



PFAS FORUM

Moderator and Speaker Compendium

May 2-4, 2022
Renaissance Tampa International Plaza Hotel
Tampa, Florida



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- Remediation of Petroleum and Heavy Hydrocarbons
- Funding and Insuring Remediation Projects
- Business Aspects for the Environmental Professional
- Other Relevant Topics

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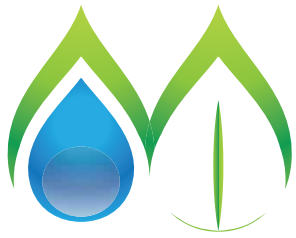
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AGENDA

Note:
All sessions to be held in
Costa Del Sol Ballroom

Monday, May 2, 2022

2:30 pm - 7:00 pm Registration Open

2:30 pm - 5:00 pm Sponsor - Exhibit and Poster Board Set up
Costa Del Sol Ballroom and Pre-function Area

3:30 pm - 5:30 pm **PFAS Environmental Justice Workshop**

Defenseless at the Fence-line No More: Defining a Regulatory, Public Health, Economic, and Equitable Development Agenda for Addressing PFAS in Environmental Justice Communities through Access to Science, Data, and Agency Decision-making

Moderator: **Michael R. Goldstein, Esq.**, Managing Shareholder,
The Goldstein Environmental Law Firm, P.A

5:30 pm - 7:00 pm Reception - Exhibit Hall and Costa Del Sol Prefuction Area

Tuesday, May 3, 2022

7:15 am - 6:00 pm Registration Open

7:15 am - 8:00 am Continental Breakfast - Exhibit Hall and Costa Del Sol Prefuction Area

8:00 am - 10:00 am **Opening Session:
PFAS Regulatory and Legislative Update**

Welcome: **Gene Jones**, Executive Director, Southern Waste
Information eXchange, Inc. (SWIX)

Moderator: **Martha Maier**, PFAS Program Leader,
Montrose Environmental Group

PFAS Regulatory State of the Union

Taryn McKnight, PFAS Practice Leader, Eurofins Environment
Testing America

PFAS Strategic Roadmap: EPA's Commitments to Action

Aaryn Jones, Emerging Contaminants Coordinator,
US Environmental Protection Agency, Region 4

Tuesday, May 3, 2022 (Continued)

8:00 am - 10:00 am

**Opening Session:
PFAS Regulatory and Legislative Update (Continued)**

***What Transpired Leading to the 2022 PFAS Law in Florida and
Going Forward***

Jorge Caspary, P.G., Principal, Cameron Cole, LLC

State of Florida Perspective and Legislative Update

Teresa Booeshaghi, Assistant Director, Division of Waste Management,
Florida Department of Environmental Protection

***PFAS Water Regulatory Updates, Future Predictions and Impacts
on Corporate Needs***

John Gardella, Shareholder and Founding Member, CMBG3 Law

10:00 am - 10:30 am

Refreshment Break: Exhibit Hall and Costa Del Sol Prefuction Area

10:30 am - 12:00 pm

**Session I:
PFAS Toxicology, Fate and Transport**

Moderator: **Dr. Christopher M. Teaf, Ph.D.**, Institute of Science &
Public Affairs, Florida State University

***What's New in PFAS Toxicity Since 2016 PFOA/PFOS Health
Advisory and Potential Impacts to Federal and State Actions***

Dr. Ziqi He, Ph.D., P.E., Senior Technical Consultant, Verdantas

Toxicology, Risk, & Regulation of PFAs: Florida & USEPA Activity

Dr. Christopher M. Teaf, Ph.D., Institute of Science & Public Affairs,
Florida State University

***PFAS Fingerprinting to Refine the Conceptual Site Model for
an Unlined Landfill***

Christopher Gurr, PE, PFAS Remedial Investigation Discipline Leader,
CDM Smith, Inc.

12:00 pm - 1:00 pm

Lunch (Costa Del Sol Prefuction Area and La Fuente Courtyard)

Tuesday, May 3, 2022 (Continued)

1:00 pm - 3:00 pm

**Session II:
PFAS Treatment and Encapsulation**

Moderator: **Chad Northington, P.E.**, Southeast District Manager,
REGENESIS

***Thermal Treatment of PFAS Impacted Soil – Field Demonstration
and Scale-Up Considerations***

Chris Blundy, Technical Sales Lead, TRS Group, Inc.

***Low-Cost, Passive In Situ Treatment of PFAS-Impacted
Groundwater Using Foam Fractionation in an Air Sparge Trench***

Dung “Zoom” Nguyen, Chemical and Environmental Engineer,
CDM Smith, Inc.

In Situ Treatment of PFAS Using Colloidal Activated Carbon

Dr. Paul B. Hatzinger, Ph.D., Director, Biotechnology Development and
Applications Group, Aptim

PFAS Encapsulation in Soil and Leachate

Paul Ruehl, US Environmental Remediation Coordinator, Holcim (US)

3:00 pm - 3:30 pm

Refreshment Break: Exhibit Hall and Costa Del Sol Prefunction Area

3:30 pm - 5:30 pm

**Session III:
PFAS Regulatory and Legal Issues: Panel Discussion**

Moderator: **Frank Hearne, Esq.**, Shareholder, Mechanik Nuccio Hearne
& Wester, P. A.

Panelists:

Howard Nelson, Esq., Partner, Bilzin Sumberg Baena Price &
Axelrod, LLP

Robyn D. Neely, Esq., Partner, Chair, Environment and Natural
Resources Practice, Akerman, LLP

Ron Noble, Esq., Shareholder, Buchanan Ingersoll & Rooney PC

Michael R. Goldstein, Esq., Managing Shareholder, The Goldstein
Environmental Law Firm, P.A.

Laurel Lockett, Esq., Shareholder, Carlton Fields, P.A.

Ralph Demeo, Esq., Shareholder, Guilday Law

5:30 pm - 7:00 pm

Poster Reception: Exhibit Hall and Costa Del Sol Prefunction Area

Wednesday, May 4, 2022

7:15 am - 3:30 pm Registration Open - Costa Del Sol Prefuction Area

7:15 am - 8:00 am Continental Breakfast - Exhibit Hall and Costa Del Sol Prefuction Area

8:00 am - 10:00 am **Session IV:
PFAS Assessment and Management**

Moderator: **Jorge Caspary, P.G.**, Principal, Cameron Cole

My Site has PFAS! Time to Go Back to the Drawing Board

Blaine Dawson, P.G., Project Geologist, Geosyntec Consultants

***A Case Study on Implementing PFAS Remediation Strategy in the
Absence of Regulation***

McLane Evans, Assistant City Attorney, City of Tampa

***Full-spectrum Solutions for the Subsurface Management of
PFAS Pollution***

Chad Northington, P.E., Southeast District Manager, REGENESIS

PFAS Leaching from AFFF-Impacted Source Areas

Dung “Zoom” Nguyen, Chemical and Environmental Engineer,
CDM Smith, Inc.

10:00 am - 10:30 am Refreshment Break - Exhibit Hall and Costa Del Sol Prefuction Area

10:30 am - 12:30 pm **Session V:
PFAS Site Characterization and Managing Liabilities**

Moderator: **Joseph L. Applegate, P.G.**, Sr. Principal Hydrogeologist
Geosyntec Consultants, Inc.

PFAS Treatment and Remediation - What’s New in Destruction

Dr. Viraj deSilva, PE, BCEE, Senior Treatment Process Engineer and
PFAS Expert, Freese & Nichols, Inc.

Understanding and Managing PFAS Risks and Liabilities

Seth Kellogg, P.G., Principal, Geosyntec Consultants, Inc.

***Centralized Ion-Exchange Regeneration Strategy to Reduce
Life-cycle Costs and Long-term Liability from
PFAS Remediation Waste***

Paul Newman, Department of Defense Market Sector Leader, ECT2

Wednesday, May 4, 2022 (Continued)

10:30 am - 12:30 pm

**Session V:
PFAS Site Characterization and Managing Liabilities (Continued)**

Advances in High-Resolution Site Characterization Technologies and Applications for PFAS

Dr. Tamzen W. Macbeth, Ph.D, PE, BCEE, Senior Vice President and Remediation Practice Leader, CDM Smith, Inc.

12:30 pm - 1:30 pm

Lunch (Costa Del Sol Prefuction Area and La Fuente Courtyard)

1:30 pm - 3:30 pm

**Session VI:
PFAS Forum Closing General Session**

Moderator: **Michael J. Deliz, P.G.**, Restoration Program Manager, NASA Headquarters, Environmental Management Division

Destructive Technologies Overview for Complete PFAS Destruction

Paul Newman, Department of Defense Market Sector Leader, ECT2

Airport and Landfill Leachate PFAS Adsorption, Fixation, and Destruction

Thomas Maher, Jr., P.G., Vice President Corporate Environmental Engineering and Sciences Practice Lead, Civil & Environmental Consultants, Inc.

Using Appropriate Conceptual Site Models and Phased Approaches in PFAS Investigations

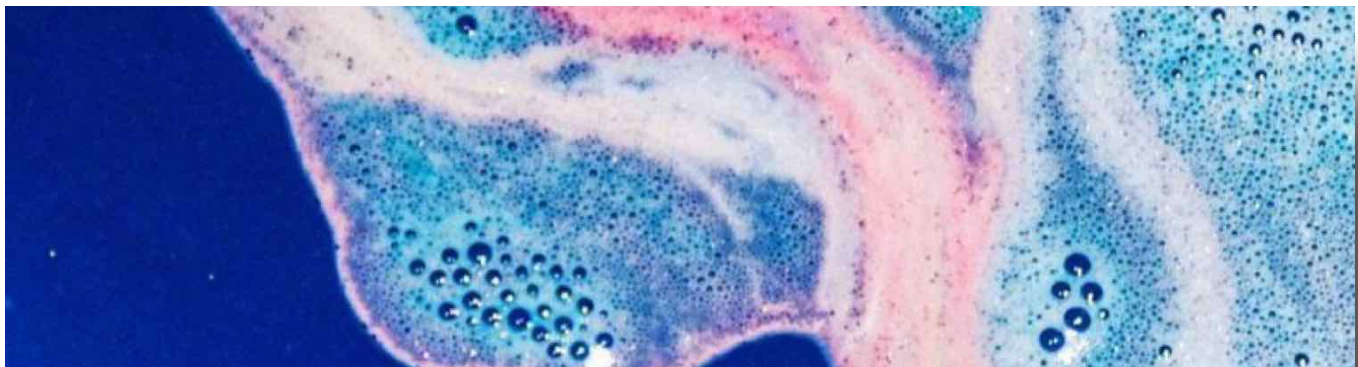
Nicholas Barnes, P.E., Environmental Engineer, Verdantas

PFAS, Standards, Enforcement and Obligations

George Naslas, P.G., LSP, Vice President, Weston & Sampson

3:30 pm

Adjourn



PFAS Forum II Poster Presentations

PFAS Degradation with a Flow Though Gas-Liquid Non-Thermal Plasma

Rachel Gallan, Department of Chemical and Biomedical Engineering, FAMU-FSU College of Engineering

Abstract:

The contamination of groundwater by per- and polyfluorinated substances (PFAS) is a major world-wide environmental problem. Current water treatment methods for dealing with PFAS use the non-degradative methods of activated carbon and reverse osmosis for physical removal from the contaminated water. In the present work we utilize a non-thermal plasma chemical reactor to degrade perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), two commonly found PFAS. The non-thermal plasma, a type of ionized gas, is generated by a high voltage electrical discharge in a reactor with flowing gas (argon) and liquid (water). The plasma discharge channel propagates along the interface between the gas and the thin liquid water film where the generated reactive chemical species, including reductive and oxidative species, degrade PFOA and PFOS into smaller carbon chain daughter products and mineralization products such as carbon dioxide and fluoride (F⁻). We have quantified PFOA/PFOS degradation, mineralization, and daughter product production for different feed concentrations (10 ppb to 1 ppm) in deionized water solutions. Through optimizing of the plasma reactor operating conditions (pulse frequency and pulse width) we have achieved 90-75 percent degradation of PFOA/PFOS. Degradation of PFAS in this plasma reactor is insensitive to the solution conditions of pH, conductivity, and added organic matter. We have also demonstrated that ground water and landfill leachate samples contaminated with PFAS can be treated with this plasma reactor.

Updates on USEPA's Maximum Contaminant Level Goal (MCLG) Development for PFAS

Andrew Pawlisz, D.A.B.T., Regulatory Toxicologist/Business Development and William Kelly, PG, Regional Development, Trihydro Corporation

Abstract:

This poster presentation outlines EPA's current efforts towards the development Maximum Contaminant Level Goal (MCLG) for per- and polyfluoroalkyl substances (PFAS) under the Safe Drinking Water Act (SDWA). The content focuses on the MCLG derivation process, agency's methodology for health effects identification, relative drinking water contribution to the overall PFAS intake, and preliminary non-cancer and cancer toxicity reference dose selection.

PFAS Forum II Poster Presentations (Continued)

The Value of a Single Source Provider for Removal of Emerging Contaminants Including PFAS

Geoffrey Pellechia, Senior Business Development Manager-Emerging Contaminants, Evoqua Water Technologies

Abstract:

Poster will provide a Case Study for PFAS Water Treatment at a Water Utility. Describe the problem, solution, and where they are at today.

Adsorption of Short and Long Per- and Polyfluoroalkyl Substances (PFASs) onto Granular Activated Carbon from at ng/L levels

Yan Zhang, Department of Civil & Environmental Engineering, University of South Florida

Abstract:

The chain length of PFASs can be categorized as short-chain and long-chain. Historically, short-chain PFASs have been released into environmental compartments mostly as undesired by-products during the production of long-chain PFASs. However, given the current concerns about increased regulation for long-chain PFASs, a shift to the production and usage of their short-chain homologs, such as perfluorobutanoic acid (PFBA) and perfluorobutane sulfonic acid (PFBS), may result in their widespread presence in environmental media making them a class of pollutants of considerable environmental concern. Previous studies demonstrated that granular activated carbon (GAC) and other conventional adsorbents are effective to remove long-chain PFASs; however, they are non-selective and the removal efficiency for short-chain PFASs is low. The overall goal of this research is to design an appropriate adsorption system to remove short and long chain PFASs at environmentally relevant concentrations and conditions using GAC and porous organic polymers (POPs). By focusing on the adsorption system can be configured to remove the full range of PFASs in a cost-effective way. Currently, this study finished the measurement of adsorption capacity and rate of both short-chain and long-chain PFASs removal by GAC.

PFAS Environmental Justice Workshop



Workshop Description:

Defenseless at the Fence-line No More: Defining a Regulatory, Public Health, Economic, and Equitable Development Agenda for Addressing PFAS in Environmental Justice Communities through Access to Science, Data, and Agency Decision-making

Presenters:

Moderator: **Michael R. Goldstein, Esq.**, Managing Shareholder, The Goldstein Environmental Law Firm, P.A

Michael R. Goldstein, Esq.



Michael R. Goldstein, Esq.,

Managing Shareholder, The Goldstein Environmental Law Firm, P.A.

Bio:

Michael R. Goldstein, Managing Shareholder of The Goldstein Environmental Law Firm, P.A., and a Martindale-Hubbell AV Preeminent and Chambers and Partners rated attorney, practices exclusively in the areas of environmental law and environmental redevelopment for a broad range of clients, including retail, residential, and industrial developers, public and private companies, real estate funds, lenders, and local governments. A major aspect of Mr. Goldstein's environmental legal practice involves support of real estate and business transactions, including managing pre-acquisition and pre-leasing due diligence investigations; structuring, negotiating, and drafting environmental provisions in purchase, lease, and development agreements; and assisting lenders evaluate and limit the risk of exposure to environmental liability in connection with new loans and potential foreclosures. In addition, he works closely and extensively with real estate development principals and engineering, planning, and design professionals to help coordinate federal, state and local regulatory approvals for complex retail, industrial, residential, mixed use, and marina related projects throughout the State of Florida.

Mr. Goldstein's practice has a heavy emphasis on the remediation, financing, and beneficial reuse of contaminated sites and involves a broad array of Brownfields related transactional, administrative, regulatory, legal, legislative, and policy work for clients in both the private and public sectors. He has developed a national reputation as one of the leading and most innovative Brownfields practitioners in Florida, working on important and precedent establishing projects as well as heading up or participating in numerous local, regional, state, and federal environmental restoration initiatives. On a statewide level, Mr. Goldstein was the founding Chairman of the Florida Brownfields Association and served as its Chairman and/or President for the first five years of the organization's existence. Mr. Goldstein's tenure as Chairman and President was distinguished by his commitment to elevating environmental justice and public health as critical areas of emphasis for business, community, regulatory agency, and local government stakeholders. In 1996, the Miami-Dade County Commission appointed him Chairman of the Miami-Dade County Brownfields Task Force, a post that he held until the committee's business was completed in 2004. In January 2006, Mr. Goldstein was appointed to serve on the Advisory Board of the Bureau of National Affairs' highly respected Environmental Due Diligence Guide, which serves as a national reporting, editorial, and opinion forum for environmental transactions and related Brownfields and policy matters. In 2008, he founded and funded the Goldstein Brownfields Foundation, which is dedicated to empowering economically and health disadvantaged individuals and communities with scholarships, programming, and resources to restore polluted land, revitalize neighborhoods, and protect public health. The Goldstein Brownfields Foundation also focuses on increasing the ethnic and gender diversity of lawyers working in the environmental arena through academic scholarships, educational and career programming, and professional mentoring. In 2009, Mr. Goldstein was appointed to the Executive Committee of the National Brownfields Coalition, an affiliation of private and public sector stakeholders working in the U.S. Congress to advocate for improvements in environmental redevelopment policy and legislation.

Eugene (Gene) Jones



Eugene (Gene) Jones

Eugene (Gene) Jones, Executive Director, Southern Waste Information eXchange, Inc. (SWIX)

Bio

Gene Jones serves as Executive Director of Southern Waste Information Exchange (SWIX), a non-profit organization which has been operating since 1981 assisting businesses and municipalities with their waste management issues.

In addition, Gene is a serial entrepreneur and brings over 38 years of experience with waste management and recycling in senior executive level positions. Over the past 38 years, he has successfully founded, built and sold several businesses including Environmental Management & Consulting Services, Inc., Advanced Derived Fuels, LLC, Hazardous Substance and Waste Management Research, Inc., Environmental Industry Conference Management, LLC, FieldClean of Florida, LLC, Lawncare Equipment Sales and Services, LLC, and his latest venture, the Florida Industrial Hemp Company, LLC.

Gene is based in Florida and specializes in building strategic relationships with waste recycling firms and brings a vast network of associations in the recycling sector from his work in organizing conferences such as;

Conferences:

- the Florida Remediation Conference,
- the Agricultural Plastics Recycling Conference & Trade Show,
- the Waste Conversion Technology Conference & Trade Show,
- the Southeast Recycling Conference & Trade Show,
- the New Life for Closed Gas Stations Conference and Exhibition,
- the International Symposium on the Redevelopment of Manufactured Gas Plant Sites,
- the National Conference on Waste Exchange and Resource Reuse,
- Florida Medical Cannabis Conference & Exhibition,
- Florida Industrial Hemp Conference & Exhibition, and
- PFAS Forum.

Associations:

- Florida BioFuels & BioEnergy Association, Inc.,
- Recycle Florida Today, Inc.,
- International Society of Technical & Environmental Professionals, Inc.,
- Florida Brownfields Association, Inc., and
- Keep Florida Beautiful, Inc.

Gene is a Martial Arts practitioner and has his 7th degree black belt in Shaolin GoJu and a 5th degree black belt in Nisei GoJu. Gene is also the Author of [Instant Self-Esteem: Empowering Self-Confidence](#).

Gene is also the inventor of the [Soap Bag Saver](#), which he designed for the reuse of leftover soap bars.

Martha Maier



Martha Maier

PFAS Program Leader, Montrose Environmental Group

Bio:

Martha Maier is the PFAS Program Leader and subject matter expert for Montrose Environmental Group, Inc. She is the former president and owner of Vista Analytical Laboratory in El Dorado Hills, CA, and has over 35 years of experience in environmental testing, primarily involving high resolution mass spectrometry for the analysis of chemicals such as dioxins, PCBs and chlorinated pesticides. Martha led the PFAS program at Vista from the development of their in-house LC-MS/MS method for serum in 2007 to become one of the most respected analytical PFAS service providers in North America. She earned her BS in chemistry and philosophy at the University of Wisconsin-Madison. She is a member of the ITRC PFAS Sampling and Analysis Subcommittee.

Taryn McKnight



Presentation Title

PFAS Regulatory State of the Union

Taryn McKnight, PFAS Practice Leader, Eurofins Environment Testing America

Abstract

PFAS are in the news across the states, and they have become a growing topic of discussion amongst environmental practitioners, at all levels of regulatory agencies, and they are certainly a hot topic at conferences. With a new administration and a new Congress, 2021 issued in a revised PFAS Roadmap, a National Defense Authorization Act full of PFAS legislation, and plenty more on the docket for 2022. The states have continued to forge their own paths forward with how to address PFAS contamination. And with rapidly evolving science and technologies there is an almost immeasurable amount of developments to keep track of. This presentation will catalogue notable and even lesser known but relevant regulatory actions at both the federal and state level. In addition, a state of the science with regards to a range of research topics and scientific developments will be provided. This includes toxicology, health studies, analytical method development, advances in treatment technology and understanding the fate and transport of PFAS.

Bio

Taryn McKnight is the PFAS Practice Leader for Eurofins Environment Testing America based in Sacramento, California, has nearly 20 years of experience in the environmental testing industry specializing in PFAS and Vapor Intrusion assessments. She is responsible for providing technical guidance to clients, agencies and industry personnel across the country. With 20 years invested in PFAS method development and analysis, Eurofins has demonstrated leadership in this field of testing, supporting an analytical approach that provides consistent and defensible data in a world that lacks standardization for PFAS methodologies.

Aaryn Jones



Presentation Title:

PFAS Strategic Roadmap: EPA's Commitments to Action

Aaryn Jones, Emerging Contaminants Coordinator, US Environmental Protection Agency, Region 4

Abstract:

EPA Administrator Michael Regan released the comprehensive PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024 in October 2021, outlining the Agency's plans to confront PFAS contamination nationwide. EPA's Roadmap is centered on three guiding strategies: Increase investments in research, leverage authorities to take action now to restrict PFAS chemicals from being released into the environment, and accelerate the cleanup of PFAS contamination. This talk will provide a multimedia update on the EPA's PFAS Roadmap including commitments met thus far, and anticipated timelines for current and future actions.

Bio:

Aaryn Jones is the Emerging Contaminants Coordinator for EPA Region 4 in Atlanta, GA, where she serves as the regional point of contact for multimedia PFAS issues and leads a Regional PFAS workgroup. Aaryn has been with EPA Region 4 for over 14 years and most recently served as the Special Assistant to the Regional Administrator. Prior to that role, Aaryn was a physical scientist and enforcement officer in the Land, Chemicals and Redevelopment Division, where she worked directly with states, tribes, local governments, nonprofit organizations, and regulated entities on Underground Storage Tank enforcement and corrective action, Brownfields project management, and RCRA hazardous waste enforcement and corrective action. Aaryn holds a BS in Chemistry and MS in Analytical Chemistry from East Carolina University, and an MS in Environmental Chemistry from the Nicholas School of the Environment at Duke University. Her educational and research background has included novel green chemistry analytical method development, studying environmental fate, transport, and treatment of persistent halogenated contaminants in soil and groundwater, and fluoropolymer chemistry.

Jorge Caspary, P.G.



Presentation Title:

What Transpired Leading to the 2022 PFAS Law in Florida and Going Forward

Jorge Caspary, P.G., Principal, Cameron Cole

Abstract:

Will discuss prior discussions of the legislation dating back to 2019 and which culminated with Governor's expected signature into law. Stakeholder's objectives, broad risk context, continuing obligations, and possible rehabilitation funding framework.

Bio:

- Twenty-five years of experience in technical and management decisions in the areas of environmental assessment and site cleanup, solid and hazardous waste management, RCRA/CERCLA program and policies, brownfields redevelopment, and contaminated property reuse strategies.
- A Principal at Cameron-Cole and former Vice President of WSource Source Group. Currently involved in technical and State-level policy and legislative discussions regarding PFAS as well as providing expert assistance to plaintiffs in PFAS litigation, airports, ports, and law firms. Was involved in the development and implementation of new environmental policy, rules, and guidance as the former Director of the Division of Waste Management within the Florida Department of Environmental Protection; has consulted and provided strategic direction and technical support on complex closures of contaminated properties and has also engaged with other states and EPA regional and headquarters regulators.
- Registered Professional Geologist: Florida; B.S. Civil Engineering, Florida State University, Tallahassee, Florida; B.S. in Geology, University of Florida, Gainesville, Florida.

Teresa Booeshaghi



Presentation Title:

State of Florida Perspective and Legislative Update

Teresa Booeshaghi, Assistant Director, Division of Waste Management, Florida Department of Environmental Protection

Abstract:

The Florida Department of Environmental Protection (FDEP) is actively investigating the historic use of perfluoroalkyl substances (PFAS) and potential impacts to the State of Florida drinking water sources. FDEP is currently focusing on two of the PFAS constituents, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonate (PFOS). To aid in the assessment and remediation of PFAS contamination in the State of Florida, the Department, per Rules 62-780.150 and 62-780.650, F.A.C., has derived provisional groundwater and soil cleanup target levels (CTLs) for PFOA and PFOS. This presentation will provide information on the provisional CTLs and PFAS screening levels the Department has developed, along with a discussion of the Department's efforts related to statewide PFAS assessments.

Bio:

Ms. Booeshaghi is the Assistant Director for the Division of Waste Management at the Florida Department of Environmental Protection. She has been with the agency for 21 years. In her current role she works with District Offices throughout the state to ensure consistent and uniform adherence and application of regulations. She provides oversight to the Division's Permitting and Compliance Assistance Program, including promotion of waste management practices that minimize waste generation, encourage recycling and reuse, prevent discharges of chemical and petroleum products contained in storage tank systems, and ensure adequate and timely cleanup of the environment. Teresa was instrumental in the Department's initial PFAS assessment work and serves as a state representative on two national forums. She previously served as the Waste Cleanup Program Administrator where she was responsible for a number of cleanup programs, including the Drycleaning Solvent Cleanup and Superfund Programs, Federal Facilities, Brownfields and Voluntary Cleanup Tax Credit programs.

John Gardella



Presentation Title:

PFAS Water Regulatory Updates, Future Predictions and Impacts on Corporate Needs

John Gardella, Shareholder and Founding Member, CMBG3 Law

Abstract:

The Biden Administration has already shown considerable momentum towards federal regulations with respect to PFAS in water. The question for drinking water standards under the Safe Drinking Water Act and a "hazardous substance" designation under CERCLA (the Superfund law) is not "if", but "how soon." The presentation will discuss the current landscape of federal and state PFAS water regulations, predictions for future PFAS regulatory action, and the significant financial, remediation, and filtration technology needs of numerous industry types - not just water utilities.

Bio:

Attorney John Gardella is a Shareholder and founding member of Boston-based environmental law firm, CMBG3 Law. He is Chair of the PFAS practice group, and the firm was the only law firm in the country recognized in 2020 as a thought leader on PFAS by National Law Review. Attorney Gardella has over 16 years of environmental law experience, with a significant portion his work in the last five years relating to PFAS. He is regularly published in and interviewed by media on the topic of PFAS, including in Bloomberg. He is frequently invited to speak in-house at corporations, insurance companies and financial institutions on the risks that PFAS pose to a wide variety of industries.

Dr. Christopher M. Teaf, Ph.D.



Dr. Christopher M. Teaf, Ph.D.

Institute of Science & Public Affairs, Florida State University

Bio:

Dr. Teaf is a Board-certified toxicologist and risk assessor with over 40 years of environmental and public health experience specializing in soil, water and air quality, toxicology, risk assessment, and environmental health issues for solvents, petroleum, pesticides, polyfluorinated compounds (PFAs), metals, radionuclides, particulates, and bacteria/molds. Chris is Director Emeritus of the Center for Biomedical & Toxicological Research at Florida State University, and Director of Toxicology for Hazardous Substance & Waste Management Research in Tallahassee. He has experience with industrial facilities, waste management sites, power facilities, agricultural sites, mining operations, educational institutions, and products in general commerce. He has directed research and taught environmental toxicology and risk assessment at the University level, for USEPA, the World Health Organization, NATO, ATSDR, many state/local agencies, and the private sector. He serves as co-Editor-in-Chief of Soil and Sediment Contamination and sits on editorial boards or as peer reviewer for a variety of scientific journals. Chris has testified in many state and federal courts, as well as state administrative hearings.

Ziqi (Zeke) He



Presentation Title:

What's New in PFAS Toxicity Since 2016 PFOA/PFOS Health Advisory and Potential Impacts to Federal and State Actions

Dr. Ziqi He, Ph.D., P.E., Senior Technical Consultant, Verdantas

Abstract:

Over the past two decades, there have been dramatic changes in “guideline” levels for PFOA/PFOS, primarily as a result of science developments in understanding toxicities of these substances. Since the US EPA established final Health Advisory Levels (HALs) for PFOA/PFOS in 2016, numerous states have further developed their own health-based or regulatory values that are distinct from the EPA’s HALs in terms of screening, notification, action, response, maximum contaminant levels, cleanup levels, etc. This presentation will examine the regulatory dynamics of PFAS as Emerging Contaminants through comparison/contrast of regulations nationally considering new PFAS toxicity data developed since 2016, with particular focus on the following matters: what to expect with federal Maximum Contaminant Level (Goals) having new toxicity values several orders of magnitude lower than those used for the EPA 2016 HAL, potential development of TCLP levels for PFOA/PFOS as a characteristic hazardous waste, ramifications of UCMR5 data for 29 PFAS with lower detection limits than UCMR3, discussion of which PFAS compounds and HALs the US EPA may develop during the EPA’s 2021-2024 Commitments to Action, and communication of major challenges for decision making in impacted businesses and industries.

Bio:

Ziqi (Zeke) He, Ph.D., P.E. is a senior technical consultant at Verdantas with over 20 years of research and consulting experience in the area of fate and transport/transformation of persistent and emerging contaminants in both natural and engineered systems. He received his BS and MS in Civil and Municipal Engineering from Xi’an University of Architecture and Technology, and his PhD in Environmental Engineering with a minor in Geological Sciences from The Ohio State University. He gained his PFAS chemistry knowledge and treatment experiences in the early 2000s and has been tracking new research/development on PFAS toxicity and treatment technologies. Recently, he has led PFAS investigation and treatment system design activities at several sites. Dr. He has also been invited as a peer reviewer for frontier scientific journals and grant proposals, and is an active member of the Interstate Technology & Regulatory Council (ITRC) PFAS team focusing on guidance document writing and reviewing.

Dr. Christopher M. Teaf, Ph.D.



Presentation Title:

Toxicology, Risk, & Regulation of PFAs: Florida & USEPA Activity

Dr. Christopher M. Teaf, Ph.D., Institute of Science & Public Affairs, Florida State University

Abstract:

Toxicological information and regulatory pressure regarding perfluorinated or polyfluoroalkyl substances (PFAs), recently estimated at 5,000 to 10,000 synthetic chemicals, many of which have been in common use since the 1940s, is rapidly expanding. Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) have received the greatest historical research and regulation, and continue to be the most detected in PFAs sampling efforts, though lower molecular weight analogs have become the focus of recent study. PFAs exhibit desirable surfactant properties and persistence in the environment. Elimination half-lives in humans range from hours for low molecular weight congeners to tens of years for PFOA, PFOS and PFHxS, making comparison of toxicity between species difficult, though ongoing exposure sources complicate the persistence issues. CDC (2021) estimated over a 7 year period that mean serum PFOA was 1 to 2 ug/L, while PFOS mean serum concentration was 4 to 6 ug/L. The USEPA (2021) proposed Unregulated Contaminant Monitoring Rule (UCMR5) would require monitoring of 29 PFAs in drinking water from 2023 to 2025. Some PFAs have been linked to potential human health concerns, including immunotoxicity, developmental effects, organ-specific toxicity, and cancer, though information varies. Potential sources of PFAs include: manufacturing raw materials, fire training and emergency response, consumer products (e.g., textiles/carpet/furniture stain resistance food packaging, non-stick cookware). As a result of greater sampling and very low detection limits, many PFAs have been detected in air, soil, and water even in very remote areas of the world, though much of the focus of PFAs regulation still involves drinking water. There currently is no federal drinking water Maximum Contaminant Level (MCL) for any PFA chemical, though late-2021 EPA Science Advisory Board information suggests they are being developed. Media reports and public activity addressing PFAs have caused some jurisdictions to establish state-specific criteria (e.g., Notification Levels (NLs), Action Levels (AL), Public Health Goals (PHGs)) for PFOA, PFOS and others. Increasing PFAs are being identified with expansion of approved analytical methods for drinking water, though analytical methods struggle to keep up with extremely low advisory values in the part per quadrillion range. Variability in toxicity data for PFAs cause challenges with how to approach the very large compound family. Research is necessary to relate PFAs levels in drinking water to the levels that may be associated with potential human health effects.

Bio:

Dr. Teaf is a Board-certified toxicologist and risk assessor with over 40 years of environmental and public health experience specializing in soil, water and air quality, toxicology, risk assessment, and environmental health issues for solvents, petroleum, pesticides, polyfluorinated compounds (PFAs), metals, radionuclides, particulates, and bacteria/molds. Chris is Director Emeritus of the Center for Biomedical & Toxicological Research at Florida State University, and Director of Toxicology for Hazardous Substance & Waste Management Research in Tallahassee. He has experience with industrial facilities, waste management sites, power facilities, agricultural sites, mining operations, educational institutions, and products in general commerce. He has directed research and taught environmental toxicology and risk assessment at the University level, for USEPA, the World Health Organization, NATO, ATSDR, many state/local agencies, and the private sector. He serves as co-Editor-in-Chief of Soil and Sediment Contamination and sits on editorial boards or as peer reviewer for a variety of scientific journals. Chris has testified in many state and federal courts, as well as state administrative hearings.

Christopher Gurr, PE



Presentation Title:

PFAS Fingerprinting to Refine the Conceptual Site Model for an Unlined Landfill

Christopher Gurr, PE, PFAS Remedial Investigation Discipline Leader, CDM Smith, Inc.

Abstract:

PFAS is a class of contaminants impacting many communities across the nation. Unlike the “fully emerged” contaminants (like chlorinated solvents) where, for groundwater at least, we typically only have to track just a few contaminants, samples for PFAS can return detections for over 20 compounds per sample. That list continues to grow as analytical methods mature. This is both a challenge and an opportunity. It’s a challenge, because now we have many more compounds to track, evaluate, and communicate risk (not to mention unquantified “suspect” PFAS and precursors). It is an opportunity because the datasets are much larger, with many more variables—which opens the door to more rigorous forensics. In this presentation, I will discuss how PFAS analysis can be used to “fingerprint” sources at contaminated groundwater sites, and why the chemistry allows us to do so. I will present a case study of a contaminated landfill where CDM Smith used a thermal imaging drone to identify seeps around the landfill cap. The distribution, or fingerprint, of PFAS detections in the seeps were comparable to the landfill’s monitoring wells. The fingerprinting served as a strong line of evidence to develop the conceptual site model, particularly groundwater to surface water discharge.

Bio:

Chris Gurr, PE, is the PFAS Remedial Investigation Discipline Leader for CDM Smith. He specializes in contaminant fate and transport and remediation technology. He is active in multiple PFAS R&D projects, and has been an author on the ITRC PFAS guidance. He has a BS in chemistry from the University of Virginia and MS/ENG degrees in environmental engineering from Stanford University.

Chad Northington, P.E.



Chad Northington, P.E.

Southeast District Manager, REGENESIS

Bio:

Mr. Northington is a professional engineer with over twenty years of experience in the environmental field in the areas of site investigation, remediation system engineering and construction, project management and technical assistance. He received both his undergraduate and graduate degrees in environmental engineering from Michigan Technological University. Mr. Northington currently serves as the Southeast District Manager with Regenesys. In this capacity, he provides technical support for application of soil and groundwater remediation solutions. Mr. Northington works directly with environmental consulting, construction, and engineering firms to develop turnkey remedial approaches for in situ-applied strategies across a broad spectrum of technology classes.

Chris Blundy



Presentation Title:

Thermal Treatment of PFAS Impacted Soil – Field Demonstration and Scale-Up Considerations

Chris Blundy, Technical Sales Lead, TRS Group, Inc.

Abstract:

Soils contaminated by per- and polyfluoroalkyl substances (PFAS) present a unique challenge because the options for treatment are extremely limited. Excavation and off-site disposal/treatment is problematic because the liability for the PFAS contaminants present in soil, and off-site treatment options are uncertain. Even thermal destruction in soil burners may be problematic due to the potential formation of byproducts. Laboratory-scale thermal treatment studies using PFAS-impacted solids at temperatures between 350 and 400°C have shown great promise; all 28 targeted PFAS compounds were effectively removed to near non-detect concentrations. This finding is consistent between studies performed by the TRS Group, Jacobs Engineering, and Kruger. To date, no field-scale demonstrations of thermal treatment of PFAS-impacted soils have been completed. Eielson AFB in Alaska has approximately 150,000 cubic yards of PFAS-laden soils stored in 52 above-grade piles. With funding from ESTCP, a small pile was treated on site in 2021. Activities included:

- Laboratory soil heating studies – including experiments designed to look for non-targeted compounds and potential by-products formed during heating
- Field demonstration of thermal treatment of one stockpile using 48 heaters and nine soil vapor extraction wells; a three-month-long operation which brought the soil to temperatures above 350°C
- Extraction of vapors and on-site treatment using cooling, condensation, and granular activated carbon
- Soil sampling and determination of PFAS concentrations before and after treatment To our knowledge, this is the first field-scale PFAS soil thermal treatment demonstration that focuses on providing a detailed understanding of the process. The detailed sampling and analysis demonstrated PFAS reductions and served to identify the fate of precursors and by-products. As part of the off-gas sampling effort, the new U.S. EPA OTM-45 vapor sampling method was deployed. The presentation will focus on lessons learned, PFAS behavior and fate, and considerations for scaling up the process to treat large volumes of PFAS-laden soil piles.

Bio:

B.S. Geology 20 years at TRS Group, Inc. Technical Sales

Dung "Zoom" Nguyen



Presentation Title:

Low-Cost, Passive In Situ Treatment of PFAS-Impacted Groundwater Using Foam Fractionation in an Air Sparge Trench

Dung "Zoom" Nguyen, Chemical and Environmental Engineer, CDM Smith, Inc.

Abstract:

Passive and in situ PFAS treatment approaches have yet to be demonstrated at the field-scale settings. Currently available ex situ treatment approaches involving groundwater extraction and conventional sorption-based treatment of the extracted groundwater are generally inadequate in removing residual PFAS from AFFF-impacted groundwater, require extensive above- and under-ground infrastructure, and generate a large volume of PFAS-impacted waste that also requires disposal or treatment. Our proposed approach employs the use of a conventional air sparge trench to intercept a shallow PFAS contaminated groundwater plume, which is often observed emanating from former fire training areas that employed the use of AFFF. For PFAS, the sparging bubbles provide a high air-water interfacial area that facilitates "stripping" of the surface-active PFAS from the groundwater. This sparging process results in formation of a foam on the water surface, which can be subsequently removed via a vacuum and/or skimming system, resulting in orders of magnitude decreases in bulk groundwater PFAS concentrations. This PFAS removal process has been well demonstrated, including in an ex situ field-scale foam fractionation system. Typical PFAS concentration factors are typically in the range of 1-L of reconstituted foam to 5000-L of groundwater. This low volume, high concentration recovered PFAS waste can then be treated via conventional high temperature incineration, or treated via promising technologies such as electrochemical oxidation (ECO) and enhanced contact plasma (ECP). The proposed treatment approach has the potential to treat PFAS-impacted groundwater in situ, passively, and economically with very little energy consumption, waste generation, and little to no chemical additives. With proper optimization, it is foreseeable that the proposed approach can be scaled up and implemented at multiple DoD installations at a fraction of the life-cycle cost of conventional ex situ treatment and including onsite PFAS destruction in the very near future.

Bio:

Zoom Nguyen is a chemical and environmental engineer from the CDM Smith Bellevue, Washington office with 13 years of experience in bench-, pilot-, and full-scale design and implementation of in situ and ex situ soil and groundwater treatment systems. Zoom also serves as the manager of CDM Smith's Research and Testing Laboratory where he leads design support treatability studies and innovative research and development work on fate and transport, and treatment of traditional and emerging contaminants including PFAS. He has served as the principal investigator or the co-principal investigator for a number of SERDP and ESTCP projects.

Paul B. Hatzinger



Presentation Title:

In Situ Treatment of PFAS Using Colloidal Activated Carbon

Dr. Paul B. Hatzinger, Ph.D., Director, Biotechnology Development and Applications Group, Aptim

Abstract:

There are currently no proven in situ technologies to destroy PFAS in groundwater aquifers, but in situ amendments designed to adsorb and sequester PFAS are increasingly being evaluated in the laboratory and field tests. One of the most promising amendments is colloidal activated carbon (CAC). There are a number of important questions concerning CAC application for PFAS, including (1) distribution in aquifers; (2) general effectiveness on different molecular structures comprising PFAS; and (3) long-term adsorption capacity and potential for re-release of PFAS to groundwater. We are currently conducting a field demonstration at a PFAS-contaminated site in Virginia with the objective of answering many of these questions. This demonstration includes site assessment, laboratory column studies, CAC injection and distribution testing, and long-term monitoring of effectiveness. During this presentation, the fundamentals of CAC as a remediation approach for PFAS will be discussed, as will the current results from the Virginia field test as well as other studies of PFAS remediation using CAC.

Bio:

Dr. Paul Hatzinger is the Director of the Technology Development and Applications Group at APTIM. He holds a PhD from Cornell University and has more than 25 years of experience in contaminant remediation and forensics. His research group has been instrumental in the development and field application of new remedial approaches for several emerging contaminants and currently has several DoD-funded projects assessing PFAS fate and remediation. He has authored more than 90 peer-reviewed papers and book chapters.

Paul Ruehl



Presentation Title

PFAS Encapsulation in Soil and Leachate

Paul Ruehl, US Environmental Remediation Coordinator, Holcim (US)

Abstract

This presentation updates my previous presentation with more data from more sites. It describes the state-of-practice, and demonstrates typical results of the successful use of cement products for solidification/stabilization (S/S) of landfill leachate concentrate (concentrate). A typical landfill might have 10,000-100,000 gallons or more of leachate to manage. As much as one third of the operating costs at a landfill is the management of leachate. The concentrated leachate will nearly always have PFAS in significant amounts. LafargeHolcim has patented a method for encapsulating PFAS from the concentrate, dramatically reducing the availability of PFAS to the environment. Typical analytical results indicate two to five orders of magnitude reduction between the concentration of PFAS in the concentrate and the extraction fluid. The method describes how PFAS is encapsulated in an inorganic matrix formed by mixing the contaminated concentrate with a mineral binder. The slurried concentrate can be sprayed onto the landfill working face shortly after it has been treated. In this fashion, the landfill can increase its capacity and extend its useful life by using the treated leachate as an Alternate Daily Cover instead of the usual six inches of "free" dirt from onsite. This increased capacity can significantly offset the price of the binder and provide a permanent solution to recapturing PFAS contaminated leachate each day. This method eliminates off-site disposal costs for leachate and the need to recirculate leachate into the landfill. This process eliminates the endless cycle of PFAS from landfill to POTW and back again. This constitutes 100% resource recovery.

Bio

Paul Ruehl- Environmental Remediation Coordinator for LafargeHolcim BS- Chemistry Alma College 1977 MS- Chemistry University of Detroit 1985 Paul has 42 years as an environmental professional, 38 years in the cement industry; and 30 years as an adjunct university chemistry professor. He has been involved with solidification/stabilization (S/S) of contaminated sites in the US for more than 37 years. He presently works for LafargeHolcim Cement with responsibility throughout North America for the management of S/S projects. Paul has been involved with remediating more than 500 sites using cement products.

PFAS Legal Issues

Moderator: **Frank Hearne**, Esq., Chairman: Environmental Practice Group, Mechanik Nuccio Hearne & Wester, P. A.

Panelists:

Howard Nelson, Esq., Partner, Bilzin Sumberg Baena Price & Axelrod, LLP

Robyn D. Neely, Esq., Partner, Akerman, LLP

Ron Noble, Esq., Shareholder, Buchanan Ingersoll & Rooney PC

Michael R. Goldstein, Esq., Managing Shareholder, The Goldstein Environmental Law Firm, P.A

Laurel Lockett, Esq., Shareholder, Carlton Fields, P.A.

Ralph Demeo, Esq., Shareholder, Guilday Law

Panel Description:

Leading environmental lawyers will discuss key legal issues revolving around PFAS including recent legislation, enforcement, litigation, transactional due diligence and other topics.

Moderator



Frank Hearne, Esq

Frank Hearne, Esq., Chairman: Environmental Practice Group, Mechanik Nuccio Hearne & Wester, P. A.

Bio:

Frank L. Hearne is a shareholder in the firm of Mechanik Nuccio Hearne & Wester, P.A., in Tampa, Florida where he practices exclusively environmental law. In addition to his legal credentials, Mr. Hearne holds an undergraduate degree in engineering focused on water resources and a master's degree in zoology focused on aquatic and estuarine ecology. Mr. Hearne's engineering and scientific training enables him to better comprehend the many technical aspects of his work such as geohydrology, assessment and remediation strategies, complex organic chemistry and other topics. A substantial portion of his legal practice of almost 40 years has been to advise public and private clients involving contaminated sites including cleanup programs in Florida and other states, federal Superfund sites, Brownfield designation and financial benefits, Brownfield Site Rehabilitation Agreements, site assessment, remedial action, risk assessment and monitoring, Site Rehabilitation Completion Orders, restrictive covenants implementing institutional and engineering controls, negotiation of environmental insurance coverage and assertion and collection of environmental insurance claims.

His experience also includes many types of properties such as former and permitted landfill sites, golf courses, industrial facilities, petroleum production and refining facilities, mines, dry cleaning and underground tank sites, automobile dealerships, rental car sites, wood treating sites, waste and wastewater treatment plants and many others which can be discussed in detail upon request. Representative recent sites include redevelopment of a large ground transportation site on a permitted landfill in Pinellas County, a manufactured gas plant and adjacent property in Tampa, the Delaney Creek Brownfield Redevelopment Area at a former battery recycling site, the "Pink Palace" Hotel in Bradenton, the Jacksonville Raceway site, the Former Wellcraft Boat Manufacturing Facility in Sarasota, the Tampa IKEA Store and the Avion Project consisting of several hotels and office buildings near the Tampa airport. He has extensive experience in all the major federal and state environmental regulatory programs including rule making, permitting and enforcement defense.

Over many years, he has been repeatedly named to several independent lists of outstanding environmental lawyers in the state and nation including, *The Best Lawyers in America* and *Florida "Super Lawyers."* Mr. Hearne is a member of the Florida Bar Environmental and Land Use Section, the Florida Bar Real Property, Probate and Trust Law Section and is on the Board of Directors of the Florida Brownfields Association. Personal and professional references are available upon request.

Panelists



Howard Nelson, Esq.

Howard Nelson, Esq., Partner, Bilzin Sumberg Baena Price & Axelrod, LLP

Bio:

Howard has more than 25 years of experience in environmental law and land development. He represents clients throughout all phases of the development process from site location through permitting and construction, as well as in permit appeals and defense of environmental enforcement matters. Howard represents several national homebuilders throughout Florida and the eastern United States in pre-acquisition site analysis and post-acquisition remediation. He works closely with a network of environmental professionals, including engineers and planners. He also represents a variety of other types of businesses in contamination assessment and remediation. Howard has extensive experience representing clients in complex wetland matters, including issues related to protected and sensitive wetlands, preservation efforts and enforcement defense.



Robyn D. Neely, Esq.

Robyn D. Neely, Esq., Partner, Chair, Environment and Natural Resources Practice, Akerman, LLP

Bio:

Robyn Neely focuses her practice on environmental site contamination issues related to real estate and corporate sales and acquisitions, and leases, including pre-acquisition, pre-leasing and pre-foreclosure due diligence analysis. Her practice also includes managing the investigation and remediation of contaminated properties and brownfield redevelopment including innovative solutions to risk management with risk based corrective actions. Her clients include private equity firms, homebuilders, residential apartment developers, hotels and resorts, lenders, international manufacturers, cell tower developers and service providers, municipal governments, and REITs throughout the United States.

Robyn's comprehensive environmental experience includes the assessment and remediation of sites impacted by arsenic, petroleum, chlorinated solvents, chlorinated pesticides, PCBs, asbestos, and radon, and involves risk-based closures and other alternative strategies for site closure, as well as environmental compliance matters including defense of enforcement actions under CERCLA, RCRA and state environmental laws. Her experience also has included industrial wastewater, air quality, landfills and hazardous waste. In consultation with engineers, geologists, and other technical experts, she assists with environmental due diligence, compliance and risk assessments and develops practical and cost-effective strategies to address existing contamination, or environmental violations.

Robyn is consistently recognized by legal publications, including *Chambers USA* and *Best Lawyers of America*, which named her a Lawyer of the Year for Environmental Law.



Ron Noble, Esq.

Ron Noble, Esq., Shareholder, Buchanan Ingersoll & Rooney PC

Bio:

Ron H. Noble represents clients in all areas of environmental due diligence, permitting and regulatory compliance. Other practice areas he has experience in include hazardous and solid waste regulation, wastewater treatment enforcement and permitting, environmental representation for land use and zoning matters, petroleum storage systems and negotiation of consent orders and related environmental enforcement actions with local agencies, DEP, EPA and the Department of Justice.

His representations include coordination with the full spectrum of local, state and federal regulatory agencies. Additional areas include representation of potentially responsible parties identified by EPA under CERCLA, environmental due diligence for real property acquisitions and advise clients with respect to regulatory compliance in the following areas: Clean Water Act (CWA), Superfund (CERCLA), RCRA (Resource Conservation and Recovery Act), Underground storage tanks, Asbestos and PCBs.

Ron has garnered an AV® Preeminent distinction, the highest available mark for professional excellence from Martindale-Hubbell's Peer Review Ratings. He is listed as a leading Environmental lawyer in *Florida by Chambers USA®*, has been consecutively named to The *Best Lawyers in America®* list since 2008 and named to the Florida *Super Lawyers* list each year since 2006.



Michael R. Goldstein, Esq

Michael R. Goldstein, Esq., Managing Shareholder, The Goldstein Environmental Law Firm, P.A

Bio:

Michael R. Goldstein, Managing Shareholder of The Goldstein Environmental Law Firm, P.A., and a Martindale-Hubbell AV Preeminent and Chambers and Partners rated attorney, practices exclusively in the areas of environmental law and environmental redevelopment for a broad range of clients, including retail, residential, and industrial developers, public and private companies, real estate funds, lenders, and local governments. A major aspect of Mr. Goldstein's environmental legal practice involves support of real estate and business transactions, including managing pre-acquisition and pre-leasing due diligence investigations; structuring, negotiating, and drafting environmental provisions in purchase, lease, and development agreements; and assisting lenders evaluate and limit the risk of exposure to environmental liability in connection with new loans and potential foreclosures. In addition, he works closely and extensively with real estate development principals and engineering, planning, and design professionals to help coordinate federal, state and local regulatory approvals for complex retail, industrial, residential, mixed use, and marina related projects throughout the State of Florida.

Mr. Goldstein's practice has a heavy emphasis on the remediation, financing, and beneficial reuse of contaminated sites and involves a broad array of Brownfields related transactional, administrative, regulatory, legal, legislative, and policy work for clients in both the private and public sectors. He has developed a national reputation as one of the leading and most innovative Brownfields practitioners in Florida, working on important and precedent establishing projects as well as heading up or participating in numerous local, regional, state, and federal environmental restoration initiatives. On a statewide level, Mr. Goldstein was the founding Chairman of the Florida Brownfields Association and served as its Chairman and/or President for the first five years of the organization's existence. Mr. Goldstein's tenure as Chairman and President was distinguished by his commitment to elevating environmental justice and public health as critical areas of emphasis for business, community, regulatory agency, and local government stakeholders. In 1996, the Miami-Dade County Commission appointed him Chairman of the Miami-Dade County Brownfields Task Force, a post that he held until the committee's business was completed in 2004. In January 2006, Mr. Goldstein was appointed to serve on the Advisory Board of the Bureau of National Affairs' highly respected Environmental Due Diligence Guide, which serves as a national reporting, editorial, and opinion forum for environmental transactions and related Brownfields and policy matters. In 2008, he founded and funded the Goldstein Brownfields Foundation, which is dedicated to empowering economically and health disadvantaged individuals and communities with scholarships, programming, and resources to restore polluted land, revitalize neighborhoods, and protect public health. The Goldstein Brownfields Foundation also focuses on increasing the ethnic and gender diversity of lawyers working in the environmental arena through academic scholarships, educational and career programming, and professional mentoring. In 2009, Mr. Goldstein was appointed to the Executive Committee of the National Brownfields Coalition, an affiliation of private and public sector stakeholders working in the U.S. Congress to advocate for improvements in environmental redevelopment policy and legislation.



Laurel Lockett, Esq.

Laurel Lockett, Esq., Shareholder, Carlton Fields

Bio:

Laurel Lockett practices in the areas of environmental law and commercial real estate. She has substantial experience with cleanup, purchase, sale and redevelopment of brownfields and other contaminated sites, including manuscripting of environmental insurance policies and other creative solutions to risk management, including risk based corrective action and alternative closure strategies. She also has substantial experience with industrial and domestic wastewater, storage tank regulation, landfill, used oil, hazardous waste, and air permitting and regulation. In addition her experience extends to the resolution of environmental enforcement matters, negotiation of prospective purchaser agreements, consent orders, remediation plans and terms of conditional closure associated with the cleanup of hazardous waste, petroleum, chlorinated solvents, and other contaminants with local, state, and federal environmental agencies, redevelopment of those sites and other environmental aspects of real estate and commercial transactions, including asbestos and indoor air quality issues, vapor intrusion, and lead based paint.



Ralph Demeo, Esq.

Ralph Demeo, Esq., Shareholder, Guilday Law

Bio:

Mr. Demeo is a Shareholder with Guilday Law, located in its Tallahassee office. He has been practicing environmental law for 37 years. Mr. Demeo is also an Adjunct Professor of Law at FSU college of law, and is a frequent author and lecturer. He represents multiple clients, public and private, in the PFOS area, and has 3 cases pending in the PFOS Multi District Litigation.

Jorge Caspary, P.G.



Jorge Caspary, P.G.

Principal, Cameron Cole

Bio:

- Twenty-five years of experience in technical and management decisions in the areas of environmental assessment and site cleanup, solid and hazardous waste management, RCRA/CERCLA program and policies, brownfields redevelopment, and contaminated property reuse strategies.
- A Principal at Cameron-Cole and former Vice President of WSource Source Group. Currently involved in technical and State-level policy and legislative discussions regarding PFAS as well as providing expert assistance to plaintiffs in PFAS litigation, airports, ports, and law firms. Was involved in the development and implementation of new environmental policy, rules, and guidance as the former Director of the Division of Waste Management within the Florida Department of Environmental Protection; has consulted and provided strategic direction and technical support on complex closures of contaminated properties and has also engaged with other states and EPA regional and headquarters regulators.
- Registered Professional Geologist: Florida; B.S. Civil Engineering, Florida State University, Tallahassee, Florida; B.S. in Geology, University of Florida, Gainesville, Florida.

Blaine Dawson, P.G.



Presentation Title:

My Site has PFAS! Time to Go Back to the Drawing Board

Blaine Dawson, P.G., Project Geologist, Geosyntec Consultants

Abstract:

When evaluating sites for emerging contaminants after historical assessment and remediation activities have been completed, it is important to take a step back and update the conceptual site model (CSM). This presentation will highlight how current PFAS site assessment data can be inconsistent with previous CSMs for a site and will demonstrate the need for thorough record reviews and consideration of additional tools such as forensics to support the identification of potential source(s) of PFAS.

Bio:

Blaine has been involved in a variety of field activities to assess contaminant impacts to groundwater, surface water, soil, sediment, and soil air gas throughout Florida and Southern Georgia. Blaine has experience in CSM development via lithologic characterization, multimedia sampling, aquifer testing, and pilot testing. Blaine has completed numerous site assessments and remedial implementations in accordance with 62-780, F.A.C., including multiple PFAS-affected sites.

McLane Evans



Presentation Title:

A Case Study on Implementing PFAS Remediation Strategy in the Absence of Regulation

McLane Evans, Assistant City Attorney, City of Tampa

Abstract:

This presentation will provide a case study on how the City of Tampa is pro-actively assessing the extent of PFAS contamination and strategizing remediation measures at its Fire Training Facility in the absence of any formal regulatory standards or guidance on PFAS.

Bio:

McLane Evans is an Assistant City Attorney for the City of Tampa and represents the City in legal matters pertaining to solid waste, environmental programs, water, stormwater, wastewater, and sustainability and resiliency. Prior to becoming an attorney, Ms. Evans had a successful career as an environmental consultant specializing in project management, strategic planning, and technical permitting efforts for complex, large-scale land and water resource projects.

Chad Northington, P.E.



Presentation Title:

Full-spectrum Solutions for the Subsurface Management of PFAS Pollution

Chad Northington, P.E., Southeast District Manager, REGENESIS

Abstract:

This presentation will explain the process through which CAC can be used to treat PFAS contamination and will examine the different application approaches, both individually and when combined. Laboratory data will demonstrate sorption efficacy in groundwater and reduced leachability from soils. Practical application and validation data will be shown from real-world case studies. This presentation will be of interest to practitioners, site managers and regulators interested in how to comprehensively manage PFAS contamination, from highly contaminated source areas to low concentration distal plumes or direct protection of sensitive receptors.

Bio:

Mr. Northington is a professional engineer with over twenty years of experience in the environmental field in the areas of site investigation, remediation system engineering and construction, project management and technical assistance. He received both his undergraduate and graduate degrees in environmental engineering from Michigan Technological University. Mr. Northington currently serves as the Southeast District Manager with Regenesys. In this capacity, he provides technical support for application of soil and groundwater remediation solutions. Mr. Northington works directly with environmental consulting, construction, and engineering firms to develop turnkey remedial approaches for in situ-applied strategies across a broad spectrum of technology classes.

Dung "Zoom" Nguyen



Presentation Title:

PFAS Leaching from AFFF-Impacted Source Areas

Dung "Zoom" Nguyen, Chemical and Environmental Engineer, CDM Smith, Inc.

Abstracts:

This study couples bench-scale results from batch desorption experiments with laboratory measurement techniques for quantifying PFAS uptake at air-water interfaces to describe and predict PFAS porewater concentration measured using field-deployed lysimeters within an historically impacted AFFF source area. Overall findings show that rate-limited desorption from soils and sorption at air-water interfaces impact the mass discharge of PFAS to underlying groundwater in AFFF source areas, and that conventional methods for developing soil clean-up criteria for PFAS may be inappropriate.

Bio:

Zoom Nguyen is a chemical and environmental engineer from the CDM Smith Bellevue, Washington office with 13 years of experience in bench-, pilot-, and full-scale design and implementation of in situ and ex situ soil and groundwater treatment systems. Zoom also serves as the manager of CDM Smith's Research and Testing Laboratory where he leads design support treatability studies and innovative research and development work on fate and transport, and treatment of traditional and emerging contaminants including PFAS. He has served as the principal investigator or the co-principal investigator for a number of SERDP and ESTCP projects.

Joseph L. Applegate, P.G.



Joseph L. Applegate, P.G., Sr. Principal Hydrogeologist Geosyntec Consultants

Bio:

Joe Applegate is a Sr. Principal Hydrogeologist in the Tallahassee, FL office and has 35 years of experience and has managed multiple USEPA CERCLA, RCRA, and FDEP environmental contracts and programs and has managed federal, state, and industrial sites including petroleum, dry-cleaning facilities, chemical manufacturers, fire training facilities, landfills, former MGPs, and pesticide manufacturers and applicators.

Joe is a recognized regulatory expert with extensive knowledge of federal and state environmental rules, regulations, and permitting processes allow him to meet the clients and regulatory community needs quickly and efficiently. Joe has managed numerous State of Florida Superfund, State Hazardous, Drycleaning Solvent, State Owned Lands and Site Investigation, Brownfields, Petroleum, and Former Manufactured Gas Plants. He has managed multiple conditional closure projects and developed RC packages for private client projects as well as for the FDEP. He has also managed projects with emerging contaminants, including 1,4 Dioxane and PFAS. He has presented at multiple conferences in Florida on industrial uses of these compounds, physicochemical properties, fate and transport of PFAS in soil and groundwater, as well as general assessment and remedial approaches.

Viraj deSilva, PE



Presentation Title:

PFAS Treatment and Remediation - What's New in Destruction

Dr. Viraj deSilva, PE, BCEE, Senior Treatment Process Engineer and PFAS Expert, Freese & Nichols, Inc.

Abstract:

After clearing the hurdles of identifying and removing PFAS, water and wastewater utilities must then figure out what to do with it. Removal of PFAS is a widespread challenge because public-owned treatment works are refusing to accept PFAS sources for example from industries and landfills. A case study will examine PFOA and PFOS leachate data from 4 landfills in North Carolina and how one landfill is currently removing and managing these contaminants. EPA is currently considering multiple disposal techniques, including incineration of PFAS materials, thermal treatment of PFAS in biosolids and managing PFAS in landfill leachate. If PFAS waste can be broken down at high temperatures with less harmful compounds, this may be one way to manage PFAS when options such as GAC, IX, or RO only do separation and ending up with concentrated product with original PFAS content. This presentation will provide an overview of ongoing PFAS destruction research funded by USEPA and progress on each technology, along with expected destruction efficiencies and timeline for completion and producing commercially available systems. Most these projects are in the final stages with some promising results. The presentation will cover technologies such as electrochemical oxidation, mechanochemical degradation, pyrolysis/gasification, and supercritical water oxidation. Learning Objectives: Options for PFAS destruction technologies that are under development through EPA-funded research.

Bio:

Dr. deSilva has more than 29 years of experience on water and wastewater treatment projects across the U.S. and 12 other countries, including PFAS management and treatment projects in five states working with airports, landfills, and other contaminated sites. He has been published in or presented at over 170 industry journals and conferences; authored EPA, WEF, ASCE and AWWA manuals of practice; and his recent PFAS work is cited in AWWA and EPA publications. Dr. deSilva currently serves on the WEF PFAS Task Force and works closely with the national EPA Council on PFAS and state agencies for development of the new PFAS regulations. Dr. deSilva's AWWA's paper Managing and treating PFAS in membrane concentrates has been selected as the 2021 AWWA Membrane Treatment Best Paper AWARD.

Seth Kellogg, P.G.



Presentation Title:

Understanding and Managing PFAS Risks and Liabilities

Seth Kellogg, P.G., Principal, Geosyntec Consultants, Inc.

Abstract:

This presentation will discuss tools and strategies for evaluating PFAS usage, transitioning away from PFAS-based products, reducing and managing potential liabilities, and separating site-specific impacts from more generalized anthropogenic “background”.

Bio:

Seth Kellogg, PG is a Principal with Geosyntec Consultants, Inc. Ms. Kellogg has 25 years of experience investigating and remediating sites in New York and New Jersey. Ms. Kellogg supports industrial, petroleum, aviation and water supply clients in managing, characterizing and remediating their PFAS liabilities. She has become an industry leader in evaluating and managing PFAS including co-authoring the first PFAS best practices guidance (NGWA 2018), educating industry professionals on the unique challenges of characterizing and remediating PFAS and briefing Congress on the state of PFAS science and policy. Additional areas of technical expertise include chlorinated solvents and DNAPL in groundwater, aqueous geochemistry, contaminated sediments and mercury speciation.

Paul Newman



Presentation Title:

Centralized Ion-Exchange Regeneration Strategy to Reduce Life-cycle Costs and Long-term Liability from PFAS Remediation Waste

Paul Newman, Department of Defense Market Sector Leader, ECT2

Abstract:

The presentation will provide an overview of regenerable ion exchange resin regeneration technology, and how implementation of such can minimize waste, generate lifecycle cost savings, and possibly be paired with a PFAS destruction technology to drastically reduce or even eliminate off-site waste disposal. An overview of a pilot study at Wright-Patterson AFB, in which a destruction technology was paired with regenerable resin IX.

Bio:

Paul Newman is the Department of Defense Market Sector Leader for ECT2 (Emerging Compounds Treatment Technologies). ECT2 is an equipment company focused on developing and commercializing treatment technologies for emerging, difficult-to-treat contaminants. Paul's focus is currently on commercializing Synthetic Media technologies for the sustainable treatment of PFAS and 1,4-dioxane.

Dr. Tamzen W. Macbeth



Presentation Title:

Advances in High-Resolution Site Characterization Technologies and Applications for PFAS

Dr. Tamzen W. Macbeth, Ph.D, PE, BCEE, Senior Vice President and Remediation Practice Leader, CDM Smith, Inc.

Abstract:

Complex contaminated soil, sediment and groundwater sites are difficult to restore and require robust conceptual site models (CSMs) that represent site complexity with sufficient detail and at appropriate scales to support more effective remedy decision-making. AFCEC published a guidance document and tools selection table on over 60 high resolution site characterization tools (HRSCs) to support improved CSMs and decision-making throughout a remedy life cycle. The 60 HRSC technologies were compiled and grouped according to the types of data they generate including physical (i.e., geology hydrology), chemical (i.e., phase, composition and properties of contaminant, biogeochemical aquifer properties), and attenuation (i.e., sorption, biotic and abiotic degradation). The HRSC technologies were also grouped based on the information they provided, i.e., screening level (e.g., geophysics tools or membrane interface probe), semi-quantitative (e.g., cross- hole tomography), and quantitative (e.g., flux meters or porewater rock coring evaluation). PFAS characterization requires a unique understanding of both the characteristics of these chemicals and the physical, chemical, biogeochemical and attenuation properties of the environment. In this presentation we will focus on how to use high-resolution tools to support evaluations of PFAS leaching from vadose zones in soil and sediment to groundwater. Our current state of science has elucidated critical parameters to understand sorption and desorption properties (particularly with respect to the air-water interfacial sorption which is unique to PFAS compared to other contaminants), partitioning in co-contaminants such as petroleum hydrocarbon light nonaqueous phase liquids (LNAPL) or chlorinated solvent dense nonaqueous phase liquids (DNAPL), partitioning into percolating porewater and the role of PFAS precursors as future sources of toxic PFAAs. We will discuss the tools and methods which can fill these data gaps to develop a better CSM to quantify PFAS leaching for remedial decision-making.

Bio:

Dr. Tamzen Macbeth is Senior Vice President and Remediation Practice Leader for CDM Smith with over 20 years of experience in cleanup of hazardous waste contaminated sites. Her work leverages her interdisciplinary academic and research background in microbiology and engineering to advance remediation technologies to clean up non-aqueous phase liquids (NAPLs), dissolved organic, inorganic, radioactive chemicals and emerging contaminants, such as PFAS, under a variety of regulatory programs. She has served as principal investigator, manager and/or technical lead and advisor for government, private and international contaminated sites undergoing characterization, design, and remediation at the laboratory-scale, pilot-scale and full-scale. Dr. Macbeth has published more than 100 technical papers, presentations, training manuals and guidance documents on remediation topics, and seminars and short courses for the ITRC, USACE, Navy RITS, and been an invited speaker at international conferences and symposia on remedial technology application for cost-effective cleanup. She is also an affiliate faculty member at Idaho State University.

Michael J. Deliz, P.G.



Michael J. Deliz, P.G.

Restoration Program Manager, NASA Headquarters, Environmental Management Division

Bio:

Mike has 38 years of professional geological experience and recently joined NASA Headquarters Environmental Management Division, where he became the agency's Restoration Program Manager. He is overseeing the investigation and cleanup efforts at all NASA Centers and Component Facilities, following 21 plus years at Kennedy Space Center as the Technical Lead and a Remediation Project Manager. Prior to that, he was a Remedial Project Manager with the Florida Department of Environmental Protection and an Exploration Geologist in the oil and gas industry. Mike resides in Merritt Island with his wife and two golden retrievers and is the proud father of two Florida State Seminoles.

Paul Newman



Presentation Title:

Destructive Technologies Overview for Complete PFAS Destruction

Paul Newman, Department of Defense Market Sector Leader, ECT2

Abstract:

To move beyond just sequestering per and polyfluoroalkyl substances (PFAS) many groups are looking to find methods to completely break down the carbon fluorine bond and achieve mineralization of PFAS compounds. ECT2 has developed technologies that concentrate PFAS to help make these technologies feasible. Due to this involvement in many different destructive technology pilots, this will be a unique overview on many of the destruction options that are promising. This presentation will give an overview of what some of these technologies are, how they work, and their technology maturity. The following technologies will be highlighted: Plasma, Thermal, Electrochemical Oxidation, Electron Beam, Advanced Oxidation, Supercritical Water Oxidation, Hydrothermal Alkaline Treatment, Sonolysis, UV-sulfite, Zero-Valent Iron, Alkali Metal Reduction, and Biodegradation. Data and time will be focused on two promising technologies; Plasma and Electrochemical Oxidation.

Bio:

Paul Newman is the Department of Defense Market Sector Leader for ECT2 (Emerging Compounds Treatment Technologies). ECT2 is an equipment company focused on developing and commercializing treatment technologies for emerging, difficult-to-treat contaminants. Paul's focus is currently on commercializing Synthetic Media technologies for the sustainable treatment of PFAS and 1,4-dioxane.

Thomas L. Maher, Jr., P.G.



Presentation Title:

Airport and Landfill Leachate PFAS Adsorption, Fixation, and Destruction

Thomas L. Maher, Jr., P.G., Vice President Corporate Environmental Engineering and Sciences
Practice Lead, Civil & Environmental Consultants, Inc.

Abstract:

This presentation discusses approaches for both airport PFAS contamination and landfill leachate options, including risks and liabilities associated with storage and disposal of AFFF, contaminated soil and stormwater, construction debris, as well as landfill leachate and other PFAS-containing materials. Focus will be on current and prospective treatment technologies.

Bio:

Mr. Maher is the Corporate Environmental Practice Lead, co-founder/lead of the Technical Advisory Group (TAG) and a PFAS subject matter expert for PFAS for Civil & Environmental Consultants, Inc. (CEC) in Pittsburgh, PA. As the TAG lead, Mr. Maher coordinates the activities of the Emerging Contaminants, Vapor Intrusion, and Advanced Site Investigation & Remediation Subgroups. He has a BS in Geology from the University of Pittsburgh and is a PG in several states. Mr. Maher has over 35 years' experience performing a diverse range of environmental projects including complex site investigations and remediation under Superfund/CERCLA, RCRA Corrective Action, TSCA, and various state programs. He serves as subject matter expert on CEC's PFAS related Due Diligence, Regulatory Negotiation, Site Investigation & Remediation, and Wastewater Treatment projects. Mr. Maher has managed and been the technical resource for the site characterization and remedial alternatives evaluations for PFAS releases due to application of AFFF Foam to extinguish fires and releases from industrial facilities including impacts to soil, groundwater, and surface water.

Nicholas Barnes, P.E.



Presentation Title:

Using Appropriate Conceptual Site Models and Phased Approaches in PFAS Investigations

Nicholas Barnes, P.E., Environmental Engineer, Verdantas

Abstract:

Information regarding the presence or use of PFAS in certain products and industries is readily available and there are known to be strong connections between PFAS sources and facilities such as airports, wastewater treatment plants, landfill facilities, and certain manufacturing or other PFAS-using industries. How do we know if other facilities have a potential unknown source of PFAS or if a site has been impacted by external sources? This presentation will explore unsuspected sources, providing a deeper dive into PFAS contribution from industries not directly affiliated with PFAS manufacturing or use. Case studies will be presented to provide a phased and detailed investigation approach to determine the specific conceptual site model for PFAS contamination at unsuspected sites and understand potential PFAS sources from historical or offsite sources.

Bio:

Nicholas Barnes, P.E., is an Environmental Engineer at Verdantas, with over 15 years of experience in the assessment and remediation of environmental contamination. He has extensive experience in the evaluation and selection of remedial action cleanup strategies for a range of contaminants and has led PFAS characterization activities at numerous waste cleanup sites.

George Naslas, PG, LSP



Presentation Title:

PFAS, Standards, Enforcement and Obligations

George Naslas, P.G., LSP, Vice President, Weston & Sampson

Abstract:

Massachusetts Enacted its MCLs in October 2020. Using a case study highlighting a non-traditional source of PFAS, we will illustrate obligations and the process that is required once PFAS becomes regulated. How MassDEP is regulating releases, detections in private wells and programs in place to provide help. Of interest to the audience is source of PFAS which was detected at a DPW yard in Eastern Massachusetts.

Bio:

George Naslas, PG, LSP, Vice President of Weston & Sampson, is a Massachusetts-Licensed Site Professional and New Hampshire, New York and Tennessee Professional Geologist. George has more than 35 years of professional experience and is the Practice Leader for Environmental Services. George leads Weston & Sampson's Emerging Contaminants workgroup which focusses on environmental, water supply, wastewater and product issues, such as toxicology associated with Emerging Contaminants. He has worked on 1,4-dioxane and PFAS projects in multiple states.

George has presented on environmental issues to the Harvard Graduate School of Design, University of Connecticut as well as at many conferences, including the 4th Sino American Land Engineering Conference in Xian, China in 2018. George holds a Master of Science degree in Hydrology/Hydrogeology from the University of Nevada, Reno and a Bachelor of Science in Geology from the Royal School of Mines, Imperial College of Science, Technology and Medicine at the University of London. George is also an active member of the Licensed Site Professional Association and other industry associations.

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February/March 2022

Volume 44, Number 1

A note to readers

I'm reminded of the famous quote by Heraclitus, "No man ever steps in the same river twice, for it's not the same river and he's not the same man." The Specifier will continue to focus on quality reporting and focus on providing practical information for the environmental professional. We have many new staff members, but we hope you continue to find the paper useful.

— John Waterman,
Publisher, Florida Specifier

Business profile

Gene Jones, the CEO of Southern Waste Information eXchange, Inc. or SWIX, is trying to change the way we think about and manage recycling and waste. SWIX was founded in 1981.

Fishing report

Capt. Sandy Bottoms enjoys his fishing outing with Capt. Tanner Plouffe of Panama Outfitters at Panama and the Apalachee Bay. It's a place stuck wonderfully in the past.

Departments

Federal File	2
Florida Notes	3
Water Watch	4

Have a story idea or lead?

Have an idea for a story? Would you like to submit a column for consideration? Please let us know. And don't forget to fill us in on your organization's new people, programs, new offices, project or technologies — anything of interest to environmental professionals working in Florida. Send to Florida Specifier, 2901 1st Ave. N., Suite 202, St. Petersburg, FL 33713.

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Groups conserve water in Weeki Wachee Springs

While boating strikes typically account for 20 percent of the previously

The Full Snow Moon

February's full Moon reaches peak illumination at 11:59 a.m. EST on Wednesday, Feb. 16, 2022. It's known as the Snow Moon due to the typically heavy snowfall that occurs in February. Other traditional Native American names for this Moon include the Eagle Moon (Crow), Raccoon Moon (Dakota), and Hungry Moon (Cherokee).



Courtesy of The U.S. Fish and Wildlife Service

The devastation of the manatee population in 2021 was so profound, it qualified as an Unusual Mortality Event under the Marine Mammal Protection Act.

Manatees starving, need help

Seagrass die-offs leave loveable sea cows in peril

By BLANCHE HARDY, PG

If you open the Florida Fish and Wildlife Conservation Commission's (FWC) 2021 Preliminary Manatee Mortality Report Table, you will find 32 pages of neatly typed tables containing the final records of 1,101 dead manatee, on average just slightly less than double the recorded manatee deaths in the past six years. At last count, early in 2019, roughly 5,700 manatees still are alive in Florida.

While boating strikes typically account for 20 percent of the previously

Did You Know?

Manatees are the only vegetarian marine animal.

recorded manatee deaths, not last year. In 2021, only about 10 percent of the 1,101 manatee deaths were boating related. Florida manatees are now at greater risk of starving to death in some areas. The gentle 1,000 pound sea cows are indigenous. They are as much a part of the Florida's persona as sunshine. The devastation of their population in 2021 was so profound, it qualified as an Unusual Mortality Event under the Marine Mammal Protection Act.

This represents roughly double the average number of deaths in years prior.

and it is the most deaths ever recorded in a year," said Patrick M. Rose, a CPM, aquatic biologist, and the executive director of the Save the Manatee Club. "More than half of these deaths occurred in the northern Indian River Lagoon due to starvation and malnutrition caused by seagrass die-offs attributable to nutrient pollution and associated harmful algal outbreaks. Tragically, we face another bleak winter as many of the manatees are starting the winter grossly malnourished with very little seagrass remaining anywhere near the warmwater outfall from the Cape Canaveral power plant."

Having exhausted attempts to have the necessary actions taken to protect the manatee, the Center for Biological Diversity, Defenders of Wildlife, and the

To MANATEES Page 16

le plan could help Indian River Lagoon

Did You Know?

Individual grant amounts prorated based on a city's modeled nitrogen loading. Homeowners are bused per pound of nitrogen up to the maximum

suits were calibrated with local groundwater concentration data.

Modeling showed nitrogen loading to the Indian River Lagoon (IRL) was highest from homes close to the lagoon, in sandy or rocky soils, and in low-elevation areas with a high groundwater table. These areas also had high soil hydraulic conductivity, meaning water can pass easily from septic drainfield to groundwater through porous sediment.

In Brevard, about 15,000 septic systems lay within 55 yards of the lagoon or connecting surface water. These systems load an estimated 408,863 pounds of total nitrogen to the lagoon each year. About 8,203 of these systems are in

To UPGRADE Study Page 5

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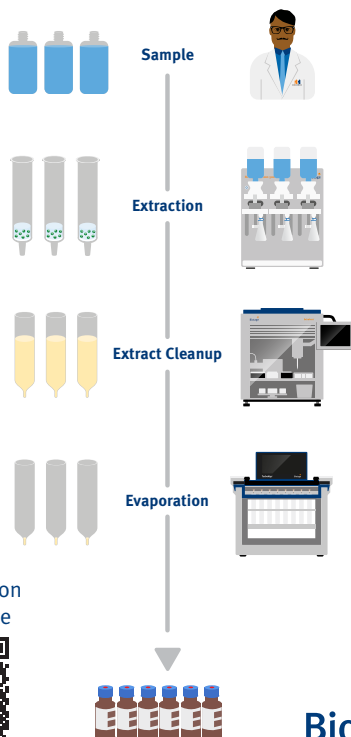
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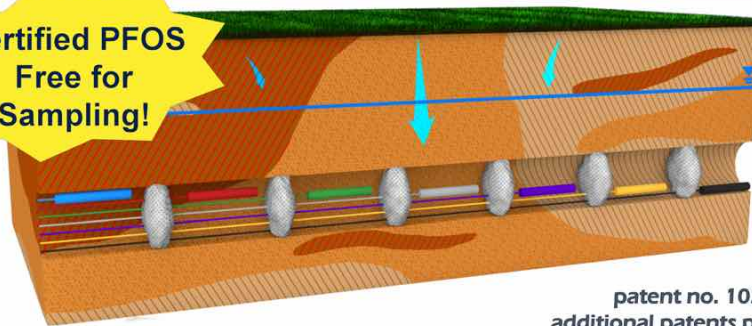


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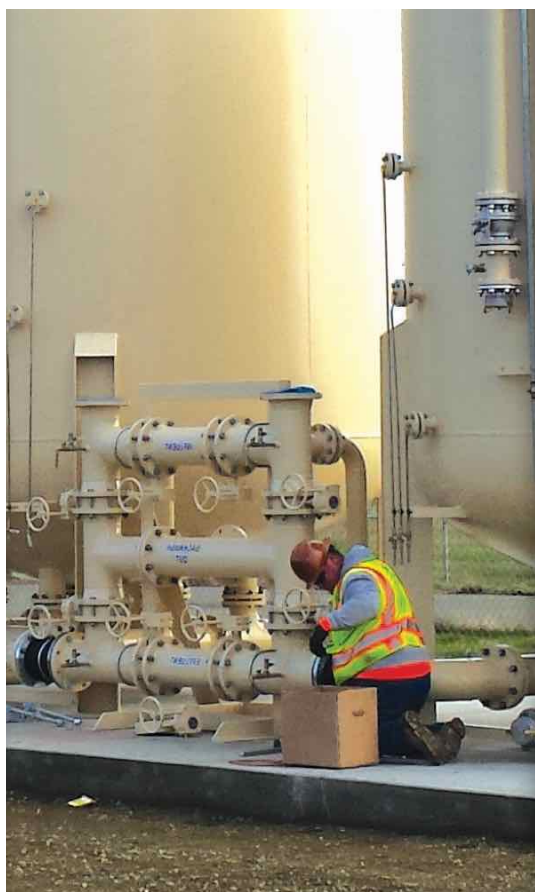
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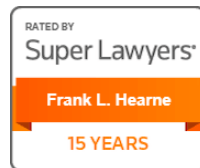
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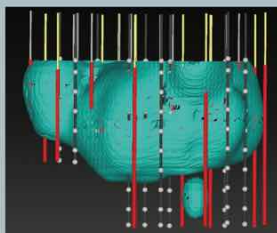


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