THE CITY OF SAN DIEGO

REPORT TO THE CITY COUNCIL

DATE ISSUED: October 8, 2008 REPORT NO.: 08-146

ATTENTION: Natural Resources and Culture Committee
Agenda of October 15, 2008

SUBJECT: Automated Meter Reading Initiative Implementation

REFERENCE: IROC Memorandum, March 3, 2008
NR&C Report, October 21, 2005

REQUESTED ACTION: Approve Staff Recommendation

STAFF RECOMMENDATION: Implement Automated Meter Reading

SUMMARY:

The Water Department has been studying the use of Automated Meter Reading (AMR) technology to determine how it can best enhance its water meter reading, billing, water conservation and management processes. After analyzing several options it has been determined that if applied strategically, a limited deployment (Phase I) of AMR will allow the Water Department and its customers to maximize the benefits of the technology. AMR will enable the Water Department to be more responsive to customer needs, increase revenues and minimize operating costs by creating a more efficient meter reading operation. In Phase I, customers with large meters (mainly commercial customers), all monthly read meters, some residential water users, all new development, and at a minimal fee customers who request it, will have AMR technology installed. The Feasibility Assessment, conducted by the Department regarding the potential use of AMR, highlighted the following key factors leading to significant improvement:

1. The geographic concentration of meters within the City's downtown area and along commercial corridors will enable the deployment of AMR at reasonable cost;
2. Improved customer service resulting from increased accuracy and timeliness of consumption data, quicker resolution of bill disputes, a reduction in the production of estimated bills, and other improvements;
3. The reduction in meter reading costs associated with large commercial meters;
4. Increased revenues resulting from the installation of new, more accurate, large meters which would take place concurrently with AMR installation;
5. Automating of the highest-cost and hardest to read meters, such as meters in vaults and in canyons.

Among the benefits of AMR is that it will allow the Water Department to help its customers, who typically use large amounts of water, to conserve water. For instance, customers will be able to compare their current water usage (such as irrigation times) with optimum usage and to identify water leaks. Therefore, while some benefits can be more directly attributed to large commercial users, all rate payers will benefit as the water system becomes more efficient and as larger users have the ability to monitor their use thus reducing water consumption. Concurrently, the Department's initiative to refurbish large meters in conjunction with the AMR installations will recover unbilled revenues to the benefit of all customers.

Background

AMR technology allows water meters to be read electronically rather than by hand. The meters send out a radio frequency, collected by the Water Department, with information such as overall water consumption and time-of-use data. Time-of-use data can be used to manage and analyze customer consumption patterns. Additionally, AMR data helps alert the Water Department to possible leaks on a customer's property and meter tampering. This information is very useful for water conservation efforts.

AMR can be used to read meters using different methods. The first method is by having meter readers walk near the meter and collect reads using a hand-held device. The second method is a mobile system where a computer in a vehicle collects reads as it drives near the meters. A third alternative is a fixed system where the meters send information to a computer based at the Water Department.

The Water Department recommends that a mobile system is used during Phase I implementation. The four main system components of such system are:

1. Meter Interface Unit (MIU) – Device attached to the meter that collects and transmits meter reading data in digital format.
2. Mobile Data Collection Unit (MDCU) – Laptop computer docked in a vehicle that collects meter reads while traveling through streets at normal driving speeds. MDCUs emit audible tones to indicate collected and missed reads, and GPS and mapping applications guide meter readers through set customer routes.
3. Control Computer – System computer, which manages a database of meter readings, user-profile patterns, such as tamper and leak detection, and other meter related information.
4. System Software – Software designed to operate interfaces with various other network servers and systems, such as the billing system (CIS), and provide graphical displays of general consumption patterns, individual account water-use, and system performance.

Feasibility Assessment

In Fiscal Year 2005, supported by Cognyst Consulting, Inc., a nationally recognized expert in AMR technology, the Water Department completed a Feasibility Assessment regarding the potential use of AMR within its business operations. A review of meter reading requirements, and bill payment and investigation activities was completed. In addition, meter maintenance

operations were assessed to fully evaluate the degree to which AMR technology could provide support.

As well as the key findings of the Feasibility Assessment described in the Summary section of this report, the assessment found that while full deployment of AMR throughout the entire Water Department service area in a single-phase was not cost-effective, at over $80 million, a limited strategic implementation could quickly and significantly enhance operations, increase efficiency and offer a short payback period. The recommended Mobile AMR system has a payback period of less than five years.

In addition to the findings of the Feasibility Assessment, it is important to note that conditions have continued to change since the conclusion of the assessment. As water conservation increasingly becomes more important, AMR technology will allow the Water Department to provide tools to empower its customers to make better decisions about their water use. AMR is proving to be an effective tool for educating consumers about their water consumption and the impact such conservation would have in reducing expenses.

Project Scope – Phase I

The proposed installation (Phase I) targets approximately 10 percent (27,000) of the total meter population of roughly 274,000. Deployment will include all meters located in the downtown area, all meters in vaults, all monthly-read meters, meters that are difficult to access, meters due for replacement in the "age replacement program," new meters for new service installations and at minimal fee meter replacements upon customer request. In order to pilot the use of AMR for residential customers, the downtown area has been expanded to include residential customers in the surrounding areas as can be seen in the attached map. Subsequent phases of implementation are not currently scheduled; however, the contract for Phase I implementation includes provisions and price extensions for full deployment of subsequent phases at the City's option.

Status

In October 2005, the Public Utilities Advisory Commission (PUAC) and the Natural Resources and Culture Committee (NR&C) reviewed and approved the Feasibility Assessment and the recommendation to develop and issue a Request for Proposals (RFP) for the solicitation of bids from qualified firms.

In 2006 with the intention of gaining knowledge and expertise to issue an RFP that would address the findings of the Feasibility Assessment, the Department continued to study the development of AMR technology and to network with other water utilities which were in the process of, or had already, implemented AMR systems. This effort allowed the Department to benefit from the cumulative water industry knowledge of AMR. During this time AMR technology continued to evolve to better meet the demands of water utilities and AMR prices became more competitive.

In 2007 the Department concluded the RFP period and began the evaluation of responses for technical merit, competitive pricing and financing options.

RFP Evaluation Process

The RFP requested technical and price information for each proposed AMR technology. Responding vendors were required to provide a "turn-key" deployment, including meter purchases, meter and AMR installations, system hard/software, and overall project management. Independent financing was also a requirement for the entire cost of service, technology and installation proposed to the City. Vendors had the option to recommend their best solution(s) to address the City's needs, including only mobile/walk-by systems, only fixed network, or hybrid (combination of mobile/walk-by and fixed network) solutions.

In order to evaluate RFP responses, a cross-functional Technical Evaluation Committee (TEC) was formed. The team was led by the AMR Program Manager and included the Meter Services Manager, Meter Reading Supervisor, Customer Service Representative, Information Technology Analyst, and an Information Technology and Communications engineer. The team was advised by Cognyst Consulting, Inc.

The TEC evaluation included grouping responses into sub-categories, making a determination of how each sub-category met the City's requirements, and scoring each sub-category. At its conclusion, the technical evaluation team ranked every technology and prepared a detailed written evaluation of the strengths and weaknesses of each, including findings from vendor demonstrations, reference checks and site visits. The team's findings were documented in a 13-page Narrative Summary Report of Technical Evaluations submitted to the Purchasing and Contracting Department.

The Price evaluation included total life cycle cost analyses for each technology, including significant aspects of implementation such as operations and maintenance requirements, Information Technology costs, on-going maintenance agreements, and a comparison of AMR components between the different vendors' technologies.

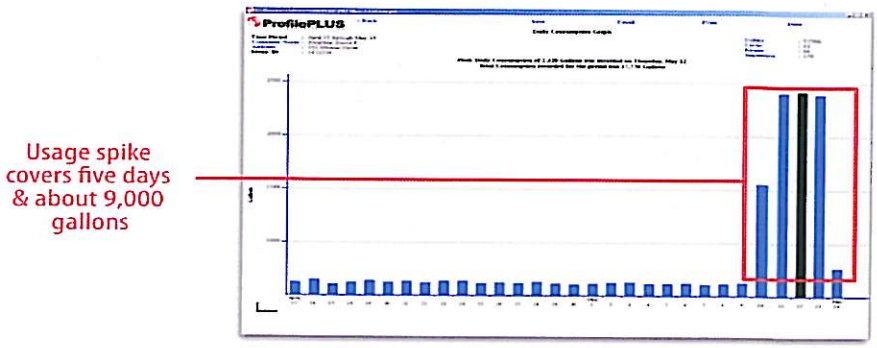
Datamatic Mobile AMR – Functionality and System Attributes

In August 2008, the Department reached a tentative (contingent on Mayor and City Council approval) agreement with Datamatic, Ltd. The Department recommends implementation of an AMR mobile system from Datamatic. Datamatic is an innovative and customer-oriented organization that provides the only system available in the industry that is fully able to migrate from a mobile to fixed system with the same meter MIU and minimal equipment changes. This efficient migration would also result in marginal upgrade costs. This deployment will allow the Water Department first to implement a mobile system and later convert to a fixed network AMR should it be appropriate to do so.

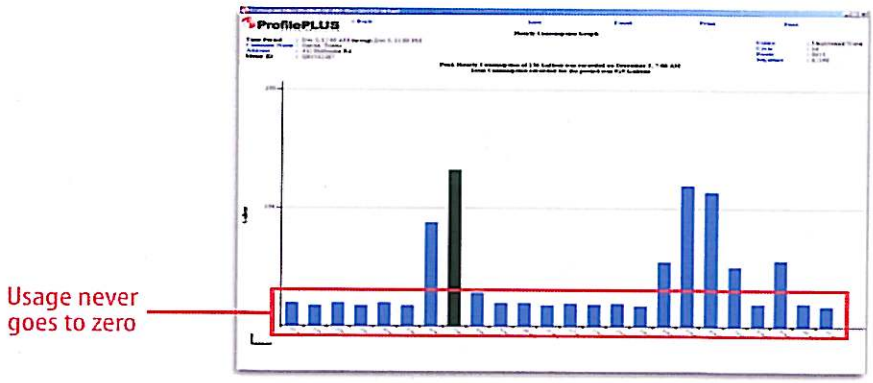
The Datamatic mobile system offers functionality typically associated with the more advanced fixed network AMR, including:

- Customer user profiles in 1, 4, 6 or 24 hour intervals;
- User-profile displays in graphical format – available to consumers – that include:
    - Water Violations (if applicable)

- Consumption, including high consumption.
  The graph below displays the level of consumption for filling a swimming pool, including date and time of consumption to assist in resolving a customer inquiry.



- Identification of water-leak patterns.
  In the graph below, consumption never goes to zero during this 24-hour period, strongly suggesting a water leak.



- Programmable automatic alarms, definable to meet specific customer needs;
- Storage of over 100 days of hourly water usage data in the meter MIU;
- Secure and reliable data – encrypted data transmissions;
- Half-mile range, or more under certain conditions, from the meter to the mobile data collector unit in the vehicle;
- Universal compatibility with meters currently in the system to reduce meter exchanges and promote competitive bidding of new meter purchases;
- Automatic integration of new system meters into the network.

FISCAL CONSIDERATIONS:

The projected implementation costs and savings are described below. However, it is important to note that AMR deployment will also result in significant customer benefits that are difficult to

quantify, such as customer satisfaction resulting from faster resolution of disputes and inquiries, as well as better utilization and availability of water data for general consumption analysis.

Financing and Costs

Consistent with the RFP, Koch Financing proposed to finance the cost of the Datamatic AMR deployment. The total project cost and lease payments will be budgeted within the Department's operating budget and are included in the Water Rate Case. The cost of procuring, installing, operating and maintaining the system for 15 years is approximately $19.2 million. Of that amount, approximately $17.7 million will be financed over a 10-year term at 1.27% of the ten year AAA MMD Index rate. As of August 5, 2008, the interest rate was 4.8% with a total interest payment of approximately $4.86 million. The effective interest rate will be determined on the date of funding.

The projected capital cost of $17.7 million includes procurement of meters, AMR technology, related equipment hardware and software, maintenance/warranty agreements, installation, and project management (assuming a two-year deployment beginning in December 2008).

The net annual impact to the Department includes the cost to maintain and operate the system, lease payments and sales tax. Annual operations and maintenance costs are projected at approximately $20,000 during early deployment and close to $200,000 as the system reaches the end of its useful life of 15 years.

The estimated annual fiscal impact is indicated in the table below.

Financing Proceeds, Capital Expense and Annual Payments

	FY 2009	FY 2010	FY 2011	Each FY 2012-2019	FY 2020	FY 2021
Financing Proceeds(~$17.7M)	***$1,844,341***	***$13,619,576***	***$2,269,930***			
Capital (~$17.7M)	$1,844,341	$13,619,576	$2,269,930			
*Lease Payments & Sales Tax**	$126,608	$993,076	$1,952,647	$2,259,681	$1,925,417	$361,938
TOTAL	$1,970,949	$14,612,652	$4,222,577	$2,259,681	$1,925,417	$361,938

*Lease Payments and Sales Tax total approximately $23.4M.

Cost Avoidance/Savings

The table below provides an overview of the project costs and annual cost avoidance/savings expected due to implementation of AMR. Costs as described above total approximately $19.2 million for Phase I deployment and maintenance over 15 years. Comparing costs against projected savings results in a payback period of less than five years.

Total projected savings equals $4.2 million, as follows:

- Personnel: Due to automation of meter reading operations, the Department expects to reduce 8.00 full-time equivalent positions resulting in savings of approximately $500,000.
- Registration Recovery from Replacement of Inaccurate Meters: Older meters typically result in under-registration of water consumption (not all water consumed is recorded). Replacement of older, under-registering, meters is projected to increase revenue at a rate of approximately $3.3 million annually.
- Deferred Normal Replacement: Over a period of two years, most of the system's large meters will be replaced with new automated meters. This will defer normal scheduled replacements at a savings of approximately $400,000 annually.

Overview of Costs & Savings/Cost Avoidance (Dollars in Millions)	
Costs:	
AMR Project	$17.7
Sales Tax	0.8
O&M	0.6
Total	***$19.2***
Annual Savings:	
Personnel	$0.5
Registration Recovery-Meter Replacement	3.3
Deferred Normal Replacement	0.4
Total Savings/Cost Avoidance	***$4.2***
Payback Period, years	4.6

Recommendation

Based on the Department's evaluation of Automated Meter Reading technology, the findings of the Feasibility Assessment and the region's current water-use analysis needs, the Department's recommendations are to:

1. Implement a mobile AMR system for Phase I;
2. Require all new development to be automated with AMR technology;
3. Continue to conduct cost benefit analyses and recommend appropriate steps for system-wide deployment as soon as practicable.

PREVIOUS COUNCIL and/or COMMITTEE ACTION:

IROC – Information Item (March 2008)
NR&C – Approval to Issue Requests for Proposals for AMR Technology (October 2005)

COMMUNITY PARTICIPATION AND PUBLIC OUTREACH EFFORTS:

Public outreach will take place once the project is approved and will extend through implementation. To achieve this, the Department will educate and explain the benefits and features of AMR to interested parties with focus on the customers who will be receiving the new technology.

KEY STAKEHOLDERS AND PROJECTED IMPACTS:

All City of San Diego residents will be positively impacted as larger users will have the ability to monitor their use thus enabling them to reduce water consumption. Concurrently the Department's initiative to refurbish large meters in conjunction with the AMR installations will recover unbilled revenues to the benefit of all customers.

10/8/08

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10/8/08

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Attachment: Downtown area as defined for Phase I of AMR deployment