15th Annual

FLORIDA REMEDIATION CONFERENCE

An NTCC Conference

October 15-16, 2009

Radisson WorldGate Resort

A Technical Conference in a Casual Atmosphere

Produced by NTCC, Inc. and the

Florida **Specifier**

Continuing Education Credits for PEs, CFEAs and LEPs

Day 1

Thursday, October 15, 2009

FLORIDA REMEDIATION CONFERENCE

8:00 Opening Remarks from the Conference Chair
Nicholas Albergo, PE, DEE, Principal
HSA Engineers & Scientists, Tampa, FL

8:30 Immobilization of Arsenic and other Heavy Metals in Groundwater using EHC-M®
Jim Mueller, PhD, President/Director of Remedial Solutions and Strategies
Adventus Group, Freeport, IL

EHC-M is an in-situ remediation technology, consisting of controlled-release organic carbon, zero valent iron and a source of sulfide, designed for long-term stabilization of metals such as arsenic, chromium, lead, mercury and others in groundwater. EHC-M encourages the precipitation and adsorption of arsenic and other dissolved metals, transferring them from the aqueous phase to solid phase. The primary mechanism of removal entails physical precipitation of arsenic with iron and other inorganic compounds, especially those associated with the reduction of sulfate to form arsenopyrite. EHC-M can be applied to the subsurface environment in a number of ways to quickly reduce the concentration of metals in groundwater in a safe and timely manner. Once applied, EHC-M has been shown to rapidly reduce the concentration of dissolved As from concentrations >1,000 to <10 ug/L under both laboratory and field conditions. For example, a continuous-flow laboratory study showed that As removal efficiencies exceeding 98 percent were maintained for over a year, followed by another year of uncontaminated water of varying pH and dissolved oxygen conditions. After >1,000 days of column operation, differential As extractions showed that removal using EHC-M was non-reversible by change in Eh or pH. Based on a cumulative As mass flux, about 35 mg of As were immobilized by 5 g of EHC-M during the 380-day period. Field applications of EHC-M for As and As plus toxaphene, both at Florida sites, and a mixture of heavy metals including copper (86 ppb), cobalt (210 ppb) and nickel (350 ppb) at a site in Canada will be described. Information on application techniques, cost and performance monitoring will be presented.

9:00 Peroxide-Coated Nanobubble Ozone Emulsions for Spill Cleanup in Groundwater, Soil and Fractured Rock
William Kerfoot, PhD, LSP, Principal
Kerfoot Technologies, Mashpee, MA

The development of means to peroxide-coat ozone nanobubbles which persist in solution as an emulsion and can be pulsed through groundwater and soil broadens the horizon for cost-effective treatment. Firstly, larger plume regions can be treated with fewer drilled wells. Secondly, the reactivity to treat chlorinated ethenes greatly exceeds previously measured air stripping efficiencies. Thirdly, the ability to maintain suspension allows pulsed nanobubbles to travel long distances in fractured bedrock and be used in a scrubbing fashion with compression waves. Laboratory testing to field examples are presented to illustrate the behavior of the nanobubble ozone and applications. While early microbubble ozone exhibited a 12 percent increase in efficiency of treatment of TCE, coated nanobubble ozone shows up to five times the removal rate of air sparging. Previous injection of microbubble ozone showed promise for treating Karst geology with fractures contaminated by TCE at a military installation, but there was concern that gas build-up in downward-bent tubes may airlock liquid flow. With negatively-charged bubble emulsion forms of ozone, coalescing problems are overcome, and the mixture, though compressive, flows as a liquid. A summary of results will be discussed.

9:30 Morning break

10:00 Design of a Green Remedial System
Eric Kramer, PE, Senior Engineer
Shaw Environmental & Infrastructure, Clermont, FL

Designing a remedial system that operates with the same reliability as a grid-powered system but reduces the overall carbon footprint requires a realistic cost-benefit analysis of solar, wind and fuel cell technologies and a determination of each technology's ability to supply power consistent with the remedial design requirements. At the request of Lake County, FL, during the design of a conventional groundwater recovery remedial design, Shaw incorporated green energy technologies to reduce the carbon footprint of the system. Shaw designed a groundwater recovery system using three-dimensional modeling. Matching the remedial system's operational power requirements to the capabilities of solar, wind and fuel cell technology proved to be a challenge that required the designer to review the remedial system's operating strategy, power requirements and equipment options, and to perform cost-benefit analysis of the capital costs associated with incorporating green power systems. This presentation reviews some of the design features that must be considered in order to successfully complete and operate a remedial system.

10:30 Green Remediation via an Enhanced In-Situ Bioremediation Solar-Powered System
Rebecca Daprato, PhD, PE, Environmental Engineer
Geosyntec Consultants, Cincinnati, OH

Geosyntec identified and delineated a dissolved phase trichloroethene plume during a RCRA facility investigation at a site located at the Kennedy Space Center. The corrective measures strategy implemented included enhanced bioremediation using biostimulation and bioaugmentation with aquifer buffering, and groundwater recirculation using a solar-powered extraction system to mitigate the potential discharge of impacted groundwater to an adjoining surface waterbody and provide enhanced mixing within the dissolved plume. The project initially relied on the injection of potassium lactate, sodium bicarbonate and microbial culture into a network of injection wells. Following implementation, optimization of the system was performed that included modifying the electron donor and aquifer neutralization agent to EOS® and EOS® AquaBupH™, respectively, to eliminate the need for multiple injections. Additionally, the locations of the recirculation injection wells were modified to enhance electron donor distribution. An evaluation of groundwater performance monitoring data has revealed a significant and ongoing mass reduction of both TCE and its breakdown products, with a corresponding order of magnitude increase in Dehalococcoides and ethene concentrations. These

reductions have resulted in TCE and cis-1,2-dichloroethene concentrations below cleanup target levels in multiple performance monitoring wells. These results suggest that the green remedial strategy implemented at the site is meeting corrective action objectives with a smaller carbon footprint relative to traditional remedial technologies.

11:00 Successful Implementation of Ex-Situ SVE and Enhanced Bioremediation in an Aerobic Aquiferto Remediate a DNAPL Site

Brian Moore, PE, Env. Program Manager and Gordon Walters, PE, Env. Department Manager
HSA Engineers & Scientists, Tampa, FL

During the past ten years, HSA has conducted remedial activities at the Varsity Cleaners site in Tampa, Hillsborough County, FL. Site assessment activities were initiated in March, 1997, and a contamination assessment report was prepared in June, 1998, that indicated the presence of the drycleaning solvent tetrachloroethene at concentrations near 5 mg/L in groundwater in a 10-foot screened well. During site renovations in January, 1999, an interim source removal was implemented at the site to address the impacts in the unsaturated and saturated groundwater zones identified during site assessment. The ISR addressed the impacted soils through soil excavation and on-site soil vapor extraction treatment. In total, approximately 3,250 cubic yards of soil were excavated. The majority of the excavated soil was treated and returned to the excavated area, and approximately 250 cubic yards of clayey soil was transported off-site for disposal. During the ISR, approximately 75,000 gallons of water was also recovered and treated. During the ISR, an underground storage structure and associated piping were identified that led to challenges to remediation. Following soil excavation, a recovery trench was installed for the purpose of treating a residual groundwater PCE mass that remained following redevelopment. The trench was a unique design based on the site conceptual model and the remedial strategy used. Three horizontal wells were constructed in the trench to allow the recovery of groundwater from different vertical elevations inside the hydraulic wall for treatment. Following soil treatment and site redevelopment, HSA recommended the use of existing constructed features of the site to supplement groundwater with a readily available carbon source to promote anaerobic conditions and enhance biological processes for natural attenuation of residual PCE impacts. Potassium lactate was added to the subsurface in the shallow recovery well and was circulated through the recovery trench by extracting groundwater from the deeper recovery well. The enhanced bioremediation activities were conducted between May, 2004, and December, 2007. Based on the results of all constituents of concern decreasing to levels below applicable default groundwater gleanup target levels, the enhanced bioremediation efforts were discontinued and post active remediation monitoring was recommended. PARM was conducted between January, 2008, and January, 2009, and ultimately revealed levels of all target analytes below applicable GCTLs.

11:30 Cost/Performance Analysis of Enhanced Anaerobic Dechlorination Used at Four Drycleaner Sites

Brian Timmins, MSc, Director
ETEC LLC, Portland, OR

Four enhanced anaerobic dechlorination demonstration projects were conducted from 2005 until the present. Each of the cleanups, funded by the Oregon Department of Environmental Quality Dry Cleaner Program or Orphan Site Program, are at former dry cleaners. The programs face limited funding, so it was necessary to find technologies that work in a reasonable time-frame across large areas and are cost-effective. This talk includes the design considerations due to the financial and time limitations, the technology being used, the groundwater data and a complete cost analysis of all four sites. The same in-situ technology was utilized at each site. EAD using a groundwater extraction and recirculation approach was selected for the sites after successful results were demonstrated in an initial pilot-test. This recirculation approach uses a simple, nutrient-amended substrate to stimulate EAD across large areas in short time frames, while maintaining a high degree of hydraulic control in the saturated zone. At one site, previously-installed pump and treat and soil vapor extraction infrastructure was easily adapted and utilized. Up to 1,000,000 gallons of groundwater has been amended and recirculated in the saturated zones at these sites. Chemicals of concern include tetrachloroethene and its associated dechlorination daughter products, trichloroethene, cis-1,2-dichloroethene, and vinyl chloride. Project demonstration areas had dimensions ranging from 50 feet by 50 feet to 350 feet wide by 450 feet long. Saturated thicknesses ranged from 10 feet to 60 feet in thickness. Saturated zone lithologies ranged from silty sand to sand and gravel. Initially most of the aquifers were aerobic and had limited dechlorination occurring prior to the implementation of EAD. Aerobic conditions were quickly overcome and strongly reducing environments were generated rapidly in the treatment zones. Groundwater data will be presented from all four sites showing the temporal and special affects of this approach, as well as some long term data showing no rebounding concentrations. A detailed cost breakdown was conducted for each site to determine the cost per cubic yard treated with this approach. All costs including well installation, trenching/piping, system and substrate costs, consulting, and analytical will be shown.

12:00 Day One Luncheon

1:30 Chemical Oxidation for Cost-Effective Remediation of NAPL at Petroleum, Brownfields and MGP Sites

Chuck Whisman, PE, Vice President of Engineering
Groundwater & Environmental Services, Exton, PA

Remediation sites with significant non-aqueous phase liquid impacts typically require elaborate and expensive remediation. New developments utilizing aggressive chemical oxidation remediation approaches via ozone and hydrogen peroxide injection allow for more cost-effective remediation solutions that are capable of meeting regulatory guidelines in an expedited manner. This presentation will discuss innovative ways to assess cleanup goals at remediation sites with large NAPL plumes, including diesel fuel, heating oil and coal tar impacts. Case studies will convey how the remediation system can reduce volatile organic compound composition in NAPL, soil, and groundwater and reduce the NAPL/coal tar thickness and volume to below clean-up goals within the allotted time-frame. The presentation will discuss recent case studies where ozone and hydrogen peroxide injection systems were designed and operated to achieve cleanup goals. This discussion will also explore tools that can assist with the evaluation and design of the chemical oxidation system and system enhancements that can be made to address challenging remediation goals. The importance of matching your chemical oxidant demand to the amount of oxidant used will also be discussed. Case studies include information obtained from remediating NAPL at manufactured gas plant facilities, brownfield sites, heating oil releases and petroleum refineries/terminals. These case studies are completed in-field projects which utilized chemical oxidation for an expedition and aggressive remediation of significant NAPL mass. The discussion will provide a detailed analysis of the remediation effects on soil, groundwater and NAPL during aggressive chemical oxidation, and evaluate the various investigation and confirmatory tools were used to assess remediation performance.

2:00 Bulk Reduction of Contaminant Mass in Vadose Zone Soil via "Stepped" In-Situ Oxidation Injection Events

David Burgstiner, Senior Engineer

URS Corp., Tampa, FL

This talk will document the application and efficiency of "stepped" in-situ chemical oxidation to treat soil contaminated with diesel fuel on private property as well as within a railroad right-of-way in west central Florida. The source of contamination was nearly 40,000 gallons of diesel fuel accidentally released from a petroleum pipeline over approximately two acres. The majority of contaminated soil at the site, approximately 15,000 tons, was removed via excavation immediately after the release occurred. However, due to the presence of an important and heavily used freight and passenger rail line, removal of all contaminated soil was not possible. Consequently, approximately 240 cubic yards of diesel-impacted soil remained in place directly beneath and along the railroad line. A series of chemical oxidation injection events were implemented in a "stepped" manner to incrementally reduce contaminant mass in the subsurface soils. A new innovative injection technology was used in which large volumes of the chemical oxidant were injected at a high rate in order to achieve an effective radius of influence within the unsaturated vadose zone. Three individual injection events were performed at 90 direct push points using 128,000 gallons of a three percent chemical oxidant solution. A radius of influence of 30 to 40 feet was achieved by injecting 4,000 gallons of solution into each point at a rate of 20 to 35 gallons per minute. The mass of diesel contamination has been reduced from approximately 2,700 pounds prior to the first injection event to less then 400 pounds after the completion of the third injection event. An estimated mass reduction of 85 percent was achieved within a period of nine months.

2:30 **Novel Methodologies of Chemical Oxidation Application in Vadose and Groundwater Zones at a Multi-Level Complex Karst Petroleum Site**

Lance Robinson, PE,

MACTEC Engineering and Consulting, Newberry, FL

This talk will present data developed at a complex preapproval site near the Suwannee River to focus on pilot and novel full-scale oxidant treatment. The RAP methodology was adopted following a previous contractor's failed AS/SVE/pump-and-treat approach that left a residual source area with sheening, and a parts per million BTEX plume to 55 feet depth in a karst Floridan Aquifer. Customized primary injection of a stable EN Rx product utilizing above-ground activated peroxide-based chemical oxidant was proven effective by approximately 70 percent reduction by using combinations of non-compliance wells, and existing sparge and extraction points as injectors combined with selective sparging and purging to enhance contact. The program was accomplished without excessive new drilling or capital equipment or infrastructure. Chemical oxidant and bio technologies injection methods have slowly evolved and become streamlined over time. However, new products, difficult sites and tight economic conditions increasingly call for new ways to apply products by creative methods including modifying the order of operations, employing DPT methods, multi-level well construction, etc. These methods have broad application potential at recalcitrant sites that continue to defy natural attenuation and where continued operation of traditional existing systems is no longer economically viable. Injection schemes vary from simple to complex, from singular well with slow-flow injection, to pulsed injection and recirculation, to enhanced mixing by air sparging and groundwater recovery and reinjection. Lessons learned are discussed that continue to be refined as site feedback allows for further cost effectiveness.

3:00 Afternoon Break

3:30 Thermal Conductive heating Enhanced DNAPL Source Removal

Amy Fu, PE, Senior Project Engineer

Golder Associates, Jacksonville, FL

Residual dense non-aqueous phase liquid was identified associated with a chlorinated solvent groundwater plume at a former electrical equipment service facility in Jacksonville, FL. The areal extent of the DNAPL source area was estimated to be approximately 3,000 square feet, extending vertically to a depth of approximately 16 feet below ground surface. The primary constituents of concern are tetrachloroethene, trichloroethene, cis-1,2-dichloroethene and vinyl chloride. To address DNAPL source removal, Golder installed a system consisting of a multi-phase extraction system, a soil vapor extraction system and a thermal conductive heating system at the facility. The employment of the TCH system is expected to increase the recovery of residual DNAPL from impacted soil and groundwater during subsurface heating The MPE and SVE systems began operating in January, 2009. The TCH system began operating in February, 2009. During the first quarter of operation, the remedial system has operated at almost 100 percent operational efficiency with increase of the subsurface temperature by approximately 40 degrees Fahrenheit, facilitating approximately 180 pounds of contaminant mass removal and reduction of average groundwater concentrations of constituents of concern in the DNAPL source area by over 90 percent. Soil monitoring in the source area is being conducted periodically to further evaluate the effectiveness of the system. Golder and JEA will present project results including the status of the DNAPL source removal action, cost considerations, design and operational challenges, and lessons learned during installation and operation of the thermal conductive heating enhanced DNAPL source removal system.

4:00 Remedial Activities at a Secondary Battery Recycler, Tampa, FL

Lawrence J. Maron, PE, Senior Principal Consultant

Qore Inc., Tampa, FL

The EnviroFocus Technologies facility is a secondary battery recycler in Tampa, FL, that primarily recycles automotive lead-acid batteries. The facility began operation in the 1960s and underwent numerous expansions and modifications. Past practices lead to soil and groundwater impacts primarily from lead and sulfuric acid. Remedial actions at the EFT facility have been conducted both on-site and at adjacent properties. Soil removal was conducted at nearby properties in response to impacts from fugitive dust, and to a lesser degree from surface water runoff into stormwater ditches. The facility is undergoing a major expansion involving demolition of all existing buildings and construction of a new facility. The use of the concept of an "area of contamination" will be integrated into the soil management plan to minimize the amount of soil that requires treatment and disposal. A groundwater recovery and treatment system was operated for a short period of time in the 1990s. The final approved remedial strategy for groundwater is a recently completed barrier wall constructed around the entire perimeter of the facility. This barrier wall is a combination of PVC sheet piling and a combination of bentonite and cement-bentonite slurry wall. A groundwater recovery system in the interior of the barrier wall will produce a lowered hydraulic head so that horizontal groundwater flow is toward the site, and vertical groundwater flow is upward.

4:30 Large-Scale Pesticide Remediation using Deep Soil Inversion

Carol Brown, PE, Professional Engineer

St. Johns River Water Management District, Palatka, FL

In the fall of 1998, the North Shore Restoration Area at Lake Apopka became flooded due to the termination of pumping of the fields and rainfall after the St. Johns River Water Management District took possession of these properties. Unfortunately, fish-eating birds associated with the NSRA died in significant numbers during the fall of 1998 and winter of 1999. The U.S. Fish and Wildlife Service released a statement in February, 1999, indicating their opinion that the cause of the bird deaths was organochlorine pesticide poisoning. Initial cost estimates to excavate the OCP impacted areas were $800,000,000 ($100,000/acre). The district proceeded with an investigation into alternative remediation techniques to reduce the exposure of avian species to OCPs within an approximately 8,000-acre area that would eventually be restored to a wetland habitat. Several other alternatives were evaluated including capping, blending, land-farming, incineration and inversion. The most feasible remedial option was an inversion technique that uses four 52-inch disk blades on a Baker Plow to invert the top 10 inches of OCP contaminated soil into a ~3.5 foot furrow, ultimately creating an in-situ capping. Inversion of approximately 4,000 acres was completed in May 2009. Reductions of OCPs within the inverted fields averaged 68 percent. The final cost for this project was approximately $10,000,000.

5:00 Reception

Day 2

Friday, October 16, 2009

8:00 In-Situ Remediation of Hydrocarbons Using EAS ™ as Terminal Electron Acceptors

Timothy Parker, Technical Representative

EOS Remediation, Raleigh, NC

It was once thought that aromatic hydrocarbons do not biodegrade under anaerobic conditions. However, the importance of naturally occurring anaerobic oxidation processes in the biodegradation of petroleum hydrocarbons is now firmly established and is considered to be the dominant driving force in natural attenuation of PHCs in the subsurface. This process occurs through the oxidation of the PHC with the reduction of inorganic terminal electron acceptor compounds such as nitrate, sulfate and iron. Sulfate reduction and methanogenesis appear to be the dominant natural degradation processes at most sites. A BP/EPA study on the median consumptions of electron acceptors at 74 sites concluded that most hydrocarbon plumes are anaerobic and depleted of sulfate. Based on a solid body of published scientific evidence, adding electron acceptors such as EAS™ (U.S. Patent # 7,138,060) to groundwater will aid in increased degradation. EAS™ addition will stimulate biodegradation by providing a soluble, readily available electron acceptor. In the presence of elevated SO4 -2, anaerobic groundwater bacteria use the PHCs for carbon and energy while mineralizing the hydrocarbons to CO2 and H2O. In addition, SO4 -2 reduction consumes protons increasing the pH and enhancing methanogenesis. This presentation will provide information on anaerobic biodegradation of PHCs. The effectiveness of this cost-effective technology and case studies will also be discussed.

8:30 The Use of Low Energy In-Situ Bioreactors for Soil and Groundwater Remediation

David Cochran, CHMM, PE, Engineer

Cameron-Cole LLC, Pensacola, FL

Techniques are rapidly developing for the in-situ aerobic biodegradation of organic constituents. In the past, impediments to success included the lack of supplemental nutrients, dissolved oxygen and/or the absence of an acclimated microbial population limiting the success of in-situ microbial degradation. Working with the Louisiana State University Aquatic/Industrial Toxicology Laboratory, Institute for Environmental Studies, an Immobilized Microbial Bed Reactor system has been developed and successfully utilized on multiple sites with both soil and groundwater contaminated with petroleum and chlorinated compounds. This system incorporates a proprietary device with a unique delivery system enabling the user to emplace toxin-specific microflora in the in-situ environment with controls to monitor and adjust the surrounding environment for optimal growth of the microbial populations and maximum degradation of the organic constituents targeted for treatment.

9:00 Enhanced Bioremediation Using ChitoRem™

Steven Buser, CHMM, Senior Project Manager

Golder Associates, Jacksonville, FL

ChitoRem™ (SC-20), manufactured by JRW Bioremediation Services LLC, was used at two sites in Florida to facilitate anaerobic reductive dechlorination of chlorinated solvent constituents in the groundwater. ChitoRem is a non-toxic, food grade biopolymer derived from waste crab parts, that contains 20 percent chitin which slowly degrades to yield electron donors over the long-term to facilitate bioremediation of the chlorinated solvents. This was the first known application of ChitoReM or chitin in the state. One site is a former drycleaning facility located in Jacksonville, which is under a voluntary cleanup agreement with the Florida Department of Environmental Protection to conduct site rehabilitation to accelerate the cleanup of the site to facilitate leasing of the property by the client. Tetrachloroethylene was present in the source area soils and shallow groundwater at concentrations as high as 240,000 micrograms per kilogram and 200,000 micrograms per liter. During excavation activities in 2006, Golder implemented an innovative technology involving the application of 1,200 pounds of ChitoRem to the base of the excavation to accelerate the anaerobic biodegradation of the residual chlorinated hydrocarbons in the source area groundwater. Within less than one year after the application of the ChitoRem, the PCE and daughter product concentrations were reduced to below the applicable DEP groundwater cleanup target levels. Chlorinated constituent concentrations have remained below GCTLs after three annual sampling events. The second site is an active electrical components manufacturing facility located in Florida. Two chlorinated solvent degreasing compounds, PCE and 1,1,1-trichloroethane, had been released into the soil and shallow groundwater at the site at two separate locations during the 1970s. PCE and 1,1,1-TCA were present in the source area soils at concentrations as high as 534,000 µg/kg and 75,500 µg/kg, respectively. PCE and 1,1,1-TCA

were present in the shallow source area groundwater at concentrations as high as 870 µg/l and 7,300 µg/l. Golder applied 4,000 pounds of ChitoRem to the bases of two separate source removal excavations. Within less than one year after the application of the ChitoRem to the primary source area, there was a significant and on-going reduction in chlorinated constituent concentrations in the shallow groundwater, with over 90 percent reduction for most constituents. Golder will present the site results and discuss the advantages of using ChitoRem to facilitate the anaerobic reductive dechlorination of chlorinated solvent constituents in groundwater. The discussion will also include plans to conduct pilot studies to inject ChitoRem into the subsurface in slurry form to facilitate reductive dechlorination of residual chlorinated solvents and daughter products in the downgradient groundwater.

9:30 Biological Remediation of a Mixed Urea, Ammonia and Nitrate Plume in Wilmington, NC

John Haselow, PhD, PE, President

Redox Tech LLC, Cary, NC

A shipping terminal along the Cape Fear River in Wilmington, NC, was used for receiving, storing and shipping bulk pelletized urea, chromium ore, salt and salt cake. Historical uses of the property also included the storage and distribution of potash, zircon sand, granite, limestone, canola meal, calcium nitrate, ammonium nitrate and iron ore pellets. As a result of past activities, the groundwater became impacted with urea, ammonia and nitrate above acceptable regulatory levels. The property has prime commercial value because of its location. Remediation alternatives such as pump-and-treat and constructed wetlands were considered. Pump-and-treat was too expensive and the POTW had stringent pre-treatment requirements. Constructed wetlands were not considered because of the value of the property that would have been required. The selected remedial approach employed a combination of aerobic and anaerobic treatment. The urea is converted to ammonia via a hydrolysis reaction. The ammonia is aerobically converted to nitrate by supplying oxygen through an air sparging network. Nitrate is converted to nitrogen via denitrification as groundwater flows through an anaerobic permeable reactive zone. The anaerobic PRZ was installed by soil blending sand and Duramend® into a trench that intercepted groundwater flow. After a few months of operation, it was observed that anaerobic denitrification could be obtained by cycling the air sparging system; the groundwater was naturally reducing because of high organic content. After three years of operation, the groundwater quality has improved dramatically and there was been a substantial reduction in ammonia, urea and total nitrogen levels.

10:00 Morning Break

10:30 Florida Petroleum Cleanup Program Panel

Participants include: Glenn MacGraw, PG, Regional Manager, FGS Group, Tallahassee, FL
Mike Ashey, Bureau Chief, Petroleum Storage Systems, FDEP, Tallahassee, FL

11:30 Day Two Luncheon

1:30 Ensuring Data Quality During Vapor Intrusion Investigations

Chris Anderson, Air Product Manager, East Coast

TestAmerica, South Burlington, VT

For the past 15-20 years, the risk potential for significant exposure to vapor intrusion had been suspected, but only recently has a comprehensive approach to VI investigations been developed to evaluate and address the risks. Many states have published guidance on VI with the number increasing from eight states in 2004 to approximately 28 today. All of the guidance does not adequately address the subject of chemical analysis and data quality. Understanding the data quality challenges associated with evaluating exposure from VI is critical as human health exposure risk is being determined. The presentation will briefly evaluate data impacts introduced from sample media, canister cleaning/certification, flow controller cleaning/certification, canister maintenance, sampling protocols, data review and non-VI sources. The presentation will include empirical data collected to verify the effectiveness of the best practices used in commercial air laboratories for canister and flow controller cleaning and certification.

2:00 Preparing for and Using Water Assurance Compliance System ADaPT Software Application

Linda Hoffman, Senior Engineer

HSW Engineering, Tampa, FL

Beginning Oct. 1, 2009, hazardous waste facilities regulated under DEP's Bureau of Solid and Hazardous Waste are required to report analytical data electronically in ADaPT-compatible format. ADaPT, an Access-based software application, was developed for the DEP to generate compatible, electronic data for uploading into the DEP Water Assurance Compliance System database. Electronic data reporting will involve coordination between the laboratory and data users (consultants, TSDs, generators, agencies, municipalities) with the DEP. To prepare for meeting the deadline, data users must become familiar with using ADaPT to perform automated data review, create an electronic field data file each time environmental samples are collected, and output correctly formatted ADaPT-reviewed data files. These electronic data files are then to be submitted for uploading into DEP's WACS database. It is likely that ADaPT electronic data reporting will also be required in the near future for other programs (petroleum, dry cleaner, 62-780) reporting data to DEP's Division of Waste Management. It is, therefore, imperative that these regulated entities be familiar with ADaPT data review and reporting and ensure that adequate training and support are provided to meet the DEP's deadline. This talk will provide an overview of the ADaPT automated data review process, field data deliverables and reporting requirements to meet the DEP's October deadline.

ADaPT Software Application Demonstration

Cathy Katsikis, Senior Scientist

Laboratory Data Consultants FL, Royal Palm Beach

Data validation is a time-consuming and often tedious part of the analytical data process. Simple Level I and Level II data validation, involves reams of paper and hours of the validator's time. Often, it is not achieved in a timely manner to affect decisions.While the laboratories have the capability to perform an electronic technical review utilizing their LIMS, the end user is left with the task of manually calculating and reviewing the data. ADaPT gives the data receiver the opportunity to accomplish in a few minutes what would usually take hours. The presentation provides a live demonstration of Laboratory Data Consultants' FLADaPT software in order to familiarize attendees with the

Automated Data Processing Tool and to demonstrate the ease and value of its usage for the Data End User and the Florida Department of Environmental Protection.

3:00 Afternoon Break

3:30 Innovative Uses of Large Diameter Augers in Site Remediation

William Gordon Dean, PE, Vice President

Tri-Con Inc., Tallahassee, FL

Large diameter auger borings have been frequently used to excavate contaminated soils in areas that are inaccessible to conventional heavy equipment. Tri-Con has also used LDA borings in a variety of innovative ways to enhance site remediation. These include injection chambers for in-situ chemical oxidation and/or bioremediation reagents, soil vapor extraction, groundwater extraction and multi-phase extraction. Use of LDA borings in low transmissivity soils has proven to be particularly beneficial. The conceptual approaches for each type of use will be discussed, along with a comparison of MPE performance versus a conventional well at a site in Georgia.

4:00 Evaluation of Various Monitoring Well Development Techniques

Tom Kwader, PhD, PG, Principal

Qwater Well Developer, Tallahassee, FL

All types of wells should be developed to remove as much of the fine-grained materials adjacent to the producing portion of the borehole as possible. Loose fines, silts, clays and colloidal-size particles and drilling additives can significantly impact the ability of the well to produce water and increase the turbidity of the water to the extent that the quality and analyses of water samples will be adversely affected. In general, monitoring wells are poorly developed by the drilling industry. Small diameter monitoring wells limit the size and types of tools that can be lowered into the well to perform an adequate degree of well development. Common methods employed by drillers for well development include air lifting, bailing, pumping, and the surge block with check valve. Lightly pumping or bailing a new well will often produce clear, low-turbidity water in a short period of time. The more aggressive development approach such as using a surge block, where the water in the borehole is forced in and out of the screen and/or adjacent formation, requires more time to obtain clear water; however, these wells will produce more water, of lower turbidity, for a much longer period of time. Highly turbid water samples can adversely impact concentration levels of various metals and compounds detected. Many state regulatory agencies and the U.S. EPA are beginning to require groundwater samples to meet minimum turbidity criteria (20 NTUs or less) before samples can be submitted for analyses. Poorly developed wells take much more time to purge prior to sampling than a properly developed well. This extra time prior to sampling adds significantly to the long term cost of sampling the well. Factors relating to the selection of the well development method include cost, development time, ease of use, impact on water quality samples, and most importantly long-term effectiveness. In most cases, the surge block method with check valve for pumping water, fitted with an upper shut-off value, has proved to be a very effective method for small diameter well development.

4:30 Increased In-Situ Remediation Efficacy with an Innovative Injection Technology

Brad Carlson, Manager

ZEBRA Environmental Corp., Tampa, FL

ZEBRA recently used Primawave technology on an injection project in central Florida. The project encountered difficult injection conditions due to relatively shallow aquifers with high hydraulic conductivity. These conditions often result in blow-by where the injected remedial material flows up to the surface around the injection rods and preferential pathway migration in which the injected material takes only the path of least resistance. This phenomenon greatly reduces remedial efficacy, and can result in substantial project disruption. The project was a trial of the Primawave technology at a lead acid battery recycling facility where previous injection events were not successful in raising the soil pH due to blow-by and surface “day-lighting” of product at other areas in the vicinity of the treated area. Blow-by was eliminated compared to non-Primawave injection events. The number of successful injection points, and the amount of injected bentonite clay gel and lime slurry increased dramatically during the event using the Primawave technology. This presentation will include a detailed explanation of the technology, including photographs of field applications and graphic displays of the data. The resulting data implications for in-situ remediation technology selection and applications will also be illustrated.

5:00 FRC 2009 adjourns