the inaugural CSI Conference in Calgary and some of the challenges in verifying innovative stormwater management technologies

The Western Canada Water Environment Association (WCWEA) hosted the inaugural Canadian Stormwater Institute Conference at the end of November this year. It was a sold out event, highlighted by the largest number of weather related jokes ever told at one time – e.g., *"What does a cloud wear under its raincoat?" "Thunderwear"*.

The focus of the conference was on water quantity. Many descriptors were used - *Climate Change, Resiliency, Sustainable Management, Preparedness* - but they all dealt with the same issue: preventing floods. This makes good sense, if your basement is full of water - the contents of the water are of less interest than a plan to remove the water and prevent it from coming back. This presents an on-going challenge for ETV because many flood management solutions are not technology *per se*. In many cases the solutions are more a matter of policy, education and political will.

There were a few presentations on water quality, but no mention of ETV or ISO. There are two likely reasons for this lack of awareness.

One is marketing. In Canada we have not done a very good job of marketing ETV outside the provinces of Ontario and Quebec. This geographic disparity is as old as the country so it will require some effort to overcome.

The second is the focus on low impact development (LID), which consists mainly of public domain practices such as swales and bioretention ponds. These practices are not owned by any particular entity so it is difficult to make an economic case for trying to verify them as a category of solutions. They tend to be implemented on a case-by-case basis by consulting engineers, usually based on some kind of design criteria. There have been some calls for performance based criteria, which would fit very well with ETV, but so far progress has been slow.

The CSIC was a good event - congratulations and thanks to WCWEA. The next conference is planned for 2020 in British Columbia.

From an ETV perspective the conference served to point out the challenges and opportunities facing ISO14034 and ETV in general.

The stormwater space has been relatively active in terms of ETV - 10 of the 21 listed technologies on the website etvcanada.org are categorized as "Stormwater" and there is a lot of room for growth. For example, a similar list on the website www.njcat.org has 31 technologies on it and they could all be tested according to ISO14034.

On the challenge side, the buzz and the largest growth in the industry is around LID, which has no verified technologies yet and which presents significant challenges in applying ETV.

For more information contact:
Greg Williams, PhD, PEng
Managing Director
Good Harbour Laboratories
Ontario, CANADA

In responding to these challenges, VerifiGlobal and its Alliance members are committed to:
- Assisting decision-makers in determining which stormwater technologies and management options are viable and sustainable over the long-term;
- Facilitating the tracking and demonstration of stormwater technologies and management options, and the measurement and verification of their performance;
- Encouraging broader acceptance of stormwater technologies and strengthening the business case for users, operators, regulators and investors to invest in and implement innovative stormwater technologies.

Contact VerifiGlobal to find out how VerifiGlobal Alliance members are supporting performance verification and market acceptance of effective stormwater management technologies and best practices

City of Toronto to Adopt ISO 14034 ETV Standard and Process for Acceptance of Stormwater MTDs

The City of Toronto has announced its upcoming direction with respect to the adoption of the ISO 14034 Environmental Technology Verification (ETV) Standard and process for the acceptance of manufactured treatment devices (MTDs). The City has also developed a new gravity-settling MTD evaluation methodology and tool to help design engineers and reviewers comply with performance verification, design and O&M requirements for gravity-settling MTDs.

The City recognizes two (2) types of MTDs that can be used to meet requirements of its Wet Weather Flow Management Guidelines (WWFMG 2006):
- Gravity-settling MTDs, commonly referred to as Oil-Grit Separators (OGS), remove large, coarse particle suspended solids through the process of gravity settling hydrodynamic separation.
- Filtration MTDs typically consist of filtration cartridges or filter media that can target the removal of fine-particle suspended solids or other pollutants (e.g., nutrients or metals).

As per the City's upcoming direction, the City of Toronto will only consider for acceptance gravity-settling MTDs that have undergone testing and verification through the ETV standard and process.

The City is encouraging MTD manufacturers to review the MTD Evaluation Tool and the upcoming acceptance requirements for gravity-settling MTDs.

The City is also inviting feedback from manufacturers on the development of acceptance requirements and a review checklist for filtration MTDs to guide design engineers and reviewers.

For more information, contact:
Policy & Program Development
Water Infrastructure Management
Toronto Water
Email: wwfmg.ppd@toronto.ca

March 2019 TRIECA Stormwater and Erosion Control Conference

Toronto and Region Conservation (TRCA) and the Canadian Chapter of the International Erosion Control Association (IECA) are hosting the annual TRIECA Conference, 20-21 March 2019, at the Pearson Convention Center in Brampton, Ontario, Canada

TRIECA is Canada's premier stormwater and erosion and sediment control conference, bringing together leading experts, influencers and research partners. Together, these participants are shaping the future direction of the stormwater, erosion and sediment control and natural channel design industries.

The conference format includes two full days of concurrent sessions with speakers from across North America presenting the latest technological innovations, case study findings and academic research. TRIECA also features an industry tradeshow, offering delegates the opportunity to speak directly with representatives from a wide variety of leading solutions providers.

For more information contact Victoria Kring at:
victoria.kring@trca.on.ca

May 2019 WEF Stormwater and Green Infrastructure Symposium

The Water Environment Federation (WEF) will be hosting its inaugural Stormwater and Green Infrastructure Symposium in Fort Lauderdale, Florida, 8-10 May 2019.

The impacts from extreme weather events (drought, flood, heat) highlight the importance of striving for a flexible and multi-dimensional approach to stormwater management while leveraging the strengths of different stormwater infrastructure design sand operational strategies. Effective stormwater management requires collaboration among design and construction engineers, inspection and maintenance professionals, landscape architects, municipal stormwater program managers, environmental scientists, water resources managers, economists, communications specialists, decision makers and the public.

The Symposium is seeking to deepen the technical knowledge of professionals involved with stormwater management and to provide a forum where key issues in the sector are discussed.

For more information go to:
https://www.wef.org/events/conferences/upcoming-conferences/stormwater-and-green-infrastructure-symposium-2019/

ADVANCED SEPTIC SYSTEM NITROGEN SENSOR CHALLENGE - UPDATE

Revised 2018-19 Testing Schedule

Revised Timeline:

December 19, 2018
Application deadline for the January 2019 test

January 21-February 22, 2019
One-month test at MASSTC

March 11, 2019
Notification of acceptance for the six-month test

May 13 – November 15, 2019
Six-month field performance testing at MASSTC for selected sensors

Mid-February 2020
EPA prize: ISO 14034 ETV verification reports and statements

For more information contact Amy Dindal at: sensorchallenge@battelle.org

BATTELLE

This project is being conducted by Battelle for the US EPA under contract #EP-C-16-014

EPA selected Battelle Memorial Institute (Battelle) to support Phase II: Prototype Testing and the development of a Test/Quality Assurance Plan (T/QAP) and Verification Plan, and to oversee the testing of the sensors. The T/QAP is based on the International Organization for Standardization Environmental Technology Verification (ETV) Standard - ISO 14034. Funding for the testing program is from the US EPA Office of Research and Development and the Office of Water/Wastewater Management.

Sensor testing will be completed in 2018-19 at the Massachusetts Alternative Septic System Test Center (MASSTC), a National Sanitation Foundation (NSF) certified test facility in Barnstable, Massachusetts. Developers are invited to participate in the two one-month no-risk tests offered in October 2018 and January 2019. Each one-month test will include the one-week screening test during the first 7 days. Developers whose sensors meet basic performance goals during the first seven days will be invited to participate in the extensive 6-month field performance test.

Battelle will verify the results of the field performance tests based on the VerifiGlobal Performance Verification Protocol and the requirements of the ISO 14034 ETV standard. EPA will award ISO ETV verification reports and statements for sensors that complete the six-month field testing and meet the minimum performance goals

Following the release of the verification reports and statements in early 2020, an external technical panel and The Nature Conservancy (TNC) will review the results. TNC and others are seeking funding for an order of 200 deployable septic sensor units, not to exceed a total cost of $300,000. The order would be presented in the summer of 2020 to the best performing sensor/s that completing the 6-month field performance test and meeting or exceeding the performance goals.

MASSTC
The Massachusetts Alternative Septic System Test Center

Massachusetts Alternative Septic System Test Center (MASSTC) is operated by the Barnstable County Department of Health and Environment. MASSTC conducts testing on products that remove contaminants contained in domestic wastewater. The MASSTC facility can accommodate over 20 concurrent tests, allowing companies to conduct research and development on their products, as well as testing using a variety of standardized test protocols.

For more information about MASSTC, contact: George Heufelder, Director, MASSTC
Phone: +1.508.375.6616 - Email: gheufelder@barnstablecounty.org

November 2018 Nitrogen Sensor Challenge Workshops Organized by The Nature Conservancy (TNC)

Nutrient pollution affects more than 100,000 miles of rivers and streams, close to 2.5 million acres of lakes, reservoirs, and ponds, and more than 800 square miles of bays and estuaries in the United States alone. Harmful algal blooms and hypoxia are examples of negative impacts of excess nutrient runoff that impact human health, ecosystems, fisheries, and tourism.

The Nature Conversancy (TNC) is partnering with the Environmental Protection Agency (EPA) on the Septic System Nitrogen Sensor Challenge (the Challenge). The Challenge has established nitrogen sensor performance goals, which assume that advanced septic systems need a nitrate and ammonium sensor package that ideally could also measure total nitrogen. The winner of the Challenge will be awarded up to $300,000 by TNC as a first sensor order, with expected deployment in the of summer 2020.

The Septic System Nitrogen Sensor Challenge has already initiated prototype sensor testing at the Massachusetts Alternative Septic System Test Center (MASSTC) with the objective of identifying suitable sensors for a 6-month field test scheduled from May 13 to November 15, 2019. Battelle will verify the field test results in conjunction with VerifiGlobal following the requirements of the ISO 14034 ETV standard and the VerifiGlobal Performance Verification Protocol.

As part of the Septic System Nitrogen Sensor Challenge, TNC organized two product development workshops/webcasts, each with over 20 participants including technology developers, end users, and regulators. The first took place on November 27, 2018 at the Uplands Farm Sanctuary in Cold Spring Harbor, NY. The second took place on November 28, 2018 at the Cape Cod Commission, in Barnstable, MA.

The intent of the workshops/webcasts was to help inform development of sensor technology and to better understand the requirements for successful deployment of a viable nitrogen sensor as part of an effective clean water toolbox. Workshop participants discussed efforts to address pervasive nutrient contamination in freshwater and coastal environments and possible applications for low-cost nutrient water sensors.

It was noted that governments, industry, water utilities, environmental groups and academia are researching and implementing nutrient management solutions that are driving demand for cost-effective nutrient monitoring solutions. However the optimized deployment of nutrient water sensors must fully consider its ultimate intended use in a variety of application areas, including wastewater, stormwater, groundwater, and agriculture, as well as in the management and protection of freshwater and marine ecosystems quality.

The scope and scale of sensor deployment is an important factor in determining the manufactured cost of a commercial sensor, and its cost per application. Key considerations moving forward are the need to build and leverage regional data networks, as well as the need to develop open data standards and data management protocols. The emergence of effective tools to integrate, manage, and share large datasets is a critical requirement for market acceptance of nutrient sensors.

The table below illustrates the potential use of nitrogen sensors in advanced septic systems applications, highlighting the relationship between sensor/system complexity and market application. Beyond the development and deployment of a viable stand alone sensor is the application of the sensor to address specific end uses, such as process optimization or confirmation of compliance with a regulatory requirement, as well as the integration of the sensor within an engineered system and/or data network.

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Understanding nutrient sensor/system complexity and market application

		Increasing complexity →		
		Sensor	**Targeted Application – e.g., advanced septic system operation**	**Watershed and ecosystem integrity**
Increasing Market Relevance ↓	**1.0 Basic functionality**	Detect and measure targeted substances (e.g., nitrate, ammonium, nitrite, phosphate, other)	Prevent and/or control contaminant releases	Monitor and control contaminants on watershed basis
	2.0 Effective application	Ability of regulator and/or operator to effectively use the sensor (e.g., in-situ manual observations)	Ability of advanced septic system to effectively operate and control contaminant releases using information provided by sensor	Ability to generate and validate useful data to support watershed based decisions
	3.0 Effective deployment	Repeated use at multiple sites	Integration of sensor within operational and control processes of advanced septic systems	Availability and use of sensor data within a watershed management network
	4.0 Performance optimization	Remote and networked capacity	Optimized septic system performance	Complex data products incorporating processed or synthesized observational data Network for continuous nutrient and water quality monitoring to inform management and policy solutions to protect and restore water resources Optimized, watershed management performance with measureable outcomes.

The essential parameters for determining the performance of nutrient sensors depends on the intended use of the sensor. The performance and cost-effectiveness of a sensor used for process control would likely be assessed differently than one used as a tool for demonstrating regulatory compliance. Key considerations pertain to required data quality, frequency of measurement, integration and the use of the accumulated data within a larger information system. In other words, it comes down to what can be measured, what needs to be measured, and how will the sensor data be used.

For more information on the US EPA Advanced Septic Systems Nitrogen Sensor Challenge go to - http://www.verifiglobal.com/~/media/Files/Verifiglobal/Challenge-Background-Information.ashx or contact - Amy Dindal: mailto:sensorchallenge@battelle.org

For more information on The Nature Conservancy contact -Nicholas Calderon: n.b.calderon@tnc.org

Chemical Life Cycle Collaborative Tool

On November 8, 2018, the University of California Santa Barbara, Bren School of Environmental Science and Management delivered a webinar to launch its Chemical Life Cycle Collaborative Tool

The CLiCC tool is a web-based chemical impact and risk analytics software that allows rapid assessment of chemicals with regard to their hazards, chemical properties, life cycle impacts, and human and ecological health risks.

While the number of synthetic chemicals known to humans is growing rapidly, our understanding of their life cycle impacts and risks has not kept pace. Analysts often have to assemble data from multitude of disparate sources, making the process time-consuming and costly. The CLiCC tool addresses these challenges by connecting cutting-edge scientific models and various new and existing data sets into an interactive web-based platform. The outputs of CLiCC tools can assist, among others, alternatives analysis, materials selection, and product innovation.

CLiCC was funded by the US Environmental Protection Agency Network for Characterizing Chemical Life Cycle (NCCLC) Program. As an open-access, online tool for rapid and efficient characterization of chemical life-cycle impacts, the CLiCC tool:
- Enables high-throughput screening of life-cycle impacts for new chemicals;
- Provides a platform for accessing, generating and sharing information on chemical life-cycle impacts;
- Expands life cycle thinking through an international network of academic and industry collaborators.

The CLiCC tool was developed to evaluate life-cycle impacts for chemicals and materials at an early stage of the chemical product development process, when the precise manufacturing routes and fates of the products are still uncertain.

CLiCC Tool stakeholders, such as industry partners, policy makers, and academic researchers will be able use the tool in a variety of ways. For Upstream companies, CLiCC can be used as an early predictive tool, particularly in the research and development stages. CLiCC also offers support for alternative comparison and product phase-out option in planning stages. Downstream companies have the benefit of making sourcing decisions and designing a new product.

The CLiCC tool also facilitates collaborations between raw material designers and companies, so that new materials are created specifically to fit a certain application farther down the value chain. Regulated entities are able to complete alternatives assessments. Policy makers are able to use CLiCC as a screening tool for new chemicals, thereby informing new product restrictions and creating enforceable regulations.

VERIFIGLOBAL ALLIANCE MEMBERS

Battelle - USA

Centre for Advancement of Water and Wastewater Technologies (CAWT) - Canada

CertMark International (CMI) - Australia

ETA-Danmark - Denmark

Good Harbour Laboratories (GHL) - Canada

Institute for Ecology of Industrialized Areas (IETU) – Poland

Korea Testing Laboratory (KTL) – South Korea

RESCOLL - France

Southern Research (SR) - USA

Toronto and Region Conservation Authority (TRCA) - Canada

VTT Expert Services Ltd - Finland

To learn more about CLiCC, go to: https://CLiCC.net or contact Sangwon Suh, CLiCC Program Director at: admin@clicc.net.

Southern Research at US SERDP and ESTCP Symposium in Washington DC

Verifiglobal Alliance member, Southern Research (SR), attended the US Department of Defense Strategic Environmental Research & Development (SERDP) and Environmental Security Technology Certification Program (ESTCP) Symposium November 27-29 in Washington DC. SERDP-ESTCP focuses on the Department of Defense (DoD) priority environmental and installation energy issues.

The Symposium brings together environmental and energy researchers and technology developers with the defense user and regulatory communities to showcase cutting edge environmental technologies and ideas. The 2018 Symposium highlighted SERDP and ESTCP's recent efforts to enhance mission capabilities, reduce costs in times of increasing fiscal constraint, while improving environmental and energy performance.

Southern Research presented two posters at the networking sessions:
- An overview of the ISO 14034 ETV process, its benefits, and how it relates and ties directly to the ESTCP and SERDP technology demonstration process; and
- A new project demonstrating a hybrid energy storage system based microgrid, focused on optimizing system design through modeling, and potential future technology demonstration at DoD installations.

The SERDP ESTCP program supports the development and demonstration of technologies that impact the environment in many ways, and is a natural fit for implementation of the ISO 14034 standard as a basis for technology evaluations.

Discussions were held with program managers at the National Renewable Energy Lab (NREL), and the Program Manager for ESTCP regarding the ISO 14034 standard and potential role in measurement and verification of technologies in DOD programs. There is strong interest in the potential adoption of the standard to establish requirements for future demonstration programs. Future meetings are being planned with US government agencies to discuss this.

SERDP and ESTCP technology focus areas encompass:

Installation Energy & Water -
- Technologies that support sustainable building design and operations, including innovative energy-efficient lighting, heating, and air conditioning systems
- Renewable energy, such as solar and wind power, and other distributed-energy generation sources
- Systems that enable better management of energy resources, such as improved energy storage and control techniques
- Methods and technologies to reduce water demand.

Environmental Restoration -
- Remediating and monitoring contaminated groundwater
- Managing contaminated sediments
- Managing contaminants on testing and training ranges
- Treating wastewater and drinking water
- Developing tools for improved risk assessment.

Munitions Response -
- Advanced sensors and identification technologies
- Contaminant monitoring technologies for soil, groundwater, and underwater environments
- Remediation technologies

Weapons Systems and Platforms, including technologies that -
- Reduce or eliminate the use of hazardous materials in production and maintenance processes
- Reduce hazardous waste streams
- Better understand and mitigate emissions and other environmental impacts that result from ioperations
- Ensure that alternative technologies, materials, and processes are adequately vetted from an environmental perspective.

Resource Conservation & Resiliency

Opportunities for technology verification abound, as do opportunities for international partnerships to evaluate innovative environmental technologies.

For more information contact:
Tim A. Hansen, P.E., Energy & Environment Division Southern Research
Email: thansen@southernresearch.org Tel: +1-919-282-1052

SR SOUTHERN RESEARCH
Solving the world's hardest problems.

Update: EU ETV Pilot Programme

During November both the European Union (EU) Environmental Technology Verification ETV Steering Committee and the EU ETV Technical Working Group held meetings where the primary focus was to present and discuss the findings of an independent evaluation of the EU ETV Pilot Programme.

Based on substantial interviews with stakeholders and market-oriented investigations, the evaluation addresses three questions:
-Is the EU ETV Pilot Programme achieving the desired outcomes and impacts after more than three years of operation?
- Is the Programme functioning as planned, in terms of the verification infrastructure established and expected outcomes for innovators using the scheme?
- How could an EU ETV scheme operate in the future?

Positive conclusions:

Key positive conclusions of the survey are the following:
- The need for EU ETV has been confirmed by business participation in the Pilot, which includes initial enquiries from 1,166 companies, 256 quickscans, 29 verifications concluded to date, and a further 35 verifications in process.
- EU ETV has demonstrated that it can bring benefits to innovators by facilitating access to EU and non-EU markets.
- A robust system has been developed, with multiple opportunities for performance claims to be challenged by independent expert reviewers.

The EU ETV Pilot Programme is in line with EU policy objectives to support market penetration by environmental technologies. However, the verification process is sometime perceived as complex, lengthy and time consuming for participating companies, especially SMEs. Hence it is recognized that simplification of the Programme may be necessary.

In addition, verification fees charged by verification bodies for the service are in the same range as certification fees on the market, but the willingness of surveyed technology proposers to pay is around 60% of the average current verification fee. Grant support - which is available in several countries such as Denmark, France and Poland – is regarded as important to make up the difference

Next steps:

The next steps in the evaluation process will be to consider options for continuation of the EU ETV Programme at full scale in the context of various potential business cases and expected outcomes, as well as possible simplification of the process.

In the meantime, the EU ETV Pilot Programme is continuing with the possibility that other EU member states can join, along with the possibility of an extended scope to include additional technology areas.

For more information on the EU ETV Pilot Programme contact:

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Update: ISO 14034 Technical Report Development

ISO/TC207/SC4/Working Group 5 Meeting, October 30 – November 1, 2018

The ISO working group responsible for development of the ISO 14034 ETV Standard met on October 30 – November 1, 2018 in Tokyo, Japan to continue work on a proposed Technical Report (TR) intended to clarify and improve a common understanding of the requirements for independent verification. The proposed structure of the TR closely follows the ISO 14034 standard, making it easier to navigate between both documents.

Although the proposed TR is primarily intended for verifiers using the ISO 14034 standard, the guidance it will provide may also be useful for environmental technology suppliers, technology users, policy makers and other organizations interested in understanding how the ISO 14034 standard can be used and how qualified, competent verifiers can be engaged.

Find out more at: https://committee.iso.org/home/tc207sc4

Cleantech Forum San Francisco (USA) 28-30 January 2019

Solving the world's hardest problems.

Southern Research is co-hosting an ISO 14034 ETV focused workshop taking place at the Cleantech Forum January 28-30 in San Francisco. The event brings together 700+ innovative clean technology developers and investors in a single forum.

The workshop, **"Create Value and Reduce Risk - Independent Verification of Your Cleantech Innovations"**, is primarily intended for executives of startup and growth-stage innovation companies**.**

The ISO 14034 standard provides a consistent approach for the independent verification of performance and impacts of new technologies. Workshop participants will learn how the ISO 14034 standard can be used as strategic decision support tool to reduce risk and increase market acceptance of innovative clean technologies.

Discussions with top independent verifiers will ensure that participants leave the session with a clear picture of what the new standard can do for them and how they can increase the market potential of their cleantech innovations.

For additional information see: https://goo.gl/xLTX5Y or contact: Tim A. Hansen of Southern Research Email: thansen@southernresearch.org

World Water-Tech Innovation Summit, London (UK) 26-27 February 2019

The World Water-Tech Innovation Summit, February 26-27, is an opportunity to meet over 250 of the global water industry's most innovative utilities and municipalities, industrial end users, engineering firms, technology companies, start-ups, and investors.

The Summit takes place at The Tower Hotel: Guoman, St Katharine's Way, London, E1W 1LD2

The Summit offers two days of focused networking and knowledge sharing with potential clients and partners. Participants will be able to discover new technologies and engage in fresh, disruptive thinking from around the world

To view the Summit program go to: https://worldwatertechinnovation.com/agenda/

Meet decision-makers from companies, utilities and agencies, including:

ABP Food Group, Anglian Water, Arvia Technology, Cimbria Capital, DWR Cymru Welsh Water
Emerald Technology Ventures, Enging, Environment Agency, Evergreen Water Solutions, Evoqua, FCC Aqualia, Innovyze
Island Water Technologies, Isle Utilities, Jersey Water, Kompetenzzentrum Wasser Berlin, Lagos Water Corporation
Louis Berger, Magna Imperio Systems Corporation, Mekorot, Ministry of Rural Development, Mueller Water Products
Northumbrian Water, Ofwat, Portsmouth Water, PureTerra Ventures, QStone Capital, Rand Water, RedEye, Rezatec
Scottish Water, SES Water, Severn Trent Water, SKion, Southern Peru Copper Corp, Southern Water, Stanford University
Tergys, Thames Water, The Consumer Council for Water, United Utilities, Vienna Water Monitoring Solutions, Water Alliance
Watercare Services, Wessex Water, XPV Water Partners, Xylem,Yorkshire Water

Sustainable Innovation 2019 - Road to 2030: Sustainability, Business Models, Innovation and Design, Surrey (UK) 4-5 March 2019

By 2030, the world will be a different place. Tackling sustainability – particularly climate change, water scarcity and the circular economy - will be increasingly important in the design and development of products, services and technologies. How these concerns feed through to customer and societal requirements for products, services and technologies over the next decade will be crucial, presenting opportunities for eco-innovative products, services, technologies, as well as new emerging business models for pro-active entrepreneurs, innovators and designers.

Sustainable Innovation 2019 is providing a platform to examine future visions of how sustainability will impact on business models, products, services, technologies, innovation and design in 2030. This international conference will include invited and refereed papers from academics, consultants, entrepreneurs, technology providers, designers, and sustainability innovators. Sustainable Innovation 2019 will create a unique space for learning, networking and thinking, with participants from large companies, SMEs and start-ups, as well as academia, government and non-governmental

For more information contact: Martin Charter, Centre for Sustainable Design
Tel: + 44 (0) 1252 892772 - Email: mcharter@ucreative.ac.uk - Website: cfsd.org.uk

Looking forward to connecting with you at forthcoming events in 2019

Over the next year VerifiGlobal and its Alliance members will be participating in a number of key events to promote and build greater confidence in the application of ISO 14034 ETV verification.

December 2018	- COP24, and COP24 Sustainable Innovation Forum, Katowice Poland, 2-14 December 2018
January 2019	- World Future Energy Summit, Abu Dhabi UAE, 14-17 January 2019 - Cleantech Forum, San Francisco USA, 28-30 January 2019
February 2019	- 10th International Conference on Remediation and Management of Contaminated Sediments (hosted by Battelle), New Orleans USA, 11-14 February 2019 - World Resources Forum, Antwerp Belgium, 24-27 February 2019 - World Water-Tech Innovation Summit, London UK, 26-27 February 2019 - Greenbiz 2019, Phoenix USA, 26-28 February 2019 - GLOBE Capital, Toronto Canada, 27-28 February 2019
March 2019	- Sustainable Innovation 2019, London UK, 4-5 March 2019 - TRIECA Stormwater and Erosion Control Conference (hosted by TRCA), Toronto Canada, 20-21 March 2019 - Americana 2019, Montreal Canada, 26-28 March 2019
April 2019	- WEAO Technical Symposium and OPCEA Exhibition 2019, Toronto Canada, 14-16 April 2019 - 5th International Symposium on Bioremediation and Sustainable Environmental Technologies (hosted by Battelle), Baltimore USA, 15-18 April 2019
May 2019	- Blue Cities Forum 2019, Toronto Canada, 7-8 May 2019 - WEF Residuals and Biosolids Symposium, Fort Lauderdale USA, 7-10 May 2019 - WEF Stormwater and Green Infrastructure Symposium, Fort Lauderdale USA, 8-10 May 2019 - SWAN 2019 Smart Water Networks Forum, Miami USA, 15-16 May 2019
June 2019	- 2019 Real Property Institute of Canada (RPIC) Federal Contaminated Sites Regional Workshop, Halifax NS Canada, 4-5 June 2019 - BlueTech Forum 2019, London UK, 5-6 June 2019 - ACE 2019 American Water Works Association Conference and Exposition, Denver USA, 9-12 June 2019 - IWA Leading Edge Conference on Water and Wastewater Technologies 2019, Edinburgh UK, 10-14 June 2019 - TechConnect World Innovation Conference and Expo, Boston USA, 17-19 June 2019
July 2019	- U.S. Department of Energy, Advanced Research Projects Agency-Energy (ARPA-E) 10th Annual Energy Innovation Summit, Denver USA, 8-10 July 2019
August 2019	- National Environmental Monitoring Conference, Jacksonville FL USA, 5-9 August 2019 - Stockholm World Water Week, Stockholm Sweden, 26-31 August 2019
September 2019	- Water Reuse Symposium 2019, San Diego USA, 8-11 September 2019 - WEFTEC, Chicago USA, 21-25 September 2019
October 2019	- World Water-Tech North America, Toronto Canada, 23-24 October 2019 - Horizon 19 – Boston USA, October 2019
November 2019	- Aquatech Amsterdam 2019, Amsterdam Netherlands, 5-8 November 2019 - US EPA Advanced Septic System Nitrogen Sensor Challenge Webinar (TBD), Fall 2019 - SRI Sustainable, Responsible and Impact Investing Conference, Colorado Springs USA 11-15 November 2019

VerifiGlobal Alliance Members

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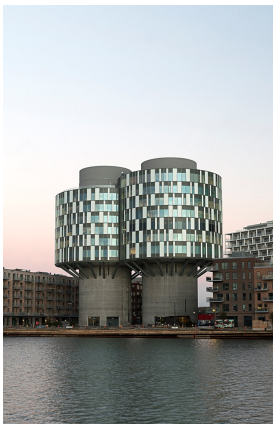
VerifiGlobal is a global network of organizations providing testing and verification services across multiple sectors and areas of expertise. Its mission is to strengthen long term, sustainable performance through improved efficiency, quality assurance and accountability.

The VerifiGlobal Alliance includes 11 member organizations from 8 different countries.

Current VerifiGlobal member organizations are: Battelle (USA), CAWT (Canada), CMI (Australia), ETA-Danmark (Denmark), GHL (Canada), IETU (Poland), KTL (South Korea), RESCOLL (France), Southern Research (USA), TRCA-STEP (Canada), VTT (Finland).



VerifiGlobal Alliance members demonstrate their conformity with the requirements of 14034 and 17020 through a peer assessment process designed according to the requirements of 17040. The VerifiGlobal peer assessment process provides a flexible mechanism for recognizing competent organizations in countries that do not yet have a national accreditation program for ISO 14034.

ETA-Danmark A/S, a subsidiary of Danish Standards, hosts the VerifiGlobal Secretariat. Accredited by Danish Accreditation (DANAK) in accordance with ISO 17020, ETA-Danmark is the Danish verification body for both ISO 14034 ETV and the EU ETV Pilot Programme. For more information on ETA-Danmark, contact Thomas Bruun: tb@etadanmark.dk

For more information on VerifiGlobal, please visit: www.verifiglobal.com