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BULLETIN – 107

Monitoring Savannah Harbor to Protect Sensitive Habitats

The Savannah Harbor Expansion Project has been in the works for years. By deepening the 45-foot-wide river channel by five feet, ships will be able to carry more cargo along the 40-mile Savannah River, boosting the local economy while lowering costs for businesses and consumers beyond the Georgia coast.

However, dredging brings numerous environmental challenges. During summer months, hot weather depresses dissolved oxygen levels in the bottom of the Savannah River below safe limits for fish during certain points of their life cycles. Deepening the river would further decrease already-low dissolved oxygen levels during summer months at lower depths, which could affect the resident fish, shellfish, invertebrates — even the birds and mammals that rely on a stable food chain.

Managing Dissolved Oxygen From Afar

The Army Corps of Engineers, which manages the project, is mitigating the environmental concerns with two new dissolved oxygen injection facilities. One plant is already operational. The second facility is still under construction. The facilities are designed to run only in the summer months. When both facilities are running together, they will process 144 million gallons of water, returning 40,000 pounds of oxygen daily into the river.

The two massive plants are at remote, largely unmanned sites, with an intricate network of pumps, strainers and generators that must be constantly monitored. Limbs and debris can become trapped along several points in the system, or power disruptions or equipment issues can halt plant processes. The remoteness of the locations — making landlines impossible — and the strictness of Department of the Army cybersecurity requirements present challenges that make monitoring difficult.

These two plants include a fleet of 12 Speece cones. Inside these Speece cones, which are 22 feet tall and look like Gemini space capsules, is where the oxygen is mixed and dissolves into the river water. Each Speece cone includes sensors that constantly track oxygen levels. The super-oxygenated water is then returned back into the river.



Speece cones located throughout the harbor area

The Corps needed a solution to remotely monitor key indicators of plant operation with alerts to those who are responsible for operating the plants while they are performing their duties at other sites.

AlarmAgent Delivers Monitoring — and More

Following an extensive evaluation process, the Corps installed AlarmAgent units in both facilities. AlarmAgent units monitor several digital points, including alarms for plant operations, strainer differential pressures, Speece cone flows, intake pump operations, traveling fish screen operations, and support pump operations. AlarmAgent units also monitor two analog points to observe continuously variable readings for oxygen and water flow, providing alerts when readings are outside a prescribed range.

Together, the alarms notify the team when anything is out of specification, such as a screen clogged with debris or a Speece cone that reports low levels of oxygen output.



Speece cones located throughout the harbor area

AlarmAgent acts as a first line of defense against failures and potential problems.

High Stakes to Get It Right

To help protect such an important ecosystem and commercial shipping, the Corps needed to ensure that AlarmAgent was up to the task. The RACO team sent a trial unit to the Corps staff, enabling them to run several simulations prior to installation.

The RACO team also met with the Corps' Information Technology staff to ensure the encryption met the project's strict standards. The AlarmAgent units use highly encrypted, packetized data that is transmitted via VPN to avoid exposing the data to open-source risks. The resulting system is far more secure than radio.

During the trial, the Corps staff realized that the AlarmAgent units could solve multiple problems for a reasonable cost, enabling the Corps to remotely monitor several variables and alert the right people when a fault is detected. Plus, the existing team could manage the installation themselves.

More Data, Lower Costs

The dissolved oxygen injection facilities operate via a SCADA system that captures data from throughout the system. By combining and feeding key SCADA outputs to the AlarmAgent units, the Corps can closely monitor trends and potential trouble.

This all comes at far less expense than trying to run landlines to remote water-bound sensors, and provides greater security than other options.

Scaling to Protect More Wildlife

No matter what, the RACO team will be on call to help the Corps protect this ecosystem through smarter monitoring.



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