

A large circular image showing an industrial water and wastewater treatment facility. The image features large blue cylindrical tanks, yellow metal walkways and railings, and various pipes. A green pipe is visible on the right side. The sky is blue with some white clouds. In the top left corner of the overall image, there are two overlapping circles, one dark blue and one light blue.

Industrial Water and Wastewater Treatment Services

Optimizing water use and minimizing waste is fundamental to the economics and long-term sustainability of industrial facilities.





Black & Veatch offers water solutions on the forefront of conservation and innovation while serving as our clients' trusted advisor throughout planning, design and construction.

Comprehensive Services and Expertise

Water is critical to efficient industrial processes, and safe water is the foundation of thriving communities. Through our water expertise, Black & Veatch is helping to address these needs for industries and communities worldwide. Our knowledge fosters industrial cooperation with the local community and promotes health and wellness for all by fulfilling one of life's most basic needs for millions of people.

Black & Veatch delivers services in all phases of developing water management plans and facilities, including research and development, feasibility studies, conceptual and detailed designs, procurement, construction and/or construction management, startup and commissioning, and asset management solutions. These services can be tailored to cost effectively support your unique processes to provide sustainable water and wastewater management practices and solutions no matter your size or location.

Major areas of focus and service offering include:

- Sustainability and water management
- Regulatory assistance
- Water and wastewater process engineering
- Project delivery

Sustainability and Water Management

With increasing water supply challenges globally and an increased emphasis on water conservation and protection of water resources, fresh thinking about industrial water and wastewater management is not just important, it is vital. Black & Veatch knows how to solve water problems and can help you take a holistic perspective on your facilities' water and wastewater management and treatment issues. Our capabilities include:

- Water management studies
- Zero liquid discharge (ZLD) alternatives
- Water and energy mapping and auditing
- Water supply selection and review
- Water conservation and reuse
- Gray water reuse studies
- Water mass balance
- Asset management to maximize utilization
- Smart water systems – digital data monitoring and diagnostics
- Conceptual and detailed design
- Water and wastewater treatment system startup and commissioning
- Performance testing
- Operator training
- Operator troubleshooting

Black & Veatch helps clients meet their challenges while balancing the fundamental, economic and social aspects of water. We provide realistic solutions that reflect our understanding of each client's business model and unique needs. We deliver facilities, infrastructure and systems that work as well in practice as they do on paper, today and far into the future.

Koch Enid Ammonia Plan Expansion

WATER BALANCE, DESIGN, IMPLEMENTATION

Client Challenge:

The community of Enid, Oklahoma was experiencing water shortages due to severe drought, and water costs were significantly increasing. Limited on water resources and holding to strict effluent discharge guidelines, Koch needed a water and wastewater treatment solution for a new cooling tower makeup and boiler feedwater system at the Koch Fertilizer production facility. The new system would be required to handle demand from the existing plant and the expanded facility.

Black & Veatch Solution:

Black & Veatch converted the main water source from city water to tertiary water from the city's wastewater treatment plant. We designed the cooling tower makeup pretreatment system to treat approximately 5.5 MGD of the city's municipal wastewater with ultrafiltration and reverse osmosis (RO). Approximately 1.4 MGD of the RO effluent was directed to an existing RO and mixed-bed system at the facility to produce demineralized water for boiler feed water. To meet discharge permit requirements, the first-pass RO reject was treated in a solids contact unit for removal of phosphorus prior to discharge from the site.



Regulatory Assistance

Our environmental consultants, scientists and engineers integrate your environmental objectives into your business operations, including the financing, development, construction and operation of projects. Through well-established relationships with federal, state and local agency personnel and our knowledge of rules and guidelines, we specialize in helping you achieve regulatory compliance with cost-effective technical solutions. Our staff have demonstrated experience with a variety of permitting and regulatory conditions, including:

- Air permitting
- National Pollutant Discharge Elimination System (NPDES) and Industrial Pretreatment Program (IPP)
- Resource Conservation and Recovery Act / Comprehensive Environmental Response, Compensation, and Liability Act (RCRA/ CERCLA)
- Unit Identification Code (UIC)
- Clean Water Act, Section 316(b) compliance and Section 404 permits
- Clean Air Act compliance
- U.S. Army Corp of Engineers (USACE)
- Federal Energy Regulatory Commission (FERC) - hydro licensing, relicensing, certification
- Nuclear Regulatory Commission
- Storm Water Pollution Prevention Plan (SWPPP)
- Agency consultation
- Toxic release inventory
- Phase 1 and 2 Environmental Site Assessments

As part of our environmental consulting services, Black & Veatch's environmental scientists and regulatory experts routinely complete permit applications and write environmental assessment documents that include substantial investigation to support permitting applications and documentation of compliance. In addition, we help clients investigate and assess potential site contamination and develop a plan for remediation and restoration of the environment and natural habitats.

Environmental Services & Regulatory Support

CONFIDENTIAL CLIENT

Client Challenge:

The client needed to identify flue-gas desulfurization (FGD) wastewater treatment technologies and water reclamation (or elimination) options to comply with coal combustion residual (CCR) regulations and 40 Code of Federal Regulations (CFR) 423 Effluent Limitation Guidelines (ELG) regulations.

Black & Veatch Solution:

Black & Veatch performed an ELG Compliance Study and prepared an updated water balance. A conceptual treatment design was based on treating primarily wet FGD bleed stream wastewater using physical/chemical and biological treatment systems, considering cost estimate and impacts to existing facilities.



Water and Wastewater Process Engineering

Black & Veatch helps clients meet their challenges while balancing the fundamental, economic and social aspects of water.

The quality of water in cooling water systems, condensate/steam cycle and auxiliary systems such as process water, utility water and wastewater systems is critical for proper operation of industrial facilities. With increasing requirements for water management and sustainable utilization of water, the treatment and conditioning of water is an important consideration. Selection of treatment technology(s) is based on a comprehensive view of water mass balance and water use as well as an economic evaluation of alternative processes for treatment and reuse. Our staff have a wide range of capabilities, including:

- Advanced water and wastewater treatment across a wide range of industrial sectors
- Optimization of treatment processes and operations for flexible and sustainable solutions
- Evaluation and implementation of zero liquid discharge (ZLD) alternatives
- Conceptual and detailed design
- Water and wastewater treatment system startup and commissioning
- Performance testing
- Operator training
- Operator troubleshooting

Our experience with conventional and advanced treatment technologies results in deployable, sustainable and cost-effective solutions.

Biokyowa

BIOTECHNOLOGY FACILITY WASTEWATER TREATMENT

Client Challenge:

The state of Missouri placed stringent regulatory limits for E.coli on Biokyowa's industrial wastewater treatment facility. This required significant additions to their treatment process to meet the limits within a 13-month time frame.

Black & Veatch Solution:

Through design-build delivery, Black & Veatch implemented a membrane bio-reactor (MBR) process to remove E. coli bacteria from the wastewater treatment effluent. The MBR technology and other improvements allowed the plant to expand while continuing to exceed regulatory requirements.



Project Delivery

Black & Veatch can deliver your critical infrastructure projects using a traditional design-bid-build method or a multitude of alternative delivery methods. Alternative delivery solutions include many different options, such as design-build, construction management at risk (CMAR), alliance/framework agreements, and public-private partnership.

Owners typically consider alternative delivery because it offers a single point of responsibility, assignment of risk, fast-track completion, lower project cost and more overall control. Black & Veatch has been executing complex water and wastewater projects using alternative delivery methods for more than 25 years. Black & Veatch has completed design-build water and wastewater infrastructure projects totaling nearly \$1 billion in revenue, and has executed projects ranging in size from \$4 million to more than \$200 million.

Industrial Reuse Water Treatment Plant

WATER TREATMENT, FAST-TRACK DESIGN-BUILD DELIVERY

Client Challenge:

A major data center company is working to develop an advanced treatment facility to reuse the non-potable water in the data center's industrial cooling systems and eliminate the discharge to the receiving waters.

Black & Veatch Solution:

Black & Veatch developed a solution that treats the existing industrial wastewater treatment plant's secondary effluent stream, allowing for the elimination of the discharge outfall to the receiving waters. The new treatment facility also treats effluent from the wastewater treatment plant for non-potable water supply and use in the data center's industrial cooling systems.

The treatment process included lime-coagulation-sediment system, ultrafiltration (UF) system, high-efficiency softening, reverse osmosis (RO) system, and UF filtrate/RO permeate blending system.

The project went from design concept through development and construction in 14 months utilizing a fast-track design-build delivery model.



Additional Project Highlights

First Energy

WATER MANAGEMENT AND TREATMENT

Client Challenge:

In anticipation of updated EPA effluent discharge guidelines affecting a First Energy power station, a water management review/wastewater treatment study was needed to develop a plan and prepare for change.

Black & Veatch Solution:

Black & Veatch updated the water balance, conducted water quality sampling and evaluated water reuse and treatment alternatives. The alternatives were developed to minimize wastewater production and treatment while meeting regulatory requirements.



Stanton Energy Center

DEMINERALIZER AND BRINE PLANT EXPANSION: ZERO LIQUID DISCHARGE

Client Challenge:

Orlando Utilities Commission decided to replace the Unit 1 brine concentrator/crystallizer treatment equipment with a new, 600 gpm brine concentrator/crystallizer. This required additional wastewater and water treatment handling systems, building expansions, interfaces with existing systems and modifications of some existing systems.

Black & Veatch Solution:

The solution comprised an addition to the existing station demineralizer and zero liquid discharge brine plant, including both the water/wastewater treatment systems as well as building additions and modifications necessary to house the new systems. Solution development included coordination and design of all interfaces with the existing facility.

Black & Veatch also provided EPC services for the construction of the pulverized coal Units 1 and 2 at this site, including the brine concentrators/crystallizers provided to support the zero liquid discharge water management approach at the plant.



Ameren Missouri

EFFLUENT LIMITATION GUIDELINE STUDY

Client Challenge:

Ameren needed to understand the current Effluent Limitation Guidelines to determine potential impacts to Labadie, Rush Island, and Sioux generating stations from the proposed guidelines, as well as impacts of potential coal combustion residual regulations on ash systems and plant effluent.

Black & Veatch Solution:

Black & Veatch performed a study and designed the wastewater treatment systems that will be required to replace the ash ponds function when they are retired. We provided detailed design for the wastewater treatment systems to support elimination of existing ash ponds and performed a Phase 2 study for the wastewater treatment system modifications required to support ash handling conversion at the stations. Black & Veatch assisted in collecting and analyzing water quality and flow data from the plant and prepared detailed design for the new wastewater treatment systems.



About B&V

Black & Veatch is a recognized leader in the power, water, telecom, and oil & gas industries, consistently ranked in *Engineering News-Record's* Top 500 Design Firms. We are focused on supporting our industry partners in their development of more sustainable water management plans and facilities.

With our capabilities and extensive experience in industrial and municipal water and wastewater treatment, we work as a trusted business partner by offering many services, looking inside and outside your facility, to improve your water stewardship and community integration.

Founded more than 100 years ago, Black & Veatch is an employee-owned engineering, consulting, and construction company. We create and deliver sustainable water, power and advanced communications solutions, expanding the frontiers of infrastructure while improving the quality of life in communities worldwide.

Water

For more information, contact us at
bv.com/water

