

Power Generation Support Services



A key challenge for the electric power industry is finding ways to maximize production and profits while protecting the water environment. LimnoTech provides a range of services to support cost-effective decisions related to water use that are grounded in the best science and engineering.

NPDES Permitting and TMDL Support

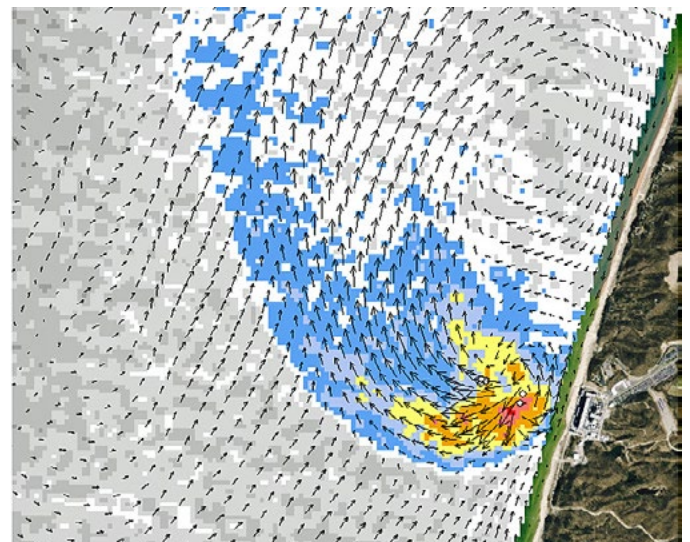
Electric power generation plants discharge waters from various uses, and these discharges are subject to permits and regulatory restrictions. When discharge limits and monitoring requirements are based on limited data, outdated assumptions, or misguided regulatory interpretations, the outcome too often is a set of overly harsh effluent limitations. This can lead to a higher risk of noncompliance, fines, and/or costly treatment and monitoring requirements. LimnoTech understands the importance of establishing a common ground between regulators and permit holders to ensure that permit requirements are set based on the best scientific, engineering, and regulatory information. LimnoTech supports the establishment of fair and achievable discharge limits for process water, cooling water, blowdown, thermal load, and coal-pile runoff through the following services:

- Interpretation of regulatory requirements.
- Technical and strategic support for TMDL development and review to ensure equitable outcomes based on sound science.
- Development of site-specific criteria and effluent limits to set appropriate targets, including evaluation of metals bioavailability and hardness effects.
- Determination of mixing zone allowances to gain maximum dilution credits.
- Evaluations of discharges and receiving waters including whole effluent toxicity (WET) and toxicity reduction evaluations (TRE).
- Data analysis and statistical evaluations to assess attainable limits.
- Support during NPDES permit applications and, if necessary, negotiations, appeals and/or litigation.

Thermal Plume Studies

Section 316(a) of the Clean Water Act regulates heated discharges into waters of the United States. Permit conditions for thermal discharges are established through a mixing zone analysis that considers plume size, position in the receiving water, dilution capabilities, and sensitive ecological communities and habitats. LimnoTech uses a variety of methods to evaluate whether thermal discharges support a "balanced and indigenous population" of aquatic organisms, in accordance with the requirements of Section 316(a) of the Clean Water Act:

- Analyze thermal satellite imagery to estimate discharge dilution and the extent and movement of thermal plumes.
- Conduct thermal plume field studies to forecast maximum thermal loads and effects.
- Conduct dye studies to directly measure receiving water dilution.
- Apply proven mixing zone modeling packages (e.g., CORMIX, UM/PLUMES) or detailed, multidimensional, finite-element mixing models.
- Conduct a site-specific assessment of distribution and extent of fish habitat and sensitive species.
- Use biotelemetry (fish tagging) field-based experiments to assess the effects of elevated temperature discharges on fish health and behavior within receiving waters.
- Develop options for diffuser implementation based on dilution modeling and field studies.



Minimizing Cooling Water Intake Effects

Section 316(b) of the Clean Water Act requires that cooling water intake structures reflect the best technology available for minimizing adverse environmental impacts. LimnoTech understands that cost-effective decisions related to the location, design, construction, and capacity of intake structures must be grounded in the best science and engineering. LimnoTech provides a range of services that can support these decisions:

- Strategic navigation of evolving 316(b) regulations.
- Site-specific assessment of distribution and extent of fish habitat and sensitive species.
- Development and implementation of monitoring plans designed to fully address all data needs cost-effectively.
- Hydraulic and hydrodynamic modeling studies to forecast potential for impingement and entrainment.



Water Sustainability

Energy production requires plentiful supplies of water for cooling, air pollution control, and hydropower generation. The industry has growing challenges related to obtaining adequate supplies, as well as significant economic and technological burdens for water handling, treatment and conservation. LimnoTech's range of service areas related to water availability and sustainability for the energy sector include:

- Developed a ten-year (\$37.5 million) research plan for the Electric Power Research Institute (EPRI) to assess technological challenges such as engineering and economic analysis of alternative technologies, dry and hybrid cooling, reduction of water losses in cooling towers, use of degraded waters, and water resource forecasting and management.

- Conducted an assessment of water resource trends and potential impacts to the electric power industry.
- Evaluated water footprinting and related water stewardship initiatives to understand what these emerging efforts mean to electric power and other industries in the Great Lakes region.
- Developed a watershed-scale decision-support system (Water Prism) to evaluate benefits of multi-sector water saving strategies for the electric power and other water use sectors.

Stormwater Assessment and Management

Management of stormwater is a high priority at power generation facilities. At coal-fired facilities, for example, coal pile runoff as well as fugitive dust and aerosol deposits can create adverse environmental effects. LimnoTech understands that solving stormwater problems requires a combination of practical experience and technical innovations. LimnoTech provides state-of-the-science services in the following areas to support the development of fair and achievable stormwater permit limits:

- Stormwater permit applications, negotiations, and litigation support.
- Simple to complex modeling of rainfall and runoff.
- Dynamic receiving water modeling to assess impacts on receiving water quality, sediments, and aquatic organisms (using existing tools and custom-built models).
- Crafting inexpensive and practical best management practices (BMPs) to reduce pollution.
- Development and implementation of monitoring plans designed to fully address all data needs cost-effectively.
- Whole effluent toxicity (WET) testing and toxicity reduction evaluations (TRE).
- Site-specific evaluation of metals bioavailability and hardness issues.

