Use Best Practices to Avert Water Treatment Complacency  
BY BARB MARTIN AND MICHAEL BARSOTTI

Drought, wildfires, storms, and other potentially serious events can significantly impact source water quality. Water treatment plant staff must be especially vigilant and prepared to maintain effective water treatment and treated water quality during such occurrences.

The Partnership for Safe Water’s treatment plant optimization program highlights several best practices optimized utilities implement to avoid complacency, including the following.

- Develop formal policies and procedures to implement source selection when this capability exists. The presence of multiple raw water sources or intake locations isn’t a reality for all utilities. However, when multiple sources are available, a utility should have procedures that define when and how raw water sources are monitored and selected.
- Staff should be aware of water quality triggers, such as high turbidity, that may necessitate changing or blending raw water.

CASE STUDY

DEVELOPING A BLUE-GREEN ALGAE SURVEILLANCE STRATEGY

Limiting complacency has been a priority for Vermont’s Champlain Water District (CWD), a Partnership for Safe Water Excellence in Water Treatment Award recipient treating high-quality source water from Lake Champlain. Beginning 12 years ago, the utility redoubled its efforts to limit complacency regarding source water quality by undertaking a targeted program for blue-green algae toxin monitoring and encouraging and leading a year-long process to strategize the state’s response to potential algal toxin detection. Algal toxins such as microcystin and anatoxin weren’t and currently aren’t regulated by the US Environmental Protection Agency, but their presence in finished water could pose enough public health risk to warrant special planning and preparedness.

CWD’s cooperative effort involved multiple stakeholders, including the Lake Champlain Coalition of Municipal Water Suppliers, Vermont Department of Health (DOH), Vermont Department of Environmental Conservation (DEC), and the University of Vermont, and was a direct outcome of the Lake Champlain Coalition of Municipal Water Suppliers ongoing work to manage and protect public drinking water sources on Lake Champlain. Communication was key to the process. Monthly stakeholder meetings were conducted as CWD planned and developed its sampling, testing, and surveillance strategy, which since has evolved with changing stakeholder efforts. The strategy has multiple components, including:

- Weekly sample collection and analysis (algal count/snapshot and biological activity reaction tests) from sample lines and pumps delivering raw water continuously from the end of each intake.
- Reviewing additional lake data online using a publically accessible Lake Champlain Blue Green Algae Tracker website developed and maintained by the Vermont DOH and cooperating agencies, including the Vermont DEC, The Lake Champlain Committee, and the Lake Champlain Basin Program.

CWD was able to conduct more targeted sampling for microcystin and anatoxin, guided by the weekly CWD data and online lake data. The combined data and observations from several parties resulted in more effective sampling.

CWD and Vermont municipal water suppliers on Lake Champlain have benefited from discussions regarding blue-green algae. CWD was able to enhance its targeted algal toxin testing protocols, using related data to obtain additional screening information that indicated when to increase intake surveillance and collect source water samples for microcystin and anatoxin analysis. CWD continues to review and update sampling protocols in conjunction with stakeholder organizations. These measures help CWD avoid complacency and maintain preparedness for raw water quality events to maintain optimized treated water quality.

sources, bypassing the treatment plant, or using an emergency interconnect.

**Be able to identify algal blooms and their impact on plant performance and production.** Algal blooms are seasonal occurrences for many water utilities, which take steps to minimize such an event’s impact on treated water quality. Proactive source water monitoring, particularly for algae and related parameters such as turbidity and nutrients, can increase awareness of seasonal water quality trends, allowing treatment plant staff to take action when an algal bloom, or other water quality event, is imminent.

**Make data-driven process control decisions based on established and documented processes.** Collecting accurate, representative data is necessary to quantify plant performance, identify long-term trends, and make process control decisions to optimize water quality. Staff may track the worst-performing filter, along with filter turbidity profiles, to assess trends that may indicate the need for filter maintenance and rehabilitation. Process control data may also be used to track potential effects of a source water event on treated water quality. The use of appropriate sampling and instrument calibration and verification techniques is essential to this process.

**Ensure standard operating procedures (SOPs) are in place to address all potential events that could affect water quality.** Having regularly reviewed and updated SOPs to address events that potentially affect water quality is a proactive step to take to increase preparedness. It’s important to train utility staff on SOPs and practice key procedures, such as jar testing and emergency response, so frontline staff can react appropriately in serious situations. This is particularly important in situations in which managers or other nondirect operations personnel may not have proximity to the plant to quickly initiate changes.

**TAKING ACTION**
High-quality treated water doesn’t occur by chance; it’s mostly the result of thorough planning, documented procedures, and anticipation of serious event scenarios that potentially impact water quality. Being prepared for water quality challenges can avert complacency and optimize operations.