



CITY OF HILLSBORO

CLIENT

HILLSBORO, OREGON

LOCATION



Don Reid, Meter Reading Staff Supervisor

## Neptune Helps City Turn Back Backflow, Move Forward with Infrastructure

### Growing Pains – Trying to Keep Up with Overstrained Resources

When the town of Hillsboro, Oregon was incorporated in 1876, the residents had to carry water in buckets from local wells and streams. By the time Hillsboro formed its own utilities commission in 1940, the expanding city had switched from a wooden pipe carrying water from Sain Creek to a steel line from the Tualatin River. Today the area continues to grow, due in large part to its location in the heart of the West Coast's "Silicon Forest." While this has helped insulate local communities against the effects of the economic recession, the manufacturing of computer chips and solar panels, along with the expanding population, require increasing amounts of water to meet the community's needs. The City has approximately 2,500 commercial and industrial (C&I) users with the remainder of the City's 25,000 service accounts consisting of residential accounts.

For the past decade, four full-time meter readers have manually read the utility's C&I meters on a monthly basis, along with 700 or so residential meters in rural areas. However, the vast majority of residential meters have been read and billed every other month. This bi-monthly schedule has made it difficult for customers to budget for the water usage portion of their bills, and polls and surveys have shown those customers want monthly billing. The bi-monthly billing on the accounts has also left the City with greater exposure to uncollectable debt or lost leak-related revenue when compared to monthly billing. With water use in Hillsboro increasing each year and projected to more than double by 2050, the Water Department was facing the cost of eventually doubling the number of meter readers to keep up with the need.

### The Many Pluses of E-CoderPLUS Features – Water Quality Enhancement and Savings

Leak and reverse flow detection flags identified:

- Sixty-seven (67) incidents of reverse flow caused by thermal expansion involving regular domestic water heaters, combined water heater/hot water coil heating systems, and one solar system
- Six (6) incidents of reverse flow necessitating installation of backflow device because of well pumps that overcame system pressure
- One (1) reverse flow incident requiring backflow device due to use of pressure washer
- One (1) reverse flow incident requiring backflow assembly due to possible illicit use of water system at public park building
- One (1) reverse flow incident requiring backflow assembly due to reverse flow caused by solar water heating system
- One (1) reverse flow incident requiring backflow assembly due to radiant heating system with pump and boiler
- Two (2) reverse flow events requiring backflow assemblies due to elevation
- One (1) reverse flow event caused by meter flow-through during repair work
- One (1) greater-than-maximum reverse flow event caused by solar heating of 200-hundred-foot garden hose expanding through unprotected hose bib in close proximity to meter
- The City of Hillsboro sent one hundred (100) notifications to customers concerning plumbing system leak based on E-CoderPLUS leak detection.

Not helping matters was the aging population of existing meters. “We had meters dating back to 1960 and 1950,” said Peter Martins, Assistant Water Department Director. “We even found a six-inch tree root that had grown around one of them that we had to hack off just to replace the meter.” Understandably, these decades-old meters weren’t the most accurate, especially when combined with a direct-read system. And with four meter readers constantly having to deal with traffic congestion, dogs, and spiders while walking on uneven terrain, repetitive injuries only added to the problem.

In addition to all these challenges, Martins suspected that Hillsboro’s traditional municipal supply system intermixed with residential areas that were historically served by private wells. Pipe complexity might leave the system vulnerable to cross-connection situations that could compromise the municipal water supply.

### **Testing Grounds Prove Neptune’s AMR the Automatic Choice**

As Martins saw it, Hillsboro had three choices: 1) stay with the status quo, having the utility’s existing employees read meters manually; 2) outsource the direct reads to a third party; or 3) implement a new automatic meter reading (AMR) system. Research showed that the utility would have to replace all its meters on average once every 20 years, so Martins began investigating true replacement costs over a 40-year period. The results pointed to the best return from a ten-year timeframe for the changeout – the savings alone due to improvements such as injury prevention, new equipment, and moving staff from meter reading to other areas to prevent future staff expansions would make the switch to AMR the most cost-efficient option. This also “penciled out” without counting new revenue generation. The 10-year changeout time period was also selected because it would stabilize the operational cash flow needed to fund the program.

After the City of Hillsboro was given the green light to move to an AMR system, the next question was, whose AMR system? Martins sent requests for proposals to a variety of manufacturers, “jamming everything into one spec,” as he put it. Clearly defining what the utility wanted was key. After initially proceeding with one manufacturer who seemed to offer needed reverse flow detection, “we learned that ‘reverse flow’ [to them and others in the industry] didn’t mean what we thought it meant. . . they proposed that so long as you had 1,000 gallons going backward but 1,001 going forward, that wasn’t ‘reverse flow.’” Martins continued, “This effort was truly a learning experience for us. Therefore, on the next solicitation process, we clearly redefined all of the terms in the industry so that all of the proposers and the City would have a common understanding.”

Next, the competitors each took a turn battling it out in the field. “We got a meter and a handheld from each company and put everyone’s system to the test,” said Martins. To gauge reception, his crew dug a pit in the utility’s operations area, put in the meter, flooded it with water, parked a car on it, and then tried the signal. Likewise, Hillsboro subjected each system to a rigorous contest for leak detection, reverse flow detection, and durability (drop testing). With its superior performance in all categories, Neptune Technology Group emerged the winner.

### **Sending out Fewer Readers, Pulling in More Accurate Data**

The City of Hillsboro began its own system-wide changeout of its 25,000 meters in June 2007; completion is expected in late 2017 or early 2018. As of mid-March 2011, roughly 7,100 of the old meters and registers have been replaced with new Neptune meters, most fitted with E-Coder)R900/™ combination encoder/RF MIUs. That 28 percent of the total meter population roughly corresponds to the

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**– Peter Martins,  
Assistant Water Department Director**



City of Hillsboro Water Department

25 percent reduction in full-time meter reading personnel. “It cut down the injury rate, plus we were able to move one employee from reading meters to working on valves and hydrants in our distribution division,” said Martins. Whereas the City had been reading with four meter readers bi-monthly, the goal is to reduce the meter reading staff to just one employee reading monthly. “By the middle of [2012] we expect to move another meter reader to our distribution division part-time,” Martins added.

Since the installation of Neptune’s ARB® Mobile™ System, the City has noticed an increase in the volume of water being accounted for – and so have its customers. “We’ve had almost triple the amount of calls from customers who can’t believe their bills are right, saying that the use is too high,” said Martins. “But we’ve been able to show them the water they’ve been actually using with the 96 days of hourly data logging information feature and confirm that their old meter was just underreporting [under-registering].” The increased meter accuracy isn’t the only thing consumers are noticing. E-CoderPLUS features such as leak and reverse flow detection are

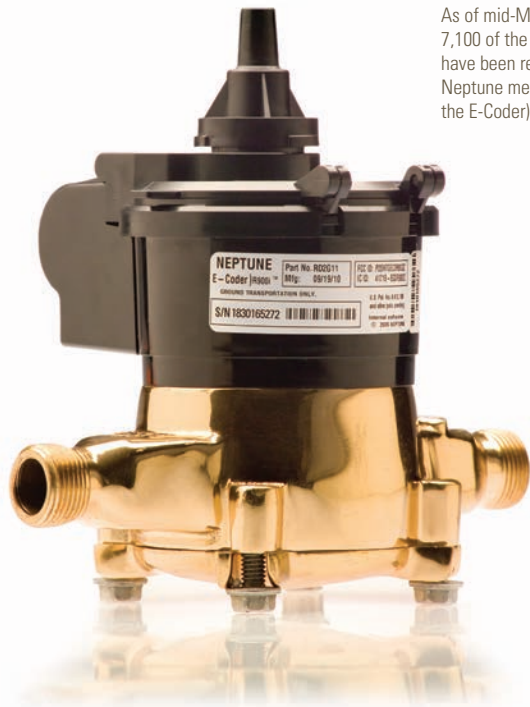
improving the City’s customer service. “Through early leak detection, we’re notifying customers much earlier than we ever could have before,” enthused Martins. “We can put the information right on their bills.” This leak detection has also given homeowners enough time to head off major property damage. And because Hillsboro provides “leak adjustments” on customer bills for half the lost water cost after a leak is detected and verifiably repaired – catching leaks early helps keep the cost of water down for them and the City.

#### **Turning Down the Heat, Turning Up the Peak**

Ironically, the City’s new AMR system is also helping customers lower their heating bills. The City has found that most anomalies in the backflow flags generated by the Neptune system are due to water heaters being set too high. “There were customers whose water heaters registered 140, 150, 160 degrees – in effect, nearly ‘boiling’ water in the tank and pushing it back into the system,” explained Martins. “By helping customers correct the issues that create unintentional backflow, we’re helping lower heating bills too.”

On the C&I side, ARB Mobile has proven to be a revenue generator. When a new commercial or industrial entity “taps into the existing water supply, it has to pay for the expansion in capacity that it plans to use,” said Martins, “in what’s called a System Development Charge (SDC). They pay for the capacity up front, but because the actual use sometimes exceeds the demand that was initially stated, Hillsboro sets up contracts to allow us to recoup costs for capacity exceedence. . . .” How has Neptune made a difference? Before, when the City needed to charge by the “peak day demand,” an average would have to be taken over the course of a peak 30-day period which greatly diluted the peak day effect. Now with the 96 days of hourly data logging capabilities of its ARB® Utility Management System™, the City can use the actual peak day and utilize the exact peak day flow rate in the SDC calculations.

For all its customers, the City of Hillsboro is proving that its ARB Utility Management System is helping strengthen and expand infrastructure for continuing growth. “Early leak detection is showing them that we’re serious about helping them conserve water,” Martins said, “and monthly billing will be crucial in helping them better see the related impacts of their choices and habits on water use.” He added that ARB Mobile has allowed the City to “get a handle on backflow risk facing the City.” Neptune has given his utility the tools it needs: “You have to understand why you want an AMR system and to have clear goals in mind to make the system successful. Neptune helped us get there.”



As of mid-March 2011, roughly 7,100 of the old meters and registers have been replaced with new Neptune meters, most fitted with the E-Coder|R900™.

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