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AquAeTer
optimizing resources | water, air, earth

The AquAeTerian

In This Issue:

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Hot Topics

Mr. Chris Bolin in our Centennial office will be leading a new Life Cycle Analysis (LCA) of water-borne and oil-borne treated wood for the Treated Wood Council. Joining Chris will be Steve Smith, Steve Wampler, Miriam Sielbeck and Dr. Jim Clarke. The LCA will project four specific components of treated wood life cycle including energy use, water use, environmental impacts, and carbon sequestration. More to follow in our Fall newsletter.

The President's Corner

Conservatio Vitae
"Cycle of Life"

AquAeTer has had a busy Fall and Winter with our team venturing out to assist clients on projects across the U.S. and internationally.

Marc Melker with our Denver office is making his second home in Central America for ongoing mining support services. Steve Wampler, along with Chris Bolin and Laura Major, are completing a new Subtitle C Landfill Cell for the US Ecology site in Beatty, Nevada. Cathryn Stewart and Steve Wampler will soon be working on a new Waste Management Landfill in Utah.

Chris Green, along with Amanda Wilding, Amanda Klink, Josh Kelley, and Kristine Pordesimo have been busy conducting Phase I, Phase II, and Phase III environmental property assessments and remediations. Amanda Klink has also been busy managing numerous Phase I and NEPA reports for the telecommunications industry. Josh Kelley has also been working with banks on "pay applications" for construction projects.

Dr. Wes Eckenfelder, Paul Marotta and Darci Scherbak have been assisting Interstate Paper engineers and scientists in Riceboro, Georgia with an upgrade of their anaerobic treatment system. The final design includes adding a low-energy final aeration step to meet very low effluent BOD_5 limits of less than 10 mg/L.

John Michael Corn and Miriam Sielbeck have recently completed flood impacts modeling and analysis for a new mill. John Michael has also been assisting Georgia-Pacific on TMDLs for their Brewton and Naheola pulp and paper mills located in lower Alabama (LA).

Pam Hoover has completed a new CERCLA project with Millennium Inorganic Chemicals at their Ashtabula, Ohio Titanium Tetrachloride facility at Plant 2 for potential source identification.

Many of you have visited Cindy and I at Beech Grove over the years. We have preserved our farm in the Land Trust Program of Tennessee so that it can never be developed and will be there for you to visit in the future.

Michael R. Corn

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AquAeTer hosted a dinner at Beech Grove farm during the NCASI meeting in Nashville: Left to right: John Michael Corn (AquAeTer), Brian McAndrew (International Paper), Bill Jernigan (Georgia-Pacific), Cindy Corn and Mike Corn (AquAeTer), Gilbert Richa (Interstate Paper), and Martin Lebo (Weyerhaeuser).

LEGISLATIVE BACKGROUND

In 1980, the legislative framework for environmental protection was formed with the passing of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLA was designed to remedy threats to human health and the environment from unexpected releases and historical mistakes in hazardous waste management.

In January of 2002, the Small Business Liability Relief and Brownfields Revitalization Act was signed into law. This law amended CERCLA and expanded potential federal financial assistance for brownfields revitalization, including grants for assessment and cleanup. The newly-signed law also limited the liability of certain contiguous property owners and prospective purchasers of brownfields properties, as well as, clarified the innocent landowner defenses to encourage revitalization and reuse of brownfields sites.

The Brownfields Law identified the method for Contiguous Property Owners and Bona Fide Prospective Purchasers to conduct "All Appropriate Inquiries" (AAI) prior to purchase of the property. AAI, as identified by Congress, is presented in Figure 1. The American Society of Testing Materials (ASTM) published ASTM E1527-05, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment (ESA) Process." ASTM E1527-05 was approved by the USEPA and went into effect on November 1, 2006.

For the first time since the creation of CERCLA in 1980, an individual may purchase a commercial or industrial property with the knowledge that the property is contaminated without being held potentially liable, if "All Appropriate Inquiries" are conducted. In the case of a facility purchased for residential use by a person who is not a government or commercial entity, a facility inspection and a title search satisfy the AAI requirement.

In addition to the environmental liabilities addressed in a Phase I ESA, perspective purchasers may face other environmental issues. These issues include, but are not limited to, asbestos, wetlands, lead-based paint, flood plains, and endangered species. The aforementioned issues have regulatory aspects that may need to be addressed prior to a property transaction.

If you are considering purchasing a property and have a choice of multiple locations, it may be beneficial to conduct pre-site characterizations at each potential location. A pre-site characterization includes researching site addresses which are compared against governmental database records. This allows multiple potential locations to be narrowed down to a specific site, based on potential environmental issues. Once a site has been selected, more detailed research, including a site visit, can be conducted through the avenue of a Phase I ESA.

FIGURE 1. Congress' S
Mandatory Components of

- The results of an inquiry by an environmen
- Interviews with past and present owners, o purpose of gathering information regarding
- Reviews of historical sources, such as chai building department records, and land-use occupancies of the real property since the
- Searches for recorded environmental clean under federal, state, or local law;
- Reviews of federal, state, and local governm underground storage tank records, and haz treatment, disposal, and spill records conce
- Visual inspections of the facility and adjoini
- Specialized knowledge or experience on th
- The relationship of the purchase price to th contaminated;
- Commonly known or reasonably ascertaina
- The degree of obviousness of the presence property and the ability to detect the contar

Source: Federal Small Business Liability Relief and Brownfield signed into law on January 11, 2002.

PHASE I ESA

Environmental due diligence can be separated into three tiers. The first tier for a prospective property transaction consists of the completion of a Phase I ESA. Within the Phase I ESA, an Environmental Professional will identify any Recognized Environmental Conditions (RECs). For the second tier of the ASTM standard, if a REC is identified during the Phase I ESA, an environmental consultant can recommend methods to further investigate the REC and/or associated liability.

PHASE II INVESTIGATION

If necessary, a Phase II Investigation can be conducted, which includes a more involved sampling event. A Phase II Investigation would entail one or a combination of the following: 1) environmental sampling of various media; 2) an additional records research; 3)

Statutory Language for "All Appropriate Inquiry"

tal professional;
perators, and occupants of the facility for the
the potential for contamination at the facility;
n of title documents, aerial photographs,
records, to determine previous uses and
property was first developed;
n-up liens against the facility that are filed

ment records, waste disposal records,
zardous waste handling, generation,
erning contamination at or near the facility;
ng properties;
e part of the defendant;
e value of the property if the property was not

able information about the property; and
e or likely presence of contamination at the
mination by appropriate investigation.

ls Revitalization Act,

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Phase II Soil Sampling

a geophysical survey; 4) an asbestos inspection; or 5) a wetlands investigation/delineation. For example, during a Phase I ESA, the likely presence of asbestos containing materials (ACM) is noted; however, prior to any demolition or renovation a thorough asbestos inspection is required prior to commencing work. Based upon the data received in the second tier during the Phase II Investigation, the environmental consultant will evaluate the data collected and report the findings.

PHASE III REMEDIATION

The data collected during the Phase II Investigation can be used to determine the extent of environmental liability associated with the property. Additional efforts

Asbestos Sampling

may be conducted and a decision can be agreed upon as part of the third and final tier. This final tier in the environmental due diligence process potentially involves many aspects. Typically, **AquAeTer** works with the perspective purchaser or lending institution and coordinates with state and federal agencies about the best path forward. For example, in the case of asbestos, the final tier may include management and removal of regulated asbestos containing material (RACM); or with an identified wetland, the final tier may involve permitting and/or mitigation. Whether the solution requires something as minor as a deed restriction or a substantial remedial effort, it's important to have a primary consultant that can assist you with all aspects of environmental due diligence.

Christopher S. Green, P.G.

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Christopher Green is a project Hydrogeologist and the Site Development Manager at **AquAeTer's** Brentwood office. Mr. Green received his B.S. in Geology from Austin Peay State University and his M.S. in Hydrogeology from Illinois State University. He is a registered Professional Geologist in the State of Tennessee. Mr. Green has worked on a variety of projects during his 9 years in environmental consulting. His experience includes several RCRA, CERCLA, and UST projects for industrial, commercial, and governmental clients. His projects have included geologic interpretation, aquifer modeling, soil characterization, site assessments, and tracer testing. While at **AquAeTer** he has primarily been involved with Phase I and Phase II ESAs for real estate transactions. Mr. Green has also implemented a Geographic Information System (GIS) and a wide range of computer modeling software including MODFLOW, MODPATH, Surfer, and ArcGIS. Mr. Green is a member of the National Association for Industrial and Office Properties (NAIOP).

Miriam B. Sielbeck

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Ms. Sielbeck received a B.S. in geology from Vanderbilt University in 2004 and a M.S. in Earth Science from Dartmouth College in 2007. Her research included the transfer of solutes between porous streambeds and channel flow and rainsplash transport of wet and dry sand particles. Since joining **AquAeTer** in 2007, Ms. Sielbeck has assisted with a variety of projects including Phase I and Phase II Environmental Site Assessments, NEPA Screenings, Environmental Litigation Support, Water Quality Studies, and Soil and Groundwater Remediation. Ms. Sielbeck has also been assisting with several Water Quality Modeling projects and is part of the team that is conducting the Life Cycle Analysis of six treated wood products for the Treated Wood Council.

Flood Impacts Modeling and Analysis

A new mill was going to be developed adjacent to a residential community, which prompted concern about flooding in the area. The development of the mill entailed redesigning the drainage systems downstream of many of the residential homes. Residents were concerned about water back flooding from the mill property and causing their homes to flood. To alleviate the flooding concerns of the community, the mill owners requested modeling of the local watershed to determine how the mill would impact the local residents. **AquAeTer** incorporated data from a Light Detection and Ranging (LIDAR) survey and on-site reconnaissance to determine the current drainage system for the community. This data included sub-basin areas, drainage pathways, and topographic highs and lows in the vicinity.

The Army Corp of Engineers has developed two modeling systems, the Hydrologic Engineering Centers Hydrologic Modeling System (HEC-HMS) and the Hydrologic Engineering Centers River Analysis System (HEC-RAS). Together, these modeling systems can be used to model urban drainage, flooding potential, and analyze steady and unsteady stream flow. **AquAeTer** input the watershed information into the HEC-HMS and HEC-RAS to create a digital model of the local drainage system. The HEC-HMS was used to model the 100-year storm (based on rainfall charts developed by the National Oceanic and Atmospheric Administration) to determine the volume of water that would move through each of the sub-basins and drainage pathways in the system.

Once **AquAeTer** modeled the volume of water moving through the watershed, the data were utilized to determine potential flood areas before and after development of the mill. During site reconnaissance, field measurements were taken of the sizes and shapes of drainage ditches, ground cover types, culverts, and bridges to optimize the model for the local community. Any observed sources, reservoirs, junctions, and diversions to the local drainage system were also noted and built into the model. Once all data were input into HEC-RAS, the model was used to predict which areas had the potential to flood during a 100-year storm.

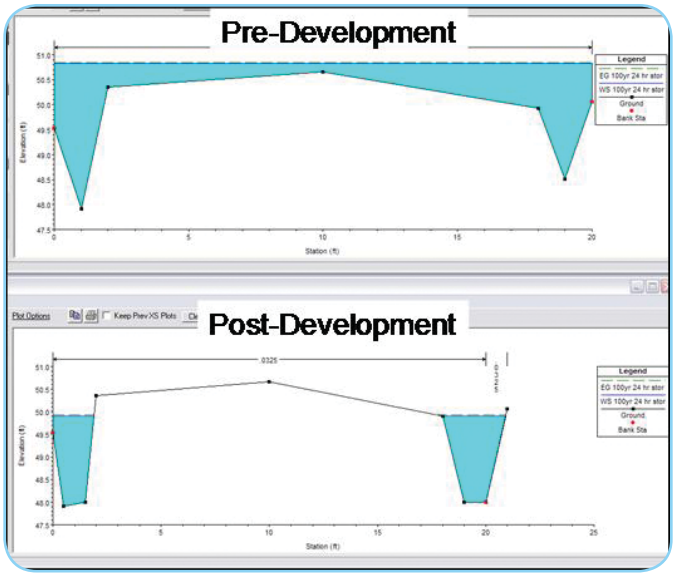

Figure 1. Model of Drainage Improvements

Two simulations of the storm were created: 1) pre-plant development; and 2) post-plant development as shown in Figure 1. This enabled **AquAeTer** and the mill planners to determine precisely how the development of the mill impacted the community and make adjustments accordingly.

With the modeling of HEC-HMS and HEC-RAS, the mill planners were able to make improvements to their drainage system, which are shown in the post-development portion of Figure 1. The figure indicates that after improvements were made to the county roads and to the mill's downstream system, a 100-year storm would reduce flooding on the county road upstream from the mill. This shows that flooding conditions can be improved in certain situations. The mill planners were also able to make recommendations to the county road maintenance office for improving the drainage in the residential areas that had not been maintained.

To learn more about flood modeling and other modeling projects we perform, you can contact Miriam Sielbeck at msielbeck@aquaeter.com or John Michael Corn at jmcorn@aquaeter.com.