CITY OF BEVERLY HILLS
STAFF REPORT

Meeting Date: January 8, 2008

To: Honorable Mayor & City Council

From: Kevin Watson, Water Operations Manager

Subject: PROPOSAL TO PROCEED WITH THE PURCHASE AND INSTALLATION FOR THE REPLACEMENT OF THE WATER METERS USING SMART AUTOMATIC METER READING TECHNOLOGY

Attachments:

A. Summary of Items to be Purchased and Installed in the Agreement
B. Water Meter Fixed Network Deployment Graph
C. Informational Matrix Comparing Manufacturers
D. Comparison Of Last Meter Replacement Project To Proposed Meter Replacement Project
E. Comparison Of Present System To Proposed System
F. Four Areas of Improved Efficiencies from Implementing an Automated Meter Reading (AMR) Program
G. The Scott Report

INTRODUCTION

In 1996, the City of Beverly Hills entered into a contract to replace residential water meters sized 2" and smaller in its entire service area, with a planned replacement life of 10 years. This project utilized positive displacement meters wired to remote read touch pads and radio read meters. The replacement project took approximately 15 months to complete. In the 10 years following that replacement, the performance of the meters began to degrade, and remote meter reading issues appeared. The City has been using extensive human resources to manually read failing meters. This replacement was expected and typical as the American Water Works Association recommends changing out residential meters every 10 years.

DISCUSSION

All of the revenue producing meters totaling 11,088 water meters throughout the City of Beverly Hills and the City's water distribution system in the City of West Hollywood are proposed to be replaced using the Neptune & Hexagram solutions. Upon approval of this purchase and installation, the City expects full installation within nine months. In addition to replacing just the average sized meter and smaller, the larger meters will be changed from older less accurate turbine meters to more accurate compound meters that can measure low flows as well as high flows. The large meters will have testing ports installed so they can have accuracy tests performed without removing the meters.

This device will allow for more efficient maintenance. Attachment A lists all the elements of this purchase to result in a completely new state of the art metering system.

The importance of pursuing this project now is described below:

1. The American Water Works Association recommends changing out residential meters every 10 years. There were 1,100 meters that were only retrofitted in 1997 and many of these were already over ten years old.

2. In 1997, the larger meters were not replaced, and they account for a major portion of water usage. When just one of these meters is under registering it can have an impact on unaccounted for water and loss of billing revenues.

3. The larger meters have to be removed and taken to remote locations for an accuracy test to be performed. The proposed meters have testing ports so the meters can be tested in place. These ports will save many hours of labor and allow more meters to have accuracy tests performed more frequently. Industry standards recommend that large meters have accuracy tests performed on an annual basis due to the loss of revenue when they are under-registering.

4. The existing large turbine meters do not measure the lower flows and as such approximately 7% of the water usage does not get measured. This deficiency will be corrected by replacing the turbine meters with compound meters.

5. With water conservation a major concern for all of Southern California and the impending restrictions on the allocation of water to the City of Beverly Hills with financial penalties imposed on the amount of water consumed above this allocation, it is imperative that the City use the available technology that more accurately captures the amount of water going through the meters.

6. Presently, staff has asked the citizens of Beverly Hills to voluntarily conserve 10% of water usage. The future outlook is that the voluntary water conservation may have to be changed to mandatory water conservation. With the purchase and installation of the smart meter technology, the City can help the citizens of Beverly Hills achieve the 10% water conservation goal by immediately notifying them when an intermittent or continuous usage of water has occurred during a 24 hour period, which may mean there is a leak on their property.

With the timing appropriate to replace the City's water meters, the next question is what meters to purchase and by whom. In July of 2006, staff contacted several water meter manufacturers to investigate options on conducting another complete residential water meter change-out replacement. Over the course of FY 06-07, water utility staff studied the capabilities of the various offerings and technologies. After thorough study and investigation of the water meters on the market, staff recommends purchase of the Neptune Technology Group's E-Coder equipped meters with the Hexagram Star MTU from Measurement Control Systems, Inc. (MCS) who is Neptune Technology's sole source distributor in the entire state of California. As such, MCS is set-up to provide local customer support and employ full-time dedicated territory managers and systems specialists. They also maintain a technical service division focused on water meter testing, repair, and change-out programs. MCS is located in Santa Ana, California, and was established in 1965 as an industrial distributor of water and gas meters, pressure regulators, and related accessories. Today, MCS offers a wide variety of products and services covering all aspects of gas, electric, and liquid measurement.

Neptune and Hexagram have an exclusive strategic business arrangement in the water market, and have worked together to develop an E-Coder compatible radio capable of communicating smart register information through the Hexagram fixed-network AMR system.

Staff recommends sole sourcing the purchase and installation of the new water meter system for the following reasons:

- This solution has been used by major City's and Utilities for over 10 years. Some of these Cities include Corpus Christi, Texas; Boston, Massachusetts; and the District of Columbia, Washington, D.C.

- Hexagram dominates the market segment with a 75% market share of water fixed-network deployments (Attachment B).

- The Neptune water meter and Hexagram fixed-network system offers smart technology that can detect and notify staff when ever the water meter is tampered, when a reverse flow occurred, or if a leak is suspected on the customer's property. This information can be captured, transmitted, and communicated to the City's database daily. No other fixed-network AMR system can communicate this information from every meter in the system.

- The key distinguishing differences identified as important components of a selected system included: Company AMR experience; warranty; meter compatibility; encoder register features[1]; encoder register resolution transmitted; leak event notification; backflow event notification; conservation monitoring and reporting tools; distribution leak detection; system ownership; data collector poser supply; DCU mounting options; radio frequency; license; and installed customer base. The Neptune/Hexagram solution met all these qualifications. (Attachment C – Informational Matrix Comparing Manufacturers)

Staff has carefully explored the differences amongst the fixed-network AMR systems currently on the market. Each system is unique and has its advantages and disadvantages. This decision impacts not only the water utility and its customers, but the Information Technology and Finance staff who also must support the day to day activity of the system. A commitment to an AMR system, which includes hardware and software, allows the agency to standardize its operation for revenue and water accountability.

An important part of this process was to reflect on the last time the City replaced its meters and to determine if there are lessons learned. Problems encountered during the first year of the 1997 project following installation and thereafter varied. The meter registers shorted out due to contact with water. The City experienced compatibility issues between the meter system and the financial system. Due to hardware failures the City had to complete manual re-reads and then enter the re-read data manually. Finally, one meter was programmed inaccurately resulting in reimbursing a customer over $100,000. These issues have been addressed in the proposed project.

[1] This digitally encodes the rotation of the measuring chamber providing "absolute" registration with no internal battery requirement. This is similar to an odometer in a car that indicates miles driven.

Meeting Date: January 8, 2008

In 1997, when the last replacement project was implemented, the total project cost was $2.9 million. This replacement included the majority of the meters in the City's territory, but did not include large meters (three inches or larger) that are accountable for reading the largest consumers in the City's service area. Also, this replacement included 700 deteriorated meter boxes, which is less than 10% of the meter boxes in the service area.

Staff expects the following benefits after the complete implementation of the meter replacement project utilizing the Neptune/Hexagram solution:

- Allows for value-added information including leak detection, tamper detection, and reverse flow detection to be captured, transmitted, and communicated to the City's database daily. No other fixed-network AMR system can communicate this information from every meter in the system. This system is also compatible with the leak detection equipment for the water distribution system.
- Minimize technical failures at the meter due to waterproofing.
- Enable City to go to monthly billing to improve cash flow
- Conserve water
- Offer superior customer service
- Reduce costs in both labor and materials attributable to meter reading; then human resources may be re-directed to maintenance of the water distribution system and water quality.
- Reduce the need for a full time meter reading vehicle thus reducing costs in manpower, fuel, and vehicle maintenance costs.
- Increased revenue due to improved accuracy. According to MCS this lost revenue may be as much as $600,000 annually.

See Attachment D: For a comparison of how the last project compares with the current proposed project.

See Attachment E: For a comparison of the present system to the proposed system.

See Attachment F: Four Areas of Improved Efficiencies from Implementing an AMR Program

FISCAL IMPACT

The cost of the meter change-out project is approximately $7.7 million. This amount includes the costs of all meters, parts, & components; meter lids; fixed-network software & hardware; project management & change-out construction; and Fixed-Network installation & training. There will be an annual software and hardware maintenance fee in the amount of approximately $17,500 after the first-year which will be an ongoing operating expense. The contract with MCS will cover the purchase of all hardware, software, related equipment, and maintenance contracts. The contract to install the meters is included in the price.

Meeting Date: January 8, 2008

In January of 2007, the City issued bonds in the amount of $3,000,000 to replace the City's water meters. The additional funds are available in the Water Enterprise Fund, since other capital programs have been delayed. Initially, MCS quoted staff a price of $3,000,000 to do the change-out of meters; however, they made the assumption that Beverly Hills had the typical ¾" meter in the majority of the residences. Not until after a non-disclosure agreement was signed and they were provided with more accurate information of the meters used by the City's customers did they learn of their mistake and provided staff with a more accurate and reasonable quote.

RECOMMENDATION

1. Approve the standardization of the City's water meters to Neptune meters that operate on a Hexagram Star fixed-network AMR system ;

2. Authorize staff to enter into a sole source purchase contract with MCS for the purchase and installation of 11,088 Neptune water meters, Nicor mounting brackets, Hexagram radios, automatic meter reading hardware, associated software, training; and installation.

David Gustavson
Approved By

ATTACHMENT A
Summary of Items to be Purchased and Installed in the Agreement

NEW METERS WITH E-CODERS & STAR RADIOS

Product Description	Quantity
Fire Service Meters 5/8" x 3/4"	500
3/4" Water Meters with e-Coder & Radio	4,582
1" Water Meters with e-Coder & Radio	2,800
1 1/2" Water Meters with e-Coder & Radio	1,935
2" Water Meters with e-Coder & Radio	1,040
3" Water Meters with e-Coder, Radio & Strainer	143
4" Water Meters with e-Coder, Radio, & Strainer	76
6" Water Meters with e-Coder, Radio, & Strainer	12
Total	11.088

RETROFIT EXISTING METERS WITH STAR RADIOS

Product Description	Quantity
Super Star MTU for existing Neptune Meters	56

METER BOX LIDS & MODIFICATIONS

Product Description	Quantity
Polymer plug & collar for existing vault lid modification	731
Polymer plug & collar for existing lid for 3/4" meters	4,582
Polymer Lid for 1" meters	2,800
Polymer Lid for 1 1/2" meters	1.935
Polymer Lid for 2" meters	1,040
Total	11,088

FIXED-NETWORK SOFTWARE & HARDWARE

Product Description	Quantity
Hexagram Star Software	1
Network Control Computer	1
Data Collection Unit	18
Star Programmer	2

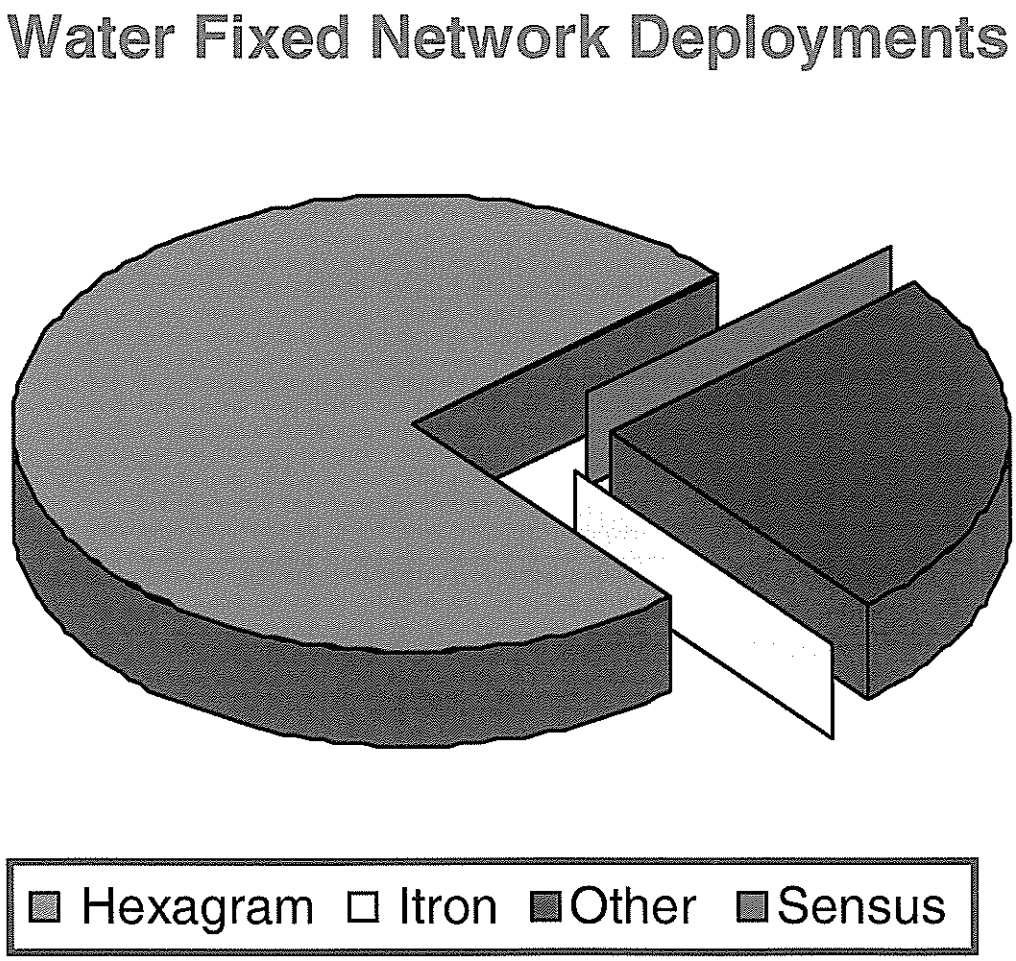
FIXED-NETWORK INSTALLATION & TRAINING

Product Description	Quantity
NCC Installation	1
DCU Installation	18
Installer Training Class	1
Host Software Training	1

NOTE: PROJECT MANAGEMENT AND METER & LID CHANGE-OUT INCLUDED

ATTACHMENT B
Water Meter Fixed Network Deployment Graph

There are a number of companies that manufacture fixed-network AMR systems including: Hexagram, Itron, Sensus, Cellnet, and several others. Hexagram dominates the market segment with a 75% market share of water fixed-network deployments. See ATTACHMENT G – The Scott Report for further explanation that includes who the manufacturers are in the category "other."



ATTACHMENT C
Informational Matrix Comparing Manufacturers

Water Utility staff has prepared the following information matrix to distinguish the key differences among the top three water fixed-network manufacturers. All information was considered during the evaluation process.

Company	Neptune / Hexagram	Itron	Sensus
Company AMR Experience	Over 10 years on same platform. 2+ million endpoints installed. Fixed Netword AMR only.	Itron product for pits is < 2 years old. Less than 10,000 pit endpoints installed. Focused on handheld and mobile AMR systems. Fixed is a new area.	FlexNet has ~2 years of water meter pit experience. No significant installations in water pits. Focused on manufacturing meters, and handheld and mobile AMR systems.
Warranty	20 year published warranty. 10 years full replacement and 10 additional years pro-rated.	5 year unpublished warranty.	20 year published warranty. 10 years full replacement and 10 additional years pro-rated.
Meter Compatibility	All meter companies. Includes commercial and industrial magnetic flow and propeller meters. Special integration with Neptune eCoder meters.	Hersey, Neptune, Sensus, Metron, Badger and AMCO	Sensus and Neptune
Encoded Register Features	LCD digital display, 9 digit visual read, Current rate of flow, Leak & backflow indicators	odometer display, 6 digit visual read	odometer display, 8 digit visual read
Encoded Register Resolution Transmitted	8 digits	6 digits	8 digits
Leak Event Notification	Yes	No	No
Backflow Event Notification	Yes	No	No
Tamper / Alarm Notification	Yes	No	No
Conservation Monitoring & Reporting Tools	Yes	No	No
Distribution Leak Detection	Palmer, Permalog, Gutterman, ZoneScan, and Flow Metrics	Flow Metrics	None
System Ownership	Customer owns all system components.	Software is hosted by Itron. Customer pays $350 per month per collector service fee. Collectors and endpoints owned by customer.	Customer owns all system components.
Data Collector Power Supply	AC or Solar	AC only	AC only
DCU Mounting Options	Pole Mount or Roof Top Mount	Pole Mount Only	Tower Mount Only
Radio Frequency	450 - 470 MHz (Narrow-band)	1427-1432 MHz DSS	900-950 MHz DSS
License	FCC part 90	FCC part 90	FCC part 90
Installed Customer Base	Washington DC, Boston Water, Corpus Christie and 100+ others	Rancho Cucamonga- CA & Global Water- AZ	Joliet, IL

ATTACHMENT D

Comparison of Last Meter Replacement Project to Proposed Replacement Meter Project

	Last Project	Proposed Project
Replace with RadioRead Meters	1,550	0
Replace with TouchRead Meters	6,900	0
Replace with Fixed Network Meters	0	11,088 (This includes the 231 large meter change-out).
Retrofit existing meters	1,100	0
Large Meter Change-out	0	231
Meter Boxes	700	?
Meter Box Lids	0	11,088
Data Collection Units	0	18
Total Meters Retrofitted	1,100	0
Total Meters Replaced	8,450	11,088
Year of Project	1995-1997	2008
Total Costs	$2,931,498.00	$7,679,731*

NOTE: According to the **Consumer Price Indexes (CPI)** $1.00 in 1995 has the **same buying power as $1.38 in 2007.**

ATTACHMENT E

Comparison of Present System to Proposed System

	Present System	Proposed System
Reading	Requires field personnel to walk and/or drive the entire service area and, depending on traffic, weather, and other variables, the collection of meter reads is a time consuming process.	Automatic - With fixed network AMR, every meter is read every day regardless of the issues stated under the City's present system, effectively eliminating the need for dedicated meter readers and their associated costs and potential liabilities.
Time requirement to read all of the customers meters.	Two months	Automatic – daily reads
Leak Detection	None	Daily with immediate notification.
Tamper Detection	None	Daily with immediate notification.
Reverse Flow Detection	None	Daily with immediate notification.
Special Reads (move-in, move-out, customer complaint, etc.)	Requires a live body to physically visit and read the meter in question.	Can be gathered with a few clicks of the mouse.
Record of consumption	Have to wait two months.	Twice per day

ATTACHMENT F

Four Areas of Improved Efficiencies from Implementing an AMR Program

Meter Reading
- Meter Reading Labor
- Meter Reading Supervision
- Related Labor Pensions & Benefits
- Vehicles
- Handheld Computers
- Equipment Maintenance
- Injuries & Damages

Accounting & Customer Service
- Call Center Labor
- Rebilling
- Estimated Billing
- Cash Flow from Moving to Monthly Billing & Collections

Revenue Protection
- Undetected Water Theft from Meter Tampering

Meter Inaccuracies
- Under Billing Because of Meter Age

<u>Business Benefits Realized by Moving to an AMR Program:</u>

1) Increased operating and maintenance efficiencies contribute to stabilization of rates
2) Eliminating traditional meter reading limits exposure to risk and liability
3) Fewer employees reduces Human Resource issues and employee turnover expense
4) Remote meter reading eliminated intrusion on customer's property and vastly improves customer service
5) Key financial ratios are vastly improved
6) Conservation information regarding residential leaks can be addressed

THE SCOTT REPORT: AMR Deployments in North America, 3rd Quarter 2006

The table below lists annual shipments of water AMR units by architecture. Those with no expected shipments in 2006 are grouped together in the category labeled "20 Others."

Line Item	Architecture	3Q06	2Q06	1Q06	Annual '06	Annual '05	Annual '04	Annual '03	Annual '02	Annual '01
#1	Neptune - RF	252,738	241,670	215,867	947,033	814,542	574,526	406,068	342,786	173,931
#2	Itron	239,051	208,421	205,432	870,538	975,714	1,137,918	912,358	661,891	482,950
#3	Sensus - RF	140,973	150,224	280,063	761,680	618,735	503,950	432,737	362,356	351,269
#4	Orion	161,338	133,979	150,203	594,026	443,987	209,430	74,213	572	0
#5	Master Meter - 3G	130,500	127,713	132,261	520,632	306,624	242,457	146,868	5,130	0
#6	Datamatic	77,500	268,784	0	461,712	166,391	204,313	181,293	130,830	83,470
#7	Hexagram	59,113	41,668	28,168	171,932	133,147	100,570	154,407	224,395	37,777
#8	Sensus - Fixnet	5,254	11,637	20,091	49,309	27,788	35,801	0	0	0
#9	AMCO/Elster (Trace)	4,865	7,308	10,762	30,580	55,319	111,769	164,739	173,295	247,692
#10	CellNet	11,390	5,362	2,620	25,829	181,824	109,790	73,658	45,328	41,815
#11	Neptune - Telephone	16,303	0	0	21,737	23	0	625	1,431	7,181
#12	First Point Energy	2,617	2,617	2,617	10,468	5,270	4,475	23,228	15,359	0
#13	TWACS	600	600	600	2,400	2,400	4,554	2,500	3,144	2,500
#14	Badger - Telephone	0	0	1,235	1,646	1,880	3,461	4,974	11,355	4,144
#15	Badger - Galaxy	222	444	0	888	47	0	0	0	0
#16	Reactel	100	100	100	400	400	300	0	891	500
#17	Silver Spring Ntwks	62	62	62	248	250	100	500	400	569
#18	Trilliant - Telephone	11	11	11	44	47	400	0	1,270	510
#19	Sensus - Telephone	4	0	28	42	120	740	2,761	3,874	6,242
#20	RAMAR	0	0	0	0	0	0	266,344	309,047	229,671
#21	First Point/Mozart	0	0	0	0	5,200	1,425	1,011	125	0
#22	20 Others	8,414	7,029	-541	19,871	-683	-4,785	28,665	-7,277	20,050
	Totals:	1,111,055	1,207,629	1,049,579	4,491,015	3,739,025	3,241,194	2,876,949	2,286,202	1,690,271

Notes:

Line items #1 - #6 represent walk-by/drive-by AMR and not fixed-network systems (Neptune has the #1 mobile radio).

Line items #7 & #8 are fixed-network systems.

Line item #7 shows that Hexagram has shipped over 800K fixed-network radios since 2001.

Line item #8 shows that Sensus fixed network did not exist until 2004 and has only shipped ~100K fixed-network radios in total.

Line item #20 contains the Itron v2.5 fixed-network system since not a single unit was shipped until 2007.