

AMR SYSTEM EVALUATION PROGRAM

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CITY OF CAMBRIDGE

MASSACHUSETTS

WATER DEPARTMENT
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CAMBRIDGE, MASS. 02138

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OFFICE OF THE CITY MANAGER
617-349-4770

Michael A. Nicoloro
Managing Director

**SUBJECT: COUNCIL ORDER #21, DATED 11/7/94 - "WAYS TO IMPROVE IN
THE METER READING AND BILLING SYSTEM**

DATE: NOVEMBER 14, 1994

FROM: MIKE NICOLORO

TO: ROBERT W. HEALY, CITY MANAGER

In response to the subject matter, the Cambridge Water Department (CWD) is pursuing innovative technologies such as Automated Meter Reading technology to improve customer service. To answer the question posed in the Council Order,

"can improvements be made in Cambridge to the meter-reading and billing system",

the answer is yes and AMR is a solution. The attached document details the CWD's course of action with respect to AMR technology. As you are aware, I was involved in several technological projects with my former employer - AMR was one. In addition to AMR, I was also involved with GIS (Geographical Information System) and SCADA (Supervisory Control & Data Acquisition) technologies. My role was to link these technologies together to maximize efficiency and eliminate redundancy. The City of Cambridge is in a similar position in that we are or will be pursuing all 3 of these technologies. The SCADA technology will be a critical operation in our future water treatment plant (i.e. automated controls, status, etc.). It is uncertain at this time how much overlap there will be among these technologies. However, this should be closely looked at in the future to eliminate redundant functionality.

I trust that the attached document is complete. Please do not hesitate to contact me if you should require further information. Thank You.

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CAMBRIDGE WATER DEPARTMENT

"AUTOMATED METER READING (AMR) PROJECT"

Strategic Overview

The City of Cambridge has been approached by Commonwealth Gas Company (COM/Gas) to participate in a joint AMR program. COM/Gas is embarking upon a vigorous AMR program that will be capable of providing meter reading and other related services directed at the gas, electric and water utilities. COM/Gas has selected Cambridge as the demo test site for expanding AMR services to the water industry.

COM/Gas began its AMR conversion program in 1992 and currently has approximately 100,000 of its 232,000 meters converted to AMR. Thus, the AMR program at COM/Gas is tried and proven - it works. At present, gas meters are read from a moving vehicle using radio-based communication, thus eliminating the need to set foot on the customer's property. The use of AMR technology has heightened customer satisfaction by virtually eliminating the need to estimate monthly billings. With respect to the Cambridge Water Department (CWD), just having the capability of converting to a monthly billing process would be a huge improvement over the quarterly billings. In order to expand its service capability from reading just gas meters to include water and electric meters, COM/Gas is pursuing the elimination of the vehicle from the procedure and replacing it with a "fixed" network. The "fixed network" would require the installation of strategically placed receiving units that would pick up radio signals from a transmitter at the meter site. The receiving unit, which is external to the customer site, is then interfaced with telephone circuitry where the data is conveyed to a centralized computer-based processing center for data manipulation.

The "fixed" network system will offer greater expandability and efficiency for COM/Gas in that it will be capable of reading 1 million meters every 11 seconds. COM/Gas is contemplating providing this service to several communities within its service territory. COM/Gas has offered to provide 10 water meters to the CWD so that the AMR "fixed" network technology can be properly evaluated. We have identified 24 potential customer sites of which 10 will be selected for joint testing of water, gas and electric meter readings. Installing this technology does not hinder the CWD's ability to perform its routine meter reading functions nor does it adversely affect the customer. The only noticeable change to the customer meter would be a device called an "ERT" (Encode - Receive - Transmit) which will be installed at the meter (Refer to the attached literature). Proper notice and explanation of the program will be given to each customer prior to the demo installation. If this technology meets our approval, we would have the option to receive a service from COM/Gas that would include reporting, billing, special applications, etc. [the services are endless] .

We will also evaluate a third party service agreement with COM/Gas for AMR services versus a City-owned and installed system. However, given the present and forecasted economic climate, the City should take advantage of every opportunity to reduce spending. In this case, the City has a golden opportunity to acquire a leading edge AMR service that will require minimal capital investment to institute. Serious consideration will be given to a service agreement relationship. Our immediate objective is to install the 10 meters and commence evaluating the technology and costs during the early part of 1995.

Benefits

Some of the potential benefits associated with the concept of AMR "fixed" network technology are :

- o improves overall customer service.
- o eliminates virtually all meter estimates and the need to enter the customer site.(i.e. there will some instances that will require manual reads).
- o offers a third party billing and report service.
- o eliminates the many manual record-keeping systems and replaces it with one electronic database that can be accessed and utilized as the need dictates.
- o offers the capability of converting to monthly billing.
- o increases billing accuracy.
- o eliminates redundant manual data entry functions.
- o improves leak detection capabilities at customer sites which will result in a savings to the customer and an added water conservation measure .
- o provides the ability to meter water consumption at multiple customer locations (i.e. this will assist the sewer abatement process).
- o improves revenue collection and billing process.
- o offers a wide range of billing formats (i.e. customer friendly).
- o provides exception report capabilities, trending analysis and historical comparisons that will assist with long-term planning and financial decision support.
- o facilitates future transition to demand billing (i.e. similar to electric rate structure if the City elects to move in this direction).

AMR Technology - How Does It Work?

An ERT (Encode - Receive - Transmit) device (Refer to attachments), is a radio-based transmitting unit that is retrofitted to the customer meter. The ERT collects meter consumption data by tracking the magnets on the meter index. This data is then passed to an ERT module where it awaits a "wake-up" call from a receiving unit external to the customer site. The ERT operates under FCC (Federal Communications Commission) Part 15 and does not require individual licensing to operate. When the ERT receives a wake up call, the data is transmitted by radio wave to the external receiving unit which is interfaced with telephone circuitry. The data is then conveyed over telephone lines to a central computer-based processing center. Once this data is collected and put into a database the information can be formatted for billing, reporting and custom applications as required.

Action Items

The following action items are currently being pursued. Our goal is to complete our evaluation and make a recommendation in 1995.

- o Select 10 demo sites.
- o Contact/meet with demo customers to explain program.
- o Install demo meters.
- o Evaluate Trial objectives (See below).
- o Provide recommendation.

Trial Objectives

The following trial objectives will be assessed during our evaluation of this technology.

- o Cost (i.e. onetime and re-occurring)
- o Reading success rate.
- o Accuracy.
- o Ease of installation.
- o Component reliability.
- o Ease of use.
- o Ability to utilize raw data with applications.
- o Ease of maintenance.
- o Vendor support.
- o Customer acceptance.
- o Billing service.
- o Reporting/trending capabilities.
- o Operator interface (i.e. user friendly).

6.



CITY OF CAMBRIDGE
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EXECUTIVE DEPARTMENT
ROBERT W. HEALY
City Manager

RICHARD C. ROSSI
Deputy City Manager

February 13, 1995

To The Honorable, The City Council:

With reference to Awaiting Report Item No. 10, regarding ways for the Water Department to improve the meter-reading and billing systems, please find attached a response from Michael Nicoloro, Managing Director of the Water Department detailing a pilot Automated Meter Reading (AMR) program that has been initiated in the City. Also attached is a list of ten (10) customers that have agreed to participate in this demonstration program. Evaluation of this program has begun; I will continue to keep the Council informed of its progress.

Very truly yours,

A handwritten signature in black ink, appearing to read "Robert W. Healy", is written over a horizontal line.

Robert W. Healy
City Manager

RWH/mev
attachment

Consent Agenda # 6 S-60

Response to Awaiting Report Item Number
Ten regarding ways for the Water Dept.
to improve the meter-reading and billing
systems.

for original see 1994
City Manager Requests #
388.

In City Council,

February 13, 1995

Report - referred to
the Environment
Committee on motion
of Councillor Buckley.
2/14/95 Copy sent to
Environment Committee (C)