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Water Case Study: Switch Batteries or Buy New AMR Units?

By Betsy Loeff - AMRA News Writer

Any water or gas utility knows that the minute an AMR module gets installed, the countdown on the battery's life begins. And while most water or gas providers plan for battery change-out in their AMR business cases, some now are finding that a battery replacement isn't always their best AMR investment.

Today, water suppliers in Aurora, Colo., a community adjacent to Denver, are eyeing the purchase of new AMR modules rather than replacing the batteries in AMR units they currently own. As one of the water industry's early AMR adopters, Aurora Utilities Department has had to break ground on the research necessary to evaluate battery change-out costs. But it wasn't just batteries the team at this progressive utility wound up examining. The group also reviewed the latest AMR technologies to see if added functionality makes new AMR units the smartest buy for their utility.

Project Pioneers

When the Aurora Utilities Department first starting installing its Badger-Trace radio-read system in 1995, theirs was the largest AMR system for pit-set water meters west of the Mississippi. The city installed 70,000 units over a five-year span.

"Back when we bought the system, it was the only technology advanced enough to install in a pit setting," says Daniel Mikesell, Customer Service superintendent for the utility, who is quick to note that AMR brought his utility all the benefits it was hoping for. "It reduced manpower needs and cut re-reads," he says. It also decreased workers' compensation liabilities--a huge plus for this utility--where readers chalked up 51 workers' comp claims in an 18-month period. "Slips, trips, dogs, bees, carpel tunnel: It was an ongoing issue to keep our readers healthy," Mikesell says.

"We've been very happy with the system we bought and used, but as we approached the 10-year battery life on our AMR modules, we realized that module costs have gone down while functionality is up," he adds. "It was time to look more closely at whether to buy new batteries or replace the AMR units."

Main Cost Cause

Aurora Utilities found the major cost factor of battery replacement was labor expense. Not only have labor costs risen over the past eight years, the labor involved in battery change-out was larger than originally anticipated. "You can't replace these batteries out in the field," Mikesell explains. "As soon as you breach the seal on the AMR module, you introduce moisture into the electronic components, which leads to corrosion. Even ambient moisture degrades these units. You need to pull the modules, take them to a controlled environment, replace the battery, then return the unit to the field." Labor costs of the multiple meter visits are cost-prohibitive.

Testing the Technology

To assess both battery replacement and new equipment options, the meter pros at Aurora Utilities ran an eight-month beta test, during which they looked at two battery change-out options and eight AMR technologies. All technologies and factors were subjected to a rigorous three-part evaluation that took into account a cost-benefit analysis of each option and associated costs of deployment. That is, some technologies would have required new meter boxes to house them. "For a long time, the city of Aurora was a low-bid buyer," Mikesell says. "Now we have about 10 different meter boxes in place, and not all technologies fit our meter pits." Other units posed potential problems with oversized antennas that might require replacing meter boxes. "If we picked a large antenna design and had to dig up 20,000 nicely landscaped yards to replace meter boxes, that's a customer service issue we'd like to avoid," Mikesell says.

Criteria used to evaluate the technologies included:

- Battery life warranties
- Reading and drive-by speed ranges
- Ease of installation, as well as installation labor time and costs
- Presence of digital encoders for read transmissions in sync with meter data
- Mapping capabilities that identify meter reads captured and routes to follow
- User-friendly software
- Leak detection through continuous water use alerts
- Data logging to access interval data with a monthly drive-by

"We submerged units in water, froze them in ice, changed reading ranges, checked references, timed installation and removals," Mikesell says. Then the team did a pair-wise comparison of all technologies in which they ranked each option against the others by assigning numeric values to all the factors under consideration. "What we found was that the functionality of the new meters vs. their costs made buying new units more feasible than replacing batteries," Mikesell concludes.

That recommendation has gone to the Aurora City Council, and will likely be decided upon sometime this summer. By the time Mikesell gives the presentation he's scheduled to deliver at the AMRA symposium in Orlando in September, he'll have the project's final results to report.

In the meantime, the city of Aurora caught its battery replacement cycle at the right time to prevent widespread unit failures. "With our units being nine years old, we're just beginning to see batteries going out," says Mikesell, who advises any utility to evaluate battery replacement long before the units are set to expire. "If you don't start early, your batteries will fail all at one time. Then you'll have to hire the manpower to get them replaced in a hurry." ◆

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