ARB® UTILITY MANAGEMENT SYSTEMS™

NEPTUNE TECHNOLOGY GROUP

CITY OF MIRAMICHI

CLIENT

NEW BRUNSWICK, CANADA

LOCATION

Right: (L-R) Frank Duffy, Director of Public Works; Jim Lamkey, City Manager; Bill Kelly, Project Manager, Neptune Canada

Directing Innovation in Advanced Metering Infrastructure

The City of Miramichi is located in northern New Brunswick, Canada, with a population of approximately 22,000 people. The city formed in 1996 through the amalgamation of Newcastle, Chatham, Douglastown, Loggieville, Nelson Nordin, Canadian Forces Base Chatham, Chatham Parish, Bushville, Chatham Head, and Lower Newcastle.

The City of Miramichi provides an excellent example of a partnership between the public and private sectors. Neptune's Canadian Field Services Group began a 15-year agreement with the city in 1999 to provide turnkey project management services including water meter system operation and maintenance, meter reading, and billing services. This relationship recently advanced to include turnkey implementation of the market's latest fixed base technology. As the evolution of Advanced Metering Infrastructure (AMI) continues to accelerate forward, the water experts at the City of Miramichi are excited about the recent implementation of Neptune's ARB® FixedBase™ technology that will advance the way the city manages its overall water system.

DRIVERS FOR NEW TECHNOLOGY

The city has approximately 4,800 metered services and 2,200 of these water meters were in need of replacement. The need to replace a significant portion of the meter population provided a compelling event for the city to make a decision on its future meter reading technology. As part of the partnership agreement, Neptune is called upon to keep the city knowledgeable of technology advances.

KEY CUSTOMER HIGHLIGHTS

- **Who:** City of Miramichi
- **Where:** Miramichi, New Brunswick, Canada
- **Population:** ~ 22,000
- **Metered Connections:** ~ 4,500
- **Meter Population:** 95% Residential, 5% Industrial/Commercial/ Institutional (ICI)
- **Meter Revenue Source:** 50% Residential, 50% ICI
- **System:** ARB N_SIGHT FixedBase
- **Endpoint:** R450 MIU with E-Coder Solid State Absolute Encoder
- **Meter Register:** E-Coder Solid State Absolute Encoders
- **What:** Turnkey installation project including system supply, installation, and system integration

The city looked at the following considerations when examining its current remote-based reading technology:

- Increased maintenance costs as current technology ages (older remote receptacles, wire, and water meters);
- Increased frequency and expenses associated with seasonal meter reads;
- 50% of revenue came from commercial meters, increasing the need for more frequent meter reads;
- The city wanted to provide similar service levels for all customers;
- Understanding and addressing Non-Revenue Water.

Introducing Neptune's innovative ARB FixedBase technology would allow the city to effectively address the issues listed above and position itself with a technology that would meet its needs over the next 15 to 20 years. The city would have the ability to better manage its Non-Revenue Water, implement proactive backflow monitoring, elevate customer support, and enhance its ability to manage public works projects and conservation programs.

TURNKEY INTEGRATION

Neptune's Canadian Field Services Group was awarded the opportunity to execute a turnkey installation project including system supply, installation, customer appointments, and complete system integration:

- Replacement of all of the meters in the former Town of Newcastle;
- Register replacement to Neptune E-Coder®-type registers (Chatham and Douglastown);
- System-wide upgrade of meter reading technology by installing Neptune's ARB FixedBase R450™ radio frequency meter interface units (RF MIUs) on all of the upgraded meters;
- Supply and installation of R450 FixedBase data collectors; and
- Neptune's ARB® N_SIGHT™ FixedBase software.

FUTURE SYSTEM USES

The city can use advanced metering information as the foundation for a variety of critical management functions such as:

NON-REVENUE WATER MONITORING

- Total daily production vs. total daily consumption
- Daily leak monitoring system

Using the System's time-synchronized midnight meter readings, the city will have the total consumption for any given collection of meters within a district or "zone." This total consumption is used to compare to a master or "bulk" meter(s) servicing the zone. This will provide an additional tool for the city which it can now use to perform mass balances within any given zone of its distribution system. Zones having a large discrepancy between the total consumption of the zone and the respective master meter(s) are indicative of potential distribution system leaks within a particular zone.

Using the ARB FixedBase System's two-way licensed communication capability from the host software to the R450 RF MIU, the city can receive prompt notification of leak occurrences at the meter source and along the city's water distribution lines. Leak notifications can be viewed as a report or transferred seamlessly through the System's software as an email to critical operations staff alerting them of potential issues within the city's distribution system.

Neptune's ARB FixedBase System is compatible with Fluid Conservation Systems' (FCS) AMR Permalog® acoustic noise leak loggers that can detect leaks in the distribution system. Figure (A) depicts an actual distribution main leak event captured by the city's new AMI system. The city had suspected a severe leak occurrence in its system, but did not know the exact location of the leak. With the new AMI system it now has confirmation that this is actually occurring and can easily perform daily monitoring of the distribution system from the comfort of the city's office.

Figure A

ENHANCED CUSTOMER SERVICE

- Email usage profiles directly to the customer
- Alarms for leak, tamper, and reverse flow detection
- High-water bills

Customer inquiries can now be resolved more expediently with the ARB FixedBase System's capability to email customers' usage graphs that profile their water consumption, identifying leak situations as well as when actual water consumption occurred. These capabilities help a customer understand their water consumption and quickly answer questions regarding their recent water bill. All this information is readily available to the city staff.

Figure (B) depicts an actual leak occurrence at a residence within the city. The usage profile was used to address an actual high-bill complaint. Consumption graphs can be easily emailed to an end-user to confirm how much and when the water consumption occurred.

IMPROVED OPERATIONAL EFFICIENCIES

- Configurable proactive alarm notification
- Optimum read success rates and security with licensed frequencies

Using the ARB FixedBase System's two-way licensed communication capability, the city receives prompt notification of alarm conditions such as a leak at a home or building, or a major reverse flow event. Alarms are configured for email to critical city staff, allowing them to make important operational decisions or efficiently effect any necessary actions to resolve the situation. Figure (C) illustrates how a priority alarm is configured to notify city personnel of specific alarm situations.

The two-way radio frequency of the ARB FixedBase System is licensed by Industry Canada and the FCC. Therefore, the city can rest assured it has an Advanced Metering Infrastructure (AMI) system that will consistently deliver the information back to its office without having to worry about other frequencies potentially interfering with its "protected" system.

SUPPORT OF CONSERVATION INITIATIVES

- Track water usage restrictions (odd/even-day usage)
- Email consumption to the end user

With time-synchronized midnight meter readings and 24-hour consumption intervals, usage restriction programs (odd/even-day usage) can now be easily and effectively monitored to determine exactly what time and day end users are using water. This information (in the form of an easy-to-read usage profile graph) can be emailed to an end user to further reinforce the importance of water conservation and adherence to a water usage restriction program.

MANAGING DEMAND FOR HIGH-REVENUE USERS

Support for high-revenue users can now be provided efficiently through the city's AMI system. Peak demand is monitored using the system's time-synchronized midnight meter reads and 24-hour consumption intervals to properly size Industrial, Commercial, and Institutional (ICI) meters; if required, the city can make an informed decision to resize a meter for its specific application. Monitoring of peak demand can also be used to enforce demand restrictions on high-revenue users to ensure enough supply for all customers within the City of Miramichi.

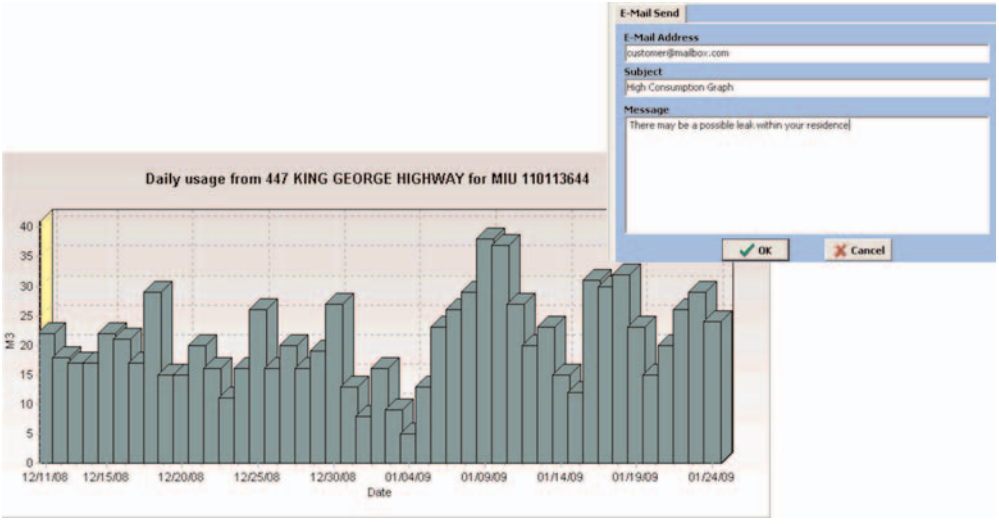
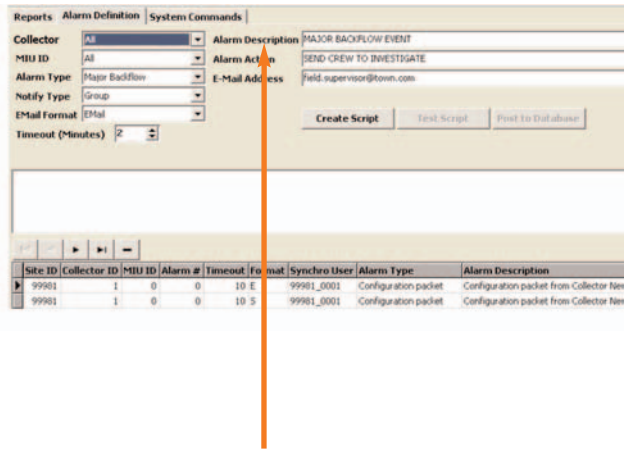


Figure B

Figure C



- **Alarm Description** – more detail on alarm
- **Alarm Action** – desired action to address issue
- **Email address** – recipients of alarm notification

Moving into the future, the city's meter reading technology will no longer be used for just "reading meters." Rather, the implementation of Neptune's ARB FixedBase System will allow Miramichi to obtain timely (critical) data from the field as well as daily (system-wide) time-synchronized snapshots of readings from all meters. Access to this valuable data will support future leak detection and conservation initiatives and eliminate off-cycle readings for high-water bill complaints and/or move-ins/move-outs. The City of Miramichi chose to implement a system that will not only deliver on present-day requirements of providing accurate and timely bills, but also has the capabilities to deliver enhanced customer service and proactive system monitoring well into the future.

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