

Bio-Fouling

Advanced Technologies for Effective Control

Kinectrics can help you prevent process interruptions, equipment de-ratings and shutdowns due to bio-fouling issues related to mussel infestation, algae, debris, and microbiologically-influenced corrosion.

Mussel Control

Kinectrics' environmental experts have over 25 years experience in developing and advancing effective mussel control technologies. Services include:

- Bio-monitoring of raw water systems
- Monitoring of control system performance
- Design & implementation of control techniques
- Consultation on mussel biology, treatment optimization, filtration, applications, and anti-fouling coatings
- Custom design applications
- Specialized lab & field facilities



Algae

Kinectrics can provide engineered solutions that effectively reduce the impact of algae on plant systems, and major operational problems caused by algae and other debris.



Microbiologically-Influenced Corrosion (MIC)

MIC is a disease of metallic components that can result in the initiation or propagation of serious corrosion in plant systems that can cause equipment to fail, often incurring millions of dollars in lost production and repair costs.



Systems commonly affected by MIC:

- Heat Exchangers & Condensers
- Fire Protection Systems (FPS)
- Storage Tanks
- Water Distribution Systems
- Intakes



Comprehensive Solutions

Uniquely qualified to provide clients with effective MIC control, Kinectrics offers comprehensive capabilities that include the assessment of problems in the early stages, system-specific strategies, and implementation of control technologies.

- Identification & assessment of problems
- System-specific strategies for control
- Lab and pilot scale demonstrations
- Technology implementation & monitoring
- Complete microbiology facilities
 - Advanced Scanning Electron Microscope (SEM)
 - Bio cells & pilot scale rigs to simulate field conditions
 - Electrochemical facilities and chemistry lab

New SEM at Kinectrics



With the new **JEOL 7401F (SEM) Scanning Electron Microscope**, Kinectrics can now assess microstructural features, including very small grain-size materials, to better understand corrosion-related degradation.

Up to 1,000,000 x magnification

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On

Sizing up Your Needs

The recent changes and expansion of the U.S. EPA 316(b) ruling presents utilities with a significant challenge in meeting the new requirements that protect fish and other species from impingement and entrainment in plant intakes and water systems.

Choosing the appropriate technology for 316(b) compliance is critical, particularly when considering the costs of implementing major fish diversion programs. Finding the right answer for 316(b) means not only obtaining the Best Technology Available to meet stringent requirements, but selecting a program that provides the best **site-specific response**.

This could also involve strategies that would allow a power plant to take credits based on existing design and location. For example, a variety of options can often be retrofitted to an existing power plant to establish a program to achieve a cost-effective solution that works for the location, facility design, water body and species present.

Knowledge-based analysis of each individual plant is essential for success. The Kinectrics team of environmental specialists directed by Paul Patrick, an internationally-recognized expert in the development of fish diversion technologies, brings you the advantage of in-depth understanding of environmental issues, combined with unique industry experience that can help you find the **right answer** to 316(b) for your facility.

KINETRICS INC.

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ENVIRONMENTAL SPECIAL EDITION 316(b)

Volume 3, Issue 1 July 2006

The
Right
Answer

...Choosing the
solution you need for
316(b)

On special edition **316(b)**

special edition **316(b)**

The right answer for 316(b)

Site-specific Solutions for Your Facility

Although there are some technologies available to address the 316(b) regulation, they may prove to be expensive and may not be necessary for certain plants. Other low-cost, but equally effective options, can be retrofitted to an existing power plant to provide utilities with an effective and acceptable "site-specific" solution for 316(b) compliance.

Taking advantage of low-cost options requires an accurate evaluation of each site's intake structure, hydraulic flow characteristics, water quality, the species present and their abundance, as well as the site location itself since the design and placement of any selected technology is critical to achieving success.

The Kinectrics Advantage

Kinectrics offers unrivalled qualifications and a track record of success in providing clients with reliable knowledge-based site assessments, together with advanced site-specific technology for 316(b).

An internationally-recognized leader in environmental technologies, Kinectrics has significantly advanced the development of low-cost fish diversion technologies. Engineering and testing is carried out at our unique laboratories on the Great Lakes and in southern Florida.



SITE-SPECIFIC TECHNOLOGIES
Great Lakes / Rivers / Oceans

- Reversed Louvers
- Barrier Structure on Intake
- Modified Porous Dike
- Hybrid Barriers (strobe/acoustic)
- Screening Technologies
- Barrier Net
- Restoration
- Fish Return Systems

Unique Lab Facilities

A special laboratory has been designed at our Vero Beach facility to perform 316(b) related work that addresses both southern freshwater and marine species.

This lab belongs to Kinectrics and was developed in collaboration with the Florida Institute of Technology, an academic institution known nationally for its marine biology and scientific expertise.

Unique components at Vero Beach include large tanks (26 foot diameter) and hydraulic flow pumps, which can generate flows from 0.2 to over 2 feet per second.

The lab is equipped with underwater and above-ground cameras and a Web-based system from which results can be viewed remotely in "near" real-time. This capability enables clients to review and assess, from their own offices, the performance of various technologies being evaluated for species commonly impinged at their locally-sited power plants.

Cost-effective Compliance

Kinectrics can provide the proven expertise and experience you need to achieve timely, cost-effective compliance with 316(b) for your facility / site.

SAFETY IS A PRIORITY AT KINECTRICS



Methods employed to ensure a safe work environment include: Site-specific safety plans, rigorous personnel training, regular safety audits and 2-person sampling teams. Kinectrics has conducted over 35,000 hours of I&E work without a lost day incident.



KINECTRICS 316(b) PROJECTS 2004-2006

USA - INDIANA - MICHIGAN - FLORIDA - OHIO - ALABAMA
WYOMING - WISCONSIN **CANADA** - ONTARIO - ALBERTA

The Kinectrics project team has significant experience on the Great Lakes and inland rivers, and with structural, behavioral and restoration options. **The Kinectrics team is presently working with 33 power plants providing complete Comprehensive Demonstration Studies (CDS) or components.**

This experience and project success is reflected in our **unique and exceptionally cost-effective approach** to the 316(b) regulation.

Comprehensive Site Assessment Services

Kinectrics' site-specific technology plans include:

- Review & selection of Best Technology Available (BTA) to reduce entrainment / impingement losses
- Describe design & operation of selected technologies for reducing entrainment / impingement
- Report on strengths / weaknesses of technologies
- Review possible integration of technologies
- Develop design concept, identify major equipment & design drawings
- Perform sizing calculation
- Contact potential vendors for information & costs
- Estimate O&M costs, construction, lost generation, equipment & engineering costs
- Review safety issues or maintenance issues
- Estimate efficacy for each technology for dominant species
- Detail technologies, costs, efficacy, list assumption and engineering feasibility evaluation

Innovative Technologies for 316(b)

Acoustic-Strobe Light Deterrent Technology

Kinectrics recently completed comprehensive lab and field studies of a hybrid acoustic-strobe light system. The studies consisted of analysis of the responses of several fish species to a new acoustic device integrated with a strobe light system.



Reversed Louver Technology*

Kinectrics has completed a detailed analysis and redesign of our reversed louver system specifically for 316(b) applications. This new concept is effective not only for diverting fish, but also for deflecting debris. It is particularly suitable for applications used by power plants located on rivers.

Improved fish diversion technologies such as reversed louvers are expected to outperform traditional louvers based on the expected flow dynamics. Kinectrics' results indicate a diversion efficiency exceeding 80-85%.

Pipe-Based Dike Technology*



This is another example of a cost-effective behavioral-based system that Kinectrics has been developing for excluding fish impingement. Customized pipe - based dike technology can minimize intake velocities and also reduce entrainment relative to baseline conditions. Kinectrics' modified pipe-based dike technology has been designed to deal with zebra mussel and attached algae accumulation.

Extensive studies have also been conducted on the use of advanced polymer coatings including innovative products being developed with other partners to reduce mussel attachment on pipes and other structures.

*Kinectrics' patent pending

For the latest news on 316(b) technologies, visit our Web site at www.kinectrics.com