

**WATER DEPARTMENT  
WATER PRODUCTION DIVISION  
AUDIT 10-13  
SEPTEMBER 30, 2011**



# CITY OF TAMPA

Bob Buckhorn, Mayor

Internal Audit Department

Roger Strout, Internal Audit Director

September 30, 2011

Honorable Bob Buckhorn  
Mayor, City of Tampa  
1 City Hall Plaza  
Tampa, Florida

RE: Water Production, Audit 10-13

Dear Mayor Buckhorn:

Attached is the Internal Audit Department's report on Water Production.

The Water Production Division has already taken positive actions in response to our recommendations. We thank the management and staff of the Water Production Division for their cooperation and assistance during this audit.

Sincerely,

/s/ Roger Strout

Roger Strout  
Internal Audit Director

cc: Santiago Corrada, Chief of Staff  
Sonya Little, Chief Financial Officer  
Steve Daignault, Administrator of Public Works and Utility Services  
Brad Baird, Director of Water Department  
Jeff Vilagos, Water Production Manager

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*/s/ Thomas Sanchez*

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Auditor

*/s/ Roger Strout*

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Audit Director

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**BACKGROUND**

Water Production is responsible for providing potable water to approximately 570,000 people in a service area of 211 square miles in and around the City. The treatment facility on 30th street has the capacity to treat 120 million gallons per day. Typical daily production runs 60-70 million gallons per day (MGD). Raw (untreated) water can also be purchased from Tampa Bay Water (TBW), a regional supplier, when demand is high. Current demand is down due to rain and the economy (empty houses in foreclosure).

A treatment facility at Morris Bridge has been closed and is not staffed. It is now a repump station and the connection point to receive water supply from TBW. The wellfield there is still active and is operated by TBW.

The City's main source of water is the Hillsborough River. The Treatment plant is adjacent to the Hillsborough River and upstream from the dam. The dam was originally built in the 1890's, and expanded during the depression by public works projects of the era. Improvements were made about 10 years ago. Additional improvements are scheduled for FY11.

Water Production has the capability to pump water into Aquatic Storage Recovery during the wet season when production exceeds demand and there is sufficient supply in the Hillsborough River. Approximately 1 billion gallons can be stored in this manner.

The department considers the following to be its most significant challenges:

- Availability of chemical supplies.
- Control of electrical use and cost.
- Need for a fourth electrical generator. Three are adequate but no backup if one is taken off line.
- Succession plan as key personnel retire.

**Regulation**

The U. S. Environmental Protection Agency sets standards for water, but is not responsible for enforcement. The Florida Department of Environmental Protection (FDEP) is responsible for enforcement, and has delegated this responsibility to the Hillsborough County Health Department.

### Electrical Consumption

Water Production is an energy intensive process, with a total electric cost of approximately \$3 million/year. The Water Production Division has several energy cost reduction programs in place.

These include:

- A credit of approximately \$85,000 (annualized) for allowing interruptible supply (by using backup generators).
- A credit of approximately \$45,000 (annualized) for providing transformers.
- Conversion to “soft start” equipment to reduce demand peaks.
- Timed controller for air conditioning.
- The Division is currently in the process of implementing more cost effective lighting.

### Physical Security

The water plant and remote facilities are a critical part of the region’s water infrastructure. Enhanced security includes a well qualified security team, physical barriers and electronic monitoring devices. Because of the sensitivity of security, details are not included in this report.

### Maintenance

Water Production has 1,849 assets in its maintenance database, which includes both the water treatment plant and remote facilities, such as off site pumps, tanks, and aquifer storage. For FY10, over 10,000 work orders were generated for maintaining these assets.

## **STATEMENT OF OBJECTIVES**

This audit was conducted in accordance with the Internal Audit Department's FY11 Audit Agenda. The objectives of this audit were to ensure that:

1. Water Production facilities electrical usage and billing are monitored for cost savings, including review of kilowatt usage, time-of-day charges, demand charges, fuel cost, and earned credits.
2. Physical Security over Water Production facilities is adequate.
3. Preventive Maintenance is scheduled and performed at appropriate predetermined intervals, and tracked with timely follow-up as appropriate.

## **STATEMENT OF SCOPE**

This audit covered the objectives with respect to the Water Treatment Plant and related facilities for the period October 1, 2009, to September 30, 2010. It did not include Water Distribution or customer billing, or areas reviewed by outside consultants or regulatory agencies, such as the Hillsborough County Health Department.

A study by MWH consulting was recently completed. It addressed ways to improve the efficiency of the laboratory at the plant. Because of the comprehensive review completed by MWH, our scope did not include this area during our audit.

## **STATEMENT OF METHODOLOGY**

Electrical usage: Electric bills were reviewed, and rates were compared to Florida Public Service Commission Tariffs. Electric conservation efforts were reviewed with the City's Department of Public Works.

Security: Discussions and site visits to various facilities were conducted with the Department's Security and Safety Coordinator. Security measures were reviewed with the Tampa Police Department liaison for Homeland Security.

Maintenance: The sample size and selection were statistically generated using a desired confidence level of 90%, expected error rate of 5%, and a desired precision of 5%. Statistical sampling was used in order to infer the conclusions of test work performed on a sample to the population from which it was drawn and to obtain estimates of sampling error involved. A database query was also run to compare scheduled due dates with actual maintenance dates. Criteria used for examination were any scheduled maintenance that was performed 50% late, i.e., if Preventive Maintenance was to be performed every 30 days, any items greater than 45 days was considered an exception. When appropriate, judgmental sampling was used to improve the overall efficiency of the audit.

To achieve the audit's objectives, reliance was placed on computer-processed data contained in the department's MaintScape® maintenance management program. We assessed the reliability of the data contained in the database and conducted sufficient tests of the data contained in it. Based on these assessments and tests, we concluded the data was sufficiently reliable to be used in meeting the audit's objectives.

## **STATEMENT OF AUDITING STANDARDS**

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

## **AUDIT CONCLUSIONS**

Based upon the test work performed and the audit findings noted below, we conclude that:

1. Water Production facilities' electrical usage and billing are monitored. However, their ability to monitor peak demand charges is limited and electric rate monitoring could be improved.
2. Security over Water Production is not addressed in this report due to the sensitive nature of this area. Findings and observations were discussed with management.
3. Maintenance was performed, with only a few minor exceptions, within the time frames considered acceptable.

While the findings discussed below may not, individually or in the aggregate, significantly impair the operations of the Water Production Division, they do present risks that can be more effectively controlled.

## **MONITORING AND CONTROL OF ELECTRICAL DEMAND**

### **AUDIT ISSUE**

The Division does not have the ability to validate demand charges billed monthly.

### **OBSERVATIONS**

Demand charges are a significant part of the cost of electrical energy. Demand charges may be defined as follows:

Demand Charge – A charge for the cost of the facilities and equipment that Tampa Electric installs to serve the maximum demand for electricity at any given time. Demand is based on the highest 30-minute average kilowatt requirement occurring during the month. (From TECO Website)

The Water Production plant incurred demand charges of \$58,000 on the June 2010 bill; which equals 22% of the \$264,000 bill. This is fairly typical. The Water Production facilities currently do not have the capability to confirm the demand as described above.

During the course of this audit, we obtained data from TECO which showed the date and time of the maximum demand during the billing period, which supported the amount indicated on the monthly bill. Division personnel confirmed that the times were reasonable.

Currently, the City is exploring various opportunities to reduce energy costs.

### **CRITERIA**

Charges from vendors should be verified prior to payment of bills.

### **RISK DESCRIPTION**

The City may be incurring electrical costs that could be more effectively controlled.

### **RECOMMENDATION 1**

The Division should request a monthly report from TECO which would support the demand charges. It then could be reviewed for reasonableness.

### **RECOMMENDATION 2**

Evaluate the results of the citywide energy conservation initiative to determine if they can be utilized by Water Production to help further control energy costs.

### **MANAGEMENT'S RESPONSE**

We agree. We will continue to monitor electric demands as compared to water usage rates to determine reasonableness. This will be accomplished using the existing Supervisory Controls And Data Acquisition (SCADA) system. As recommended, we will request monthly reports from TECO to check that the timing of “on peak” and “off peak” demands coincide with water use patterns. Also, we agree to evaluate the results of the citywide energy conservation initiative to determine whether results are applicable to facilities of the Production Division and could be implemented.

## **REVIEW OF ELECTRIC BILLS**

### **AUDIT ISSUE**

TECO bills for electric service at Water Production are not thoroughly reviewed for accuracy. The calculations are complex and rates are subject to numerous and changing tariffs proposed by TECO and approved by the Florida Public Service Commission (FPSC), which regulates electric rates in Florida.

Electric rates being charged are not being compared to electrical service tariffs, and currently Water Production has no way of determining if peak demand and time-of-day demand are accurately measured. Our review did find FPSC approval of the existing tariffs.

### **OBSERVATIONS**

The Water Production plant electric bill averages about \$233,000 per month, and the bill is complex. Electric rates are regulated by the Florida Public Service Commission (FPSC). City-wide, payments to TECO are approximately \$20 million per year, which includes street lighting.

Water Production reviews the bills for reasonableness, but does not verify the bill or rates line by line. The City has entered into an agreement with a vendor to review opportunities for energy savings in various departments.

### **CRITERIA**

Leverage opportunities to reduce electric costs to the City.

### **RISK DESCRIPTION**

The City may be incurring electrical costs that could be more effectively controlled.

### **RECOMMENDATION 3**

Consult with Revenue and Finance to identify methods to improve the monitoring of electrical bills to help ensure they comply with approved rates and reflect actual electrical services received.

### **MANAGEMENT'S RESPONSE**

We agree. An initial discussion with the Revenue and Finance Department has revealed that new software is being purchased that will automate the bill review process, including verification of bill accuracy. The first bills that will be tested with the new software will be TECO bills.