

CASE STUDY

# Small New England water system implements 24-hr monitoring

## Two New England communities now have round-the-clock monitoring of their municipal water distribution facilities, ensuring that water system managers are notified of and can respond quickly to off-hour service problems

The Hampton (N.H.) Water Works Co. supplies potable water to several seacoast communities in southern New Hampshire, and the Salisbury (Mass.) Water Supply Co. serves Salisbury residents. Although the two companies have separate water sources and distribution facilities, they are operated by the same personnel out of a common office. Together they serve about 11,000 customers during peak summer vacation months, when daily water delivery nears 7 mil gal.

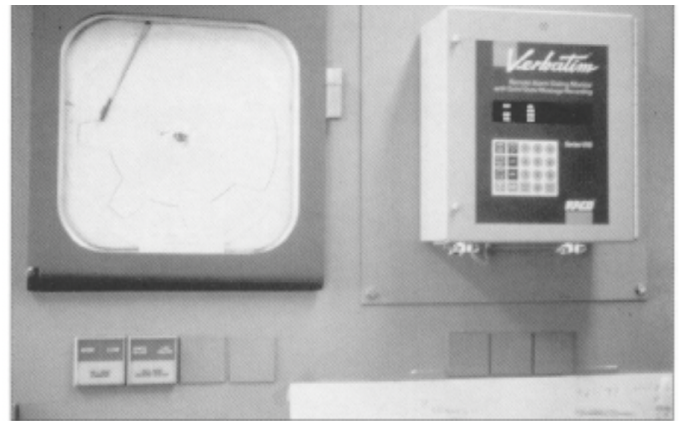
The primary source of water for both companies is groundwater pumped from a network of wells. Salisbury supplements this supply with small amounts of water imported from an adjacent community system. Water is pumped into six above-ground tanks located throughout the combined system.

### System upgrade undertaken

The Hampton and Salisbury distribution systems are connected through a variety of communications devices to a central pumping station, where the status of the overall system is monitored by company staff during normal working hours.

In a recent system upgrade undertaken to improve service to an expanding customer base and to enhance protection of system equipment, the companies installed an automated monitoring system that takes over status checking and alarm reporting functions at night and on weekends.

After investigating alternatives, including hiring additional personnel, the companies opted to install the Verbatim Model VSS-8C Autodialer/Alarm Monitor from RACO Manufacturing and Engineering Co. of Emeryville, Calif. Capital cost of the equipment was approximately \$1,600; installation, operation, and maintenance costs are minimal.



RACO Verbatim autodialer is mounted inside the Hampton Water Works control center for easy access. Because the unit is designed for operation in harsh environments, it can also be placed outdoors. Because of its low cost and simplicity of operation, the Verbatim unit is suited for use in smaller water distribution systems. (Photo by John Rock)



According to Laurel Flax, production superintendent of the water companies, “The autodialer has given us far greater control over our system. Before it was installed, we had no way to monitor our plant facilities during nights and on weekends. We had to depend on our customers and local fire departments to notify us of service problems during off hours. Now we get the information first hand, often before any interruption of service. Most of the time, we have enough warning to head off trouble before it happens.”

## **Tank levels, fire pump critical monitoring points**

The Verbatim system is programmed to monitor 11 key points in the two systems, the most critical being water level in any of the storage tanks and the operation of a large fire-service pump. Hampton’s Verbatim system is equipped with an optional analog input card, which receives 4 - 20-mA signals from the storage tanks. The unit has been programmed to convert these signals into actual water levels so that a routine status call to the system reveals actual water level in each tank as well as the status of all other functions being monitored: High and low set points have also been programmed for each analog input, so that should the water get too high or too low, the appropriate alarm call is placed.

“We have had a number of calls when tank levels went below acceptable levels,” Flax said. “Operating personnel were called by the Verbatim unit and informed that an emergency condition existed. Designated staff members were able to get to the facilities in time to take remedial action before the tanks were empty.”

If the fire pump comes on, an alarm call occurs to summon a staff member to attend it while it is operating. The pump is not designed for unattended operation; without an operator, the pump can overheat or otherwise malfunction when needed most. Also, it must be manually shut off when no longer needed. The Verbatim system ensures that an operator is on hand to monitor pump performance during emergency conditions.

## **Additional capabilities**

The system also monitors the operation of the transfer connection through which water is imported from an adjoining town into the Salisbury system. AC power is also monitored at all well locations. Information is transmitted through telemetry lines on a continuous basis from the Salisbury system to the pump house in North Hampton. The line is monitored by the Verbatim unit, and should the line fail for any reason, an alarm call is initiated to alert appropriate personnel.

The autodialer performs all monitoring and alarm reporting functions over standard telephone lines. When an alarm occurs, the Verbatim unit is set up to call a preprogrammed list of up to 16 phone numbers until one of

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the numbers is answered. When an alarm call is completed, the unit reports the station identity and the specific alarm condition in the user's own voice-recorded message. Acknowledgement of the alarm is accomplished simply by pressing a button on the called phone.

The Verbatim autodialer continues calling even if an alarm condition returns to normal-intermittent or short-duration alarm conditions do not go unnoticed. Once tripped, calling is continued until acknowledged. Nuisance calls are avoided by varying the alarm response times.

## Status checking feature

Verbatim systems represent the highest level of technology in the autodialer field. They are completely solid state and can do much more than just dial telephone numbers. In addition to phone calling, the new-generation autodialer has a status-checking capability. The user can call in at any time to hear a voice message giving the present status of monitored functions.

"Status checking is an excellent feature," notes Flax. "Instead of making a physical check of our facilities, we simply call in for a status report. I can anticipate trouble by calling in for level check when I anticipate heavy usage. This gives us extra time before an alarm condition occurs."

A built-in speaker phone permits a called party to listen to local sounds as well as having a two-way conversation with personnel at the autodialer site. Flax added, The Verbatim unit is easy to use on a day-to-day basis. If we want to add or change a voice message, we simply record the new version at the system console. We've also had some personnel changes. We can program new phone numbers into the system in minutes."

The Verbatim unit stores in memory anything that can be spoken and plays it back exactly as recorded. Using digitized voice technology, all voice messages are preprogrammed by the user and stored in the system's nonvolatile memory. Service personnel do not have to be called in to change telephone numbers or voice messages. The Verbatim unit is user-programmable at the system console or from any telephone.

The Verbatim system installed in Hampton is currently using eight digital inputs for monitoring functions. Optional expansion boards let the user increase the number of digital input channels to 16, 24, or 32. Similarly, the unit can accommodate 4, 8, or 16 analog signal inputs; four analog inputs are being utilized in the Hampton facility. The system also provides for independent programming of each channel for type of alarm and reporting of run time and totalized pulses. One or more channels can be programmed for run-time metering. A device such as a pump motor can be monitored for total run time in order to properly schedule maintenance. In a similar manner, one or more channels can be programmed for pulse totalizing.

## Expansion possibilities

Future possibilities being considered by Hampton include expanding the present Verbatim unit so that each pump in the system can be monitored individually and installing additional Verbatim systems at satellite locations to broaden the amount of alarm coverage.

Hampton is also considering equipping the Verbatim unit with an interface card that would permit it to communicate with a centrally located printer, which would generate a hard-copy record of all alarm activities. If additional Verbatim units are utilized, a centrally-located computer, modem, and printer could be used to poll the remote Verbatim units and report on alarms and events at those locations.

Verbatim systems can also be equipped for remote supervisory control, which lets an operator turn equipment on or off via any telephone. A supervisory control and data acquisition system is also available for complete control of data collection and reporting via computer using specially developed RACO software.



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