



KONGSBERG

Case Study

M3 Sonar[®]

Survey of debris accumulation at Bruce Power, a nuclear power plant located 250 km northwest of Toronto, Ontario.



The company

Bruce Power is Canada's first private nuclear generator, located on the shores of Lake Huron in Ontario, Canada. The facility operates two generating stations—Bruce A and Bruce B—which together produce 6,300 MW of electricity using a once-through cooling process to condense generated steam. Each station comprises four units. Each unit is equipped with three large cooling water pumps that draw water through an offshore velocity cap and intake tunnel into an approximately 1.3-hectare reservoir.

The challenge

Historically, Bruce Power employed divers to clean pump wells individually on an as-needed basis. However, cleaning requirements have increased significantly in recent years due to accumulation of invasive Dreissenid mussel shells—a species absent from Lake Huron when the stations were originally designed. While existing equipment could handle some debris removal, extensive cleaning became necessary as accumulation increased.

To transition from reactive maintenance to a preventative approach, Bruce Power needed to:

- Generate a detailed overview of the reservoir base to understand sediment dynamics and predict accumulation rates
- Identify specific areas of accumulation to support regular maintenance planning
- Ensure ongoing availability of cooling water and avoid extensive debris loading that could impact operations

“The M3 Sonar® has proven to be a valuable instrument because of its capability to provide both imaging and bathymetric data. It was the perfect sonar for this job.”

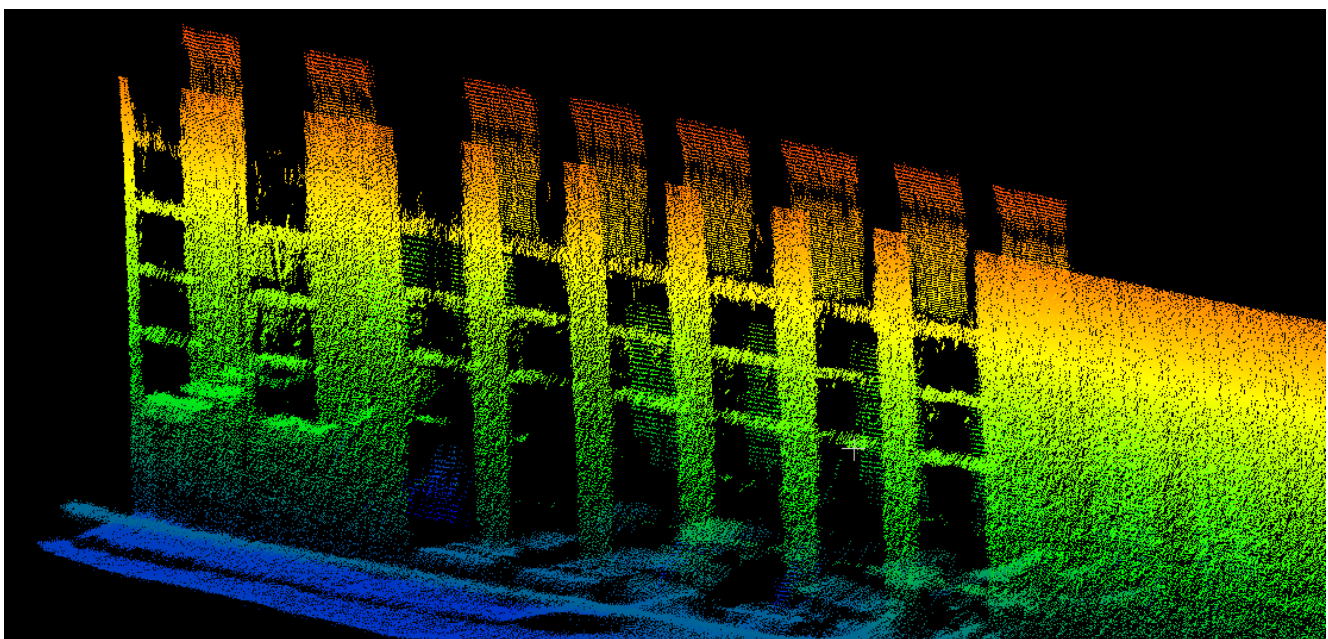
Scott Milne, Principal at Milne Technologies

The solution

Bruce Power partnered with Kinectrics Inc. and Milne Technologies to conduct a detailed and comprehensive bathymetric survey of the reservoir to identify potential sediment accumulation. The team deployed Kongsberg Discovery's M3 Sonar® system with multimode multibeam technology to deliver the required data.

The M3 Sonar® is uniquely positioned in its price category to produce both high-quality imaging records and 3D bathymetric datasets using a single sonar head. Its dual functionality includes:

- Imaging capability: Detection of small objects at ranges up to 150 meters, with a 120° to 140° field of view that provides real-time comprehensive underwater visualization
- Bathymetric surveying: A narrow 3° beam that generates detailed 3D point clouds for precise mapping





Horizontal forward-looking (eIQ mode) imaging surveys of the forebay bottom to identify accumulations of material (i.e. mussel shells) and to identify previous sediment removal sites. Inset photos show accumulation of mussel shells.

The results

A two-day deployment of the M3 Sonar® revealed critical operational insights:

Comprehensive reservoir mapping

The data provided Bruce Power with essential information about the amount, distribution, and potential rate of accumulation of material within the cooling water reservoir.

Targeted maintenance planning

Detailed maps and images now enable Bruce Power staff to direct maintenance crews to specific areas where sediment removal is required, improving operational efficiency.

Baseline documentation

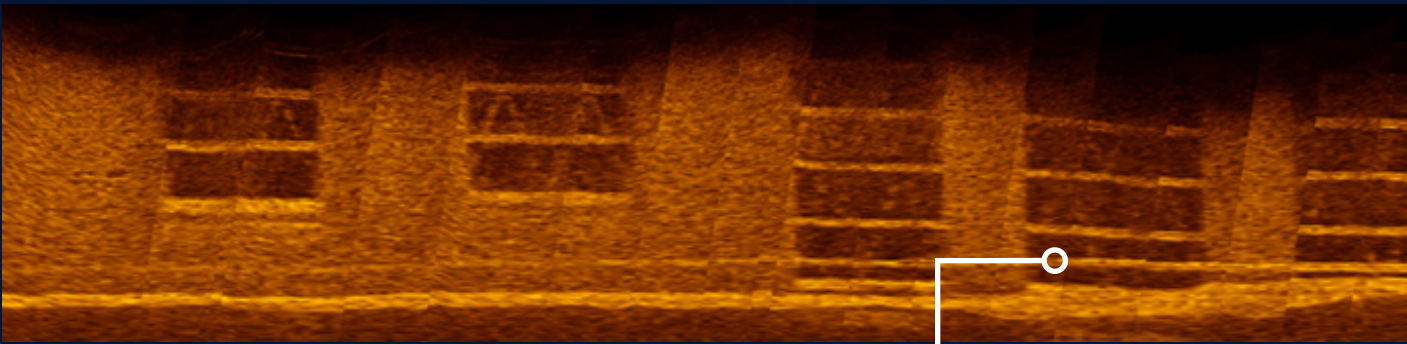
The images confirmed that the reservoir did not contain extensive debris at the time of survey and documented where accumulation is most likely to occur in the future.

Operational assurance

The data confirmed that cooling water remains readily available, with no immediate risk of debris loading that could compromise plant operations.

Conclusion

By implementing advanced sonar technology from Kongsberg Discovery, Bruce Power successfully transitioned from reactive to preventative maintenance planning, ensuring continued safe operations while optimizing resource allocation and maintaining their commitment to public safety.

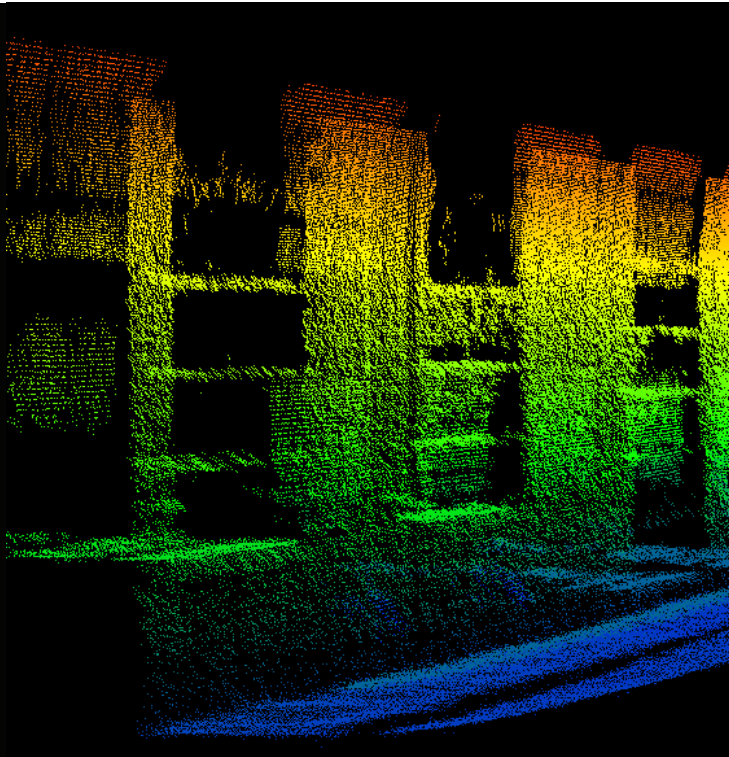


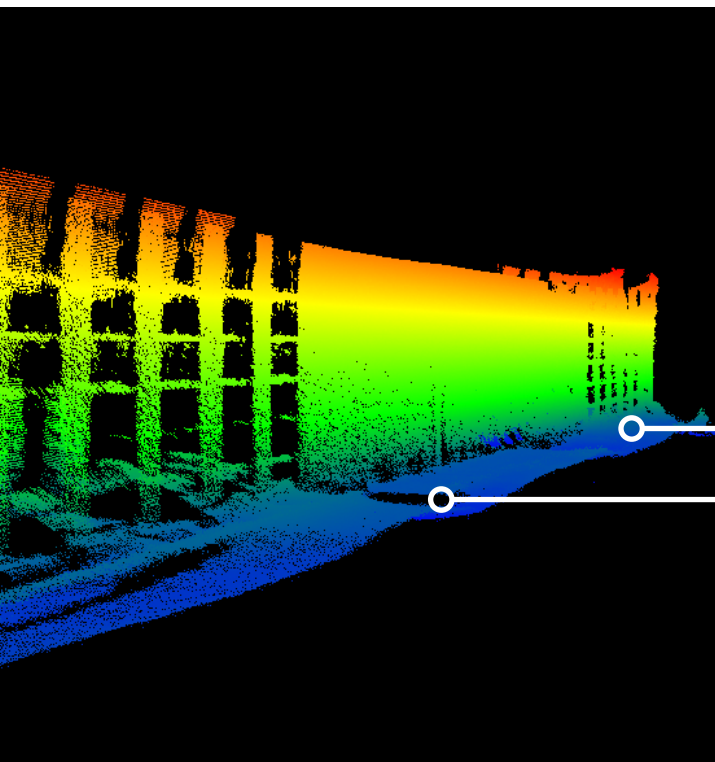
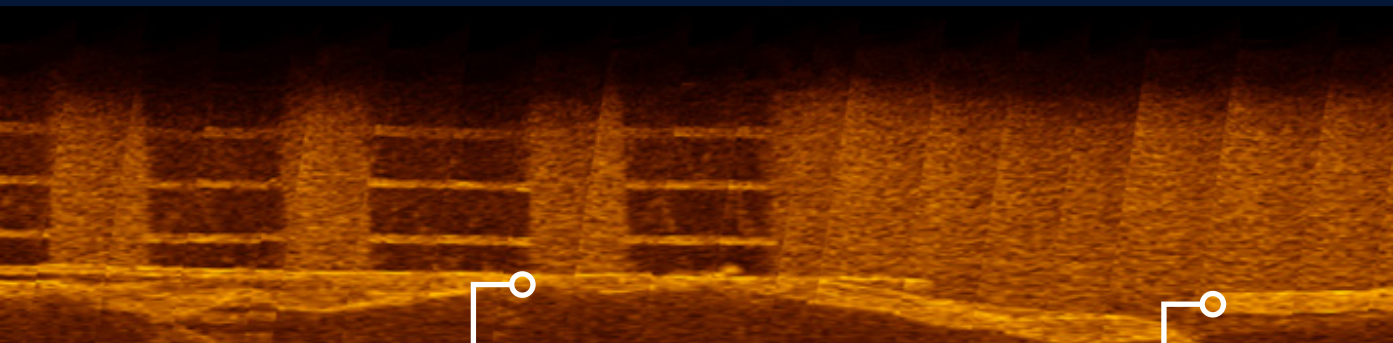
Vertical sonar imaging (Kongsberg M3 Sonar eIQ mode) of the intake wall (Unit 3). Also shown are the maintenance pump intakes at far left of sonar image. Note accumulation of material in front of the first four intake ports. The gap within the crane rail is partially hidden in accumulated material at the far right of sonar image. The photos show the mussel piles and crane rail with the white areas indicating dead mussel shells.



"We were very impressed with the data we received from Kongsberg Discovery's M3 Sonar®. The information is very important as we ensure ongoing safe plant operations and continue our dedication to increased public safety."

**Dr. Cherie-Lee Fietsch,
Environmental Scientist at Bruce
Power**





Detailed bathymetry (profiling and fast-profiling modes) of the intake channel, forebay bottom and forebay walls.

Small mussel shell pile

Larger mussel shell pile

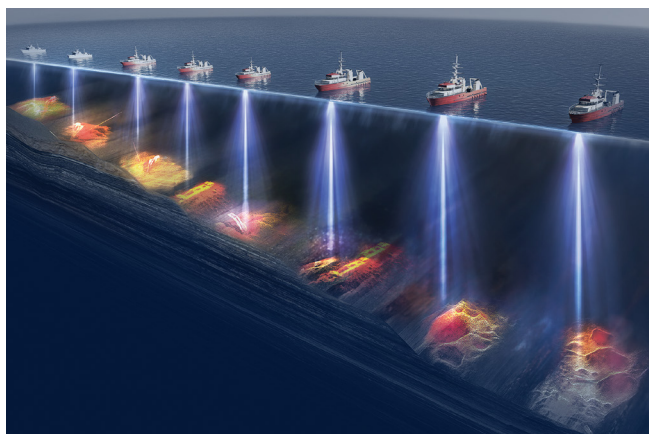
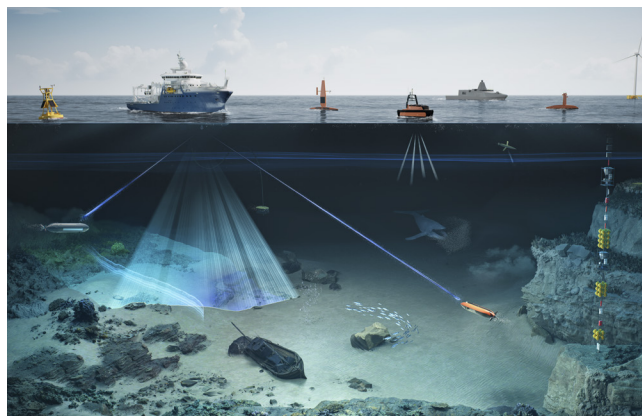
Kongsberg Discovery

Protecting people and planet

From the deepest sea to outer space

Kongsberg Discovery serves the ocean space from the deepest sea to outer space. We develop technology to ensure sustainable management of marine resources, monitor climate change and critical infrastructure, and safeguard national security.

Our technology aims to sustainably manage marine resources, monitor climate change, secure infrastructure, protect national security, and address crucial global challenges. It is vital for offshore operations, fisheries, marine research, maritime activities, ocean energy production, infrastructure monitoring, and naval operations.



Committed to protecting our planet

We recognize the global sustainability challenges and are committed to developing solutions and products that resolve operational issues while addressing environmental impacts on the ocean ecosystem.

The business has over 1,100 employees located in Horten, Trondheim, and Oslo in Norway, as well as operations in Alicante in Spain, Aberdeen in the UK, Lynnwood (Seattle), Houston, and New Orleans in the USA, Vancouver and Halifax in Canada, Kuala Lumpur in Malaysia, and Singapore. Kongsberg Discovery is part of KONGSBERG, a leading technology group based in Norway.

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