

# **Final Audit Follow-up**

*As of March 31, 2010*



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City Auditor

## **Gas Infrastructure**

*(Report #0727 issued September 13, 2007)*

**Report #1016**

**May 18, 2010**

### **Summary**

***Each of the 27 action plan steps established to address issues identified in audit report #0727 had been completed as of March 31, 2010.***

In audit report #0727 we noted that, overall, the City has adequate and proper processes and procedures to ensure a safe and reliable infrastructure. We also noted significant improvements and enhancements had been and were being made in regard to accounting for and tracking infrastructure. We reported installations of new infrastructure met federal and state requirements and expansions and replacements were planned and funded. We reported an effective public protection program was established. However, we also identified areas where improvements and enhancements were needed. Accordingly, recommendations were made to install an additional isolation valve, accurately designate critical valves in the Gas Utility geographic information system (GIS), develop a project management plan for refinement of the Gas Utility's GIS, protect stored pipe from environmental elements, ensure timely repair of non-critical leaks, and enhance monitoring of system pressures at a satellite utility facility. Recommendations were also made to improve documentation in several areas, including infrastructure testing and inspection, leak identification and repair, emergency notifications and responses, and other areas.

Twenty-seven action steps were developed to address the identified issues. In our three prior follow-up reports, we reported 25 of those 27 action plan steps had been completed (i.e., as of March 31, 2009). During this follow-up engagement, we

found the two remaining steps were completed. Completion of those two steps involved the following:

- A plan was prepared and placed into operation resulting in the completion and/or implementation of various refinements to the Gas Utility's geographic information system (GIS).
- The Supervisory Control and Data Acquisition (SCADA) monitoring system was expanded to cover the City's gas infrastructure segment located in the City of Midway.

We appreciate the cooperation and assistance provided by Underground Utility staff during this audit follow-up.

### **Scope, Objectives, and Methodology**

We conducted this audit follow-up in accordance with the International Standards for the Professional Practice of Internal Auditing and Generally Accepted Government Auditing Standards. Those standards require we plan and perform the audit follow-up to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit follow-up objectives.

### **Report #0727**

The scope of report #0727 included a review of the Gas Utility's processes established to install (construct), maintain, protect, and account for the City's gas infrastructure. The objectives were to determine whether:

- Adequate and complete records were maintained to enable the Gas Utility to effectively and efficiently track, monitor, and manage the City's gas infrastructure;
- The Gas Utility had a process in place to ensure additions (expansion and replacement) meet federal and state standards;
- The Gas Utility had a process in place to ensure gas infrastructure is safely and appropriately maintained;
- An adequate public protection program was maintained; and
- The Gas Utility had an adequate process for planning and funding gas infrastructure expansion and replacement.

The audit focused on programs and processes in effect during the time of our initial audit fieldwork in winter and spring 2007.

### ***Report #1016***

This is our fourth and final follow-up on action plan steps identified in audit report #0727. The purpose of this final follow up is to report on the progress and status of efforts to complete action plan steps due for completion as of March 31, 2010. To determine the status of the action plan steps, we interviewed staff, made observations, and reviewed relevant documentation.

### ***Background***

The City's Gas Utility was established in 1956. Effective April 1, 2008 (subsequent to the initial audit), the Gas Utility was combined with the Water Utility into a new City department, Underground Utilities. The "Gas Utility" as referred to throughout this report is now a division within that new department.

At the time of our initial audit, the City's gas infrastructure was comprised of:

- Four gate stations;
- 780 miles of gas mains;
- 18 regulating stations;
- 27,925 service points;
- Approximately 6,900 gas valves; and

- Other miscellaneous components such as test stations and anodes, odorizing equipment, etc.

The City's gas pipelines (mains and service lines) are made up of either coated steel or polyethylene plastic. Polyethylene plastic is generally used for medium and low pressure lines while steel is used for all high pressure lines. Polyethylene plastic and steel pipe used for gas pipelines must be manufactured in accordance with specifications provided in governing federal regulations.

At the time of our initial audit, an independent contractor performed the vast majority of infrastructure expansion and replacement. Occasionally, City staff installed or replaced gas mains or other infrastructure for minor jobs or projects.

The primary authority controlling and regulating the City's gas infrastructure is the United States Department of Transportation, Office of Pipeline Safety. The State of Florida, Public Service Commission establishes additional regulations.

For fiscal years 2002 through 2006 (five-year period), the City incurred costs of approximately \$7.9 million to maintain and operate the City's Gas Utility (exclusive of fuel costs). During that same five-year period, the City expended approximately \$14.5 million through 10 capital projects for infrastructure expansion and replacement.

### ***Previous Conditions and Current Status***

In report #0727, we noted that, overall, the City has adequate and proper processes and procedures to ensure a safe and reliable infrastructure. We also noted significant improvements and enhancements had been and were being made in regard to accounting for and tracking infrastructure. We reported installations of new infrastructure met federal and state requirements and expansions and replacements were planned and funded. We reported an effective public protection program was established. However, we also identified areas where improvements and enhancements were needed. As a result, we recommended that:

- A project management plan be developed to assist in the refinement of the Gas Utility's geographic information system (GIS) as part of the on-going "Automation Implementation" capital project;

- Pipe stored at the City’s Municipal Supply Center (MSC) be better protected from environmental elements;
- An additional isolation valve be installed at one of the City’s 18 regulating stations, and the integration of other regulating station isolation valves into the GIS;
- The cathodic protection system (protects underground metallic pipe and components from corrosion) be tested at the required frequencies and intervals, and records of those tests be better documented;
- Training be enhanced for non-Gas Utility staff inspecting gas service lines for atmospheric corrosion;
- Grade 2 and 3 gas leaks (which do not represent immediate threats to public safety) be timely repaired, and better records be maintained to track and monitor the status of leaks and related repairs;
- Critical infrastructure valves be designated in the GIS;
- Upon completion of a system upgrade, Station 21 staff (satellite City utility facility) be trained in their expected roles in monitoring system pressures, and system alarms at the facility be reestablished;
- The Supervisory Control and Data Acquisition (SCADA) monitoring system be expanded to cover the City’s gas infrastructure located in the City of Midway;
- Emergency notification dispatches and responses be better documented; and
- Documentation be improved in other areas, including, for example, pipe specifications, reorder points and quantities, atmospheric corrosion, and valve inspections.

Twenty-seven action plan steps were developed to address the identified issues. As shown below in Table 1, as of March 31, 2010, each of those action plan steps had been completed.

**Table 1  
Action Plan Steps from Audit Report #0727  
Due as of March 31, 2010, and Current Status**

<b>Action Plan Steps Due as of March 31, 2010</b>	<b>Current Status</b>
<b>Enhance records used to account for and manage gas infrastructure</b>	
<b>Gas Division within the Underground Utility</b>	
<ul style="list-style-type: none"> <li>• With the assistance of ISS, a project management plan will be established for the GIS that (1) identifies tasks and actions remaining to be completed, (2) prioritizes those tasks and actions, (3) establishes completion goals (dates), and (4) identifies and allocates resources needed to complete those tasks/actions.</li> </ul>	<p>3 In the initial audit, we described various planned and ongoing refinements to enhance the accuracy, completeness, and usefulness of the GIS, as well as enhance staff’s ability to manage and monitor gas infrastructure. We acknowledged these refinements were ongoing and being funded through the “Automation Implementation” capital project. Examples of those planned and/or on-going refinements included:</p> <ul style="list-style-type: none"> <li>– Identifying and adding to the GIS existing valves and mains not reflected in that system.</li> <li>– Recording additional attribute data in the GIS for infrastructure components.</li> <li>– Referencing and/or linking applicable construction, inspection, and engineering documents to gas mains reflected in GIS.</li> <li>– Adding non-primary infrastructure components (e.g., test stations) to GIS.</li> </ul> <p>To facilitate completion of the refinements, we</p>

	<p>recommended a project management plan be developed to help staff ensure appropriate tasks and actions are identified, prioritized, and timely completed, and necessary resources identified and allocated.</p> <p>To date, we found the Underground Utility’s information technology staff has implemented a plan that has resulted in most of the noted refinements being completed and/or implemented. Examples of completed/implemented refinements include:</p> <ul style="list-style-type: none"> <li>– Critical (isolation and key) valves are clearly and accurately depicted in the GIS.</li> <li>– Standard attribute data is captured and recorded in GIS for new gas infrastructure components.</li> <li>– A method has been established/implemented for indexing (referencing) new gas infrastructure components added to the GIS to the related project documents (construction, inspection, and engineering) stored in the City’s electronic data management system (EDMS).</li> <li>– Non-primary gas infrastructure components (e.g., cathodic protection test stations) are being added to the GIS.</li> <li>– A two-man crew is systematically surveying the City’s underground utility (includes gas) infrastructure using global positioning devices (GPS) resulting in more accurate depictions of components in the GIS and identification and recordings of components (e.g., mains) previously not reflected in the GIS.</li> <li>– Procedures were enhanced to reduce the number of outstanding instances where new gas meter settings do not get accurately recorded and reflected in the GIS through system interfaces.</li> </ul> <p>In addition, staff has begun the development of a formalized workflow management and project tracking system that should further enhance the management, monitoring, and tracking of the City’s gas infrastructure.</p>
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**Ensure proper materials are obtained and safeguarded**

**Gas Division within the Underground Utility**

<ul style="list-style-type: none"> <li>• In conjunction with the Municipal Supply Center (MSC), a cost efficient method will be identified to protect stored polyethylene pipe and related fittings from direct sunlight.</li> </ul>	3 Completed in a prior period.
<ul style="list-style-type: none"> <li>• Updated pipe specifications will be provided to the MSC for all pipe materials and sizes.</li> </ul>	3 Completed in a prior period.
<ul style="list-style-type: none"> <li>• Appropriate reorder points and quantities will be determined and provided to MSC.</li> </ul>	3 Completed in a prior period.

**Municipal Supply Center (MSC)**

<ul style="list-style-type: none"> <li>• In conjunction with Gas Utility staff, a cost beneficial method for protecting stored polyethylene pipe and</li> </ul>	3 Completed in a prior period.
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<p>fittings from direct sunlight will be determined. Upon that determination, the pipe and fittings will be stored accordingly.</p>	
<ul style="list-style-type: none"> <li>The PeopleSoft Financials system will be updated upon receipt of updated pipe specifications from the Gas Utility.</li> </ul>	3 Completed in a prior period.
<ul style="list-style-type: none"> <li>Upon receipt of recommended quantities from the Gas Utility, reorder points, quantities, and suggested maximum inventory levels will be adjusted in the PeopleSoft Financials system.</li> </ul>	3 Completed in a prior period.
<b>Ensure proper valve placement and records for regulating stations</b>	
<b>Gas Division within the Underground Utility</b>	
<ul style="list-style-type: none"> <li>For the one regulating station, constructed subsequent to 1974 and identified on audit as not having an isolation valve located no more than 500 feet upstream from the station, an additional valve will be installed in accordance with PSC requirements.</li> </ul>	3 Completed in a prior period.
<ul style="list-style-type: none"> <li>The Gas Utility will ensure isolation valves for other regulating stations (i.e., stations not selected for audit) are properly located in accordance with PSC regulations. Additional valves will be installed at those other stations if warranted.</li> </ul>	3 Completed in a prior period.
<ul style="list-style-type: none"> <li>The three applicable regulating station isolation valves will be incorporated into the Gas Utility GIS.</li> </ul>	3 Completed in a prior period.
<b>Ensure proper cathodic protection for metallic mains and service lines</b>	
<b>Gas Division within the Underground Utility</b>	
<ul style="list-style-type: none"> <li>Testing of the sacrificial anodal system, rectifiers, and interference bond will be conducted at the required frequencies. All testing and related actions will be properly and adequately documented (i.e., test dates and results and repairs when applicable).</li> </ul>	3 Completed in a prior period.
<ul style="list-style-type: none"> <li>Gas Utility Maintenance Division management will periodically obtain and review records of tests performed to ensure applicable staff is performing and documenting required testing of the sacrificial anodal system, rectifiers, and interference bond.</li> </ul>	3 Completed in a prior period.
<ul style="list-style-type: none"> <li>Complete and accurate records of each test station established for the cathodic protection system will be prepared and maintained. Those records will clearly identify for each test station the area and system component (interconnected main, isolated main, rectifier, etc.) covered.</li> </ul>	3 Completed in a prior period.
<b>Properly and timely identify and address atmospheric corrosion</b>	
<b>Gas Division within the Underground Utility</b>	
<ul style="list-style-type: none"> <li>In the event non-Gas Utility staff continues to be assigned responsibility for identifying and reporting instances of atmospheric corrosion, additional and appropriate training will be provided to that staff in regard to proper identification of corrosion. As a quality control measure, knowledgeable Gas Utility</li> </ul>	3 Completed in a prior period.

staff will selectively follow up on efforts by the non-Gas Utility staff in their identification of corrosion.	
<ul style="list-style-type: none"> <li>The PeopleSoft Customer Information System (CIS) will be used to document and track all instances of identified atmospheric corrosion.</li> </ul>	3 Completed in a prior period.
<ul style="list-style-type: none"> <li>The processes and methods employed to identify, report, and monitor atmospheric corrosion will be documented in formal written procedures. Those procedures will address, at a minimum: (1) definitions of atmospheric corrosion and examples of instances that should be addressed and repaired, (2) staff assigned responsibility for conducting the inspections and making needed repairs, (3) frequency of inspections, (4) methods and timing of inspections, (5) time standards for addressing and repairing or otherwise disposing of reported instances, and (6) methods for recording and tracking identified corrosion and related dispositions.</li> </ul>	3 Completed in a prior period.
<b>Ensure gas leaks are timely and properly addressed</b>	
<b>Gas Division within the Underground Utility</b>	
<ul style="list-style-type: none"> <li>Applicable staff will be reminded that all gas leaks will be repaired in a timely manner. To facilitate repair, Gas Utility Maintenance Division management will obtain and review periodic reports that reflect the status of all identified leaks.</li> </ul>	3 Completed in a prior period.
<ul style="list-style-type: none"> <li>PeopleSoft CIS field activities and orders will be used to document, track, and record the repair of all identified leaks. Actions taken (e.g., repairs) will be timely recorded in that system.</li> </ul>	3 Completed in a prior period.
<b>Ensure other required inspections are performed</b>	
<b>Gas Division within the Underground Utility</b>	
<ul style="list-style-type: none"> <li>Upon completion of applicable hydraulic modeling, critical valves (including isolation, key, and other critical designations) will be accurately and clearly designated in the Gas Utility GIS.</li> </ul>	3 Completed in a prior period.
<ul style="list-style-type: none"> <li>Valve and regulating station inspection records will be properly and adequately completed and imaged into the City’s Electronic Data Management System (EDMS) for storage. The imaged documents will be adequately indexed so as to allow efficient identification and retrieval of inspection documents for a specific valve(s) or regulating station(s).</li> </ul>	3 Completed in a prior period.
<b>Ensure adequate monitoring of system pressurization</b>	
<b>Gas Division within the Underground Utility</b>	
<ul style="list-style-type: none"> <li>Upon completion of the Supervisory Control and Data Acquisition (SCADA) system upgrade, Gas Utility staff will (1) provide appropriate training to Station 21 staff as to their expected roles and assigned responsibilities and (2) reestablish meaningful system alarms at Station 21 that indicate potential system over or under pressurizations. (NOTE: Station 21 is</li> </ul>	3 Completed in a prior period.

<p>a satellite utility facility that, among other things, receives and dispatches emergency calls after normal working hours. Station 21 staff is also available to monitor gas flows on behalf of the Gas Utility.)</p>	
<ul style="list-style-type: none"> <li>The City of Midway gas infrastructure will be incorporated into the system monitored through the SCADA system.</li> </ul>	<p>3 In the initial audit report we acknowledged that one of the more recent expansions of the City’s gas infrastructure was into the City of Midway, located in Gadsden County. That segment was (is) not interconnected with the remaining City gas infrastructure in Leon County and, as reported, the gas flows and pressures were not tracked through the City’s SCADA system. While there were alternative measures to monitor those flows and pressures, a determination was made that implementing a SCADA application to monitor the flows/pressures would be more efficient. In our discussions on this matter, the Gas Utility responded that it planned to incorporate the City of Midway segment in the infrastructure monitored through the SCADA system. We recommended those plans be completed. We found during our follow up fieldwork that, as part of a planned upgrade, Underground Utilities incorporated the City of Midway gas infrastructure into the SCADA monitoring system, effective January 2010.</p>

**Ensure appropriate and timely emergency responses**

**Gas Division within the Underground Utility**

<ul style="list-style-type: none"> <li>Gas Utility staff responding to reported gas emergencies will be reminded of the requirement to properly and timely document their responses and actions taken in regard to the emergencies. Those responses/actions will be recorded in the PeopleSoft CIS through completed field activities/orders and also recorded in the new MOBILE Work Management System through a system interface.</li> </ul>	<p>3 Completed in a prior period.</p>
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**Station 21**

<ul style="list-style-type: none"> <li>Station 21 staff will be reminded of the requirement to create and dispatch a PeopleSoft CIS field activity/order to the Gas Utility for each gas emergency notification received, regardless of whether a verbal dispatch was also made. In addition, CIS reports will be periodically generated and reviewed by supervisors to ensure the accuracy and documentation of field orders created by Station 21 staff and to assess staff performance.</li> </ul>	<p>3 Completed in a prior period.</p>
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**Ensure accurate and clear performance measure reporting**

**Gas Division within the Underground Utility**

<ul style="list-style-type: none"> <li>Appropriate support for reported performance measures will be retained for a minimum of three years after the measures are initially reported.</li> </ul>	<p>3 Completed in a prior period.</p>
<ul style="list-style-type: none"> <li>Calculations and determinations of performance measures will be reviewed by independent staff to ensure measures are proper and accurate.</li> </ul>	<p>3 Completed in a prior period.</p>

<ul style="list-style-type: none"> <li>• Appropriate language will be used to clarify what the “emergency response” performance measure represents.</li> </ul>	<p>3 Completed in a prior period.</p>
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**Table Legend:**

Issue to be addressed from the original audit.

3 Issue addressed and resolved

**Conclusion**

Table 1 above shows 25 action steps were completed in a prior period, and the two remaining action plan steps due as of March 31, 2010, have also been completed. The successful completion of these 27 action plan steps demonstrates Underground Utility’s commitment to provide appropriate management and accounting of the City’s gas infrastructure. We commend Underground Utility staff for their efforts.

We also appreciate the cooperation and assistance provided by Underground Utility staff during this audit follow-up.

**Appointed Official’s Response**

**City Manager:** I am very pleased with the results of this audit. The report reflects management's commitment to ensure the reliability of the Gas Infrastructure by using technology to improve efficiency and effectiveness. The most important factor is the obvious commitment to enhanced customer service and staff's collaborative effort to implement the action plan. I thank the audit staff for their thorough analysis.

Copies of this audit follow-up #1016 or audit report #0727 may be obtained from the City Auditor’s website (<http://talgov.com/auditing/index.cfm>) or via request by telephone (850 / 891-8397), by FAX (850 / 891-0912), by mail or in person (Office of the City Auditor, 300 S. Adams Street, Mail Box A-22, Tallahassee, FL 32301-1731), or by e-mail ([auditors@talgov.com](mailto:auditors@talgov.com)).

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