FLORIDA REMEDIATION CONFERENCE

The 29th Florida Remediation Conference

FRC 2024

Moderator & Speaker Compendium

November 4-6, 2024
Rosen Centre Hotel
Orlando, Florida

Organized by:

EICM
ENVIRONMENTAL INDUSTRY CONFERENCE MANAGEMENT, LLC

ENVIRONMENTAL UNIVERSITY

SWIX

FRC 2024 is Dedicated to Jim Clark

James W. Clark, III

Born February 3, 1952; Passed January 16, 2024

In 1982, Jim entered the environmental field as rules and regulations were being developed. He became a Certified Hazardous Materials Manager – CHMM in 1986 (#963) and participated in the cleanup of industrial facilities, military bases, and Superfund Sites.

In 1989, Jim, his wife Beth and their two young children moved to Brandon, FL in the Tampa Bay area. In 1991, Jim and Beth started Clark Environmental, Inc. in Mulberry, FL "Cleaning Earth One Ton at a Time". The business held numerous Florida Department of Environmental Protection permits handling non-hazardous and hazardous waste disposal, transportation, and remediation. Jim was the idea guy with the RCRA waste knowledge and had the outgoing personality needed to market the business. Jim and Beth successfully ran Clark Environmental for 31 years, selling in 2022 to EnviroServe.

His dedication to the remediation industry was resound and his support over the years for the FRC Charity Golf Tournament was unbelievable.

We will greatly miss "Captain Jim".

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FLORIDA REMEDIATION CONFERENCE

50/50 Raffle

FRC 50/50 Raffle

Retail Value ~ $1,200

Winner Can Select to Take Half the Pot in Cash or a Bottle of Old Rip VanWinkle!

Drawing to take place in the Exhibit Hall at 6:30 pm at the Tuesday Night Reception

In Honor of Jim Clark, Proceeds to Benefit:

One Ticket $5
Five Tickets for $20

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SUPPORTING ORGANIZATIONS:

Florida Brownfields Association

Florida Specifier

FSU

FAEP

INSTEP
International Society of Technical and Environmental Professionals

M4ME
Mothers for Mother Earth, Inc.

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Florida Remediation Conference
November 4-6, 2024
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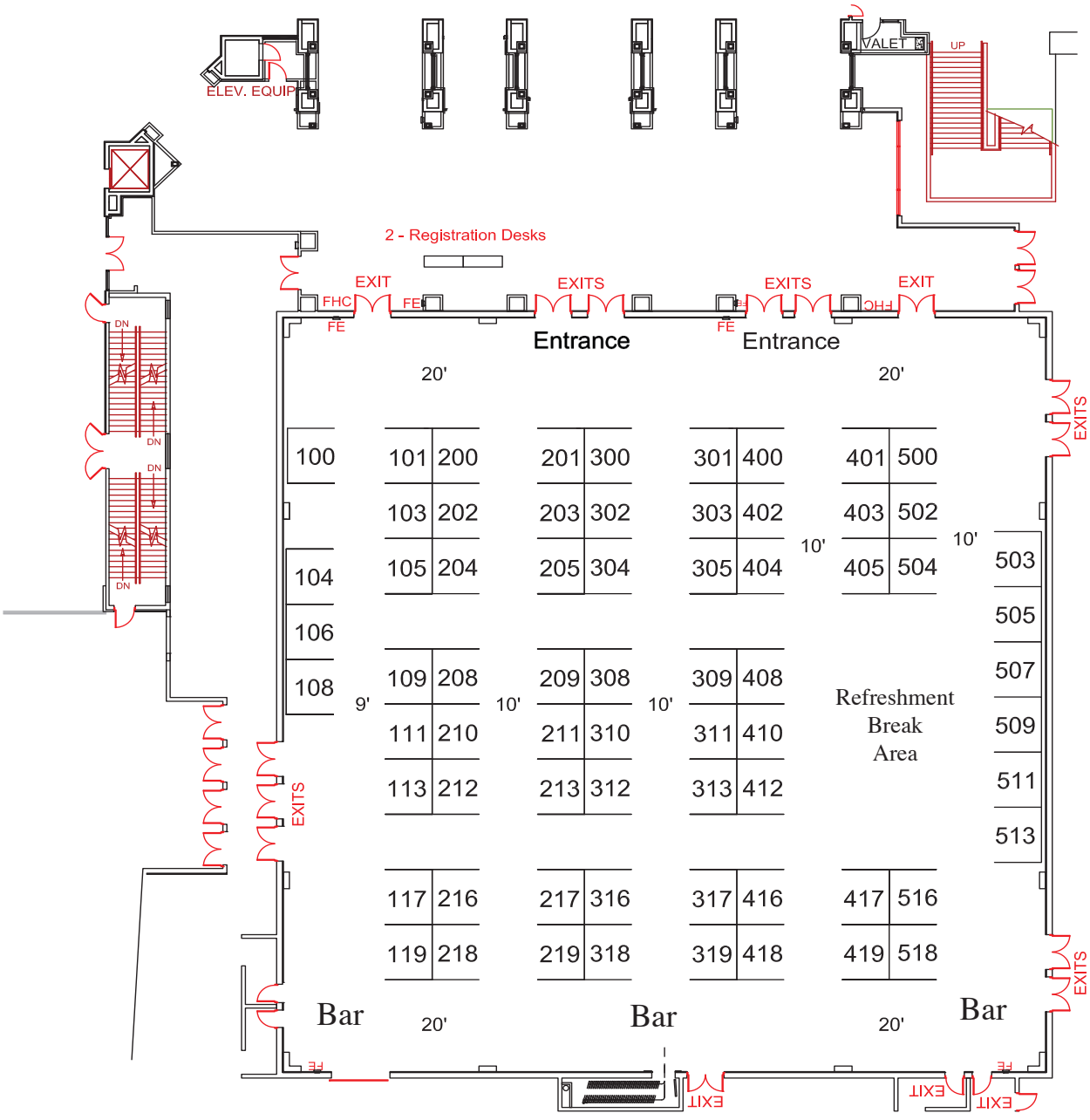

Agenda

Monday, November 4, 2024

11:00 am - 5:00 pm	Charity Golf Tournament - Shingle Creek Golf Club	
3:00 pm - 7:00 pm	Conference Registration Open - Rosen Centre Hotel	(Executive Ballroom Foyer)
3:00 pm - 7:00 pm	Exhibitor and Poster Presentation Setup	(Executive Ballroom)
5:30 pm - 7:00 pm	Welcome Reception	(Pool Deck)

Tuesday, November 5, 2024

7:45 am - 7:00 pm	Registration Open	(Executive Ballroom Foyer)
7:45 am - 8:30 am	Continental Breakfast – Exhibit Hall	(Executive Ballroom)
8:30 am - 10:00 am	**FRC 2024 Opening Session**	(Grand Ballroom D)

Welcome: **Eugene (Gene) Jones**, Execuive Director, Southern Waste Information eXchange, Inc.

Moderator: **Howard E. Nelson**, Partner, Head of Environmental Practice, Bilzin Sumberg

FDEP Cleanup Programs
Tim Bahr, P.G., Director of Division of Waste Management, Florida Department of Environmental Protection

FDOT Roadway Incident Spill Containment Standard Operating Procedures and GIS Application Overview
Maria Salgado, DCIC, Florida Department of Transportation - District 4
Eric Krebill, P.G., DCIC, Florida's Turnpike Enterprise
Pietro Taballione, CAR Senior Scientist, AECOM - District 4

What in the PFAS is going on? An Update on PFAS Litigation, Regulation, and Legislation
Ralph DeMeo, Esq., Shareholder, Guilday Law, P.A.

Tuesday, November 5, 2024 (Continued)

10:00 am - 10:30 am — Refreshment Break – Exhibit Hall (Executive Ballroom)

10:30 am - 12:30 pm — **Session I:** (Grand Ballroom D)
General Remediation Session - Part 1

Moderator: **Dr. Fayaz Lakhwala, Ph.D.**, Key Accounts Manager Soil & Groundwater Remediation, Evonik Corporation

Easy Installation and Quick BTEX Reductions in Poorly Accessible Offsite Locations Using Bio Sparging via Nested Horizontal Wells
Cheryl-Anne Nichols, Senior Consultant, and Ben Alex, P.E., Senior Project Manager, Verdantas, LLC

Sustainable Remediation via Bioelectrochemical System at a Petroleum Site
Michael Spievack, P.E., Senior Project Manager, Langan Engineering and Environmental Services, LLC

Gasoline Tanker Truck Rollover Remediated Using qHRSC and an Activated Carbon Injectate Permeable Reactive Barrier
Derek Pizarro, CPG, Senior Geologist and Product Manager, AST Environmental, Inc.

DNAPL Site Remediation - Examining the Life Cycle of a Solvent Site
Jim Langenbach, PE, BCEE, Senior Principal Environmental Engineer, Geosyntec Consultants

12:30 pm - 1:30 pm — Lunch (Grand Ballroom E)

1:30 pm - 3:00 pm — **Session II:** (Grand Ballroom D)
Current Issues in Environmental Insurance

Moderator: **James P. Rigano, Esq.**, Rigano LLC

Panelists:
Travis Moore Hearne, Esq., Shareholder, Mechanik Nuccio Hearne & Wester, P. A.
Nicholas Rigano, Esq., Rigano LLC
Jared Dubrowsky, Senior Vice President, Environmental Insurance Practice, NFP
Edwin Baez, Underwriter - Environmental, Beazley

Tuesday, November 5, 2024 (Continued)

3:00 pm - 3:30 pm — Refreshment Break - Exhibit Hall — (Executive Ballroom)

3:30 pm - 5:30 pm — **Session III:** — (Grand Ballroom D)
PFAS Assessment and Remediation

Moderator: **Dr. Kesavalu M. Bagawandoss, Ph.D., J.D.**, Industries & Environment Technical Director North America, SGS North America, Inc.

PFAS Remediation in Circulating Wells – Proven Success and Confirmed Efficacy
Dr. Mohamed Odah, Ph.D., P.E., Principal, Accelerated Remediation Technologies Inc. (ART)

In Situ Remediation with Colloidal Activated Carbon to Reduce PFAS Risk and Liability
Brett Hicks, Central Region Manager, REGENESIS

Pilot Study for the Aqueous Electrostatic Concentrator (AEC), an Efficient, Low-waste Solution for PFAS Treatment in Drinking Water
Tonya Chandler, President, BioLargo Equipment Solutions and Technologies

2024 PFAS Regulatory Update: Does it Matter to Phase I/II Site Assessments?
Nicholas Albergo, P.E., Senior Advisor, GHD

5:30 pm - 7:00 pm — Poster Reception - Exhibit Hall — (Executive Ballroom)
In Honor of Jim Clark,
Raffle Proceeds to Benefit:

Wednesday, November 6, 2024

7:45 am - 12:30 pm	Registration Open	(ExecutiveBallroom Foyer)
7:45 am - 8:30 am	Continental Breakfast - Exhibit Hall	(Executive Ballroom)
8:30 am - 10:00 am	**Session IV:** **General Remediation Session - Part 2**	(Grand Ballroom D)

Moderator: **Michael J. Deliz, P.G.**, Restoration Program Manager, NASA

How Advanced Air Monitoring Solutions Reduce Risk and Costs Associated with Brownfield Site Rehabilitation
Paul R. Pickering, VP Global Strategic Accounts, Aeroqual

Biogeochemically Enhanced Treatment of Chlorinated Organics and Metals
Daniel Leigh, P.G., CH.G. Technical Applications Manager, Evonik Active Oxygens

Analytical Tools for Forensics Analysis - Gasoline Releases
Dr. Kesavalu M. Bagawandoss, Ph.D., J.D. Industries & Environment Technical Director North America, SGS North America, Inc.

10:00 am - 10:30 am	Refreshment Break - Exhibit Hall	(Executive Ballroom)
10:30 am - 12:30 pm	**Session V:** **General Remediation Session - Part 3**	(Grand Ballroom D)

Moderator: **Chad Northington, P.E.**, Senior Project Manager, Terracon

Will Lithium Become the Next Emerging Contaminant in the Spotlight?
Dr. Ziqi He, Ph.D., P.E., Senior Technical Consultant, Verdantas LLC

Confidential C&D Landfill Redevelopment: Navigating FDEP and County Regulations Miami-Dade County, Florida
Manivannan Nagaiah, P.E., Senior Project Manager, Langan and F. Joseph Ullo, Jr., P.E., Esq., Shareholder, Carton Fields

Wednesday, November 6, 2024 (Continued)

10:30 am - 12:30 pm	**Session V:** **General Remediation Session - Part 3** **(Continuted)**	(Grand Ballroom D)
	Optimizing Bioremediation with Low pH Tolerant Dhc Corey Scales, Bioaugmentation Coordinator, SiREM	
	High Chain Hydrocarbon Soil Remediation with Advanced Oxidation T.E.S.T Technology Case Study Jamie Davidson, Director - Global Turnaround Solutions, Amerapex Corporation	
12:30 pm	Adjourn	
10:30 am - 1:30 pm	Exhibitor and Poster Breakdown	

2024 Poster Presentations

Note: Posters Listed in Alphabetical Order by Presenter's Last Name

Alternative Solutions for Contaminant Remediation: An Evaluation of Two Horizontal Case Studies

Elliott Andelman, P.G., Environmental Project Manager, Directional Technologies, Inc.

Abstract:

Background/Objectives:

Two case studies are presented where horizontal remediation wells (HRWs) were selected as the remedial solution to target subsurface contamination as an alternative to traditional vertical methods at sites in Florida. Challenges presented in Case Study 1 involved access restrictions to groundwater contamination that resided beneath above ground storage tanks (ASTs), limited staging and setup locations for the drill rig, and 24/7 facility operations that could not be impeded during well installations. Vertical drilling techniques were not a feasible solution due to the surface-level access restrictions on site. Challenges presented in Case Study 2 involved targeting subsurface contamination beneath a busy intersection and off-site adjacent properties with limited surficial access availability. Shutting down the gas station for the installation duration would significantly impact business revenue and was therefore not an option.

Approach/Activities:

Twenty one (21) individual horizontal air sparge (HAS) wells were installed from four (4) discreet rig staging locations, which were strategically selected to avoid significant restoration costs and prevent disruptions to 24/7 on-site activities. Advanced drill-bit locating services were implemented to accurately install the wells beneath the ASTs and active roadways where standard walk-over locating services were not feasible. Wells were installed via the blind installation method, where an exit point is not required, due to site space constraints. Eight (8) horizontal wells were installed to combat a petroleum release at a gas station bordered by a busy intersection and neighboring commercial and residential properties. Contamination had migrated slightly upgradient beneath the intersection and downgradient off-site onto adjacent properties. Vertical drill rigs could not be positioned above the upgradient contamination without shutting down the intersection. Down-gradient access had not been granted by the property owners to install vertical remediation wells. All 8 wells were installed via the entry-exit method, contrary to the installation method used in Case Study 1.

Results/Lessons Learned:

Horizontal remediation wells were able to access the target contaminated zones and perform the necessary remedial applications at the sites in both Case Study 1 and Case Study 2, despite the site-specific challenges presented at each site. By utilizing horizontal directional drilling techniques, there were no disruptions to business operations and no loss to client revenue as a result of installation operations. Through teamwork and collaboration with the environmental consultants, the horizontal well screen designs were optimized for each remedial application. Installation techniques were chosen based on site access restraints to install the wells into the target locations and ultimately reduce the remedial timeline of each project.

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Sulfidated Zero Valent Iron Structure, Mechanisms of Operation and Performance

Dr. John Freim, Ph.D., Director of Materials Science, Regenesis

Abstract:

Zero valent iron (ZVI) is a powerful reductant that can accomplish the in-situ remediation of chlorinated hydrocarbons and other toxic groundwater contaminants. Using sulfidated zero valent iron (SZVI) can help overcome some of the shortcomings of bare ZVI. The key feature of SZVI is its core shell configuration with a thin surface layer of reduced iron sulfide with a zero valent iron interior. It has been reported that for bare unsulfidated ZVI, hydrolysis consumes over 95% of the material. Preventing hydrolysis is particularly important when using nanoscale or small microscale iron where using bare ZVI results generally results in premature material exhaustion and short reactive lifetimes. In addition to extended persistence, reaction kinetics with chlorinated hydrocarbons is exceptionally rapid. Scanning electron microscopy with electron backscatter analysis was used to verify the core-shell structure of a commercially available SZVI material. We will then describe theories and mechanisms that explain the beneficial features of SZVI. Notably, iron sulfide is relatively hydrophobic, and this is believed to favor reactions with contaminants instead of hydrolysis. Additionally, iron sulfide is relatively conductive allowing for better electron transfer from the zero valent iron interior to the surface where the reactions occur. The results of treatability studies with chlorinated ethenes are presented showing that SZVI increases reactivity with TCE by about 30 times compared to bare iron. The results of a column study are also presented where a TCE solution continuously was passed through a sand column containing a representative in-situ dose of SZVI. Reactivity was maintained for over four years with the near complete elimination of TCE and its daughter products. The results of remediation programs using SZVI in combination with complimentary remediation amendments are described. These show that SZVI accelerates bioremediation with fewer and shorter-lived daughter products. SZVI can also accomplish in-situ destruction is permeable reactive barriers containing activated carbon products enhancing their performance.

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Remediation of Contaminated Soils using Sustainable Soil Amendments

Dr. Fayaz Lakhwala, Ph.D., Key Accounts Manager Soil & Groundwater Remediation, Evonik Corporation

Abstract:

Agricultural, industrial, and military sites have been successfully remediated throughout the world using sustainably produced organic soil amendments over the past 25 years. Contaminants treated using this approach have included petroleum hydrocarbons, PAHs, phthalates, chlorinated phenols, chlorinated herbicides such as 2,4-D, and chlorinated pesticides including Lindane. The soil amendments, known as Terramend® reagents, are manufactured using processed plant materials, a balanced blend of nutrients, and a food grade emulsifying agent. This formulation promotes more rapid and complete destruction of the targeted contaminants and enables the attainment of industrial and even residential land use standards. This approach to soil remediation provides a more economical and environmentally sustainable alternative to excavation, thermal treatment, or off-site soil disposal by landfilling. Many large-scale projects using Terramend® reagents have been completed in Canada, the United States, and Europe. Together, these projects have resulted in remediation of more than 1,000,000 tons of soil, sediment, and industrial process wastes. Treatment has been conducted both in situ without excavation, on-site following soil excavation, and off-site at soil treatment centers. The presentation will illustrate how Terramend® reagents improve soil microbial ecology by increasing the supply of bioavailable water and nutrients and reducing acute soil toxicity. These changes lead to increased microbial growth and support more rapid contaminant destruction as compared to alternate bioremediation approaches. Results from bench-scale testing and full-scale projects will be presented and discussed from the perspectives of performance and cost. Brief case studies will illustrate attainable removal efficiencies as well as recognized limitations to this type of soil remediation.

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Colloidal Activated Carbon Paired with Enhanced Bioremediation for the Remediation of Residual Benzene and Cumene Plume

Daniel Pile, Technical Sales Representative, REGENESIS

Abstract:

Background/Objectives:

After both extraction and air sparge systems reached asymptotic levels above GCTLs, further treatment was needed for the large dilute plume that remained on-site. Carbon sorption and enhanced bioremediation were selected to reduce benzene and cumene levels required to reach the GCTLs of 1 ppb and 0.8 ppb for benzene and cumene, respectively. This coastal central Florida site posed significant difficulties resulting from the shallow water table, ranging between 1 and 4 feet from the ground surface, and the low cleanup standards. The treatment area included most of the source property, which at that time contained a closed gas station and extended to neighboring commercial properties.

Approaches/Activities:

Colloidal activated carbon under the brand name PetroFix®, amended in two areas with Oxygen Released Compound Advanced (ORC Advanced®), was selected for having previously demonstrated the potential to achieve low treatment levels at other sites in Florida. By the time the remedial conceptual model was planned, the concentrations on and off-site had been relatively stable for over five years, creating a moderately delineated plume. Infrastructure on-site limited in situ application access; this resulted in a single large treatment area and multiple outlying hot spots. From mid-November 2020 through early January 2021, 122 direct push injection points were advanced, applying 15,600 lb of PetroFix and 720 lb of ORC Advanced during the application.

Results/Lessons Learned:

All ten monitoring locations within the treatment areas experienced reductions in benzene and cumene to below detection limits by their first sampling event, five or nine months after the application. During three and half years of quarterly sampling, most sampling events showed non-detect levels for all monitoring petroleum hydrocarbon constituents. All ten treatment area monitoring wells achieved concentrations below detection limits during the first sampling event, and except one in 2023, all sampling events in all have remained below GCTLs. One monitoring event in MW-13R cumene was detected at 1.5 ppb. The shallow depth of injections posed issues during the application of PetroFix as a high volume injectate and we will discuss how shallow injection challenges were overcome.

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In Situ Injection of Modified Clay for PFAS Remediation: Field Demonstrations Examined

Derek Pizarro, CPG, Senior Geologist and Product Manager, AST Environmental, Inc.

Abstract:

Background/Objectives:

Use of common adsorbents for the remediation of per- and polyfluorinated substances (PFAS) in situ has generally been limited to liquid activated carbon (LAC) - also known as colloidal activated carbon (CAC), and biochar (BC), or conventional pump and treat systems. A significant issue with LAC/CAC/BC installations for remediation of contaminants is the mobility of the product after the energy of injection ceases. Most of these low-energy applications are not adequate to capture the total contaminant mass present due to limits in total effective sorption capacity and mobility of the product in the subsurface pore space. Further, conventional emplacement techniques of LAC/CAC/BC are ineffective for optimal distribution within certain overburden and regolith mediums. Until recently, due to mesh size and chemical composition, practitioners believed that modified clay was not deployable in situ without the use of conventional soil mixing or civil construction techniques. However, overburden injection of an organically modified clay has been demonstrated using direct push technology (DPT) and high-solids slurry batching and injection equipment.

Approach/Activities:

The modified clay selected was manufactured by applying an organic chemical modifier to bentonite clay parent material. The resultant product has high sorption kinetics, significant sorption capacity, can be effective across a wide range of PFAS concentrations, and, if necessary, is compatible for co-mixing with many other common site remediation reactants. In most cases, this combination functions without detrimental interaction or competitive adsorption for PFAS contaminants. These statements have been verified by independent university laboratory testing where the product was comparatively assessed with ion exchange resin (IX), GAC, and biochar. Additionally, competitive adsorption was tested with co-contaminants such as chlorinated volatile organic compounds (CVOCs) and petroleum hydrocarbons (PHCs). Relevant sorption and kinetics data will be discussed.

Results/Lessons Learned:

Field installation of modified clay was conducted at sites in Kentucky, California, and Alberta (Canada) to prove the injectability of the technology in source (grid) and transmissive zone (PRB) settings. These demonstrations verified the injectability and distribution of the modified clay as effective in different geologies and site deployment usages. Various slurry designs were also tested in the Kentucky example, examining increasingly dense and higher solids mixes to mimic site situations where significant product mass would be matched to significant PFAS mass. Field distribution verification testing was a focus of the Alberta deployment, and co-mixing of modified clay and reactants will be reviewed in the California example. Slurry designs will be discussed from bench scale evaluation to field deployment including lessons learned from varying the ratios of product and carrier fluid (water). This discussion includes the use and necessity of adaptable overburden remediation injection units (high energy/high flow trailer systems) - combined with specific downhole tooling and field installation protocols- to provide precise and proficient installation of modified clay injectate in a variety of unconsolidated and consolidated geologic settings to remediate PFAS.

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Mitigating LNAPL Migration into an Adjacent Surface Water Body Using a Regenerative PRB

Derek Pizarro, CPG, Senior Geologist and Product Manager, AST Environmental, Inc.

Abstract:

Background/Objectives:

At an active terminal site, petroleum sheening was observed on an adjacent tidally influenced waterway. It was determined to be caused by light non-aqueous phase liquid (LNAPL) seeping through soil and beneath a bulkhead (seawall). Initial responses, including mitigation of the source, placement of containment booms, and LNAPL recovery in sumps. An extensive evaluation of potential remedial technologies was completed to complement these deployments. The process also had to consider the conceptual site model and the structural stability of the seawall (heavy equipment could not be utilized). A permeable reactive barrier (PRB) installed via direct push technology (DPT) was selected as the most appropriate remedial approach in two areas along the bulkhead. To optimize the performance of these PRBs, high-resolution site characterization (HRSC) was twinned with a Remedial Design Characterization (RDC) event (soil, groundwater, sump water) to adjust placement, depth of installation, and product design loadings of the two PRBs.

Approach/Activities:

A slurry composed of activated carbon, electron acceptors (calcium sulfate, magnesium sulfate), nutrients (corn starch and yeast extract), and custom-selected petroleum-degrading microbes was installed via DPT injection. The PRBs are designed to mitigate LNAPL seepage into the river via a trap and treat approach, while the barrier is also designed to adsorb dissolved-phase petroleum hydrocarbons- all of which are degraded via microbiological processes while adsorbed to and within the activated carbon structure and pore space. Due to the concentration of LNAPL in soil, the installation of the PRBs was broken into two injection events to allow for formational uptake of a significant slurry mixture loading- matched stoichiometrically to the impacts from the RDC design. Using two events prevented the possibility of sub-optimal product distribution, short-circuiting, and daylighting versus attempting the deployment in one injection event.

Results/Lessons Learned:

Baseline data in performance monitoring locations were collected prior to barrier installation, and included LNAPL thickness, volatile organic compound (VOC), anion, dissolved gasses, and total volatile petroleum hydrocarbon (TVPH) concentrations. Post-installation monitoring data (groundwater, sump water, and the water body) was conducted one day, one week, one month, and quarterly following barrier construction to evaluate the reduction of LNAPL in-ground and cessation of LNAPL discharge to the water body. Initial post-injection groundwater analytical data indicated a significant (1 to 2 orders of magnitude) decrease in VOC and TVPH concentrations. Microbial activity was monitored using secondary lines of evidence, specifically a continued increase in carbon dioxide and methane concentrations, and a decrease in sulfate concentrations- which were elevated by the slurry installation. Continued monitoring was used to determine the necessity and timing for supplemental injections- electron acceptors, nutrients, and microbes, if necessary. This data is also used to optimize the supplemental injection mix by PRB or specific PRB segment. A timeline of data from pre-installation to current day will be presented and discussed, including the timing of initial injections and augmentation injections to date.

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Quantitative High-Resolution Site Characterization (qHRSC) and Lessons Learned

Derek Pizarro, CPG, Senior Geologist and Product Manager, AST Environmental, Inc.

Abstract:

Background/Objectives:

Limitations in funding or regulatory requirements often lead to soil and groundwater data gaps and an incomplete conceptual site model (CSM). An accurate CSM leads to better remedy selection, surgical application of the chosen remedy or remedies, shorter remedial timeframes, and lower overall remedial costs. One of the most common data gaps is limited speciated saturated soil analytical data and discrete assessment in underlying units. An integral approach to characterization and remediation is to obtain spatially and vertically dense soil analytical data and vertical profiling of groundwater; vertical groundwater profiling can effectively be twinned with high density soil sampling to determine contaminant mass distribution, gradients, and variability in aquifer properties due to geologic heterogeneity. These limitations also apply to transition zone and bedrock units but can be resolved with recent advances in procedures and methodologies.

Approach/Activities:

Most overburden injection via direct-push technology (DPT) is not adequate to capture the total contaminant mass present nor is the equipment effective for installation within the geologic medium. Improvements to overburden injection methodologies will be highlight the use of flexible overburden remediation units (low pressure/low flow to high pressure/high flow) combined with unique downhole tooling and field installation protocols to allow expert installation of all commercially available injectates. Additionally, subsurface conditions exist within the transition between overburden and competent bedrock lithologies that may prevent the use of traditional equipment or techniques to reach and isolate the targeted depth interval for assessment and treatment. These obstructions can be naturally occurring (hardpan/caliche, chert layers, dense fine-grained sediments, gravel, partially weathered rock, etc.) or anthropogenic (cut and fill, buried rubble like concrete, etc.). Development of the GeoTAP™ technique has provided both access for characterization and access to these intervals. It been used successfully on 50+ project sites across the country accessing depths as great as 180 feet below ground surface. This method characterizes these zones such that drilling is conducted like a bedrock application and injection is like overburden reactant/reagent installations. Finally, a key to bedrock remediation is not to just treat the highly transmissive zones. A combination of custom packers for discrete sampling and injection (18" between inflation elements) and a unique bedrock injection unit (flow rates ranging from 50 to 250 gallons per minute and pressures up to 2,700 psi.) allows focused treatment using high energy access to the smaller aperture fracture networks which typically contain more contaminant mass than more transmissive features. Being able to isolate and treat these zones is a key component to success at difficult fractured rock sites.

Results/Lessons Learned:

A comparative evolution of recent improvements to techniques and approaches to characterization and injection in overburden, transition zone/saprolite, and consolidated lithologies will be discussed. Site-specific case studies will illustrate the development of both quantified high-density data (CSMs) and focused in-situ remediation techniques. Lessons learned and relevant data will depict the benefits of high-density indiscriminate soil and groundwater sampling for quantitative lab analysis, then subsequent aggressive techniques to install the required in-situ treatment in targeted locations and loadings.

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A Modern View and Approach to Measuring, Reporting, and Designing with Mass Flux Data

Patrick Singer, Southeast District Technical Manager, REGENESIS

Abstract:

Background:

The in situ remediation of contaminated aquifers continues to be one of the most cost and energy-efficient means of restoring and protecting natural water resources. To properly implement any in situ remedy, the extent and magnitude of contamination must be well understood as well as the geologic and hydrogeologic settings. Monitoring wells and traditional site characterization methods are effective at locating and tracking the extent of contaminants but may blur some of the most important details needed for effective treatment. Even other high resolution site characterization methods can often miss the areas that serve as contaminant transport zones. Underperformance or failure of many treatments can be attributed to a mismatch between amendment placement and key contaminant transport locations. The vertical extent of contaminant and groundwater flux are key data sets that better guide remedial efforts and help ensure long-term project success.

Approach/Activities:

This presentation will cover the use of Flux Tracers to directly measure contaminant and groundwater flux. These new passive devices were developed to easily collect contaminant and groundwater flux data at discrete vertical intervals. These data allow site managers and remediation designers to identify the aquifer zones driving contaminant transport and plume formation. While the concept of flux measurement is not new, these devices improve upon existing methods by making device deployment and sampling significantly more user friendly. The flux measurement devices arrive on site fully assembled, ready to be unpacked and inserted into an existing monitoring well. After deployment, the measurement unit is removed from the well, repackaged, and returned intact for laboratory analysis - no field sample preparation is required. By bringing device handling and sampling into the laboratory, we achieve a higher level of process control and therefore data quality.

Results/Lessons Learned:

The design of the devices will be introduced, and the data generated from project sites will be reviewed. Emphasis will be given to the improvements made to the design and implementation of remediation projects using the data collected from these devices. Available data collected using these devices will be used to show vertically delineated, flux-based contaminant and groundwater measurements hold tremendous promise in improving the design quality a

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Applying Horizontal Remediation Well Technology To Improve Site Clean Up

Julie Sophis, Geologist, Directional Technologies, Inc.

Abstract:

Horizontal or directional drilling is often associated with the oil and gas industry or utility installations. However, for over three decades, Horizontal Directional Drilling (HDD) technology has been used to install Horizontal Remediation Wells (HRWs) in the environmental industry. HRWs can cost-effectively remediate large subsurface areas, even in active and complex industrial sites that are difficult or impossible to reach with traditional vertical wells or other in-situ approaches. Due to the long reach of directional drilling, horizontal wells can span entire plumes, avoiding surface infrastructure and redevelopment activities. This presentation will provide an overview of horizontal remediation systems, covering the basics of HDD technology and compatible remedial applications. It will include case studies showcasing the installation of HRWs at redevelopment sites, demonstrating the technology's ability to improve project time, cost, and safety.

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Remediation and Restoration of Challenging Soil Conditions by Comparing and Designing In-house Treatability Techniques

Dr. Bhagyashree Vaidya, Ph.D., Senior Staff Scientist – Environmental Remediation Technology, Langan Engineering and Environmental Services, LLC

Co-Authors: Padmanabhan Krishnaswamy, P.E., Senior Staff Engineer and Dr. Amita Oka, Ph.D., Senior Project Manager – Remediation Technology, Langan Engineering and Environmental Services, LLC

Abstract:

Among the currently available treatment technologies for petroleum-impacted soils, In-Situ Stabilization (ISS), In-Situ Chemical Oxidation (ISCO), and Biosparging are some of the most effective techniques. Our in-house treatability techniques developed and designed to mitigate challenging soil conditions and restore the site to a natural/amended habitat for redevelopment have been demonstrated in the work presented here. We applied these three techniques to treat petroleum-impacted soil from a site located in the northeast. While ISS involves stabilizing in place hard-to-treat contaminants such as chlorinated solvents present in the Light Non-Aqueous Phase Liquid (LNAPL), ISCO involves the addition of chemical oxidants (hydrogen peroxide, permanganate, etc.) into the subsurface and targets petroleum hydrocarbons and chlorinated solvents. Alternatively, biosparging involves the injection of air/oxygen and nutrients into the saturated zone to enhance microbial activity and biodegrade the petroleum contaminants dissolved in the groundwater or adsorbed to the soil aggregates present under the water table. A comparative study of the three techniques showed which among the three techniques would provide an efficient and cost-effective solution to implement on a field scale to restore the site.

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FLORIDA REMEDIATION CONFERENCE

Moderator and Speaker Profiles

(Moderators and Speakers Listed in Order of Appearance)

Eugene B. Jones

Eugene (Gene) Jones

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

Bio

Gene Jones serves as Executive Director of the Southern Waste Information Exchange (SWIX), a 501(c)(3) non-profit organization which has been operating since 1981 assisting businesses and municipalities with their waste management and remediation issues.

With over 40 years of experience, Gene specializes in building strategic relationships with waste and remediation firms. He brings a vast knowledge of various environmental sectors from organizing and managing conferences such as;

- the PFAS Forum,
- 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, and
- Florida Remediation Conference.

as well as in managing associations such as:

- Florida Agricultural Plastics Recycling Cooperative
- 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 8th 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 and The Mindful Sensei.

Gene is also the inventor of the Soap Bag Saver, which he designed for the reuse of leftover soap bars.

Howard E. Nelson

Howard E. Nelson

Howard E. Nelson, Partner, Head of Environmental Practice, Bilzin Sumberg

Bio:

Howard E. Nelson has more than 30 years of experience in environmental law, land development, zoning, and regional planning. 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 focuses a substantial portion of his practice to the analysis and remediation of site contamination issues, representing several national homebuilders in pre-acquisition site analysis and contamination remediation. He works closely with environmental professionals in the formulation of appropriate diligence inquiries and the preparation of remedial strategies designed to reduce costs and time frames for completion of projects. Howard also represents a variety of non-residential developers and industries with respect to contamination assessment and remediation issues.

Howard also has extensive experience in representing clients in complex wetland matters, including issues related to protected and sensitive wetlands and preservation efforts. He was instrumental in the drafting of Florida's Wetlands Uniform Mitigation Assessment Method, and he focuses a substantial portion of his practice on assisting property owners in navigating the maze of local, state and federal wetland permitting. In addition to traditional permitting for wetlands and other natural resources, Howard has substantial experience in wetland litigation and enforcement defense, both locally and throughout the state.

Howard is a frequent author and lecturer on environmental law topics and has participated in Florida Environmental Network's *Annual Growth Management & Environmental Permitting Conference* and *Annual Environmental Permitting Summer School* for the past 13 years. He has been quoted in local and national media and trade publications, including *The Wall Street Journal* and *NAIOPs Development Magazine*.

Howard is consistently recognized by legal publications such as *Chambers USA*, *The Best Lawyers in America*, and *Florida Super Lawyers*.

Prior to entering private practice, Howard served as a regional planner for both the South Florida and Treasure Coast Regional Planning Councils. In addition, he worked as a senior planner for a major South Florida engineering firm. He earned his J.D. at Nova Southeastern University, and his M.A. in Urban and Regional Planning and B.A. at the University of Florida.

Tim Bahr, P.G.

Presentation Title:

FDEP Cleanup Programs

Tim Bahr, P.G., Director of Division of Waste Management, Florida Department of Environmental Protection

Abstract:

Comprehensive update on status of remedial activities in Florida, including state funded cleanup programs and PFAS. Overview of the various cleanup programs within Division of Waste Management and recap of FY 24/25 funding for the state funded remediation programs.

Bio:

Tim has been with FDEP since 1987 after working for EPA Region V in the underground injection control program. With over 37 years with FDEP, Tim has worked in almost all facets of the Division of Waste Management's programs. His career began with FDEP as an environmental specialist in the Petroleum Cleanup program. He was promoted to environmental administrator of the Hazardous Waste (RCRA) program and for eleven years, he supervised, managed and provided guidance for the statewide RCRA permitting, compliance and cleanup program. Later he served as Program Administrator for the Permitting and Compliance Assistance Program, administering all aspects of permitting, compliance and enforcement processes for solid and hazardous waste and storage tanks system programs. Tim now works as Director for the Division of Waste Management, which provides oversight of solid and hazardous waste and petroleum storage system prevention programs and all remediation programs.

Tim earned his B.S. degree in Geology at Fort Hays State University, his M.S. degree in Geology at University of Akron, and is a licensed PG in Florida.

Maria Salgado, Eric Krebill, P.G., and Pietro Tabellione

Presentation Title:

FDOT Roadway Incident Response & Spill Containment Stand Operating Procedures (SOPs)

Maria Salgado, District Contamination Impact Coordinator, Florida Department of Transportation - District 4
Eric Krebill, P.G., District Contamination Impact Coordinator, Florida's Turnpike Enterprise
Pietro Taballione, Contamination Assessment and Remediation Senior Scientist, AECOM - District 4

Abstract:

The mission statement of the Florida Department of Transportation (FDOT) is to "provide a safe statewide transportation system that promotes the efficient movement of people and goods". This transportation goal may be affected by unforeseen events, such as vehicle crash incidents resulting in the release of fuel or hazardous substances into the environment. FDOT's incident management program strives to provide immediate response to vehicle crash incidents for traffic management and expeditious roadway cleanup while safeguarding the environment and maintaining the safety of all parties in accordance with Florida's Open Roads Policy Agreement and Florida Statewide Traffic Incident Management Program Guidelines. FDOT is divided into seven Districts, plus Florida's Turnpike District. District Contamination Impact Coordinators (DCICs) collaborate with the State Watch Office, FDEP District Office of Emergency Response, counties, internal asset maintenance contractors, contracted contamination assessment & remediation firms, and Responsible Parties for crash incident spill cleanup. Pavement cleanup is generally completed in conjunction with re-opening a roadway to resume normal traffic. FDOT developed an Incidents Response and Spill Containment Standard of Operating procedures (SOP) to properly address roadway incidents. Follow-up remediation of right of way impacts is generally completed in accordance with FAC, Chapter 62-780.500/.525. Means and methods vary to document and keep track of incidents and may include use of a smart phone to fill out a Spill Response Field Report while at an incident scene, which populates a Geographic Information System (GIS) Map, which feeds a SharePoint site.

Maria Salgado

Maria Salgado, District Contamination Impact Coordinator, Florida Department of Transportation - District 4

Bio:

Maria Salgado is the District Contamination Impact Coordinator (DCIC) for FDOT District 4. Maria graduated from Florida International University with a BS in Civil Engineering with a specialty in Environmental Engineering. She started her career in the fall of 2000 in a private firm designing Remediation Cleanup systems for contaminated sites. She joined FDOT D6 in Summer of 2008 working in the Planning and Environmental Management Office (PLEMO) as an Assistant DCIC. In 2016, she got promoted to District 4 DCIC. Her role as the DCIC is to ensure the public and roadway construction employees working on FDOT projects are protected from contamination exposure. In addition to avoid or minimize contamination impacts, her role is to review Project Development & Environmental project for impacts, review contract plans, and perform Level I and II assessment activities during the project's design phase. If avoidance or minimization is not achieved or possible, Level III Remedial Action activities are performed during the construction phase of the project.

Eric Krebill, P.G.

Eric Krebill, P.G., District Contamination Impact Coordinator, Florida's Turnpike Enterprise

Bio:

Eric Krebill is District Contamination Impact Coordinator (DCIC) for FDOT/Florida's Turnpike Enterprise with roadways in 20 Florida counties. Eric is a consultant working for Turnpike under a general engineering contract held by HNTB, and is employed by Terracon Consultants, Inc. Eric has been registered as a Professional Geologist in Florida since 1990 and his primary career focus has been related to evaluation and management of contamination.

Pietro Taballione

Pietro Taballione, Contamination Assessment and Remediation Senior Scientist, AECOM - District 4

Bio:

Pietro Taballione is a Level I and II Assessments Lead – CAR Senior Scientist at AECOM. Pietro graduated from the University of L'Aquila with a BS in Environmental Science and the University of Miami with a MA in Marine Affairs & Policy. Pietro is an established environmental professional with 19 years of experience in South Florida. He has de facto managed and assisted managing several FDOT contracts including the FDOT Districts 4 and 6 CAR Contracts, FDOT District 6 Environmental Compliance and District 6 Mitigation & Monitoring Contracts. He has authored contamination reports for the FDOT and private clients, including Contamination Screening Evaluation Reports (CSERs), Contamination Technical Memos and Phase 1 Environmental Site Assessments (ESA).

Ralph DeMeo, Esq.

Presentation Title:

What in the PFAS is going on? An Update on PFAS Litigation, Regulation, and Legislation
Ralph DeMeo, Esq., Shareholder, Guilday Law, P.A.

Abstract:

Things are heating up- pun intended- in the PFAS area. State and federal governments are moving forward with aggressive regulation and enforcement, and the federal Multi District Litigation is either going to make or break pending and future claims against manufacturers and others. This presentation will highlight key developments in these areas.

Bio:

I have been practicing environmental law for almost 40 years, with a Florida and national practice. I have been the lead attorney on dozens of cases involving among other issues emerging contaminants. My practice includes regulatory, legislative, and litigation matters. I lecture frequently on environmental law, I am an Adjunct Professor of Law at FSU College of Law and Tallahassee Community College, and have published other 30 law related articles in scholarly journals and treatises. I have been recognized as a leading environmental lawyer by multiple state and national lawyer rating services.

Dr. Fayaz Lakhwala, Ph.D.

Dr. Fayaz Lakhwala, Ph.D.

Dr. Fayaz Lakhwala, Ph.D., Key Accounts Manager Soil & Groundwater Remediation, Evonik Corporation

Bio:

Dr. Lakhwala serves as the Key Accounts Manager within Evonik's Soil and Groundwater business unit. He holds M.S. and Ph.D. degrees in Chemical Engineering with a minor in Environmental Science. He has 30 years of experience in the area of site remediation with activities in technology development, remedial design and engineering, site characterization, treatability studies, project management and business development. He has worked with environmental technology companies, research laboratories and environmental consulting firms. In the past 18 years, his focus has been on the design and application of in situ chemical oxidation (ISCO), in situ chemical reduction (ISCR), enhanced reductive dechlorination (ERD), NAPL stabilization and treatment of heavy metals in soil and groundwater. Besides US, he has worked on projects in Asia Pacific and Europe.

Cheryl-Anne Nichols and Ben Alex, P.E.

Presentation Title:

Easy Installation and Quick BTEX Reductions in Poorly Accessible Offsite Locations Using Bio Sparging via Nested Horizontal Wells

Cheryl-Anne Nichols, Senior Consultant, and Ben Alex, P.E., Senior Project Manager, Verdantas, LLC

Abstract:

Plumes under adjacent properties typically require additional logistics, permissions, and often increase the time and effort to complete remediation. In worst case scenarios, these properties can completely prohibit remediation offsite. Vertical well point arrays lead to poor coverage around buildings and roads and require unwanted trenching. Large horizontal remediation wells provide options for these sites, but installation has typically been too expensive for smaller sites. The Shell Florida Hospital Site utilized compact nested horizontal wells to perform biosparging under three adjacent properties funded by the PRP program. The more cost-effective remedy was applied to a hydrocarbon plume that was approximately 16,600 sf and 120 ft in length. Directional drilling allowed seamless and easy installation from a more convenient location which traversed under two adjacent properties with significant site structures, and one property with a resistant owner. Installation incorporated 16 well screens to provide maximum control utilizing two bores and was completed quickly in only five days. After the December 2021 startup, biosparge system influence was observed within the first month and excellent reductions as reported in laboratory data to below GCTLs within the first quarter at key monitoring wells. The system continued to operate until April 2024, when system decommissioning and Natural Attenuation Monitoring (NAM) Only was approved by the regulatory authority. The obstacles, benefits, specifics of installation, and results will be discussed in this presentation.

Cheryl-Anne Nichols

Cheryl-Anne Nichols, Senior Consultant, Verdantas, LLC

Bio:

Cheryl Nichols is a Senior Consultant at Verdantas LLC, and has been practicing environmental consulting in Florida since 2003. She has a BS in Chemical Engineering from FL Tech, and a MS in Environmental Engineering from USF. She is a licensed FL PE and CHMM.

Ben Alex, P.E.

Ben Alex, P.E., Senior Project Manager, Verdantas, LLC

Bio:

Ben Alex is a Senior Project Manager at Verdantas, LLC. He has a BSCE from the University of South Florida. He is a Florida licensed Professional Engineer and has and has over 31 years experience working in the FDEPs Waste Division, Petroleum Cleanup Section providing investigation, assessment, evaluation, and remediation services to the Department.

Michael Spievack, P.E.

Presentation Title:

Sustainable Remediation via Bioelectrochemical System at a Petroleum Site

Michael Spievack, P.E., Senior Project Manager, Langan Engineering and Environmental Services, LLC

Abstract:

Background/Objectives:

At a municipally-owned public works facility in southern Florida, BTEX, cumene, and polycyclic aromatic hydrocarbons naphthalene and methylnaphthalenes), were detected above Groundwater Cleanup Target Levels (GCTL). The source of the groundwater impacts is a discharge discovered in 1987 from historical underground storage tanks. The site remediation goal is to reduce contaminant concentrations to the GCTL without interfering with the daily operations of the municipality and/or damaging the tanks.

Approach/Activities:

A pre-design site investigation was conducted to evaluate the natural attenuation of the petroleum-related contaminants at the site. Two treatability studies were conducted to evaluate treatment effectiveness via in-situ chemical oxidation (ISCO) and a sustainable bioelectrochemical degradation technology, E-Redox®. E-Redox® is an electrochemically induced oxidation-reduction technology patented by Advanced Environmental Technologies, LLC (AET). The ISCO study using alkaline activated persulfate was conducted at Langan's Treatability Facility at the New Jersey Institute of Technology (NJIT) and the bioelectrochemical degradation study was conducted at AETs facility in Fort Collins, Colorado. Bioelectrochemical devices enhance aerobic biodegradation by transferring excess electrons to the electrodes, where the electrons react with oxygen to complete the respiratory electron transfer cycle for microbes in an environment with depleted terminal electron acceptors. Based on the results of these two studies, bioelectrochemical degradation using AET's E-Redox® Units was selected as the superior remediation technology. The pilot study of this innovative technology began in June 2021. E-Redox® units provided by AET, consisting of electrodes and connection wire for the bioelectrochemical process, were placed into two dedicated wells and were operated for one year. The full-scale application was implemented in June 2022, and included the addition of four additional E-Redox® wells. One additional E-Redox® well was installed at a deeper interval to target cumene concentrations at another source area well.

Results/Lessons Learned:

The treatability study results indicated that bioelectrochemical degradation using E-Redox® technology achieved complete degradation of all site contaminants without mobilizing metals. The life-cycle analysis showed that this technology has a fraction of the carbon footprint of other technologies applicable to this site. This site is the first field implementation of this sustainable remediation technology on the East Coast. Based on quarterly groundwater monitoring data, a decreasing trend for benzene in the source area monitoring well has been observed since the implementation of the remedial system. Fluctuations in other contaminant concentrations were observed and may be attributed to an upgradient source. We have observed that the limiting factor for the system operation was likely the depletion of essential nutrients. This could cause the decrease of biodegradation activity, which correlates with the declining voltage profiles measured in the E-Redox® Units. To resume and increase the effectiveness of the system following modifications were implemented during the full-scale remediation:

- -Addition of diammonium phosphate (DAP) supplemented with potassium chloride to replenish nutrient levels in the treatment area. The first quarterly nutrient injection was conducted in October 2023.
- -Replacement of cathodes in the E-Redox® units on quarterly basis to maintain unit effectiveness. Quarterly groundwater sampling is currently ongoing to evaluate remedial effectiveness.

Bio:

Michael Spievack, PE is a Senior Project Manager and lead environmental engineer in Langan's Miami office. Michael is a graduate of the University of Florida and Georgia Tech, and has been a practicing environmental engineer for approximately 20 years. Michael is a licensed PE in 12 states and has extensive experience working for private, governmental, industrial, aviation petroleum and land development clients in the Florida and throughout the United States. Michael's expertise includes environmental assessments, corrective action plans, pilot studies, soil and construction management, construction dewatering, environmental compliance, landfill redevelopment, gas mitigation, per- and polyfluoroalkyl substances, and various remediation technologies.

Derek Pizarro, CPG

Presentation Title:

Gasoline Tanker Truck Rollover Remediated Using qHRSC and an Activated Carbon Injectate Permeable Reactive Barrier

Derek Pizarro, CPG, Senior Geologist and Product Manager, AST Environmental, Inc.

Abstract:

SUMMARY :

In 2015, a gasoline transport tanker struck a parked trailer on the shoulder of a rural part of US Route 23, causing a release of up to approximately 4,000 gallons of fuel near major surface water features. The primary challenges were protecting nearby surface water bodies and accessing the areas of contamination due to the presence of a state highway with multiple buried utilities (gas, water, fiber, and other communication lines) and surrounded by thick-forested residential properties. Initial response activities included soil excavation, resulting in removal of approximately 1,100 tons of soil impacted with petroleum hydrocarbons (PHCs). Subsequent installation and sampling of groundwater monitoring wells indicated contaminant plume expansion. Two phases of work were performed to facilitate the primary objective of the remedial effort- reduce LNAPL saturation and enhance the reduction of petroleum hydrocarbon mass. In 2017, the first phase consisted of updating and revising the existing (post-excavation) Conceptual Site Model (CSM), which focused on a remedial design characterization (RDC) event using quantified high resolution site characterization (qHRSC) data. qHRSC is a combination of HRSC and quantifiable soil and groundwater data (physical samples). The second phase was completed in 2018, involving the installation of a series of six BOS 200® permeable reactive barriers (PRBs) to capture and treat LNAPL and PHC impacts within the saturated soil and groundwater plume. This was accomplished by injecting an adsorption platform of activated carbon (AC) coupled with AC-enhanced microbial degradation that could manage the LNAPL in the short term, while allowing continued, long-term treatment of dissolved phase mass utilizing the BOS 200 biological processes.

APPROACH:

The RDC data were instrumental in the development of a quantitative CSM for the LNAPL source and solute plume. The qHRSC data determined that LNAPL level contaminant mass remained under the highway, sorbed into a natural peat layer. The RDC included the installation of 21 soil borings with samples collected every 2 vertical feet, plus 10 temporary monitoring wells to supplement the groundwater data from 14 existing wells. The RDC also included refinement of the hydraulic conductivity and groundwater gradient via rising- and falling-head slug tests in seven of the existing monitoring wells. Full-scale remediation involved injection of 42,700 lbs. of BOS 200 and 30,800 lbs. of a terminal electron acceptors (TEAs) formula across 665 injection points using direct push technologies (DPT). Angled DPT injections were used along both sides of the highway to target mass residing beneath it.

RESULTS:

Performance monitoring over more than four years has demonstrated the continued biological degradation of PHCs in groundwater. PHC mass reduction was 94% or greater at 1,700 days post-injection. The series of six PRBs has been sufficiently protective of the nearby surface water bodies. Continued biological degradation of PHC impacted groundwater is apparent in the post-injection performance monitoring data.

Bio:

Derek Pizarro, CPG is a Senior Geologist and Product Manager for AST Environmental, Inc. and a Certified Professional Geologist (AIPG). He has more than 20 years of experience in environmental applications, specifically contaminant transport studies, heavy metals remediation, permeable reactive barrier (PRB) design, and reagent bench-scale testing and design for environmental projects, industrial facilities, landfill, and utilities clients. Derek has been a technical advisor for the testing and selection of in situ stabilization (ISS) treatment for CERCLA sites, state land recycling programs, and privately funded cleanups.

Prior to AST, Derek served as General Manager and Environmental Products Director for a chemical manufacturing company. He is a technical board member for the Global EnviroSummit Conference, board member for EnviroClass, and formerly served on the American Foundry Society (AFS) Environmental Health & Safety (EHS) committee.

Jim Langenbach, P.E., BCEE

Presentation Title:

DNAPL Site Remediation - Examining the Life Cycle of a Solvent Site

Jim Langenbach, PE, BCEE, Senior Principal Environmental Engineer, Geosyntec Consultants

Abstract:

Historic releases of trichloroethene (TCE) from two discrete spill events resulted in the contamination of the surficial aquifer system at an industrial site in Cocoa, Florida (Site). Distilled TCE was used at the site between 1964 to 1977 for the precision cleaning of new aerospace equipment prior to use in Apollo and other space missions. Detailed investigations in the late 1990's through early 2000's documented the presence of a largely depleted dense non-aqueous phase liquid (DNAPL) zone within thin clay layers underlying the site and associated dissolved plume extending approximately 1,200 feet downgradient. Remedial activities were conducted over the course of 20+ years and included hydraulic containment with flushing, ISCO pilot testing, source zone bioremediation with recirculation, downgradient focused bioremediation, and natural attenuation monitoring, with a continuous focus on cost-effectiveness, optimization, and exit strategy considerations. This presentation will present key conceptual site model (CSM) findings based on significant data collection, the remediation strategies developed and implemented for the site and how changes to the CSM over time were considered, regulatory challenges managed, current site status, and the potential path to closure

Bio:

James Langenbach is a Senior Principal Environmental Engineer based in Florida with more than 30 years of experience focused on assisting clients with environmental assessments; remediation design and treatment system optimization; environmental management systems; sustainable remediation designs; and regulatory compliance.

For decades, a wide range of industries have used chlorinated solvents as degreasing agents and for similar commercial applications. In many places throughout the world, these solvents have seeped into the ground near work sites, either through spills or as runoff, creating dense plumes of contaminants that can threaten aquifers and ecosystems. Jim is at the forefront of practitioners developing novel solutions to these issues in this field.

As a consultant, Jim is recognized for using innovative approaches in the planning and execution of projects that are grounded in practical applications of existing and emerging technologies. His clients include federal, state, municipal, and industrial sites throughout the Southeastern United States. He specializes in the management of multi-party PRP sites, and the characterization and remediation of complex manufactured gas plant (MGP), and chlorinated solvent sites with non-aqueous phase liquid (NAPL) source areas using the latest, proven assessment tools and remediation strategies to achieve exit-strategy focused remedial goals. Jim has served as Geosyntec's engineer-of-record on a number of key projects at NASA's Kennedy Space Center, in addition to managing remedial actions at multi-party PRP sites such as the Orlando MGP Superfund Site. He also has served as Geosyntec's lead engineer on projects in Florida's Dry-Cleaning Solvent Cleanup and Hazardous Waste Program, during which he has completed assessments or remedial designs for more than 50 solvent, metal, and petroleum-impacted sites.

To advance the state of the practice, Jim's work emphasizes sustainable remediation approaches to the design or optimization of soil and groundwater treatment systems. Examples include his efforts to transition sites from energy-intensive, mechanical treatment systems to passive, in situ biological treatment and flux control approaches. He also designed and created a solar-powered groundwater recirculation system at Kennedy Space Center for the enhanced in situ treatment of a chlorinated solvent plume.

Session II

Current Issues in Environmental Insurance

Moderator: James P. Rigano, Esq., Rigano LLC

Panelists:

Travis Moore Hearne, Esq., Shareholder, Mechanik Nuccio Hearne & Wester, P. A.
Nicholas Rigano, Esq., Rigano LLC
Jared Dubrowsky, Senior Vice President, Environmental Insurance Practice, NFP
Edwin Baez, Underwriter - Environmental, Beazley

Session Description:

To be submitted.

James P. Rigano

James P. Rigano, Esq., Rigano LLC

Bio:

James Rigano has concentrated his practice exclusively in environmental law for more than three decades. Mr. Rigano has served in the Enforcement Division of the United States Environmental Protection Agency, where he was involved in a variety of water pollution control programs and was environmental counsel to the New York Power Authority.

He has extensive experience in subsurface contamination and solid waste issues and has represented clients in numerous matters before environmental regulatory agencies. He has negotiated the environmental issues in numerous transactions and has handled a broad range of cases involving wetlands, open space, and air pollution issues, and has litigated cost recovery actions. Mr. Rigano has had extensive experience with subsurface soil gas issues.

Mr. Rigano has extensive experience with environmental issues in brownfield development projects. He has negotiated technical and environmental issues and has addressed a host of complex regulatory concerns in the redevelopment of contaminated property. Mr. Rigano was environmental counsel for the New York Power Authority where he was involved in the permitting and environmental issues associated with hydroelectric facilities and major transmission lines.

Prior to practicing law, Mr. Rigano was employed for five years as an environmental scientist conducting research on the environmental effects of electric power generation.

Mr. Rigano has authored more than 50 articles and has lectured extensively on a variety of environmental insurance coverage topics. He has also chaired more than 20 environmental conferences. He is actively involved in civic, business and bar association organizations. Long Island Business News has featured him in their "Who's Who in the Law" edition.

Mr. Rigano is the Chair of the Environmental and Energy Law Section of the New York State Bar Association from 2022 to 2023 and Chair of the St. Paul Nursery School in Hempstead, New York. He serves on the Board of the Nassau County Boy Scouts and St. Paul's Greek Orthodox Churchre they enjoy their two young grandsons Easton and Logan.

Travis Moore Hearne, Esq.

Travis Moore Hearne, Esq., Shareholder, Mechanik Nuccio Hearne & Wester, P. A.

Bio:

Travis Moore Hearne is an Attorney in the Environmental Practice Group at Mechanik Nuccio. Travis is a second generation environmental lawyer and focuses his practice on environmental permitting, compliance, and remediation. Travis has experience in a wide variety of environmental, transactional, and land use issues and matters, including environmental resource permitting for wetland impacts and stormwater management, buying and selling contaminated property, environmental due diligence in real estate transactions, Phase I and Phase II environmental site assessments, lender environmental liability, Brownfields, solid and hazardous waste permitting and compliance, RCRA and HSWA cleanups, coastal construction permitting, riparian law, and water quality law and regulation. Travis also has experience in real estate transactions, transactional documents, and land use issues and has represented real estate developers, landowners, small businesses, local governments, and lending institutions.

Travis graduated *magna cum laude* from Stetson University College of Law, where he finished in the top 5.1% of his class and received the highest grade awards in his sections of Torts, Property, and Administrative Law. He completed the Environmental Law Concentration at Stetson and focused his legal studies on the fields of environmental, land use, administrative, and municipal and local government law. He was a member of Stetson's Moot Court Board and represented Stetson twice at the Pace University National Environmental Law Moot Court Competition, where he received two best oralist awards.

Travis also was a Senior Associate of the Stetson Law Review and sat on the Law Review's Spring 2019 Publication Committee. His law review comment focused on regulation of water quality, *From Category 4B to Category 2: How Local Stakeholders in the Tampa Bay Nitrogen Management Consortium Battled Nutrient Pollution to Improve the Bay*, was selected for publication in the Stetson Law Review's Summer 2019 Edition. Travis was also selected to present his comment at the Scholarship Luncheon held by the Stetson Law Review once each semester.

During his time at Stetson, Travis also served as a Biodiversity Fellow at Stetson's Institute for Biodiversity Law and Policy, which afforded him the opportunity to attend the Fifteenth Meeting of the Scientific Committee of the Inter-American Convention for the Protection and Conservation of Sea Turtles in Tegucigalpa, Honduras in September 2018 on behalf of the Institute. Travis also assisted in researching an *amicus* brief filed in the Southern District of New York on behalf of the Society of Wetland Scientists in the case of *New York v. Pruitt* involving litigation over the Federal Clean Water Rule.

Travis was a certified legal intern at the City Attorney's office of the City of St. Petersburg, where he researched a broad variety of issues pertaining to municipal law. At graduation, he was awarded the Outstanding Local Government Law Student Award by the Florida Bar's City, County, and Local Government Law Section.

Since graduation, Travis has been published by both the ABA's Section of Energy, Environment, and Resources and the Florida Association of Environmental Professionals.

Before attending law school, Travis earned his B.A. *magna cum laude* from the University of South Florida in English Literature. He lives in Land O' Lakes Florida with his wife, Kasandra, and their mini-dachsund, Oscar. Greek Orthodox Churchre they enjoy their two young grandsons Easton and Logan.

Nicholas Rigano, Esq.

Nicholas Rigano, Esq., Rigano LLC

Bio:

Nicholas Rigano joined Rigano LLC in 2017. Prior to joining the firm, he worked at well-known firms located in Manhattan and Long Island.

Nick represents clients in litigation and transactional real property matters involving environmental issues. His practice primarily concentrates on subsurface contamination, solid waste, and wetland issues. Nick is Chair of the PFAS Committee for the New York State Bar Association Environmental and Energy Law Section and is an appointed member of the New York State Bar Association Environmental Justice Committee. He was the Chair of the Environmental Law Committee for the Nassau County Bar Association and served on the Environmental Advisory Board for the Village of Garden City.

Nick also represents key constituents involved in Chapter 5 bankruptcy litigation and as well as *creditors to Chapter 7* and Chapter 11 bankruptcies.

Nick has authored numerous articles published in periodicals such as the Bloomberg Law Reporter, Wall Street Journal Pro, the American Bankruptcy Institute Law Review, the New York Real Estate Journal, and the New York Environmental Lawyer. He has lectured extensively on various environmental, bankruptcy and litigation topics at venues such as the Harvard Club, Nassau County Bar Association, CLE providers as well as for the New York State Bar Association. Nick has been quoted or appeared in various media outlets including Wall Street Journal, Newsday, The New York Post, News12, ABC News, NPR, Bloomberg BNA, the Garden City News, Port Washington News, Riverhead News Review, East Hampton Star, Bethpage Newsgram, and the Adirondack Daily Enterprise.

Jared Dubrowsky

Jared Dubrowsky, Senior Vice President, Environmental Insurance Practice, NFP

Bio:

Jared's focus as Senior Vice President of the NFP Environmental Insurance Practice is on elevating the Practice through strategic business development and targeted marketing. Jareds approach integrates hands-on training and education, ensuring colleagues and clients are well-versed in environmental risk and insurance solutions. Jared's expertise in environmental risk was honed through two decades in the environmental industry in a progression of roles. This included, Environmental Risk Manager at Santander Bank, Project Manager for the City of New York, Environmental Assessment and various rolls with Environmental consultants. These positions allowed Jared to develop key competencies in environmental compliance and management systems. Jared's career is a testament to a steadfast commitment to service and excellence, guiding clients with integrity through the intricacies of environmental insurance.

Edwin Baez

Edwin Baez, Underwriter - Environmental, Beazley

Bio:

Edwin Baez is an Environmental Underwriter with Beazley Environmental. With over 20 years of environment underwriting experience, Edwin works out of Beazley's Miami office and underwrites site pollution placements for complex brownfield redevelopment sites, real estate transactions, and merger and acquisition risk. He holds a Bachelor of Arts in Earth Science and Bachelor of Science in Environmental Engineering from Columbia University. He completed his MBA at Loyola University Chicago, while living and working in Chicago. He holds CPCU, ARe, CRIS, and CLCS insurance designations.

Dr. Kesavalu M. Bagawandoss, Ph.D., J.D.

Dr. Kesavalu M. Bagawandoss, Ph.D., J.D.

Dr. Kesavalu M. Bagawandoss, Ph.D., J.D. Industries & Environment Technical Director North America, SGS North America, Inc.

Bio:

Dr. Doss has spent more than 40 years in the analytical chemistry arena. Dr. Doss' expertise spans chemistry, environmental analysis, hydrocarbon chemistry (gas and liquids), forensics, industrial hygiene laboratory services (American Industrial Hygiene Association [AIHA] accredited), Air analyses (TO compendium methods), emerging contaminants - PFAS, 6PPD , 6PPDQ, biota analyses, hazardous waste management, client services, management of laboratories, laboratory builds, data validation, data management, sampling, laboratory audits and litigation support. Dr. Doss received his Juris Doctorate from Southern University Law Center and was a Law Review Editor. He is licensed to practice law in Louisiana. He earned his Ph.D., Engineering (Environmental Science) from the University of Oklahoma, his M.S., Chemistry from Wichita State University and his B.S., Chemistry from Loyola College, University of Madras.

Dr. Mohamed Odah, Ph.D., P.E.

Presentation Title:

PFAS Remediation in Circulating Wells – Proven Success and Confirmed Efficacy

Dr. Mohamed Odah, Ph.D., P.E., Principal, Accelerated Remediation Technologies Inc. (ART)

Co-Authors: Dr. Nidal Rabah, Ph.D., P.E., LSRP, Senior Vice President and Brendan Lazar, P.E., Technical Director, TRC

Abstract:

A breakthrough has been achieved with in-well fractionation, eliminating the need for water extraction and aboveground treatment. PFAS circulating well remedial design has been successfully implemented through demonstrations and full-scale applications, confirming its effectiveness in reducing PFAS concentrations while safeguarding valuable groundwater resources. This PFAS treatment technology builds upon the established circulating well concepts which have seen successful deployment at sites worldwide, with tailored adaptations to address the unique characteristics and chemical properties of PFAS compounds. In this innovative approach, the remediation process centers on boosting foam production within the circulating well (fractionation) and subsequently extracting the foam to the surface. This eliminates the necessity of pumping large volumes of water to the surface, a key distinction from traditional foam recovery methods. Moreover, besides PFAS compounds, this alternative technology has proven effective in treating a wide range of constituents. Multiple PFAS circulating wells treatment systems have been installed and operated successfully. The concentrations of PFAS in the recovered foam have consistently surpassed subsurface water concentrations. Substantial reductions in concentration levels have been verified through water samples collected from the remedial wells and monitoring locations. Field results at a full site implementation in NJ , including groundwater and foam concentrations along with mass reduction data, will be presented and discussed.

Bio:

Dr. Mohamed Odah, Ph.D., P.E. is a principal engineer and founder of Accelerated Remediation Technologies, Inc. Dr. Odah has more than 35 years of experience in the implementation of soil and groundwater remedial technologies. Dr. Odah developed and holds the patent for the ART In-Well Air Stripping, ART Low perma, and ART PFAS remedial technologies. He has worked on some of the most complex sites in the world and served as an expert in projects related to refineries, manufacturing facilities, dry cleaning sites, and underground storage tanks. Dr. Odah earned his Ph.D. from the University of Missouri in Kansas City in Engineering and Geosciences and his M.S. and B.S. in Civil Engineering at the University of Kansas. He is a registered professional engineer.

Brett Hicks

Presentation Title:

In Situ Remediation with Colloidal Activated Carbon to Reduce PFAS Risk and Liability

Brett Hicks, Central Region Manager, REGENESIS

Abstract:

Background:

PFAS (per- and polyfluoroalkyl substances) have been released into groundwater at an estimated 57,000 sites in the US alone, including military bases, airports, landfills, and various industries. Recent sampling of public water systems required by the US Environmental Protection Agency (US EPA) already confirms PFAS detections in 89 million people's drinking water, with more sample results pending. The agency's designation of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) as hazardous substances under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) in April 2024 will now force many PFAS-contaminated sites into remediation to prevent future impacts on drinking water wells and other receptors.

Approach:

The two remediation approaches currently available to remediate PFAS in groundwater involve groundwater extraction and separation treatment (pump-and-treat) or in situ remediation with colloidal activated carbon (CAC). Despite its use for groundwater remediation for over 40 years, pump-and-treat has proven ineffective in restoring aquifers contaminated with common groundwater pollutants such as trichloroethene (TCE). Using pump-and-treat to flush PFOA and PFOS out of aquifers effectively would be even more problematic as these contaminants sorb to aquifer soils approximately 5 and 25 times more strongly than TCE, respectively, while at the same time, having enforceable maximum contaminant levels (MCLs) that are 1,250 times lower. Therefore, pump-and-treat can only be useful for hydraulic containment to stop advancing PFAS groundwater plumes. However, this containment method generates a concentrated PFAS waste. This waste material must be managed, transported, and disposed of at a landfill or treated, with each step in the process causing a PFAS exposure risk. Since PFAS do not degrade naturally and bioaccumulate in animals and humans, PFAS-laden wastes present new risks and liabilities, including Strict and Joint & Several Liability under Superfund, not encountered previously with other contaminants. As such, solutions that avoid generating waste in the first place are desirable. In situ remediation with CAC occurs below the surface and does not generate waste. The CAC technology comprises <2 micron-sized activated carbon particles that coat aquifer materials upon application, converting the subsurface into a pollutant filter that effectively removes PFAS from the dissolved phase with no ongoing operation or maintenance required. With PFAS removed, the potential for exposure is also removed, eliminating the risk to receptors downstream.

Results:

In situ remediation with CAC has been successfully implemented at over 50 PFAS-contaminated sites globally across four continents. Numerous in-field case studies demonstrate the approach's effectiveness in halting the migration of PFAS in the subsurface, thereby preventing future exposure risk and liability. Additionally, independent, peer-reviewed research and modeling studies predict that typical in situ PFAS plume treatments will be effective for decades or longer. At many sites, the longevity of a CAC permeable barrier can be further increased by treating the upgradient PFAS source area, effectively reducing PFAS risk permanently. Compared to two leading pump-and-treat alternatives, using CAC to remediate PFAS in situ is approximately one-third the cost and has a 98% lower carbon footprint, based on a Life Cycle Assessment completed for a PFAS-contaminated airport site where the in situ approach was used. The CAC technology is being evaluated as part of numerous US Department of Defense research projects through the Strategic Environmental Research and Development Program (SERDP) and Environmental Security and Technology Certification Program (ESTCP).

Bio:

Brett Hicks is the Central Region Manager at REGENESIS, with 15 years of experience in the environmental industry. In his current role at REGENESIS, he leads a team of technical remediation experts across the Great Lakes, Ohio Valley, and Southeastern regions of the United States, delivering solutions for sites contaminated with PFAS, chlorinated solvents, and petroleum hydrocarbons. Brett's team assists environmental engineering and consulting firms, as well as responsible parties, in achieving their site goals using cutting edge colloidal technologies. He has extensive experience in in situ chemical oxidation (ISCO), bioremediation, chemical reduction, and carbon sorption.

Tonya Chandler

Presentation Title:

Pilot Study for the Aqueous Electrostatic Concentrator (AEC), an Efficient, Low-waste Solution for PFAS Treatment in Drinking Water

Tonya Chandler, President, BioLargo Equipment Solutions and Technologies

Abstract:

Per- and polyfluoroalkyl substances (PFAS) are a broad class of man-made chemicals known to contaminate aquifers across all 50 US states, and countless more around the world. While previously unregulated, PFAS are now the subject of escalating regulatory action by governments around the world due to mounting evidence of their links to health effects such as cancer, immune dysfunction, developmental delays, and more. PFAS have high chemical stability, and as a consequence they persist and accumulate in the environment and in humans, causing small amounts to have outsized effects over long periods of time. Changes in the CERCLA and other regulations have put a focus not only on PFAS, but on the waste generated from traditional removal technologies.

BioLargo developed a PFAS treatment technology designed to be an efficient, low-waste solution to PFAS removal. Their Aqueous Electrostatic Concentrator (AEC) exploits the polarity of PFAS molecules to electro-migrate them onto proprietary membranes. The AEC can achieve removal rates over 99.99% of both long and short chain PFAS molecules, even in the presence of other constituents including TCE.

BioLargo recently used the AEC to treat water from an impacted groundwater plume outside of an Air Force Base, a laboratory at the University of Tennessee independently verified the treatment rates using EPA methodology. The results of this pilot study and others, which will be shared, will highlight the AEC's capabilities of reducing PFAS compounds to below their detection limits from various aqueous streams with low waste generation.

Bio:

Ms. Tonya Chandler, President of BioLargo's Equipment Division, and PFAS Regulatory Compliance expert for BioLargo Inc. has spent her career in water and wastewater working both on municipally and industrially, worldwide. She has a degree from Carroll College (now Carroll University) in Waukesha WI in both Biology and Communication. She has worked for such companies as Shaw Environmental and Veolia Water where she gained hands on experience in all aspects of the industry. Her current focus is on PFAS and water reuse.

Nicholas Albergo, P.E.

Presentation Title:

2024 PFAS Regulatory Update:
Does it Matter to Phase I/II Site Assessments?
Nicholas Albergo, P.E., Senior Advisor, GHD

Abstract:

Does the designation of a couple of PFAS compounds change how a Phase I Environmental Site Assessment is Performed? The simple answer is no. This talk will walk you through why. Does the designation of a couple of PFAS compounds change how Phase II or contamination site assessments are conducted? The simple answer is no. This talk will walk you through why. What if I find PFAS on a property? Is cleanup required? The simple answer is no. This talk will walk you through why.

Bio:

Nick Albergo, P.E., DEE, F. ASCE, F. EWRA, D. WRE is Senior Advisor to GHD Services, a worldwide engineering consulting firm. He is an expert in complex litigation cases and a technical consultant to Government, industry, and other consulting firms. He also serves on the engineering faculty at the University of South Florida. Nick has spent decades working with industry stakeholders and government officials and has been a pioneer in his field, authoring or co-authoring over 185 engineering publications.

Michael J. Deliz, P.G.

Michael J. Deliz, P.G.

Michael J. Deliz, P.G., Restoration Program Manager, NASA

Bio:

Mike has 39 years of professional geological experience and is currently the Restoration Program Manager in the Environmental Management Division, NASA Headquarters. He is developing cleanup policy, overseeing the investigation and cleanup efforts at all NASA Centers and Component Facilities, and leading its Agency-wide PFAS response actions. He joined NASA Headquarters following 21 plus years at Kennedy Space Center where he was the Technical Lead and a Remediation Project Manager. Prior to that, he was a Remedial Project Manager in the Federal Facilities Subsection in 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 alumni.

Paul R. Pickering

Presentation Title:

How Advanced Air Monitoring Solutions Reduce Risk and Costs Associated with Brownfield Site Rehabilitation

Paul R. Pickering, VP Global Strategic Accounts, Aeroqual

Abstract:

Air monitoring is essential to the success of brownfield rehabilitation programs. As compliance continues to increase and new contaminants of concern are identified, communities demand more information. How do we address these issues while limiting project risk, cost, and complexity? We examine the challenges of implementing community air monitoring at a complex brownfield cleanup site contaminated with mercury, polycyclic aromatic hydrocarbons (PAHs), petroleum-related volatile organic compounds (VOCs), lead, and other heavy metals, which potentially posed a risk to nearby sensitive receptors. The case study demonstrates an advanced solution for monitoring mercury vapor, VOCs, particulate matter PM10, and wind parameters in real-time at locations on the site perimeter and in the community. The solution leveraged advances in sensor technology and cloud automation software to expedite monitor deployment, enhance data quality, and produce daily air quality reports. We summarize how automated solutions save project managers time and costs, minimize exceedances and citations, provide air quality data to the community, and meet compliance requirements.

Bio:

Paul is a trusted advisor in air monitoring technology with 20 years of experience working with environmental consultants, industrial hygienists, and geologists. As a global ambassador for Aeroqual, Paul has visited project sites, presented at conferences, and collaborated with regulatory agencies in more than 40 countries. He is a member of environmental and brownfield associations in Australasia and North America.

Daniel Leigh, P.G., CH.G.

Presentation Title:

Biogeochemically Enhanced Treatment of Chlorinated Organics and Metals

Daniel Leigh, P.G., CH.G. Technical Applications Manager. Evonik Active Oxygens

Abstract:

Recently, biogeochemical reduction (BGCR), a process which combines biological and chemical processes, has been combined with ERD and ISCR to provide an additional mechanism to more aggressively degrade CVOCs and to sequester toxic metals. These processes recently have been applied for treatment of CVOCs at sites in California and for treatment of arsenic at a site in Florida. During ERD and ISCR, highly reducing conditions are established which are favorable to the reduction of ferric iron (Fe[III]) to ferrous (Fe[II]) and sulfate (SO4) to sulfide (HS-), both of which are substantially more soluble than their oxidized form. Ferrous and sulfide in solution rapidly combine to produce iron-sulfide minerals such as mackinawite (FeS), and pyrite (FeS2). These biologically generated minerals have been demonstrated to abiotically degrade CVOCs on contact, primarily by the β elimination pathway. This additional biogeochemical degradation pathway minimizes the generation of toxic degradation products such as vinyl chloride, thereby substantially reducing the clean-up time. In addition, iron and sulfide remove toxic metals from solution as iron-sulfide. Also the generated sulfide will precipitate on zero valent iron (ZVI) if present. This sulfidation of zero valent iron (ZVI) has been demonstrated to substantially enhance reactivity and reduce passivation of the ZVI. Bench tests, and full-scale treatment were conducted at multiple sites affected by CVOCs and metals to evaluate the effectiveness a BGCR enhancing reagent (Geoform® Extended Release; Geoform® ER) for in situ remediation of CVOCs including chlorinated -ethenes, -ethanes and -methanes and metals. At each site, full-scale treatment was conducted by distribution of these reagents into the affected aquifer by high-pressure injection or through injection wells. Following distribution, groundwater monitoring was conducted to confirm and quantify treatment. The bench tests demonstrated that BGCR significantly increased the reactivity of the ZVI containing ISCR reagents for treatment of CVOCs. The field tests demonstrated that enhanced the biological reduction of the supplied sulfate to sulfide. Simultaneously, the CVOCS plume were rapidly degraded by both biotic and abiotic processes. Bench tests demonstrated that arsenic was rapidly removed from solution. A description of the BGCR processes applied, and the methods and results of the bench tests and full-scale application of biogeochemical reduction for treatment of various CVOCs, and for sequestration of arsenic at the Florida site will be presented.

Bio:

Dan Leigh is a Professional Geologist with over 40 years of professional experience, of which, 38 years have been in the area if biological, chemical and biogeochemical treatment of chlorinated organics and metals in soil and groundwater. He has applied these technologies at sites around the world. As Technology Application Manager for In Situ Reductive Technologies, he continues to work on the development and application of innovative remedial technologies.

Dr. Kesavalu M. Bagawandoss, Ph.D., J.D.

Presentation Title:

Analytical Tools for Forensics Analysis - Gasoline Releases

Dr. Kesavalu M. Bagawandoss, Ph.D., J.D. Industries & Environment Technical Director North America, SGS North America, Inc.

Abstract:

Gasoline spills and leakages from Underground Storage Tank (UST) leaks are common occurrences in the United States. There are historical releases and recent releases. This presentation will provide the tools necessary to measure the contaminants released into the ground which in many cases end up in the groundwater aquifers. This presentation will outline the analysis required to determine the composition of the product released and approximate age of the product by analyzing the product for indicator parameters such as additives. Typically, Whole Oil Analysis is performed to identify the products. Once the product is identified more sophisticated analysis such as PIANO analysis and additives identification is performed in the laboratory. Diagnostic ratios will be discussed as to the various pathways the weathering of the product proceeds in the environment. All necessary tools required for data assessment will be outlined.

Bio:

Dr. Doss has spent more than 40 years in the analytical chemistry arena. Dr. Doss' expertise spans chemistry, environmental analysis, hydrocarbon chemistry (gas and liquids), forensics, industrial hygiene laboratory services (American Industrial Hygiene Association [AIHA] accredited), Air analyses (TO compendium methods), emerging contaminants - PFAS, 6PPD , 6PPDQ, biota analyses, hazardous waste management, client services, management of laboratories, laboratory builds, data validation, data management, sampling, laboratory audits and litigation support. Dr. Doss received his Juris Doctorate from Southern University Law Center and was a Law Review Editor. He is licensed to practice law in Louisiana. He earned his Ph.D., Engineering (Environmental Science) from the University of Oklahoma, his M.S., Chemistry from Wichita State University and his B.S., Chemistry from Loyola College, University of Madras.

Chad Northington, P.E.

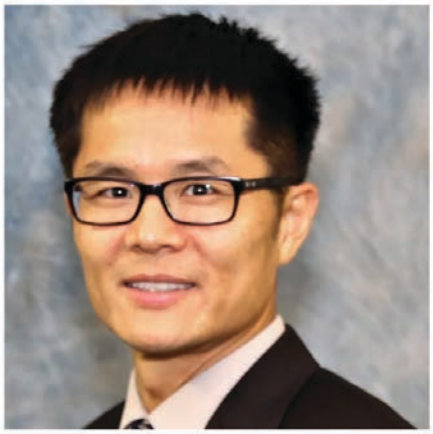
Chad Northington, P.E.

Chad Northington, P.E., Senior Project Manager, Terracon

Bio:

Mr. Northington is a professional engineer with over twenty years of experience in the environmental field in the areas of site investigation, remediation 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 a Senior Project Manager for Terracon. In this capacity, he provides technical support for application of soil and groundwater remediation solutions. Mr. Northington works directly with environmental firms and end users to develop turnkey remedial approaches for in situ-applied strategies across a broad spectrum of technology classes.

Dr. Ziqi He, Ph.D., P.E.



Presentation Title:

Will Lithium Become the Next Emerging Contaminant in the Spotlight?

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

Abstract:

Lithium is widely used in commercial industries, including pharmaceutical drugs, industrial chemical catalysts, sanitizing agents, and increasingly as a key component of batteries with a more than 5 times of production over the past decade. However, lithium is under scrutiny as a potential contaminant in drinking water. Notably, lithium is among the 66 chemicals listed in the Federal Drinking Contaminant Candidate List 5 (CCL 5) and is the sole non-PFAS (per- and polyfluoroalkyl substances) chemical selected for the fifth Unregulated Contaminant Monitoring Rule (UCMR 5). Preliminary findings from UCMR 5 reveal that lithium is detected at levels exceeding the screening health reference level in 25% of the public water systems, which is a higher occurrence compared to PFAS compounds. Given the widespread detections in drinking water systems, will lithium be the next emerging contaminant like PFAS in regard of regulations and actions? This presentation will examine lithium detections across different sized public water systems, geographic distribution, co-presence with PFAS, and its correlation to natural background or potential anthropogenic sources (e.g., mining, industrial point discharges). Additionally, lithium toxicity and various provisional values will be compiled, such as the health reference level of 10 micrograms per liter (ug/L) used by EPA's CCL 5 and the screening "drinking water only" benchmark level of 60 ug/L published by USGS. These insights will help to understand its presence in drinking water system, evaluate potential impacts to public health, capture public and regulatory attention, balance its critical role in industrial use with its environmental impacts, and prepare for treatment and any other compliance.

Bio:

Ziqi (Zeke) He, Ph.D., P.E. is a senior consultant at Verdantas with over 22 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 has led investigation and treatment system design for emerging contaminants (e.g., PFAS, 1,4-dioxane, MTBE) at many sites. Dr. He has also been invited as a peer reviewer for frontier scientific journals and grant proposals, and an active member of several Interstate Technology & Regulatory Council (ITRC) project teams.

Manivannan Nagaiah, P.E. and F. Joseph Ullo, Jr. P.E., Esq.

Presentation Title:

Confidential C&D Landfill Redevelopment: Navigating FDEP and County Regulations Miami-Dade County, Florida

Manivannan Nagaiah, P.E., Senior Project Manager, Langan and F. Joseph Ullo Jr., P.E., Esq., Shareholder, Carton Fields

Abstract:

Landfill redevelopment is becoming increasingly prevalent in several Florida counties. These redevelopment projects are typically over Class I (Municipal Solid Waste) and Class III (Yard Waste) and Construction and Demolition [(C&D)] debris landfills. A number of these landfill redevelopment projects are also over orphaned, unregulated dumps that are regulated through local permitting codes and regulations and there are others that are firmly regulated under Florida Department of Environmental Protection (FDEP) statutes (Chapter 62-701 for solid waste) and in Miami-Dade County (MDC) under Chapter 24. This project showcases the redevelopment of a former C&D landfill that was in operation from 1999 to 2004 and closed in 2017. The site was in long-term care (year 4 of 5) when the redevelopment plans were initiated through a zoning variance. The project's warehouse redevelopment plans (~ 400,000 square feet) were navigated through the following agencies for contaminated related topics. • FDEP Solid Waste (SW) Division. • MDC Department of Environmental Resource Management (DERM) Pollution Remediation Section (PRS). • MDC DERM SW. The presentation will explore the navigation at the permitting process to achieve closure certification, site assessment and remediation of soil, groundwater and methane impacts for warehouse redevelopment from prior C&D landfilling operations. The approach for soil remediation through a combination of soil source removal and relocation to meet future design grades and the delineation and long-term management of groundwater impacts will be discussed. The management of methane through the design of gas mitigation system and unique nuances will be discussed. Also, the challenges for stormwater management over waste stratums or lack thereof will be presented. We believe that this is great example of teh overcoming challenges in Florida and gives great guidance on how to navigate the typical topics for redevelopment through a maze of related and unrelated FDEP and MDC programs.

Manivannan Nagaiah, P.E., Senior Project Manager, Langan

Nagaiah Bio:

Manivannan (Mani) has over 18 years experience in remediation, solid waste and overall environmental consulting. Mani is an engineer providing technical and administrative/management support for large and small facilities in several states including FL. He is a licensed engineer in several states.

F. Joseph Ullo Jr., Esq., Shareholder, Carton Fields

Ullo Bio:

Joe Ullo counsels large and small business owners, landowners, private companies, and county and municipal governments statewide in all aspects of federal, state, and local environmental law, regulations, and processes that govern the consideration and usage of land, management of waste, and real property rights.

Joe has more than 25 years of experience serving clients throughout Florida in environmental matters, including representing clients in administrative enforcement proceedings and related civil actions, assisting in the completion of institutional controls and negotiating cleanup requirements for sites subject to state and local cleanup rules, and negotiating property transactions involving land contamination and environmental liabilities and permits. Previously, Joe served as the director of the Florida Department of Environmental Protection's Division of Waste Management (DWM). In this role, Joe directed the policy and the programmatic management of solid and hazardous waste generated and disposed of throughout the state. Joe also advised the deputy secretary of regulatory affairs on DWM policy and activities.

Before practicing law, Joe worked as a registered professional engineer for almost 10 years. He managed hazardous waste, petroleum, and dry cleaning cleanups in the southeastern United States, oversaw environmental compliance for private manufacturers, and assisted with wastewater infrastructure evaluations at federal facilities. Joe also led the environmental cleanup for various military bases, particularly in Jacksonville and Orlando, which now serve as incredible reuse examples for both industrial and residential mixed uses in Florida. This hands-on experience helps Joe coordinate expert analysis to best express a client's position to reach favorable outcomes.

Since 2009, Joe is also a registered patent attorney and assists clients on intellectual property matters especially where those matters relate to green energy technologies, water treatment, or remedial technologies.

Corey Scales

Presentation Title:

Optimizing Bioremediation with Low pH Tolerant Dhc

Corey Scales, Bioaugmentation Coordinator, SiREM

Abstract:

Tetrachloroethene (PCE) and trichloroethene (TCE) can be reductively dechlorinated to cis-dichloroethene (cDCE) under anaerobic conditions by a variety of microbes. Continued dechlorination of cDCE to VC and subsequently to ethene is conducted uniquely by Dehalococcoides (Dhc) bacteria containing the appropriate vinyl chloride reductive dehalogenase gene. For sites that are lacking native Dhc with the appropriate gene, commercial Dhc cultures are often injected into the groundwater to complete the cDCE and VC dechlorination to ethene step. Bioremediation of chlorinated ethenes and many other chlorinated compounds is optimal at neutral pH (i.e., 6.8-7.5). pH values below 6.0 is problematic for bioremediation of chlorinated ethenes with the cDCE and VC to ethene step being the most affected with either slow dechlorination rates or even complete stalling. Given that both reductive dechlorination and fermentation of commonly used electron donors are acid generating processes, enhanced bioremediation has the potential to decrease pH into the inhibitory range, even if prior to bioremediation amendment addition the pH was acceptable.

Modifying aquifer pH using buffering agents such as sodium bicarbonate and various commercial formulations has become increasingly common. Aquifer pH modification has shown varying degrees of success depending on application method, site geology and geochemistry but is generally considered challenging. In certain cases, especially where pH is near or slightly below 6.0, the use of bioaugmentation cultures acclimated to lower pH has the potential to reduce the need for aquifer neutralization. Increasing evidence indicates that complete dechlorination to ethene is possible below pH 6.0 with pH tolerant bioaugmentation cultures. These cultures can be used to minimize or avoid the need for aquifer neutralization. The development and field use of low pH acclimated cultures will be discussed and case studies presented. At one Site in Florida, with the pH ranging between 5.5 and 6.0, PCE, TCE and cDCE were completely dechlorinated to VC and ethene within 6 months of bioaugmentation with a low pH tolerant bioaugmentation culture. At another Site in Florida, where the pH was as low as 5.5, TCE (up to 100,000 ug/L) was dechlorinated to ethene after bioaugmentation with a low pH tolerant bioaugmentat on culture. The benefits of reducing or eliminating the need for aquifer neutralization will be discussed along with lessons learned.

Bio:

Corey has a B Sc. in Biocehmistry and has worked at SiREM for more than 7 years as the Bioaugmentation Coordinator and a Service Area Manager. He has technical experience in the growth, scale-up, and field implementation of several anaerobic microbial bioaugmentation cultures to degrade contaminants including chlorinated solvents, petroleum hydrocarbons, and other recalcitrant compounds. Throughout his career, he has provided technical support throughout the planning, injection, post-injection monitoring and data analysis stages for hundreds of field bioaugmentation events. He is focused on providing insights for optimal bioremediation success.

Jamie Davidson

Presentation Title:

High Chain Hydrocarbon Soil Remediation with Advanced Oxidation T.E.S.T Technology Case Study

Jamie Davidson, Director - Global Turnaround Solutions, Amerapex Corporation

Abstract:

Oil-contaminated soil is one of the most concerning problems due to its potential damage to humans, animals, and the environment. Currently industry worldwide is facing significant challenges following increasing focus on environmental rules, regulations, and compliance. As a result, Companies and Governments are facing increased current and historical liabilities and pressure to achieve the highest levels of environmental performance. This presentation will cover a real-life case study for the world's first economically advanced oxidation solution for effective and rapid treatment of high chain hydrocarbons in soil. It will provide an overview of the T.E.S.T technology, treatment plant process overview and project progress and results to date (successful treatment below 1% TPH) including enhancements in technology/treatment process for separation and removal of Asphaltenes, Paraffins, and Waxes. This project case study is for a United Nations Compensation Commission (UNCC) supported program and the largest environmental treatment and rehabilitation project in the world, with a total impacted area of approximately 114 square kilometers and an estimated volume of over 29 million cubic meters of highly contaminated soil (<15% TPH).

Bio:

Jamie has over 16 years of experience working in Industrial Manufacturing, Oil & Gas, Petrochemical and Power Generation industries supporting various projects internationally. Originally from Edinburgh in Scotland, Jamie is a Mechanical Engineer from the Heriot Watt University, and his entire career has been focused on Asset Management for large complex facilities and infrastructure both on and offshore. Jamie is an active participant in the global conference and expo event circuit, and he has presented several technical presentations on various topics at major events including API, IPEIA, NACE, etc. ranging from integrated turnkey project case studies to innovation and technology. In his current role as Director of Integrated Solutions for Amerapex Corporation, he is responsible for complex integrated projects internationally that involve various services and technologies to successfully execute, including the companies Advanced Oxidation Soil Treatment and Water Treatment systems.

PFAS FORUM

PFAS Forum V

April 9-11, 2025

Rosen Centre Hotel
Orlando, Florida

Forum Purpose:
To educate the environmental/remediation industry and regulatory community on the potential risks from PFAS, as well as discuss regulatory and legal issues, monitoring, treatment, cleanup and disposal technologies.

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- Environmental Forensics
- Innovative Strategies and Approaches to Expedite Site Closure
- Remediation of Petroleum and Heavy Hydrocarbons
- Funding and Insuring Remediation Projects
- Business Aspects for the Environmental Professional
- Other Relevant Topics

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Program at a Glance

Monday, November 4, 2024		
11:00 am - 5:00 pm	The 14th Annual Florida Remediation Charity Golf Tournament	(Shingle Creek Golf Club)
3:00 pm - 7:00 pm	Conference Registration Open - Rosen Centre Hotel	(Executive Ballroom Foyer)
3:00 pm - 7:00 pm	Exhibitor and Poster Presentation Setup	(Executive Ballroom)
5:30 pm - 7:00 pm	Welcome Reception	(Pool Deck)
Tuesday, November 5, 2024		
7:45 am - 7:00 pm	Registration Open	(Executive Ballroom Foyer)
7:45 am - 8:30 am	Continental Breakfast: Exhibit Hall	(Executive Ballroom)
8:30 am - 10:00 am	**FRC 2024 Opening Session**	(Grand Ballroom D)
10:00 am - 10:30 am	Refreshment Break: Exhibit Hall	(Executive Ballroom)
10:30 am - 12:30 pm	**Session I: General Remediation Session - Part 1**	(Grand Ballroom D)
12:30 pm - 1:30 pm	Lunch (Provided)	(Grand Ballroom E)
1:30 pm - 3:00 pm	**Session II: Current Issues in Environmental Insurance**	(Grand Ballroom D)
3:00 pm - 3:30 pm	Refreshment Break: Exhibit Hall	(Executive Ballroom)
3:30 pm - 5:30 pm	**Session III: PFAS Assessment and Remediation**	(Grand Ballroom D)
5:30 pm - 7:00 pm	Poster Reception - Exhibit Hall (6:30 pm 50:50 Raffle and Drum of Cheer Drawing)	(Executive Ballroom)
Wednesday, November 6, 2024		
7:45 am - 12:30 pm	Registration Open	(Executive Ballroom Foyer)
7:45 am - 8:30 am	Continental Breakfast: Exhibit Hall	(Executive Ballroom)
8:30 am - 10:00 am	**Session IV: General Remediation Session - Part 2**	(Grand Ballroom D)
10:00 am 10:30 am	Refreshment Break: Exhibit Hall	(Executive Ballroom)
10:30 am - 12:30 pm	**Session V: General Remediation Session - Part 3**	(Grand Ballroom D)
12:30 pm	Adjourn	
10:30 am - 1:30 pm	Exhibitor and Poster Breakdown	