

**Water Utility Billing System Audit
June 2007**



City Auditor's Office

June 1, 2007

Honorable Mayor and Members of the City Council:

I am pleased to present the City Auditor's Office's report on the water utility billing system at the City of Arlington. The purpose of the audit was to verify that adequate internal control exists in critical utility billing transactions.

Management's responses to our audit findings and recommendations, as well as target implementation dates and responsibilities are included in the following report.

We would like to thank the Water Utilities staff for their cooperation and assistance during this project.

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Water Utility Billing System Audit

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WATER BILLING SYSTEM AUDIT



Office of the City Auditor

**Patrice Randle, CPA
City Auditor**

Report #06-04

June 1, 2007

Executive Summary

The water utility billing system adequately processes billing transactions

The water utility billing system utilizes authorized billing rates

No significant security risks were identified

Opportunities for Improvement

- ***Written security policies and procedures***
- ***Improved data input controls***
- ***Implementation of a disaster recovery plan***
- ***Timely return of deposits***
- ***Interface improvements***

The City Auditor's Office has completed an audit of applications controls within the water utility billing system in accordance with generally accepted government auditing standards and standards promulgated by the Information Systems Audit and Control Association (ISACA). The objectives of the audit were to determine if:

- Adequate internal control exists in critical utility billing transactions
- Adequate security standards, which safeguard customer data and transactions, exist within the application
- Financial transactions are accurately shown on the water utility billing system and the Lawson financial system
- Transactions conducted through interactive web and voice response systems are accurate, valid and non-repudiated.

The City Auditor's Office determined that the water utility billing system adequately processes billing transactions. The System prepares reliable customer bills based on data input and authorized billing rates.

Although the City Auditor's Office found the water utility billing system to be adequate, we did note several areas where opportunities exist to improve internal controls. Generally, the City Auditor's Office noted a need for security policies and procedures, improved controls over data input, implementation of a business continuity and disaster recovery plan, and establishment of a methodology that ensures the timely return of meter deposits on closed accounts. The City Auditor's Office also determined that the System adequately interfaces with the City's new financial system, but identified several issues with the interface methodology that should be addressed. These areas are discussed in detail in the remainder of this report.

Audit Scope and Methodology

The water utility billing system audit was conducted to satisfy a 2006 audit plan requirement. Our audit objective was to verify that the water utility billing system adequately processes billing transactions. The City Auditor's Office reviewed billing system data and transactions from January 2006 through November 2006.

The following methodology was used in completing the audit:

- Interviewed Water Utilities personnel to obtain an understanding of the water utility billing system
- Reviewed the accuracy of data input
- Reviewed the effectiveness of application processing controls
- Analyzed application security
- Identified and evaluated application output controls
- Reviewed revenue processing and the accuracy of water utility financial data recorded in the Lawson financial system
- Reviewed the integrity of the web application and interactive voice response systems
- Evaluated current business continuity planning and disaster recovery efforts

Background

The Arlington Water Utilities Department is committed to providing safe water and safely disposing of wastewater in a responsive, cost effective manner, striving to continuously improve service to its customers while planning for future needs. The water utility billing system consists of approximately 98,000 accounts, servicing over 365,000 Arlington residents. The Water Utilities Department generates approximately \$96 million in annual revenue.

The monthly utility billing consists of 20 bill cycles. Each bill cycle is made up of three billing routes, based upon location within the City of Arlington. Meter readers are assigned to each route and upon completion, the read meter information is uploaded to the Grumman system and then to enQuesta. Crews begin reading meters usually five days prior to bill print date.

Customers have several choices for utility payments

- Mail-in payment
- Web and phone based payments
- Auto deduction from bank accounts (ACH)
- Direct payment from the customer's bank (E-lock box)
- Payment in person at utility office
- Payment drop boxes at selected City facilities
- Payment at selected local grocery and convenience stores through Fidelity Express

Prior to 2001, the Water Utilities Department used an internally generated mainframe application for billing and work order management tasks. The Municipal Utility Processing System (MUPS) was installed in 2001 to replace the outdated mainframe system. The City chose to upgrade MUPS to enQuesta in January 2006. Both applications are supplied and serviced by Systems and Software (S&S), a technology firm based in Vermont. The upgrade to enQuesta was performed to obtain expanded features such as:

- An efficient and accurate enterprise Oracle 9i database
- A more intuitive, browser-based user interface
- Role-based account inquiry screens
- Enhanced reporting and data export capabilities
- Enhanced search capabilities

The enQuesta water utility billing system consists of the following nine major modules:

- Central information systems
- Property and meter records
- Customer service and support
- Meter reading and estimation
- Billing and accounts receivable
- Cash receipting and payments
- Credit and collections
- Finance and accounting
- Work order management

A key operational feature in enQuesta is its work order management system. Utility customers may request repairs or other service via the internet or by calling Water Utilities Customer Services. Accessing account information through the web requires registration, including the creation of log-on identification and a password. enQuesta also offers an interface for voice response telephone application. Work orders are routed to the applicable field service crews. Meter Services crews are capable of updating enQuesta via mobile wireless data terminals.

Meter readings from Grumman handheld devices are downloaded to enQuesta on a daily basis and processed to produce monthly utility bills. Billing information, including water sales, meter deposits, payment and accounts receivable information, is transmitted from enQuesta to the Lawson financial system.

Detailed Audit Findings

Data Input Review

Data input is defined as data entering the enQuesta billing system for bill generation. Information that is entered includes monthly meter readings and work orders generated for tasks such as meter repairs and delinquent collection activity. The majority of data input needed for bill generation is uploaded to enQuesta from the Grumman meter reading system. The meter reading system consists of hand-held meter reading tablets carried by the meter readers, cradles used to download data, software to process the downloaded data and an interface to transfer the data to enQuesta.

1. Handheld input devices do not include basic log-on and security features.

Once a handheld input device is turned on, anyone can access the data in the device. Generally accepted information technology (IT) security features for any system include log-on capabilities, system lockdown after a specified amount of idle time, and other features (encryption, masking, etc.) to protect personal customer data. Requiring users to log-on to the handheld input devices creates an electronic user trail and makes accessing customer and route information more difficult for unauthorized third parties. The Water Utilities Department has minimized the risk related to log-on security by limiting personal data stored on the handheld devices to customer name, address and account number.

The electronic user trail enables management to identify individuals utilizing the handhelds. In the event handhelds are lost or stolen, encryption and masking of the customer name field would help ensure that personal customer data is not compromised. Some utility customers have selected their personal information to be treated as confidential, which could be compromised from the handheld devices if they were lost or stolen.

Recommendation:

The Water Utilities Director should request that the hand-held manufacturer add security log-on features to its meter reading devices.

Management Response:

This recommendation will be implemented if it is found to be feasible. Water Utilities has asked the hand-held unit manufacturer, which has not previously received a request for this feature, to research possible solutions.

Target Date: June 30, 2007 (Assess feasibility and develop plan)

Responsibility: Meter Services Manager

2. Meter reading routes include non-existent premises, pulled meters and unknown locations.

Meters that need to be read for each billing cycle are generated by enQuesta and downloaded to the Grumman handheld system. However, the information downloaded to the handhelds includes demolished and pulled meters. As a result, reading the meters in the route becomes cumbersome and prone to errors.

Currently, guidelines to ensure that water meter routes are current and accurate do not exist. Management solely relies on the knowledge of the meter reader to identify non-existent premises to ensure that reading errors do not occur. However, the current practice may increase error rates when personnel changes are made and new meter readers are not as familiar with existing routes.

The unread meter report mainly consists of properties with non-existent services, making it difficult to identify the fewer number of active meters that are unread. The City Auditor's Office noted that the unread meter report generated by Grumman included meters identified as "pulled". Some routes may cover an area that includes a significant number of pulled meters. For example, an ad hoc report generated by the Water Utilities Business Services Division in August 2006 identified 175 pulled meters for billing cycles 44, 45, 47, 48 and 50. These cycles include the area of the new Cowboys stadium and Johnson Creek where homes have been demolished. Updating the routes would eliminate properties with non-existent services from the unread meter report and allow meter reading supervisors to identify active unread meters quickly.

Route code "99" already exists in Grumman to account for meters that are not currently active. Premises with inactive meters could be transferred to Grumman route code "99". In rare occasions where inactive meters become valid, they can be transferred back to the applicable routes from route code "99".

Recommendation:

The Water Utilities Director should ensure that meter readers review meter reading routes, confirm non-existent properties during route visits and transfer non-existent properties to inactive route "99".

Management Response:

Meter Reading routes include locations for all service connections, including abandoned and/or inactive locations, so that unauthorized consumption can be detected. There have been no "out-of-sequence" events noted due to inactive locations being sent to meter readers.

Written guidelines will be developed to ensure that routes are reviewed monthly for accuracy, and that locations for which service connections have been physically removed will be assigned to an inactive route designated as route "99".

Target Date: June 30, 2007

Responsibility: Meter Services Manager

3. Meter Reading supervisors do not utilize reports to identify and correct abnormal meter readings.

The Grumman handhelds alert meter readers of abnormal readings (high, low or negative water consumption). Premises with abnormal readings are listed in a “Forced Reading” report. Rather than using the report to correct meter reads prior to entering the enQuesta processing cycle, abnormal readings are verified after consumption data is uploaded to enQuesta.

The City Auditor’s Office observed inconsistencies in the verification of high consumption readings. Generally, high consumption readings were not adjusted in the current billing cycle, resulting in negative consumption the following month. The City Auditor’s Office reviewed “Forced Reading” reports for June 2006 and found the following number of negative consumption readings:

Group and Cycle Number	Number of Negative Readings
7, 20	13
7, 21	5
3,7	8
3,9	13
7,19	13

Recommendation:

The Water Utilities Director should ensure that the Meter Reading Supervisors utilize the “Forced Reading” report to identify incorrect meter readings and schedule meters that should be re-read prior to uploading consumption data to enQuesta.

Management Response:

Water Utilities does not agree with this recommendation. Using the “Forced Reading” report to identify incorrect meter readings and schedule meter re-reads would not improve the error correction process currently in place. The “Edit” process is conducted by billing personnel and generates re-read activity prior to billing. The method used in the “Edit” process for selecting which meters should be re-read is more selective, and thus more efficient, than would be a method based on the presence of forced readings. Use of the “Forced Reading” report to generate re-read activity would cause a delay in sending the original read file through the “Edit” process, and it would create duplicate effort, resulting in reduced productivity.

4. Meter reading routes were not sequenced properly.

Proper route sequencing contributes to fast and accurate meter readings. The Grumman software does not include automated route sequencing. Therefore, meter readers must periodically sequence the routes manually. During field observation, the City Auditor’s Office noted that

routes were sometimes not sequenced from beginning to end and sometimes included invalid meters.

Errors in route sequencing were attributable to several factors:

- Pulled and non-existent meters were not removed from the route
- New and replaced meters were not updated in the route
- Premises, with meter clusters, were not listed in the order to be read

Sequencing errors result in process delays because the meter reader has to physically verify premise address and meter number. Discovery of sequencing errors rests solely on the experience of the meter reader. If the error is not discovered, invalid readings could be entered in the system.

Recommendation:

The Water Utilities Director should ensure that Water Utilities Meter Reading supervisors review and verify meter reader routes on a routine basis to ensure proper sequencing.

Management Response:

New accounts are automatically placed at the beginning of a meter reading route the first month so that they are easily identifiable as new accounts. The Meter Reading Supervisor reviews the new accounts and determines where they should be inserted in the route so that they will be in the correct position by the second month. The Meter Reading Supervisor reviews and re-sequences routes monthly.

Target Date: Currently in place.

Responsibility: Meter Reading Supervisor

Processing Controls

Processing controls ensure data processing integrity for the water bills produced. Adequate processing controls improve accuracy in bills produced and disallow alterations to data going through the processing cycle. Standard processing controls include cycle locking capabilities during processing, limiting user access to data to be processed and preventing data processing out of the usual processing sequence.

In order to ensure adequate processing controls, the City Auditor's Office performed the following:

- Reviewed accounts with credit balances
- Assessed the ability to alter data on accounts in processing status
- Verified the accuracy of water billing rates
- Verified that fees were valid and accurate
- Ensured that consumption estimates were reasonable
- Ensured that work orders for repairs or other services were completed in a timely manner.

5. Credit balances are not reviewed on a routine basis.

Departmental policy addressing routine review of credit balance accounts does not currently exist. Currently, credit balance accounts are only reviewed when a customer requests a refund. As of August 21, 2006, a total of 3,248 accounts had credit balances for a total of \$146,913. The City Auditor's Office noted that some credit balances were carried over for periods extending beyond six months.

The credit balances resulted from the following transactions:

- Apartment complexes – Deposits and construction fees were applied as regular payments without corresponding charges
- Residential Accounts - Monthly E-Lock box payments exceeded monthly charges

Many apartment complexes have multiple water accounts. Apartment complexes usually pay the deposit required for multiple accounts as one lump sum. In lieu of cash deposits, apartment complexes have the option to provide the City with a surety bond to guarantee account payment. Providing a surety bond after making a cash deposit will result in the cash deposit being applied to a complex's main account as a regular payment. The City Auditor's Office noted instances where this resulted in a credit balance for a client's main account although the client's remaining water accounts became delinquent, resulting in late fees being charged. Some clients may wrongfully assume that credit balances will be applied, as needed, towards all their accounts.

Some residential E-Lock customers pay more than the monthly amount due, therefore increasing their credit balance. E-lock payments are submitted by various banks, based on a pre-determined dollar amount selected by the consumer. The payment amount is independent of the actual amount due on the utility bill. In contrast, ACH payments are deducted from the consumer's bank account in an amount equaling the utility amount due. Credit balances carried over for long

periods increase the opportunity for misuse because a limited number of Customer Services employees have the capability to divert credit balances from one account to pay the balance in another account. The City Auditor's Office did not observe any such diversion.

Recommendation:

The Water Utilities Director should ensure that a policy is established to routinely review accounts with credit balances, based on a pre-determined dollar value. The review process should include customer contact, in order to determine if credit balances need to be applied to secondary accounts.

Management Response:

A report for credit balances above \$2,000 will be created monthly, for review by the Water Utilities Customer Services Manager. The \$2,000 review minimum is set because some customers routinely choose to pay more than the current balance, resulting in a large number of credit balances each month that don't need to be reviewed. Customers will be contacted to determine if credit balances need to be applied to secondary accounts. The contact will be documented on the customer's account.

Target Date: July 31, 2007

Responsibility: Water Utilities Customer Services Manager

6. Supporting documentation for consumption estimates was not retained.

Water consumption is estimated when meters are not read. Meters are usually unread because they are broken, inaccessible, or foreign material and/or pests reside in meter boxes.

Section 2.03 of the Water Utilities Ordinance "Charge in Case of Faulty Meter" reads:

"Should any meter fail to register correctly the amount of water used by a customer since the previous reading, the right shall exist on the part of the Water Utilities Department to average the month and charge for water on the basis of any three months' average: provided, however, that the months used for the purpose of making the average are comparable to the months the water is used."

During the audit, there was a backlog in replacing broken meters and addressing other causes of unread meters. Backlogs result in estimated consumption for multiple billing cycles. During calendar year 2006, water consumption for 857 accounts was estimated. The City Auditor's Office could not verify the reasonableness of estimated consumption for three of a sample of 25 accounts from January to August 2006.

Consumption estimates are determined by the Water Customer Services Billing Assistant, based on Section 2.03 described above. However, the Water Customer Services Billing Assistant did not retain documentation indicating the months used in deriving the estimates. Therefore, for the exceptions listed above, the City Auditor's Office was not able to determine whether the estimates were made in accordance with the policy.

The City Auditor's Office further noted that consumption estimates were not routinely reviewed by the Water Customer Services Manager.

Recommendation:

The Water Utilities Director should require the Water Customer Services Manager to review accounts where water and sewer usage is based on estimates and verify that estimates were made in accordance with policy.

Management Response:

The Water Utilities Customer Services Manager will review 10% of estimated readings on a monthly basis and review documentation of these estimates to ensure that they were made in accordance with policy.

Target Date: August 31, 2007

Responsibility: Water Utilities Customer Services Manager

Application Security

Application security ensures that activities are logged and access to data is secure and granted on an as-needed basis. Effective audit trails track critical system activity such as alterations to existing records, changes to rate tables, credits granted, refunds generated and collections activity. In the event of system misuse, audit trails allow management to hold users responsible for system activity.

7. Written enQuesta security policies do not exist.

System security begins with good policies and procedures, whereby users are made aware of the value of data and how it needs to be secured. Employees cannot be held accountable for breach of system security if adequate policies and procedures are not established.

The Water Utilities Information Services Section grants access to the water utility billing system based on job requirements. The Section also instructs customer service employees to safeguard personal customer information in their training manual. However, the Section has not established a written enQuesta security policy that documents these practices. Such a policy should include the above mentioned practices and also address:

- Password format and change requirements
- Penalties for non-compliance to the security policy
- Brief introduction to enQuesta security architecture

The City's Information Technology (IT) Department has recently completed a citywide IT security policy. The policy should provide the Water Utilities Department with a foundation to establish an enQuesta application security policy.

Recommendation:

The Water Utilities Director should establish written application security policies and procedures applicable to enQuesta access.

Management Response:

Water Utilities will establish written application security policies and procedures applicable to enQuesta system access. These policies will incorporate enterprise security policies recently adopted by Information Technology.

Target Date: July 31, 2007

Responsibility: WIS Manager

8. A standardized format for passwords and a methodology that requires passwords to be changed at regular intervals do not exist.

Generally accepted IT security standards require a specific format and change of passwords on a regular basis, as evident in citywide password practices governing network access. Lack of a password standard may compromise application security by making it easier to guess passwords.

The enQuesta application does not require a specific password format or require users to periodically change passwords. enQuesta also does not lock out users after several unsuccessful attempts of entering a valid password. Such a feature makes it more difficult for an intruder to gain unauthorized access to the system.

During the audit, the Water Utilities Information Services staff implemented a new password methodology, including formats, change frequencies and lockout rules.

Recommendation:

The Water Utilities Director should continue to ensure that standard password formats, change frequencies and access lockout rules are utilized.

Management Response:

Standard password formats, change frequencies and access lockout rules are already in place. Currently, a password must be at least 8 characters in length, contain a minimum of four alpha characters, and a minimum of 2 non-alpha characters. A new password is required every 90 days. Five consecutive unsuccessful login attempts locks the user's account. These standards and rules will be documented in the enQuesta Security Policies and Procedures document.

Target Date: July 31, 2007

Responsibility: WIS Manager

9. Application access had not been removed on users who are no longer employed by the City.

The City Auditor's Office noted that four (4) former non-Water Utilities employees and one (1) former Water Utilities employee had access to enQuesta. At the time of testing, the former Water Utilities employee had only been terminated for two days. Currently, enQuesta access is revoked on departing Water Utilities employees based on personal knowledge and verbal notification by the departing employee's supervisor. Non-Water Utilities employee access is revoked when the enQuesta System Administrator discovers that an employee has departed, which may take weeks or months after termination.

The risk of unauthorized access to enQuesta is mitigated by revoking network access on the employee's last day of employment. Unauthorized access to enQuesta could occur if the former employee were to use a computer that was already signed on to the City network. The integrity

of the application and safeguarding of customer data could be compromised if former employees were to gain access to enQuesta via a client already logged on to the City network. City workers from various departments (such as Parks, Police and Community Services) have access to enQuesta. Since these departments are housed throughout various city facilities, the probability of unauthorized access by a departed employee is increased.

The most practical approach to notification appears to be from the Workforce Services Department, when access to CityNet is revoked on the last day of employment. A methodology to notify the System Administrator of terminations and transfers would help ensure that employees are removed from authorized access lists.

Recommendation:

The Workforce Services Director, in conjunction with the Information Technology Director, should explore methods of employee status change notification.

Management Response:

Information Technology began working with Workforce Services in February 2007 to modify the Lawson Process Flow set-ups to allow for automatic notification to specific departments when a transfer or termination takes place for an employee. Information Technology and Workforce Services will continue that effort to develop a notification process that lists applicable employee status changes. Water Utilities will document this process in the enQuesta Security Policies and Procedures document.

Target Date: October 31, 2007

Responsibility: WIS Manager

Recommendation:

The Water Utilities Director should ensure that the System Administrator revises enQuesta system access after being notified by Information Technology and Workforce Services that employees have been terminated or transferred to other jobs within the City.

Management Response:

In order to ensure that the System Administrator revises enQuesta system access after being notified by Information Technology, the Water Information Services Manager will review system access revisions on a monthly basis. In order to accomplish this task, Water Utilities will pay the billing system vendor to develop a custom report. The review process will be documented in the enQuesta Security Policies and Procedures document.

Target Date: October 31, 2007

Responsibility: WIS Manager

10. The enQuesta system log-on history audit trail is not saved and retained for an adequate period of time.

System audit trails provide transaction history in an event of security breach, theft or unauthorized transactions. Audit trails should be retained for an adequate period of time for review.

Since system access is locked out if the log-on history file cannot record any more transactions, enQuesta requires purging of the log-on history file once the maximum record retention capacity is reached. Depending on the frequency of system use, maximum capacity is reached in approximately three months. After the file is purged, it is unrecoverable. The Water Utilities Department does not currently save and retain the log-on history file. If system administrators attempt to locate individual log-on history for investigative purposes, they would be unable to do so due to the purging of records. Instead of purging, the file could be easily transferred, saved and retained for any specified amount of time.

Recommendation:

The Water Utilities Director should ensure that a policy is established to save and retain the system log-on transaction history.

Management Response:

A procedure will be implemented that retains system logon history for an adequate period of time, and a policy reflecting this will be added to the enQuesta Security Policies and Procedures document.

Target Date: September 30, 2007

Responsibility: WIS Manager

11. Critical transactions are not reviewed.

Managerial review is currently limited to a review of work order trends generated by Water Utilities Customer Services employees. The work order trend report lists work order codes generated from each Customer Services staff member.

The Customer Information System (CIS) Analyst and two programmer analysts have the highest level of access. The CIS Analyst performs critical transactions such as changes to rate tables and maintenance functions to other files. The programmer analysts have administrator level access. User activity appears in various audit trails set up in enQuesta, or could be reviewed by activity reports for each operator.

Water Utilities Customer Services management does not review critical transactions such as refunds, credits, waivers of deposit and cancellation work orders. Some benefits of management's review of critical transactions with financial implications include:

- Ensure policies and procedures are being followed
- Early detection of errors, theft or improper activity

Recommendation:

The Water Utilities Director should establish a list of critical transactions (based on financial impact, and level of enQuesta access) and require the Water Utilities Customer Services Manager to periodically review the critical transactions for propriety.

Management Response:

The Water Utilities Customer Services Manager currently reviews and approves all payment authorizations issued to customers. Any adjustments to an account that generate a credit of \$2,000.00 or more will be reviewed through the credit balances review process identified in recommendation number five.

Target Date: July 31, 2007

Responsibility: Water Utilities Customer Services Manager

12. Security access levels in the training system do not mirror the production environment.

The utility billing system consists of a production server and a training server. The training environment is set up for employees to learn the System and to test any enhancements or fixes made by the vendor. The data in the training system is replicated with production data every Sunday night.

There is a large group of “view only” users that have access to the enQuesta production environment. Within the production server, some internal Water Utilities employees do not have access to customer personal information if it is not necessary for their assigned tasks. However, since personal customer data, such as social security numbers, can be viewed with general access rights (lowest level) in the training environment, if these Water Utilities employees were to use the training environment, safeguarded customer personal information will be exposed to unauthorized use.

Mirroring of production access rights was not established in the training system when it was implemented. However, Water Utilities Information Services personnel have identified the need to safeguard customer personal information since the initial training system was launched.

Recommendation:

The Water Utilities Director should ensure that access rights in the enQuesta training environment are designed to safeguard customer information and transaction integrity. The new security permissions should be tested and documented after implementation in the training environment.

Management Response:

In order to safeguard customer information and transaction integrity, all generic train accounts will be removed and will be replaced with specific user train accounts that mimic their actual production permissions. This process will be documented in the enQuesta Security Policies and Procedures document.

Target Date: August 31, 2007

Responsibility: WIS Manager

13. enQuesta does not track the user ID of those who perform critical system changes.

The System currently does not list the user ID on non work order related system changes. When work orders are not required to alter critical system data, such as rate tables, enQuesta tracks the change, but not the operator ID of the person performing the transaction.

The number of water departmental personnel who have system rights to perform alterations without work orders is usually limited to three staff members. Even though the number of users is limited, the City Auditor's Office was unable to determine the party performing critical changes to data tables. In general, a consistent system requires an audit trail of critical activity.

Recommendation:

The Water Utilities Director should request that S&S enhance enQuesta by including user IDs for transactions that do not require a work order.

Management Response:

Water Utilities will discuss the feasibility of adding this functionality with the billing system vendor. It is likely that this will require core table structure changes and may be difficult and costly for the vendor to accomplish. In addition, there is a minimum number of individuals that can make critical system changes. Water Utilities will also discuss the possibility of having this functionality included in future upgrades.

Target Date: October 31, 2007

Responsibility: WIS Manager

Business Continuity and Contingency Planning

An effective business continuity and contingency plan would enable a system to operate after a disaster. In the event of destruction of existing system hardware and operational facilities, an effective plan would enable Water Utilities IS staff to load backup tapes and the application to secondary hardware at a designated location and become operational. An effective contingency plan would detail an action plan for system users to follow, including individual assignments of responsibilities.

14. A business continuity and disaster recovery plan does not exist.

Ongoing business continuity related to the water utility billing system is limited to creating daily backup tapes. A written plan and hardware to run the backup tapes does not exist and testing of any contingency plans has not been conducted. However, Water Utilities management did inform the City Auditor's Office that manual processes for selected Customer Services functions do exist.

The Information Technology Department has initiated efforts to launch a citywide business continuity plan. The Water Utilities Information staff has begun their own efforts to implement a disaster recovery plan and have begun to communicate with vendors that offer recovery services. Disaster recovery plans typically consist of the following:

- Prioritization of activities that need to be recovered after a disaster
- A written plan that includes objectives, individual responsibilities and an action plan
- Identification of vendors that are capable of providing recovery services based on objectives
- Selection of a vendor and implementation of the disaster recovery plan
- Routine testing of the plan and documentation of testing efforts

Lack of an effective utility disaster recovery plan can result in many negative implications to the citizens of Arlington. During a disaster, citizens could be impacted negatively due to lack of maintaining delivery of clean water, lack of coordination in utility repairs and service restoration, inability to answer citizen calls and inability to access citizen utility records.

Recommendation:

The Water Utilities Director should ensure that an effective disaster recovery and business continuity plan, based on prioritized utility tasks and objectives, is established. The plan should be tested and results documented on a routine basis.

Management Response:

Water Utilities has a current billing system disaster recovery/business continuity project, and is negotiating with an outside vendor to provide an offsite environment for restoring the Utilities Billing System to continue business operations in the event of a crisis. This project is being coordinated with the Information Technology Department. Water Utilities is seeking funding for this project in the Fiscal Year 2008 budget process. If approved, implementation, documentation, and testing of the disaster recovery service are scheduled for fiscal year 2008.

Target Date: June 30, 2008

Responsibility: WIS Manager

15. Scheduled tape backups failed.

The standard for enQuesta backup is to perform incremental backups on weekdays and full system backup on Sundays. An incremental backup consists of daily transactions since the last backup, and is usually done in three hours. A full backup saves the entire database on a weekly basis and requires at least six hours.

Backup tape failures make system recovery difficult. Some transactions could be lost due to lack of backup or the system restoration would be partial because lost transactions would have to be recreated manually. The City Auditor's Office noted 14 backup failures between July 1 and October 1, 2006 for both incremental and full scheduled backups. The City Auditor's Office was unable to determine if the City's Information Technology staff, responsible for the backup tapes, communicated the failures to the Water Utilities Information Services Section.

Because the enQuesta system does not perform database maintenance routines on Sundays, it allows additional time for full backups. However, the City Auditor's Office reviewed the tape backup log and noted that full backups were generally being conducted on Tuesdays and not on Sundays. Usually, any failures during the daily incremental backup would be compensated during full weekly backups. However, the log shows multiple incremental backup failures on subsequent days, which, combined with the lack of a reliable full weekly backup, would prevent reliable restoration of enQuesta in the event of a disaster.

Even though the Water Utilities Department does not have a disaster recovery plan and recovery equipment in place now, having reliable backup tapes would allow re-creation of enQuesta.

Recommendation:

The Water Utilities Director and the Information Technology Director should investigate the cause of backup tape failures and coordinate with the system vendor to create incremental and full backups in a reliable manner.

Management Response:

Water Utilities will work with Information Technology to determine the cause of the backup tape failures and remedy the issues involved. Information Technology will develop a written policy and accompanying procedures detailing the backup process. That written documentation will include:

- I. Backup Requirements*
- II. Backup Schedules*
- III. Backup Failure Notifications*
- IV. Backup Failure Tasks*
- V. Backup Changes*
- VI. Backup Media Storage and Retention*

VII. Restoration Procedures

Both parties will also work on establishing reliable notification when a backup fails.

Target Date: July 31, 2007

Responsibility: WIS Manager, Network Services Supervisor (IT)

Interactive Web Response (IWR) and Interactive Voice Response (IVR) Application Controls

Water Utilities customers are capable of conducting transactions through the internet or by calling customer service and selecting the interactive voice response system. Customers may post payments or request additional service or services, such as name changes, through the internet (IWR) or over the phone (IVR). Additional services and account alterations are reviewed by customer service personnel, prior to being authorized and updated in the billing system. The voice system can be used to post payments and to fax back documents consisting of account information.

16. Customer credit card numbers are displayed.

When a customer visits the IWR website to post a payment, the previous credit card number used may be displayed as a function of the “auto complete” feature of the Windows operating system. This creates a risk when customers use public computers to post water payments, since a subsequent user can see prior credit card numbers used if the “auto complete” function is enabled on the public computer. Depending on the security configuration of the public computer, any individual with access to the computer could enable the “auto complete” function.

The risk cannot be mitigated in the current IWR system since the vendor is out of business and updating the existing application by using the source code is risky (the possibility exists that another feature in the application may malfunction as a result of attempting to upgrade the application using the source code). However, Water Information Services staff indicated that an upgrade is planned for FY 2007 and that the issue of credit card number display can be addressed at that time.

Recommendation:

The Water Utilities Director should request that the future IWR system vendor mitigate the risks associated with public use of its software.

Management Response:

Water Utilities will ensure that the future IWR system will mask the display of credit card numbers. This is an issue only for public workstations that use a browser autofill function. This functionality will be included in the statement of work.

Target Date: September 30, 2008

Responsibility: WIS Manager

17. Log-on security features do not exist for the Interactive Voice Response (IVR) system.

The current IVR system has had no log-in security features since its inception. The IVR system does not require a customer PIN or password to gain access. Customers are allowed to post a

payment or request documents to be faxed back to a number of choice after simply keying their account number through the telephone pad.

Records generated by Water Utilities IS staff for October 2006 show a total of 186 faxes being sent to customers. A total of 16 account information sheets were faxed back and the remaining 170 requests were for payment confirmation. Faxing back the payment confirmation has minimal risks since the confirmation is only available after a valid payment is posted. However, account information sheets that are faxed back may include information considered sensitive by customers. These documents are faxed back without user authentication.

The web and IVR applications are slated to be upgraded within the next two years. Enhancing the existing IVR application to accept customer authentication may not be practical. However it should be considered during future IVR enhancements.

Recommendation:

The Water Utilities Director should ensure that the future IVR system include customer authentication.

Management Response:

Water Utilities will ensure that any future IVR system or upgrade will include customer authentication in the contract statement of work.

Target Date: December 31, 2008

Responsibility: WIS Manager

18. The web application is not capable of tracking unauthorized log-on attempts in a reliable manner.

The existing audit trail is not designed to track unauthorized log-on attempts in a reliable manner. The system erases the failed attempts once the account is reset by the user. Once the account is reset, system administrators would not be able to track previous failed attempts. A query generated by the City's webmaster shows only three failed log-on attempts for 2006, which appears to be unlikely, considering 34,876 hits occurred during a three-month period. In addition, unsuccessful attempts to access accounts by the City Auditor's Office were not recorded on the failed log-on report.

The existing failed log on report does not include the source IP address for the party who failed to gain access. Password-guessing tools are readily available in the open market and could be used to gain access. Since utility accounts contain personal customer information, unauthorized access could result in identity theft.

Recommendation:

The Water Utilities Director should coordinate with the Information Technology Director to request that the future IWR vendor retain documentation of failed log-on attempts for a specific time period, including the user IP address. Failed log-on attempts should be monitored by the System Administrator in order to detect hacking or other unauthorized activity.

Management Response:

Modifications to the existing IWR system are not recommended due to lack of vendor support. Water Utilities will request that the future IWR vendor retain documentation of failed log-on attempts for a specified period of time, including the IP address if feasible.

Target Date: September 30, 2008

Responsibility: WIS Manager

Revenue Processing and Financial Interface

The following controls were found to be effective in ensuring that revenue was received, recorded and credited to the proper account:

- Reconciliations – Water Customer Services supervisors reconcile monetary transactions on a daily basis. The supervisors compare payments received to control totals recorded in enQuesta. Periodic reconciliations were performed by Water Utilities and Financial Services Department employees to ensure that the accounts receivable balance recorded on the City’s general ledger agreed with detail recorded in the water utility billing system.
- Batch Processing - enQuesta payment processing is conducted in batches. Authorizing batch processing and updates is limited to a few supervisory employees. Activities such as updating customer accounts and verifying daily receipts are restricted to supervisory personnel.
- Payment Confirmation - Payments made by customers in person require a payment stub or an account information form. The stub or the information form ensures proper payment application to the correct account. Water Utilities employees are required to provide customers a receipt for every transaction. The system generated receipt consists of an original and carbon copy. The original is given to the customer and the carbon receipt is retained by Water Utilities as a record of payment.
- Telephone (non-IVR) Payments - Customers have the option of calling in a payment using a credit card. If so, Water Utilities Customer Services Representatives conduct the transaction on behalf of customers. Customer Services Representatives note credit card numbers but destroy the information at the end of each shift. Credit card numbers are not displayed in the system. References to the transaction are made through the approval code. The credit card transaction itself is processed by a 3rd party vendor.

19. Meter deposits have been retained beyond account closure.

Utility deposits, obtained when an account is opened, have been retained beyond account closure. The Water Utilities policy states that residential deposits would be returned to customers upon 18 months of good payment history or upon satisfactory account closure. Commercial account deposits are only returned upon satisfactory account closure. The City Auditor’s Office identified approximately 33 accounts, totaling \$3,032, with overdue deposit refunds. The accounts with overdue deposit refunds had been closed out satisfactorily, dating back to 2001. The City Auditor’s Office’s analysis of deposit returns also showed two isolated instances where the deposit had been refunded twice to the customer. The duplicate refunds were caused by a system coding error.

The system vendor has advised Water Utilities staff of an existing system report that identifies deposits that are overdue. The Water Utilities Department has initiated review of accounts with overdue deposit refunds.

Unreturned deposits could be misappropriated, especially when they are in inactive accounts. They could be transferred to other accounts or processed as refunds to parties other than the original customer. Inactive accounts sit dormant and are not routinely reviewed by Water Utilities staff, increasing the possibility that misappropriations could go undetected. Unreturned deposits also contribute to poor customer relations.

Recommendation:

The Water Utilities Director should ensure that staff begins processing deposit refunds on accounts with overdue refunds.

Management Response:

The Water Utilities Customer Services Manager is currently reviewing a billing system generated report monthly, and processing any overdue refunds identified on the report.

Target Date: Currently in place.

Responsibility: Water Utilities Customer Services Manager

Recommendation:

The Water Utilities Director should ensure that staff begins monitoring the system report that identifies overdue deposit refunds and documents review of the report on a periodic basis.

Management Response:

An existing billing system report is currently being reviewed by the Water Utilities Customer Services Manager monthly to identify any overdue refunds.

Target Date: Currently in place.

Responsibility: Water Utilities Customer Services Manager

20. Transactions may be posted to inactive accounts.

The City Auditor's Office noted that customer electronic payments have been applied to inactive customer accounts that have been satisfactorily paid. When payments are credited to inactive accounts, they are refunded via an accounts payable check. In some cases, customers associated with the inactive accounts have since opened a new utility account. Therefore, before mailing the accounts payable checks, Water Utilities staff manually looks for the new customer account to apply the payment. Rather than posting to an inactive account, the initial payment could be retained in a water utility billing system suspense account, until the new account number is found. Suspense accounts could be monitored and policy could be established to clear the payments in suspense within a specific time period.

Under the existing conditions, risks of misappropriation of funds or other inappropriate activity is high. A limited number of employees have the capability to apply payments to these inactive accounts and change account names, which could result in processing refunds to third parties.

Recommendation:

The Water Utilities Director should request that S&S disable the ability to post transactions to inactive accounts. If system enhancement is not cost effective, other compensating controls that would prevent payments to inactive accounts should be considered.

Management Response:

The Water Utilities Department will investigate possible solutions, taking into account circumstances requiring the application of payments to inactive accounts. Any solution selected would need to avoid interfering with revenue collection and posting.

Target Date: September 30, 2007

Responsibility: Water Utilities Customer Services Manager

Recommendation:

The Water Utilities Director should request that S&S create a suspense account for payments without valid account numbers and routinely monitor activity in suspense accounts.

Management Response:

Payments without valid account numbers occur only through online bill payment through a customer's banking institution. The billing system vendor has been contacted regarding the implementation of a suspense account. A determination will be made based on cost effectiveness. The Customer Information Systems Analyst currently reviews all payments attempted on an invalid account number on a daily basis and posts them to the correct account number.

Target Date: September 30, 2007

Responsibility: Water Utilities Customer Services Manager

21. Year-end reconciling adjustments are required for the meter deposit payable account.

In order to ensure that general ledger account balances are accurate and that interface transactions are working correctly, control account balances should be periodically reconciled to subsidiary ledger detail.

Periodic (daily or monthly) reconciliations of the meter deposit payable account are not performed. Each year, the Financial Services Department must prepare an adjusting journal

entry to agree the amount shown on the general ledger to the detail of meter deposits retained in the water utility billing system. For FY 2006, the required adjustment was a debit of \$94,502, bringing the total balance for the meter deposit payable account to \$4,128,947. The following adjustments were required in previous fiscal years:

FY 2005 - \$118,420 Credit
FY 2004 - \$ 78,996 Debit
FY 2003 - \$124,701 Debit

At 2.3% of the total account balance, the adjustment for FY 2006 was considered immaterial by the Financial Services Department. However, changes to the sewer, water and landfill receivable accounts are monitored daily by Water Utilities Customer Services and reconciled monthly by an accountant in the Financial Services Department. As a result, errors in the interface methodology are discovered and appropriate journal entries are made throughout the year to record accounts receivable at the appropriate amount. Similarly, more frequent reconciliation of the meter deposit payable account may ensure that errors in the interface methodology are identified and corrected.

The City Auditor's Office noted that meter deposit refunds for accounts that have been "finalled" do not get recorded correctly. A monthly journal voucher is required to correct the initial interface record from enQuesta to Lawson. In addition, refunds provided to customers on request do not get recorded to the correct general ledger account. A monthly journal voucher is required to record the refunds to the correct general ledger account.

Recommendation:

The Financial Services Director and the Water Utilities Director should coordinate to periodically reconcile the meter deposit account and research why an adjustment is necessary to this account every year. Necessary changes to the interface methodology should be made so that the need for future adjustments is reduced.

Management Response:

The interface from enQuesta to the City's financial accounting system will be reviewed to determine if it is set up correctly. The billing system vendor has been asked to flowchart the meter deposit process through enQuesta. After receipt of the flowchart, Financial Services will trace transactions and work with Customer Services to decide the best way to proceed with a monthly reconciliation.

Target Date: August 31, 2007

Responsibility: Water Utilities Customer Services Manager and Financial Accountant (Finance)

22. Adjustments were made to the Accounts Receivable account without determining why the adjustments were necessary.

During the monthly reconciliation of accounts receivable, an accountant in the Financial Services Department has routinely adjusted the balance by an immaterial amount each month. Although the adjustments are immaterial (< \$2,500 in FY 2006 compared to over \$9 million in receivables), they indicate system inconsistencies. The City Auditor's Office research indicated that the adjustments were necessary due to timing differences related to balance transfers. These transactions were intended to transfer cash payments or credit balances from one Water account to another. However, the accounts were from different billing cycles, resulting in timing differences during the reconciliation of the accounts receivable account.

It may be beneficial for the Financial Services Department to provide the Water Utilities Department with details of any miscellaneous immaterial adjustments. This could assist the Water Utilities Department in identifying inconsistent practices and/or training needs of employees.

Recommendation:

The Water Utilities Director and the Financial Services Director should coordinate, identify and discuss reconciling items on a periodic basis and determine if system enhancements to interface methodologies or processing are needed.

Management Response:

All reconciling items are the result of timing differences arising from customer refunding. Customer Services staff are currently working with the City's Financial Services Department to set up a process or to ensure that reconciling items are identified in a timely manner. A copy of the monthly reconciliation will be provided to the Water Utilities Director and the Financial Services Director for their review.

Target Date: June 30, 2007

Responsibility: Water Utilities Customer Services Manager and Financial Accountant (Finance)