

Intake Operation, Maintenance, and Optimization Interest Group



This interest group provides a forum to share best practices and develop collaborative solutions to address the significant fish protection, debris and fouling issues that can affect operations of large water intakes.

Background, Objectives, and New Learning

Fish, jellyfish blooms, biofouling, waterborne debris, macroalgae, HABs, etc. are a daily concern for owners of fossil and nuclear power plants, as well as other industrial and desalination facilities with large-scale water intake structures. These intake issues create operational challenges and may require modifications to the intake system design and operations to reduce the impact on plant availability and compliance (for example, traveling water screens might require continuous to near-continuous operation). Fish protection requirements may necessitate modifications to intake design and operations (fine-mesh screens, fish return systems and other intake technologies) to reduce entrainment and impingement.

Some facilities are already seeing increased operation and maintenance (O&M) impacts associated with fish protection. Operational effects include flow reductions (and associated performance penalties), screen system outages, plant safety concerns, and debris management performance and reporting. Maintenance issues include excessive wear from continuous operation, jellyfish and debris management, corrosion, and screen failure. These challenges can ultimately translate to system reliability problems and declines in plant revenue. In addition, optimizing screen performance for fish protection could be required. Finally, global climate change further increases potential for disruption from invasive species, changes in regional flow patterns, water level fluctuations, and longer growing seasons.

- Contribute to and benefit from a network of experts and informed peers
- Discover, develop, and disseminate best practices and collaborative solutions
- Address emerging issues with continuous operation and optimization of cooling water intake screens

The Electric Power Research Institute (EPRI) conducts extensive research on intake protection technologies, but there is a need for shared best practices in O&M and optimization (OMO). Additional research is needed to build on existing foundational work through continued information exchange, data collection, engineered system improvements, evaluation of new management options and providing best management practices guidelines. Globally, as operators of large water intakes adapt to new challenges and protection requirements, the lessons learned on intake OMO will be invaluable to industrial facilities around the world.

Cooling water intake fish protection regulations require new screens to be optimized for fish protection. Parameters for evaluation include rotation speed, spray wash pressure, seal and transfer performance and parameters related to effective fish return system performance including water depth and velocity, fouling control, predation protection and discharge location. Other challenges, such as jellyfish blooms, biofouling, debris and HABs, also require optimization of design and operation. EPRI has already identified many challenging issues in meeting these requirements, and new issues will arise as more screens are installed and tested.

EPRI research provides insights into improving intake technologies, but additional OMO issues will require economically effective solutions. Intake operators will face new challenges and will benefit from a collaboration of EPRI experts and consultants and shared best practices among interest group participants.

Benefits

At the current cost of power, a 12-hour outage at a 1,000-megawatt (MW) plant can result in as much as a half million dollars or more in lost revenue. Failure to meet fish protection regulations or the impacts of sudden debris/jellyfish ingress could further increase costs associated with intake redesign and modification, fines, and other actions. The interest group will provide information to address OMO issues, forecast challenging debris loads, preclude plant outages, and reduce operating inefficiencies. Participants will benefit from experiences gained from other companies, best management practices guidance, and information on the state-of-technology on intake screen design and operation.

Project Approach and Summary

The OMO Interest Group (OMOIG) will serve as a forum to exchange information on existing and emerging intake OMO issues. The interest group will bring together experts from across EPRI's environmental, fossil generation, and nuclear R&D membership to address these critical issues. Participants will work together to launch collaborative R&D projects to address common research needs, including new technology evaluations, screen optimization practices and unresolved intake O&M problems.

Deliverables

OMOIG results will be delivered through:

- An annual technical workshop to review and discuss new technology developments, intake OMO best practices, case studies (successful and unsuccessful practices for managing debris and optimizing screens for fish protection), optimization study findings, and identify R&D needs.
- Monthly technical webcasts with information on the latest intake management technology developments (for example, traveling water screens, wedge wire screens, barrier nets, louvers, fine mesh overlays, fish return systems, variable speed drives) and their OMO impacts.
- Technical briefs on specific OMO topics of interest as determined by project funders (the number of briefs will depend on interest group participation). These briefs review the OMO issues and their possible causes, mitigation strategies, case studies, and technical resources and experts on the issue (existing technical briefs include Hydrilla, Bryozoans and Hydroids,

Jellyfish, Frazil Ice, Weed Harvesters, Coatings, Fish Kills and Marine Debris).

- Immediate on-call assistance to funders for technical contacts, peers, and research contractors used in EPRI research for emergency intake management issues.
- Quarterly newsletters on interest group activities, debris management events around the world, intake OMO-related technical publications and new technology developments.
- A participant collaboration site on www.epri.com for accessing a library of OMO deliverables since 2012 for inquiries and exchanging information debris management .

Price of Project

The price to participate is \$20,000 per year. Companies that fund any EPRI program can use Tailored Collaboration or Self-Directed Funds to participate. Companies that have not purchased an EPRI program may co-fund this project.

Project Status and Schedule

The Intake OMOIG is annually funded covering each calendar year, starting with the period January 1 through December 31. The Annual Meeting will occur in mid- to late year at a location to be determined. Monthly technical webcasts will be held (2nd Tuesday of each month at 11:00 a.m. EST) and quarterly program newsletters will be published in April, July, October, and December.

Who Should Join

Any company, public agency, or nonprofit organization can participate in this project. The project is of relevance to plant and cooling system engineers, compliance personnel and others involved in ensuring the operation and maintenance of cooling system and large water intakes.

Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

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