Water and Wastewater Services: Power Generation

Delivering work safely

Providing innovative technology solutions to meet regulatory changes

Tailoring solutions to meet water and wastewater needs

Offering full range of services
Ensuring Supply of Source Water

Water is a critical resource for the Power industry, and CH2M HILL helps industrial facilities ensure adequate, reliable supply from various sources. Examples include traditional water sources or alternative water supplies, such as grey, brackish, and sea water. We support our Power clients through the following services:

- Permitting support
- Designing conveyance and water treatment systems for cooling tower, boiler feed, and other plant uses
- Intake structure entrainment and impingement studies
- Identifying and evaluating alternative water sources, including reclaimed municipal effluent, for new and existing facilities needing to convert to alternative sources

Wastewater Management – From Characterization through Implementation

Meeting ever-tightening wastewater discharge requirements requires in-depth understanding of power plant wastewater and technology solutions. We help clients characterize stations’ wastewater, develop water and mass balances, and set a design basis for wastewater management.

CH2M HILL is an industry leader in removing pollutants, including meeting extremely low limits for trace metals, including selenium, mercury, arsenic, cadmium, salinity, and nutrients. Our significant contributions to selenium removal methods include authoring the North American Metals Council’s Review of Available Technologies for the Removal of Selenium from Water. We have expertise in physical, chemical, biological, and thermal zero liquid discharge systems, solids handling and dewatering, and deepwell injection for disposal.

We help our clients improve their existing treatment systems by evaluating processes and equipment. We have helped clients design wastewater management systems that can be cost-effectively and efficiently adapted to address future changes in capacity and discharge requirements.

CH2M HILL also supports our clients with solutions that provide significantly lower-cost alternatives, such as negotiating revised permit requirements, source control, water reuse, and outfall mixing zones.

CH2M HILL offers Power industry clients the full breadth of available water and wastewater services through a single entity across the range of industry needs.

The Power industry is facing many water and wastewater management challenges, including tightening wastewater discharge limits as a result of tougher water-quality-based effluent limits (WQBEL) and pending U.S. Environmental Protection Agency effluent limitation guidelines (ELG). Other challenges causing changes in wastewater management include managing wastewater after ash impoundments closure as a result of the upcoming Coal Combustion Residuals (CCR) rule, new water intake structure requirements (316b), further constraints regarding 316a thermal discharge requirements, water scarcity and increasing reuse, aging infrastructure, and impacts to wastewater resulting from plant changes to meet air quality regulations. To do this, all of these challenges must be met while continuing to generate power during implementation of modified or new systems.

CH2M HILL has a suite of industry-leading experience to provide cost-effective solutions.
Managing Stormwater to Meet Environmental and Operational Requirements

Stormwater must also be managed under permit requirements. In some areas of the United States stormwater is a potentially valuable water supply. CH2M HILL supports our clients in wastewater treatment and disposal management to comply with environmental and operational requirements by recommending best management practices, source separation, sewer segregation, and stormwater reuse.

Providing In-Plant Modifications to Support Compliance

Addressing a power plant’s water issues means knowing how to work within the power plant. CH2M HILL supports clients with changes inside the power block that reduce the cost of treatment and help facilities be compliant with upcoming regulations and guidelines. We also consider how wastewater management (such as the impact of flue gas desulfurization wastewater treatment on gypsum quality) can affect power plant operations and incorporate into the overall compliance strategy. We evaluate entire systems and water balances to optimize power plant performance. This includes flue gas desulfurization system operation expert evaluation studies, and designing in-plant changes, such as modifying fly ash transport systems and rerouting sumps and piping.

Providing Solutions that Address both Coal Combustion Residuals and Water Requirements

Our water and CCRs teams work closely together to ensure an integrated solution. CH2M HILL is also a leader in the field of CCRs management. Our CCRs experts have led recent state-approved ash pond closure plans, and are at the forefront of CCRs characterization and compliance planning.

Permitting Support

CH2M HILL, on behalf of our clients, works closely with regulators to negotiate permit conditions that help manage cost and risks. We use our experience with the limit-setting process, modeling, and negotiation to provide a compelling case to support reasonable compliance requirements. This includes water use permits, wastewater discharge limits, 316b studies and permits, and establishing compliance with 316a thermal discharge requirements.

Power Plant Experience, Local Project Delivery

As a full-service engineering and construction company, CH2M HILL focuses on our clients’ lifecycle needs. Our suite of capabilities allow us to focus on our clients’ requirements to conceptualize, validate, permit, design, construct, operate and maintain, and help finance industrial projects across the spectrum. We do everything from small consulting assignments to program management on the world’s largest projects. We can take responsibility for as much of the project as our clients require. We possess a complete range of expertise and take pride in our proven ability to develop innovative yet practical solutions to complex water and wastewater projects for the Power industry.

Collaborating for Success

A key element of our project delivery approach is fostering a true partnership with clients through each phase of our services. Our delivery teams are designed to:

- Serve as a seamless extension of our clients’ staff
- Rapidly mobilize and commit a local delivery team, engaging global experts as needed
- Implement a world-class project controls system, tailored to project needs, with a range of flexible options to drive quality, cost, schedule, integrity, and risk avoidance
- Deliver the most economical projects possible when measured on a lifecycle cost basis
Full-Service Provider

We provide a full complement of services that are tailored for each project:

- Siting, Licensing, and Permitting
- Consulting Services
  - Strategy Development
  - Regulatory Support
  - Process and Facility Planning
  - Technology Selection
  - Treatability and Laboratory Services
  - Staff Augmentation
- Design and Construction Services
- Commissioning and Startup
- Operations and Maintenance

About CH2M HILL

We have more than 25,000 employees worldwide, generating US$6.6 billion in 2013 revenue. The firm has long been recognized as a most-admired company and leading employer, and is consistently listed as a best place to work in the United States (2003, 2006, 2008, 2009, 2011, and 2013).

Target Zero

CH2M HILL considers Health, Safety, and Environment of paramount importance to protect all people and every aspect of our projects. We call our commitment Target Zero because our efforts are focused toward a goal of zero incidents. The outcome of our safety performance has earned us recognition from OSHA through their Voluntary Protection Program’s Star Award on multiple projects.

Global Headquarters
9191 South Jamaica Street
Englewood, CO 80112
Tel: 1.888.CH2M.HILL (1.888.242.6445)
Fax: 720.286.9250

www.ch2mhill.com
www.ch2mhillblogs.com/water

twitter.com/ch2mhill
facebook.com/ch2mhill

Contacts
Dennis Fink
Client Account Manager
Tel: 510.520.6017
Dennis.Fink@ch2m.com

Michael Bobinecz
Vice President
Tel: 925.786.9282
Mike.Bobinecz@ch2m.com

ENR Ranks

#1 Wastewater Treatment
#1 Wastewater/Sewer
#1 Environmental
#1 Program Management
(Engineering News-Record 2014)
The Power industry is facing significant wastewater management challenges, including tightening wastewater discharge limits as a result of tougher WQBELs and U.S. Environmental Protection Agency ELGs. Other challenges causing changes in wastewater discharge limits include managing wastewater after ash impoundments closure due to the upcoming CCRs rule, aging infrastructure, and changes to wastewater resulting from plant modifications to meet air quality regulations.

CH2M HILL has helped clients address the full range of wastewater streams at power plants, including flue gas desulfurization system discharges, gypsum dewatering waste, bottom-ash handling wastewater, water from fly-ash dewatering, water treatment system wastewater, metal cleaning wastes, coal pile run-off, oil/water separator wastewater, various low-volume wastes, cooling tower overflows/blowdown, once-through cooling water, dewatering bin wastewater, ash trench underdrain discharges, miscellaneous plant drainages, air pre-heater wash water, coal conveyance water extraction wastewater, landfill leachate, and limestone area run-off.

We provide compliance strategies that reduce capital and operations cost, and facilitate evaluation and decision making. Our familiarity and expertise gained from serving Power industry clients for more than 30 years allow us to concurrently save time and expenditures and mitigate risks across the full spectrum of wastewater management services needed to meet these challenges.

Permitting

Our compliance specialists are experienced in getting the permits needed for initial construction, as well as ongoing permit compliance across all environmental criteria. We have also supported many Power clients in negotiating discharge permits that helped reduce the cost of compliance.

Consulting Services

CH2M HILL has supported numerous clients in setting strategic goals and evaluating and selecting compliance alternatives.

CH2M HILL has expertise related to all of the available power plant wastewater treatment technologies. We also recognize that sometimes skillful permit negotiations, source control, or water reuse can meet the project needs while generating substantial project savings. The expertise and the tools we have developed through working in the power industry allow us to develop solutions while concurrently saving time, conserving budget, and mitigating risk. One example is our proprietary cost modelling tool, which we have successfully used for several power plant wastewater studies to rapidly develop cost estimates comparing alternatives to help our clients, leading to selection of a solution.

CH2M HILL will apply the right technology for projects, rather than try to apply pre-prescribed technologies that may not meet the life-cycle objectives of the project(s). We pay close attention to all important issues, including some that may be overlooked – facility layout, quality of ancillary equipment, constructability, operability, and interfaces with existing facilities. We also consider treatment requirements, including post-treatment, to ascertain that parameters, such as effluent biochemical oxygen demand and ammonia, are addressed.

Treatability testing is used to help minimize compliance risk and drive out unneeded conservatism and cost in design. CH2M HILL has an extensive in-house laboratory and pilot-testing capabilities. CH2M HILL’s Applied Sciences Laboratory has decades of experience in designing and building pilot treatment systems, both fixed and mobile. Applied Sciences Laboratory also sets up analytical labs, an important component of treatability testing. CH2M HILL has successfully pilot tested

Example Projects

Low-Cost Bottom Ash Solution

We redesigned a bottom ash treatment system using established technologies from other industries to lower cost. This solution will reduce capital costs by more than 60 percent from the originally proposed system.

Developing Compliance Strategy for Coal-fired Power Plants for WQBELs and ELGs

CH2M HILL supported a midwestern utility client in making a wholesale conversion from pond-based wastewater management to a system that will comply with new, tight permit requirements and anticipated upcoming ELGs and CCRs requirements.

For their two power plants, we characterized wastewater, developed a basis of design for treatment, evaluated multiple compliance options, worked with the client to select the compliance strategy, supported permitting and regulatory commission testimony, and prepared the design that was then used to hire an engineering procurement contractor firm. CH2M HILL is serving as the Owner’s Engineer.

We developed an innovative strategy during the early conceptual design phase to remove solids from flue gas desulfurization water so it could be recycled to the adsorber. This allowed the size of the softening and evaporator treatment train for the remaining flue gas desulfurization water to be reduced, resulting in a system cost savings of 30 percent.
Design and Construction Services

Our team has extensive experience designing and building wastewater treatment facilities for the Power industry and many others. Our design and construction experience allows us to incorporate constructability and operability considerations into our designs to ensure that systems meet long-term needs. Our experience with the standards and practices used in the industry allow us to start designs without a steep learning curve. We develop designs and procurement/construction plans that meet schedule challenges by phasing construction to minimize or avoid power production downtime through coordination with planned outages, modifying the current system for temporary operational improvements, and other factors. Our design teams address critical elements, such as having process engineers translate treatment concepts into workable systems, electrical and I&C engineers design and integrate systems, corrosion control experts evaluate the harsh nature of power plant wastewater (especially flue gas desulfurization water), and geotechnical and structural engineering address challenging soil or fill conditions. Our project management and project controls experts ensure that we deliver work on time and on budget and exceed quality and safety goals.

During the construction phase of a project, CH2M HILL can serve clients in a variety of roles to meet their needs. We can provide full engineering procurement construction (EPC) delivery, support clients in engineering procurement construction management (EPCM) arrangements where we augment the client’s construction management and/or procurement staff, and work as an Owner’s Engineer providing services during construction and/or startup. Examples include CH2M HILL’s EPC role for a selenium-treatment biological treatment plant, providing fast-track EPCM services for flue-gas desulfurization (FGD) wastewater treatment systems for two generating stations, and serving as Owner’s Engineer in a conversion from ash pond-based treatment to an advanced tank-based treatment system at two generating stations.

Commissioning and Startup and Operations and Maintenance

CH2M HILL has led and supported numerous system startups, and we have the tools, processes, and experience needed to bring systems through this critical phase. We have startup experts who team with process and I&C engineers from the project design to plan for and meet the challenges of system startups. We provide operator training and write easily understandable operation and maintenance manuals. CH2M HILL operates hundreds of water and wastewater treatment systems, including dozens of industrial facilities, providing owners with peace of mind that their systems will be well operated and maintained safely and cost-efficiently.

About CH2M HILL

Employee-owned CH2M HILL is a global leader in full-service consulting, design, design-build, operations, and program management services for public and private clients. With US $6.6 billion in revenue and more than 25,000 employees worldwide, we deliver innovative, practical, sustainable solutions—helping clients develop and manage infrastructure and facilities that improve efficiency, safety, and quality of life. CH2M HILL has long been recognized as a most-admired company and leading employer, and as an industry-leading program management, construction management, and design firm as ranked by Engineering News-Record (2014).

www.ch2mhill.com