



Welcome to Cascade Conversation

Welcome to Cascade Conversation. As the name implies, this quarterly newsletter is designed to spark a conversation between our company, our clients and fellow industry professionals. Cascade Conversation is a way for our readers to learn more about drilling, investigation and remediation technologies, see how these technologies are applied on site, and hear about what's new and exciting in the environmental services industry. As always, the most successful conversations go two ways so we look forward to hearing what you have to say as well! We hope you enjoy learning about our company. Please send any questions, comments or suggestions to communications@cascade-env.com

Facing the Challenges of Complex Sites

By Dr. Gorm Heron

Complex sites are typically sites where past remedy attempts have failed, and sites that require a lot of attention to get treated. They are often DNAPL sites, deep, and sometimes sites with both source zones and long plumes. Cascade is the leading provider of in situ remediation technologies, and High Resolution Site Characterization (HRSC). We are the only single-source, nationwide contractor with expert technical capabilities and fleet to fulfill all your project needs through proven solutions for contaminated soils and groundwater. Therefore, we are uniquely qualified to deal with complex sites and sites requiring combined remedies.

Sites may be complex for several reasons:

- **Setting and geology** - multiple contaminated zones, hard to treat layers such as bedrock or thick clays.
- **Depth** - too deep for excavation and simple mixing technologies
- **Contaminants** - hard to treat chemicals, mixed wastes
- **Both source zone and plume** - a solution needed that addresses both
- **Access limitations** - hard to access areas for characterization and remediation

Solutions from the Cascade Team:

- **Site characterization** - high resolution profiling, soil, vapor and water sampling, data integration and presentation
- **Remediation** - we master the range of technologies from Monitored Natural Attenuation (MNA) through aggressive thermal treatment, and customize the choice to each situation. Specifically, we combine source zone remedies with plume remediation for a more cost-effective and sustainable solution
- **Integrated, flexible implementation** - one team using state of the art techniques to optimize the characterization and remedy as we implement.

Recent Example - PCE source Zone Removed - Plume Disappeared

At a site in Endicott, NY, HRSC tools were used by Groundwater Sciences Corporation to define a PCE source in three dimensions. TerraTherm treated the PCE source zone effectively by using In Situ Thermal Desorption (ISTD), removing 99.97% of the mass and thereby reduced the source term by three orders of magnitude. In the five years following thermal treatment, the 360 m (1,200 ft) long plume shrunk, and the pump-and-treat system could be turned off. This combined remedy (ISTD and Monitored Natural Attenuation) was just published in [Groundwater Monitoring and Remediation](#), and is available by clicking the link below. The combined solution was implemented at a cost within the estimated and quoted range. The alternative option, excavation, was estimated at \$9.6M. With ISTD, the costs of treating the same footprint (and actually more volume considering the entire soil column) was estimated at \$5.4M. The actual cost of implementing ISTD was reasonably consistent with estimates made at the remedial options alternative. The client therefore realized substantial savings over the second best option.



Photo of Endicott, NY site

[Thermal DNAPL Source Zone Treatment Impact on a CVOC Plume](#)

by Gorm Heron, John Bierschenk, Robin Swift, Robert Watson and Michael Kominek

Article first published online: 25 FEB 2016 | DOI: 10.1111/gwmmr.12148

In the same issue of Groundwater Monitoring and Remediation, several other TerraTherm projects were analyzed, showing significant positive impact of source reduction on the dissolved plumes.

[How Effective is Thermal Remediation of DNAPL Source Zones in Reducing Groundwater Concentrations](#)

by Ralph S. Baker, Steffen G. Nielsen, Gorm Heron and Niels Ploug

Article first published online: 2 MAR 2016 | DOI: 10.1111/gwmmr.12149

Meet Us in Palm Springs, CA

May 22- 26 2016

Cascade and TerraTherm are sending our experts to the [Tenth International Conference on Remediation of Chlorinated and Recalcitrant Compounds](#) in Palm Springs. Come talk to us at booths 904 and 925 or join one of our many presentations.



TWS Environmental Teams up with Cascade

TWS Environmental, a full-

service environmental firm providing turnkey project management, has teamed up with Cascade in support of numerous technical services and drilling engagements across the country. TWS is a Small Business Enterprise (SBE), Small Disadvantaged Business (SDB), Service Disabled Veteran Owned Small Business (SDVOSB), and Minority Business Enterprise (MBE), who holds various state and municipal certifications, and offers access to Cascade's full suite of services. TWS and Cascade were most recently recognized for their efforts on a USGS project in the Northeast, where the team's combined capacity and collaborative approach were instrumental to the project's success.



Well data provides new insight on groundwater system

Technical Workshop in Chicago



Cascade Technical Services, TerraTherm, PeroxyChem, and Cetco are hosting a technical workshop on, ***"Advanced Site Assessment and Remediation Techniques for Challenging Geologic Settings - Low permeability clay, fractured bedrock."***

Thursday May 12, 2016 | 10:00 AM - 2:30 PM

Minerals Technologies Inc
2870 Forbs Ave
Hoffman Estates, IL 60192

Click the button below to sign up and find out more about the workshop.
If you have any questions please contact Bob Kelley at rkelly@cascade-env.com.

This workshop will also be coming soon to the following cities:

Minneapolis, Minnesota - June 9, 2016

Sign Up

Sonic Drilling and Coal Combustion Residuals Compliance

By Steve Bratton



Newly enacted legislation, Federal CCR Rule-HQ-RCRA-009-0640, affects most coal burning electrical generating plants requiring them to investigate potential contamination from coal combustion residuals landfills and surface impoundments.

CCR, also known as coal combustion residuals, coal combustion waste or coal ash is generated from burning coal for the purpose of generating electricity by electric utilities

and independent power producers. CCR includes fly ash, bottom ash, boiler slag, and Flue Gas Desulfurization (FGD) materials.

CCR is one of the largest waste streams generated in the U.S. According to the U.S. EPA, in 2012, over 470 coal fired facilities burned over 800 million tons of coal, generating approximately 110 million tons of CCR in 47 states and Puerto Rico. In that same year, over 310 active CCR landfills and 735 active CCR surface impoundments were identified.

Cascade is working with environmental and engineering consultants to help utilities maintain compliance with the Federal CCR ruling. One particular challenge has been the effect of excessive turbidity on groundwater monitoring systems near CCR impoundments. Under the new regulations, all CCR surface impoundments, landfills and lateral expansions must install a groundwater monitoring system and conduct groundwater monitoring. This includes inactive surface impoundments at active facilities unless they are closing within the three year timeframe. Groundwater requirements must be met throughout active life and closure/post closure period.

Complete well development is often difficult to accomplish where the natural lithology is finer, more silty and interbedded. Heavy metal contaminants in turbid water can compromise water samples both short- and long-term resulting in false-positive or artificially high analytical results.

To address this challenge, Cascade utilizes sonic drilling technology which has proven to provide the best solution under these conditions. Sonic imparts substantially less disturbance to the borehole wall during drilling. Well construction takes place within a temporarily cased borehole so that proper filter sand pack and well seal can be placed evenly around the well screen and casing. Well development then tends to be much faster, more effective, and longer lasting compared with conventionally installed wells where natural formations are churned and smeared back up the borehole wall.

Over 130 Cascade employees from 13 locations across the country coordinated logistics and worked together on a major CCR project in the Southeast. The scope of work included coring as well installation of monitoring and data gap wells. The six month long project involved multiple drilling technologies including sonic, rotary and auger. Work continues as the client prepares for the implementation of standards under the new federal CCR regulations.

To learn more about Cascade's CCR capabilities,
contact Steve Bratton at sbratton@cascade-env.com

In Case you Missed It

LAST CHANGE TO REGISTER- Cascade workshop in Oregon

Come join consultants and regulators on the cutting edge of the environmental industry for a Cascade workshop on **April 21st...** [Read more](#)

Cascade EBJ Achievements

Cascade Drilling is pleased to announce that it was chosen to receive the EBJ Gold Medal Award for...[Read more](#)

TerraTherm featured in Zweig Letter

Superfunds. Brownfields. Industrial waste from a bygone era. The ugly stuff that doesn't go away, like hydrocarbons, creosote, chlorinated solvents, and pesticides...[Read more](#)

TerraTherm Partners with Beijing Enviro-Chem for Environmental Remediation

TerraTherm, Inc., a subsidiary of Cascade Environmental, is pleased to announce it has partnered with a Chinese based partner to...[Read more](#)

"Think Thermal" Q1- TerraTherm's Quarterly Newsletter

Catch up on what has happened at TerraTherm over the last quarter... [Read more](#)



Let us know what you think by emailing communications@cascade-env.com