AquAeTer
optimizing environmental resources - water | air | earth

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Aqua Aer Terra

In This Issue:

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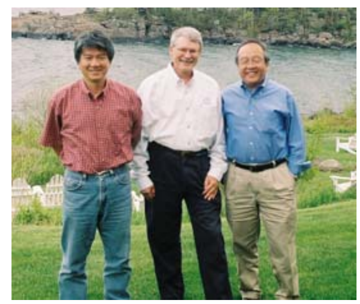
The President's Corner

Indicans Nostra Consortia: Valuing Our Partnerships

The **AquAeTer** team is completing the last of 461 environmental site and NEPA assessments for Cricket Communications in the Houston, Austin, San Antonio, College Station, and Temple/Killeen, Texas markets. Darci Scherbak and her team including Pam Hoover, Amanda Wilding, Adam Musulin, Christy Lewis, Tyler Smith, Chelsea Cunningham, Randy McQuien and Lehla Lee-Walters have memorized the streets of these Texas cities. Sean Muller of our Centennial office continues to collect frequent flyer miles to far off mines. He recently came out of the jungles of Panama in a dug-out canoe after completing work at a gold mine site and then he headed to Mongolia on a coal mining operation. Sean says the work in Mongolia was interesting ….



Texarkana, TX

Monticello, MS

Over the last year, we have continued to work with several of our long-term clients and I thought we would share what makes our partnerships with our clients work year-in and year-out. **AquAeTer** has been working with Nick Kobayashi and Sam Osuge of Kobe Steel on wastewater treatability studies for a new facility start-up in Minnesota. Steve Ladner of Tronox (formerly Kerr-McGee) along with Steve Wampler and Mike Corn in Texarkana, Texas are supervising an Affected Property Analysis Report (APAR) and related sampling being conducted by **AquAeTer** for the Texas Department of Environmental Quality. Mr. Robert Sackellares of Georgia-Pacific along with Paul Marotta, John Michael Corn and Mike Corn are conducting Total Maximum Daily Load studies on the Pearl River in Mississippi. Pam Hoover and Mike Corn have been working with Bill Shildt from Millenium in Baltimore, MD and Rob Schmude in Astabula, OH, assisting them on Spill Prevention Control and Countermeasure (SPCC) Plans and Stormwater Pollution Prevention Plans. Working side by side with our clients as an extention of their project teams has been a key factor in the success of our work. We look forward to our continued working relationships and expanding our family of clients.

Baltimore, MD

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Dr. Ramaswami has over 27 years of diversified engineering, research, and management experience in the areas of water and wastewater treatment and bioremediation of hazardous wastes in soils, sludges, and water. He has a Ph.D. in Civil/ Environmental Engineering, Master of Science degrees in Environmental and Biochemical Engineering, and a Bachelor of Science degree in Chemical Engineering. He has conducted treatability studies for organic and inorganic constituents in soils, sludges, and groundwater. Dr. Ramaswami has technical experience in the design, installation, and operation of biological, chemical, and physical wastewater and groundwater treatment plants for federal, state, and industrial clients. He has participated on a USEPA peer review panel of experts for water and waste. He is a registered Professional Engineer in Colorado, Texas, Oklahoma, and Nebraska. He is a Board Certified Environmental Engineer with the American Academy of Environmental Engineers. He is also an Adjunct Professor of Civil Engineering at the University of Colorado at Denver. Based out of our Denver (Centennial), Colorado office, Dr. Ramaswami provides technical direction and project management on municipal and industrial water and wastewater projects.

Overview of Central Waste Treatment Regulations

The United States Environmental Protection Agency (USEPA) published regulations for Effluent Limitations and Guidelines, Pretreatment Standards, and New Source Performance Standards for Centralized Waste Treatment (CWT) in December of 2000. These regulations established wastewater discharge standards for facilities that treat or recover metal-bearing, oily, and organic wastes, wastewater or used material received from off-site. The primary business of the CWT industry is to handle wastewater treatment residuals and by-products that come from other manufacturing facilities. In response to requests from the regulated community and after review of the rule, USEPA decided to make several minor changes and published the rule in the Federal Register in December of 2003.

The CWT Rule contains effluent limit guidelines (ELGs) and standards for the CWT industry. These are numerical restrictions that may be applied to the discharge of wastewaters from CWT facilities to the waters of the U.S. (direct discharge) or the introduction of wastewater from a CWT facility into a POTW (indirect discharge). The CWT rule requires that facilities subject to this rule meet these discharge requirements. The USEPA developed different ELGs and standards for CWT operations depending on the type of waste received by the CWT. There are four types or subcategories of waste: Subcategory A (inorganics); Subcategory B (oily waste); Subcategory C (organics); and Subcategory D (combination of waste subcategories).

According to the USEPA, the technology basis for the final rule varies according to the three types of waste: 1) two-stage chemical precipitation and filtration for metal-bearing wastes; 2) emulsion breaking, two-stage gravity separation and dissolved air floatation for oily wastes; and 3) equalization and biological treatment for organic wastes.

The USEPA has developed guidance to assist CWT facilities with waste acceptance procedures and subsequent subcategorization. This guidance is not a requirement of the CWT rule, but allows facilities to perform a pre-approval review of the proposed waste stream before acceptance.

The CWT subcategory procedure presented in Figure 1 consists of three basic steps. Step 1 involves collection of data in order to proceed to Steps 2 and 3, if necessary. In Step 2, waste receipt information is compared to the Waste Receipt Classification table for specific sources. In Step 3, for non-specific sources, the appropriate subcategory is determined using the numeric criteria.

Once the CWT facility's initial subcategory determination has been made, the facility does not need to repeat the determination process as long as the waste streams remain consistent. This includes accepting a new wastestream that is within the CWT facility's current subcategory. However, if a CWT facility changes its operation to accept wastes from other subcategories outside its permit, then the CWT facility should notify the appropriate regulatory authority and the subcategory determination should be revisited.

AquAeTer has been providing assistance to various industries for compliance with the CWT regulations, including data evaluation to determine which subcategory of the CWT rule applies, as well as, assessment of the ability of facilities to comply with the CWT standards in a cost-effective manner.

FIGURE 1. CWT SUBCATEGORY DETERMINATION

STEP 1	STEP 2	STEP 3
Incoming Waste Receipt Data Collection	If Step 1 indicates waste from specific sources - make subcategory determination using Waste Receipt Classification Table	If Step 1 indicates waste from non-specific sources - make subcategory determination using Numeric Criteria

$$\Delta X_v = a[S_r + f_d f_x X_i] - bX_d f_b$$

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Ms. Brown is a chemical engineer in **AquAeTer's** Brentwood office with 10 years of diverse engineering experience. After graduating from the University of Colorado, Boulder in 1996 with a B.S. in Chemical Engineering, Ms. Brown began working at Savannah River Site in Aiken, South Carolina. Her work there involved bench-scale studies, sampling technique development, and technical baseline generation for optimization of radiological waste treatment and processing. In 2003, she joined the **AquAeTer** team. Her expertise includes process modeling, process design, bench and pilot-scale studies, environmental sampling, and remediation. She has worked on numerous wastewater projects involving design, bench-scale treatability studies, system optimization and equipment selection. Her other projects include groundwater remediation, sampling, environmental litigation support, regulatory compliance, and site assessments. Ms. Brown is a professional engineer registered in the state of Tennessee. She currently resides in Nashville with her husband and their four-month old daughter.

Wastewater Treatment Plant Lifecycle Analysis

It is important to evaluate the current operation of a wastewater treatment plant in order to plan effectively for the future. Gaining an understanding of the potential future limitations of a system and evaluating options allows for smart planning. A comprehensive evaluation process can reveal the limits of the facility in its current state, and generate options for increasing the life and efficiency of the facility.

In one case, **AquAeTer** reviewed and evaluated an existing Aerated Stabilization Basin (ASB) wastewater treatment plant with a planned upstream process upgrade to develop conceptual interim and final alternatives for the system. The first objective of the analysis was to evaluate the current wastewater treatment system and identify optimization opportunities. Details of the system were gathered, including the dimensions of equipment and basins, flow rates, and wastewater characteristics of the influent and effluent. Additional data needs were determined, including an additional ASB solids accumulation survey, and in-basin profiles of dissolved oxygen, oxygen uptake rate, total suspended solids, total nitrogen series, and biochemical oxygen demand.

The second objective of the evaluation was to use the data to develop a wastewater treatment system model capable of predicting current performance and the potential future performance of proposed system improvements. The data were first input into an existing complex model designed specifically for that system. However, due to changes in the system such as sludge deposition, the model did not accurately predict the current system performance. It was determined that some of the assumptions were invalid and that the model needed to be reconfigured and recalibrated. Chrisie Brown worked with **AquAeTer** Senior Wastewater Technical Director, Dr. Wes Eckenfelder, to define the key kinetic coefficients and more closely model the current conditions. The calculated kinetic coefficients were verified in a bench-scale study by **AquAeTer** staff biologist, Amanda Wilding, and supervised by Chrisie Brown.

The effect of different alternatives on ASB performance was quantified using the newly configured model. The feasible alternatives were then evaluated on several factors including capital and operational costs, compliance margins, and operational/maintenance issues. Oxygen requirement calculations, which determined the level of aeration required to minimize odor generation while maximizing the volume of sludge stored in the ASB, showed that the ASB operation could be optimized by relocation of aeration equipment and idling unnecessary aeration equipment. The evaluation also analyzed whether the ASB operation could be converted into an activated sludge process by adding flow control structures, a clarifier, and return activated sludge capability. This option provided equivalent solids control and capability to comply with potential future ammonia discharge limits compared to a new activated sludge facility; however, the cost was much less than that of a new facility. The ASB conversion also utilized existing ASB capacity for continued sludge deposition and digestion, thus eliminating the future liability of ASB dredging.

The analysis of future process changes demonstrated that the facility could achieve a significant energy savings with the reduction of the unnecessary aerators, while still meeting effluent quality standards. Furthermore, the existing system could then be successfully re-configured to meet future ammonia discharge limits.

$$X_v t + (1 - f_d) f_x X_i + (1 - f_x) X_i$$

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Mr. Bolin is an environmental engineer in **AquAeTer's** Centennial office with over 13 years of environmental experience. After graduating from Southern Methodist University in 1993 with a B.S. in Environmental Geology, Mr. Bolin joined **AquAeTer** in the Brentwood office. In 1996, he moved to Colorado and began work on his M.S. in Environmental Science and Engineering from Colorado School of Mines. After graduation, he rejoined **AquAeTer** in the Colorado office. His technical expertise includes environmental assessments and due diligence, investigations and delineations, hydrogeology, remediation, and monitoring and reporting. He has served as project manager responsible for RCRA RFI implementation and reporting, RCRA CMS report preparation and CERCLA Brownfield investigation planning, implementation and reporting. He has served as project engineer on projects supervising removal of underground storage tanks, removal and disposal of petroleum and metal-contaminated soils, and in-situ remediation of soil contaminated with volatile organic constituents. He has also been the project manager for many property transaction assessments and due diligence reviews. Currently, Mr. Bolin is working on three Affected Property Assessments under the Texas Risk Reduction Program. In his spare time he enjoys spending time in the Rocky Mountains with his wife and two young children.

Traveling Texas Route TRRP
Affected Property Assessment Reports for RCRA Sites

AquAeTer currently is assisting several industrial clients with past or present RCRA-regulated operations, or plans to develop such operations, to comply with the Texas Risk Reduction Program (TRRP). TRRP is a comprehensive regulatory program that focuses on releases of hazardous constituents that threaten water resources (groundwater, surface water/sediment). TRRP is intended to standardize the investigation of contaminated sites, provide flexibility in determining site-specific cleanup levels, and identify appropriate response actions. In general, TRRP applies to all impacted (or potentially impacted) properties in the State, including many RCRA-regulated and permitted properties.

In its effort to standardize the submittal of information for impacted properties, the State developed the requirements for Affected Property Assessment Reports (APARs). An APAR is intended to document relevant affected property information through a detailed and prescriptive process that identifies releases (sources and chemical nature), determines the extent of such impacts, identifies transport and exposure pathways, and determines if response actions are necessary. TRRP prescribes a standardized format for the APAR. The prescriptive approach is intended to be a guide for providing pertinent information, to facilitate regulatory review, and to reduce requests for additional assessment. Going beyond the APAR, the entire TRRP process is intended to yield results that are protective of human health and the environment.