



CITY OF MIDDLETOWN  
CLIENT  
PENNSYLVANIA  
LOCATION



Standing: Chris Hannan and Ken Klinepeter; kneeling (L-R): Ron Rhodes, Steve Jumper, Don Hartman.

## Utility Finds Going All-Out FixedBase Brings it All In

### From Obsolete to Absolute Reading

Located eight miles south of Harrisburg along the scenic Susquehanna River, the Borough of Middletown, Pennsylvania is the oldest town in Dauphin County, laid out thirty years before the founding of the state capital. Providing for Middletown's water and sewerage needs since 1957, the Borough's Utility Operations and Maintenance Department now serves a population of 9,254, with 2,592 residential, 86 commercial, and 27 industrial accounts. In addition, the utility serves about 1,700 people in a couple of neighboring communities through the use of two bulk meters.

In 2002, the Borough was making do with a meter reading system that was obsolete in more ways than one. First, its meters (a mix of different brands) were aging. The remote odometers were prone to getting dirty, to the point where nesting spiders and ants affected the movement and therefore their accuracy. As Utility Operations and Maintenance Supervisor Kenneth Klinepeter discovered, it's hard to count on your counters when there are discrepancies with the reads at the meters. System-wide, the Borough's rate of Non-Revenue Water stood at 35 percent.

Klinepeter then heard from his local supply house. The bad news – the company that manufactured the pulse-based meters used by the Borough was no longer going to make them. The good news – he now had the opportunity to leave behind a problematic system once and for all, allowing for more efficient use of the utility's human and financial resources.

### Freeing Up Resources, Fixing on a Solution

Klinepeter and Assistant Supervisor Donald Hartman began to research alternatives, informally calling on other utilities as well as vendors over the next six months to see what systems were out there as well as the pros and cons of each. In September 2003 the utility solicited formal proposals from vendors and manufacturers to change out every meter in the system.

With one major objective being to “free up manpower,” Middletown chose radio reading over touchpad reading. Upon learning that Neptune Technology Group offered residential meters accurate to an eighth of a gallon, Klinepeter saw the solution to the Borough's accuracy problem. Other factors that weighed in Neptune's favor – a lead-free bronze meter, the E-Coder® Solid State Absolute Encoder's flags for leak, tamper, and reverse flow, and an unlicensed radio frequency for automatic meter reading (AMR). Additionally, the R900® meter interface unit (MIU) offered, in Klinepeter's words, a “low-profile, better looking transmitter” that would be less obtrusive to install on customers' homes.

Sold on the benefits of Neptune's ARB® Mobile™ System, Klinepeter was all ready to implement a “drive-by” solution but then learned that Neptune offered a fixed network AMR system. “The decision to go to fixed network came before the first meter went into a home,” he said. Now that the Borough had the tools it needed, it was time to begin the changeout. EAP Industries, Inc., with Business Development Manager Sharon DelSignore at the helm, started installation of the new ARB® FixedBase™ AMR System (formerly branded as EZNet) in October 2004 and finished by early June 2005.

After a propagation study by Neptune, Klinepeter and DelSignore were able to install the first generation of ten data collectors on power poles around town, taking advantage of an existing dedicated phone line. Since the installation of Neptune's second-generation ARB FixedBase AMR System in 2009, the Borough has been able to cut the number of collectors to four with some redundancy of transmission. Among the other added benefits of this newer setup is the ability to send the readings using GPRS technology which has proved to be very reliable. According to Klinepeter, “The R900® Gateways allow us the free exchange of large amounts of data. Also, we now know when the read process is complete. [And with] better operator controls, we even know if a collector is impacted by an unforeseen event such as a major storm.”

## Success by the Numbers

From the installation of the new E-Coder smart encoders alone, Middletown realized an improvement of approximately 10 percent in its Non-Revenue Water. In large part because of its AMR fixed network capability, the utility has also been able to reduce its man-hours needed to read its system from nearly 2,000 a year to an astonishing 48. "And that includes checking for stopped meters or possible high reads," said Klinepeter.

He is equally enthusiastic about the increased billing accuracy. "There are no transposed numbers, no wrong addresses, no wrong remote counter installs; and we can quickly find stopped meters." He credits the E-CoderPLUS data the utility collects with helping to ensure that "we're billing customers exactly what we should be." Not only do the alert flags for leak, tamper, and reverse flow identify lost water, but they also assist the Borough – and its residents – in taking a more proactive approach to conservation. When combined with advanced reports generated in ARB® N\_SIGHT™ AMR host software, the information is invaluable in troubleshooting customer issues.

## "The Smoking Gun": A Running Tank

"Our management can view reports in the software and can alert homeowners quickly to minimize their loss," said Klinepeter. "For instance, when getting a final read before a home is sold, we no longer have to send out a reader while the real estate agent and the seller wait." Even more important is showing residents exactly when leaks start and when they stop. "People now have proof [to explain their] high-water bills. We had a gentleman who called wanting to know why he was billed for something like 10-12,000 gallons of consumption that month, instead of the usual 2-3,000. With our software, we can view consumption for the year, for the month, and for the day, so we were able to break the graph out into hourly usage.

"I asked the man, 'Were you gone most of the weekend?' He said, 'Yes, how did you know?' I then said, 'I bet you left around one in the afternoon on Friday, and came back after ten on Sunday night.' Again, he said, 'Yes, but how did you know that?' I told him, 'It's all right here in our charts. Someone probably used the bathroom just before you left, and again just after you returned.'" The homeowner verified that was the case and was able to get a fix on the culprit – a flapper valve that did not reset correctly in the toilet tank.

According to Klinepeter, Middletown has an unusually high proportion of rental housing, close to 50 percent. "Many of the calls we receive are from landlords. Tenants aren't always as alert to noises and leaks as homeowners." A case in point: A property owner was not happy about a bill for 100,000 gallons of water usage. After checking its recorded data, the Borough met him at the building and together they knocked on the door of the suspect apartment. When they were let in, they heard the tell-tale sound of water running in the bathroom. The toilet had been running non-stop for weeks and weeks as the fill valve had never shut off. "At that point, the landlord's anger stopped being directed at us and switched to the tenant," Klinepeter added.

## Paid Back in Efficiency, Accuracy

Neptune's ARB FixedBase AMR System has not only contributed to the Borough's reading and billing efficiency but also to other tasks within the department. "It's freed us up to focus more on preventive maintenance," said Klinepeter. When he and Hartman first made the case for the system changeout, they also insisted on the need to keep the meter readers on the payroll. "Now [those employees] exercise valves, complete repairs on main breaks, and do curb valve shutoff inspections and repairs – things we didn't really have much time to do before."

In many cases, the detailed read information and proactive alerts that the ARB FixedBase AMR System provides support the preventive maintenance done by personnel. With the detailed information the Borough now receives on possible leaks along the main and at residences – along with alerts to reverse flow events – the utility has been able to take early action to isolate breaks and stop reverse flow that might otherwise affect customers. It's a good thing, because as of 2010 both AWWA regulations and Pennsylvania law require isolation of the customer's line when depressurization occurs.

When asked the main benefit the Borough receives through its Neptune ARB® Utility Management System™, Klinepeter can't quite decide, "It's a toss-up between operational efficiency and accuracy. The operational efficiency that comes from freeing up labor and quickly identifying problems; and the accuracy that allows us to find stopped meters faster and bill customers what we should."

And billing is definitely more accurate, as the Borough of Middletown has seen a \$120,000 increase in revenue from water services and a \$130,000 increase in revenue from sewerage services. According to Klinepeter, the investment in a total fixed network AMR system has paid off – literally. "The project paid for itself in just four years."

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