Comprehensive Testing for Coal Combustion Residual Sites

Power generators face new and stringent regulations regarding coal combustion residual sites (CCRs)

Before groundwater treatment begins, you need to know which constituent you are dealing with, their concentrations, where they are located and where they originate (i.e., a CCR unit or naturally occurring), and how they are transported in the subsurface. SiREM can help you characterize and understand your site before, during, and after groundwater treatment.

Each site is unique. And so is each solution.

Turn to SiREM as a neutral third party to help evaluate your groundwater, surface water, leachate, and ash treatment methods before a technology is selected and design effective, best-value systems tailored to your site. SiREM can perform the testing required by the USEPA tiered approach to help you investigate monitored natural attenuation (MNA). SiREM's molecular genetic testing (Gene-Trac®) can support your understanding of the microbial populations present and their ability to attenuate contaminants. Every step of the way, we communicate with you so that you understand what is happening and so that we design tests that address what you need.

With SiREM, every study is a look into what strategy will work best for your site. In conversation with you, we are flexible, and adapt our work to meet your needs as they arise.

Consider monitored natural attenuation (MNA)

Evaluate whether constituent are being sequestered by native aquifer material, bedrock, or soils. SiREMNA™ is comprehensive testing suite that evaluates the viability of MNA remedies to help you understand the contaminant sorption capacity of the solids and potential desorption when aquifer materials interact with background groundwater.

Find options to treat inorganics

Explore treatment strategies such as pH manipulation, calcium polysulfide, ferric sulfate, ZVI, sulfate-reducing bacteria, and other options. Understand how they can treat metals and other inorganic components. Ask us about patent-pending technologies that can recover rare earth elements (REE) from leachate and treat boron-impacted groundwater and CCR leachate in place. Our REE technology has been proven to successfully sequester yttrium (Y), terbium (Tb), gadolinium (Gd), and neodymium (Nd) from solution providing an attractive alternative to mining for these scarce elements. Our low-cost high removal boron adsorbent media exhibits loading rates similar to commercially available ion exchange resins and is able to reduce boron concentrations to below the regional screening limit of 4 mg/L. In addition to removing boron, the sorbent media also removes cobalt, selenium, and manganese.

Monitor and manage CCR leaching

Understand how contaminants including metals, PFAS, and radionuclides can leach from ash stockpiles due to stormwater runoff.

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Learn about converting byproducts into reusable gypsum

Learn how SiREM's patented technology can use sulfate oxidizing bacteria to transform hard-to-manage low-grade gypsum into a much purer product suitable for wall-board production.

Understand the bacteria at your site

Choose from more than more than 60 targeted quantitative PCR tests to understand the bacteria already at work at your site. We can measure sulfate reducing/oxidizing bacteria, selenium reducing bacteria, iron reducing bacteria, and nitrogen compound metabolism. Using Gene-Trac® next generation sequencing (NGS), we can characterize the activity of whole communities that metabolize metals and identify the wide range of microbes relevant to ash ponds and CCR-impacted groundwater.

Harness the power of passive sampling

Learn how SPeeper™ samplers can measure metals, organic carbon, phosphorus, ammonium, and nitrate dissolved in sediment pore water, surface water, and stormwater. Because our samplers only measure dissolved concentrations, they provide data that are more useful for fate and risk assessment, toxicity identification, and remediation design and monitoring.

Below are some of the ways we most often support our power-generation and CCR clients.

Evaluate MNA:

- Evaluate MNA and distribution coefficients (Kd) using isotherm testing
- Assess stability of the sorbed constituents under various geochemical conditions using desorption testing in batch reactors or column systems
- Measure SIREMNA™ parameters to evaluate the nature, rate, and extent of intrinsic biological and abiotic attenuation
- Determine bioavailable and mobile concentrations of dissolved metals and inorganics at potential exposure points with SPeepers™

Understand water chemistry:

- Evaluate potential manipulation of geochemical conditions (e.g., pH/ORP manipulation) to promote precipitation of dissolved metals and carbonate, hydroxides, oxides and/or sulfide solid phases
- Compare and assess different commercially available sorptive media to promote different commercially available media to promote attenuation

Evaluate chemical reduction:

- Act as an impartial party to test zero-valent metals (e.g., ZVI) products and dosages to measure chemical-specific reaction rates
- Evaluate rate and extent of chemical reduction using other commercial amendments, such as sodium sulfide or sodium bisulfide
- Measure the rate and extent of biogeochemical oxidation and reduction reactions that affect metal solubility

Assess microbially mediated water treatment:

- Evaluate acclimation periods for natural microbial populations
- Identify inhibitory conditions for specific microorganisms
- Optimize electron donor or acceptor additions
- Estimate site-specific enhanced contaminant degradation rates
- Assess the need for, and benefits of, bioaugmentation

Please contact SIREM for more information on how our services can help solve your CCR-related environmental concerns or to obtain a cost quotation for our services.

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