DIVISION OF INSPECTOR GENERAL

KEN BURKE, CPA
Clerk of the Circuit Court & Comptroller
Pinellas County, FL

AUDIT OF UTILITIES' METER INSTALLATION AND REPAIR PROCESS

Melissa Dondero, CPA, CIA, CIG, CIGA, CIGI, CITP, CRMA, CFS, CECFE
Inspector General/Chief Audit Executive

Audit Team
Robert Poynter, CIGA, CIGI, CISA, CCA, CECFE, CFS – Assistant Inspector General
Shawn Phillips, CIGA, CIGI, CECFE – Inspector General I

REPORT NO. 2025-01
FEBRUARY 4, 2025

KEN BURKE, CPA
Clerk of the Circuit Court & Comptroller
Pinellas County, FL

Division of Inspector General
510 Bay Avenue
Clearwater, FL 33756
Telephone: (727) 464-8371
Fax: (727) 464-8386
Fraud Hotline: (727) 45FRAUD (453-7283)
Clerk's website: www.mypinellasclerk.gov

Clerk of the County Court | Recorder of Deeds | Clerk and Accountant of the Board of County Commissioners | Custodian of County Funds | County Auditor

February 4, 2025

Jeremy Waugh, Director, Utilities Department

We have conducted an audit of the Utilities' Meter Installation and Repair Process based on our annual risk assessment. Opportunities for Improvement (OFIs) and Recommendations (Recs.) are presented in this report; see Table 1 for a summary classified by priority level.

Priority	OFIs	Recs.
HIGH	0	0
MEDIUM	7	20
LOW	1	1
Total	**8**	**21**

Table 1 - Number of OFIs and Recs.

During our audit, we found Pinellas County Utilities (PCU), in regard to the implementation of the Advanced Metering Infrastructure (AMI): Water Meter Upgrades project, had sufficient project oversight and adequate plans for the maintenance and replacement of the AMI water meters. We identified some weaknesses surrounding the meter installation and administration processes that may put at risk the achievement of objectives. We developed OFIs and Recs. to address these items.

We appreciate the cooperation shown by the staff of PCU during the course of this review.

Respectfully Submitted,

Melissa Dondero
Inspector General/Chief Audit Executive

Approved:

Ken Burke, CPA*
Clerk of the Circuit Court and Comptroller
Ex Officio County Auditor
*Regulated by the State of Florida

cc: The Honorable Chair and Members of the Board of County Commissioners
Barry Burton, County Administrator
Jill Silverboard, Deputy County Administrator and Chief of Staff
Noralvys Hancock, Deputy Director, Utilities Department
Joan Luttmann, Technical Services Manager, Utilities Department

TABLE OF CONTENTS

ABBREVIATIONS 4

REPORT SUMMARY 6

Overall Conclusion 6

Audit Objectives and Outcomes 7

Scope and Methodology 8

BACKGROUND 10

OPPORTUNITIES FOR IMPROVEMENT 18

1. PCU's Operational Efficiency Was Adversely Affected By AMI Water Meter Data Issues And Understaffing. 18

2. PCU's Logical Security Controls For Its SAP HANA System Required Improvement. 22

3. PCU's Logical Security Controls For Its BEACON AMA System Required Improvement. 26

4. PVI Used Potable Water Meter Box Lids On Some Installations Of AMI Reclaimed Water Meters. 31

5. Some AMI Installations Did Not Include A Recently Implemented Tamper-Resistant Feature. 34

6. PCU Did Not Create SOPs And Schedules For The Maintenance And Replacement Of AMI Water Meters. 38

7. PCU Field Services Did Not Have A Defined Plan To Address The Change In The Essential Job Functions Of Its Meter Readers Following The Completion Of The AMI Project. 42

8. The PCU Policy Manual Required Revisions And Approval From The BCC. 44

ABBREVIATIONS

AMA	Advanced Metering Analytics
AMI	Advanced Metering Infrastructure
AMR	Automated Meter Reading
Badger	Badger Meter, Inc.
BCC	Pinellas County Board of County Commissioners
BTS	Business Technology Services
CIP	Capital Improvement Program
County	Pinellas County
DOE	United States Department of Energy
FDEP	Florida Department of Environmental Protection
FY	Fiscal Year
HANA	High-Performance Analytic Appliance
HR	Human Resources
IAS	Integrated Account Services
Jacobs	Jacobs Engineering Group, Inc.
NIST	National Institute of Standards and Technology
O&M	Operations and Maintenance
OFI	Opportunity for Improvement
PCU	Pinellas County Utilities (a.k.a., Utilities Department)
PVI	Pedal Valves, Inc.
QA	Quality Assurance
RBAC	Role-based access control
Recs.	Recommendations

RS&H	Reynolds, Smith & Hills, Inc.
SFWMD	Southwest Florida Water Management District
SOPs	Standard Operating Procedures
SP	Special Publication
V&A	V&A Consulting Engineers, Inc.
VertexOne	VertexOne Software, LLC
VPN	Virtual Private Network
VXenterprise	VertexOne VXenterprise SAP Utility Customer Information System
VXsmart	VertexOne VXsmart Usage Analytics and Dynamic Customer Engagement

REPORT SUMMARY

Overall Conclusion

Our audit was conducted in accordance with the *Global Internal Audit Standards* of The Institute of Internal Auditors and the *Principles and Standards for Offices of Inspector General* of the Association of Inspectors General. Accordingly, it included such tests of records and other auditing procedures as we considered necessary in the circumstances.

Based on our independent and objective assessment, the department's governance is effective for the scope of this audit. Governance is operating effectively and consistently applied to support the achievement of objectives in the area audited. However, the department's risk management and internal control environment need improvement. Risk management and internal control weaknesses exist which may put at risk the achievement of objectives in the area audited. We identified areas of strength where controls are strong and aligned with the department's goals. However, we also identified areas of improvement to enhance efficiency, improve effectiveness, and mitigate risks.

Opportunities for Improvement (OFIs) are prioritized based on the likelihood of the risk occurring and the impact the risk may have on the department's governance, risk management, and/or control processes as follows:

- Priority 1 (High) = Significant risk or impact on operating effectiveness and efficiency; audit findings indicate ineffective or lack of controls
- Priority 2 (Medium) = Moderate risk or impact on operating effectiveness and efficiency; audit findings indicate control weaknesses that may negatively impact the achievement of business objectives, reputation, and/or compliance
- Priority 3 (Low) = Minor risk or impact on operating effectiveness and efficiency; audit findings indicate opportunities to enhance the control environment

Figure 1 - Priorities

Our audit was neither designed nor intended to be a detailed study of every relevant system, procedure, or transaction. Accordingly, the OFIs presented in this report may not be all-inclusive of areas where improvement may be needed.

Audit Objectives and Outcomes

The purpose of our audit was to:

1. Ensure Pinellas County Utilities (PCU) had adequate oversight of the installation and inspection of the Advanced Metering Infrastructure (AMI): Water Meter Upgrades project

2. Evaluate PCU's process for converting the existing water meter technology to digital water meter technology

3. Ensure PCU had a documented process in place to maintain, repair, and replace the digital water meters according to standard operating procedures (SOPs), industry and manufacturer standards, and best practices following the completion of the AMI: Water Meter Upgrades project

As a result of the audit, we determined:

1. PCU ensured adequate oversight of its meter installation and inspection process for the AMI: Water Meter Upgrades project. It accounted for installation work beyond the initial scope, allocated installation and inspection duties appropriately, communicated with customers both electronically and face-to-face regarding the project's status, and developed various schedules to track the project's progress and adherence to timelines. However, we observed areas for improvement in PCU's oversight process. This was due to an installation policy directing Pedal Valves, Inc. (PVI) to expedite reclaimed meter installations, which resulted in the use of incorrect lids on water meter boxes. In addition, some meters were installed without tamper-resistant devices critical to preserving data exchange. Both PCU and PVI were already aware of these concerns and started working on solutions.

2. PCU implemented an adequate water meter installation process, ensuring operational continuity as the AMI: Water Meter Upgrades project advanced, including the seamless conversion of analog and Automated Meter Reading (AMR) meters to AMI meters. Nonetheless, we observed the department needed to enhance the accuracy and completeness of meter readings recorded in BEACON Advanced Metering Analytics (AMA) and then exported to SAP High-Performance Analytic Appliance (HANA) to maintain an efficient billing process throughout the project's progression and upon its full implementation. Additionally, there were areas in the logical security measures within both SAP HANA and BEACON AMA that could benefit from strengthening. To further support the billing process, updates to the department's policy manual are necessary to reflect these changes and ensure comprehensive guidelines are in place.

3. PCU possessed both the plan and capability to adequately maintain the AMI water meters and associated infrastructure, supported by a warranty agreement with

Badger Meter, Inc. (Badger), for meter replacements. Additionally, PCU Finance issues purchase orders at the start of each fiscal year (FY), requesting shipments, as needed, to address extended lead times. However, we identified the need for PCU to develop and complete additional SOPs concerning the upkeep of its AMI water meter infrastructure. Furthermore, PCU Field Services could benefit from a more defined plan to support meter readers' transition following the completion of the AMI project.

Scope and Methodology

We performed a risk assessment of PCU's AMI: Water Meter Upgrades project. As a result of our risk assessment, the audit covered the processes for installation, inspection, billing, maintenance, and overall project oversight. We reviewed and evaluated the processes and internal controls used for the following:

- Replacement of commercial and residential potable and reclaimed water meters with new digital water meters
- Maintenance and repair programs for the new digital water meters
- Oversight of contractual agreements between PCU and all parties assisting with the project

The audit period was August 4, 2022, through October 31, 2024. However, we did not limit the review of transactions and processes by the audit period and scope.

To meet the objectives, we performed the following:

1. Met with PCU management and the contracted project manager to discuss water meter technology differences, project oversight and task allocation, project timelines, and PCU's internal control framework regarding water meter maintenance and repair after completing the AMI: Water Meter Upgrades project

2. Reviewed contractor services agreements to understand the associated terms, responsibilities, and risks

3. Reviewed the applicable PCU policies and procedures for managing the installation, maintenance, and replacement of digital water meters

4. Reviewed applicable industry and manufacturer standards for the maintenance of AMI water meters

5. Observed and documented PCU's customer outreach activities related to the AMI: Water Meter Upgrades project implementation

6. Observed the PCU Maintenance Division and its contracted staff, as applicable, install AMI water meters for residential and commercial locations

7. Observed PCU's staff and contracted staff, as applicable, inspect the AMI water meter installations in residential and commercial locations

8. Discussed the water billing process with PCU management and staff and observed PCU's preservation, conversion, and reconciliation of water usage data after implementing the AMI: Water Meter Upgrades project

9. Requested the applicable PCU policies and procedures for managing the data collection and billing process during and after the AMI: Water Meter Upgrades project implementation for review

10. Discussed and documented PCU's BEACON AMA meter reading and network management software utilization and evaluated the associated logical security controls

11. Evaluated PCU's SAP HANA and BEACON AMA applications for logical security controls and data synchronicity between SAP HANA and BEACON AMA

12. Reviewed PCU's water fees and rates and discussed with management potential changes resulting from implementing the AMI: Water Meter Upgrades project

BACKGROUND

PCU's purpose is to distribute clean drinking water, collect and treat wastewater, and deliver reclaimed water to Pinellas County (County) residents, businesses, and visitors. PCU is a full-service public utility provider, overseeing billing and revenue collections, maintenance, operations, water quality, and engineering support. PCU operates and maintains two wastewater treatment facilities and one water treatment facility to provide services to over 113,000 water customers, over 84,000 sewer customers, and over 23,000 reclaimed water customers. PCU has six operational divisions that include the following:

- Business and Customer Services
- Financial Services
- Maintenance
- Planning and Project Management
- Plant Operations
- Water Quality

The Business and Customer Services Division is responsible for PCU's call center, collections, billing and invoicing, and integrated account services (IAS). The Business and Customer Services Division oversees the Field Services and Customer Services sections, which are essential to the AMI: Water Meter Upgrades project. Field Services includes the department's meter reader and utility maintenance specialist groups, which are key to meter reading operations and maintaining compliance. Meanwhile, Customer Services comprises the IAS team members, essential in managing the database for PCU's billing operations. Financial reporting for PCU, managing contracts, and overseeing PCU's warehouse and facilities are some of the responsibilities of the Financial Services Division.

The Maintenance Division's responsibilities include managing the North and South County Maintenance facilities and maintaining water and sewer infrastructure. The Planning and Project Management Division assists the Plant Operations and Maintenance Divisions through strategic, long-term planning of the water, wastewater, and reclaimed water systems. Additionally, it develops and executes the Capital Improvement Program (CIP). The Plant Operations Division's responsibilities include management of the Keller Water Treatment Facility, William E. Dunn Water Reclamation Facility, and the South Cross Bayou Water Reclamation Facility.

The Water Quality Division conducts water quality distribution sampling, water quality monitoring, system-wide distribution flushing, and sanitary sewer overflow investigations and reporting. Implementing the Industrial Pretreatment Program and the Fats, Oils, and Grease Program are responsibilities of the division. The division uses the Laboratory, Water Quality Monitoring and Compliance, and Supervisory Control and Data Acquisition sections to oversee all regulatory programs applicable to water and wastewater. In addition, it

coordinates with other PCU divisions to maintain compliance with Florida Department of Environmental Protection (FDEP) regulations.

Until February 2024, PCU maintained an Engineering Division. However, it restructured the department, delegating the Engineering Division's responsibilities to three other divisions: Maintenance, Planning and Project Management, and Plant Operations. PCU also delegates project management to a team from Jacobs Engineering Group, Inc. (Jacobs) for various projects, including the AMI: Water Meter Upgrades project.

AMI: Water Meter Upgrades Project

An AMI water meter system consists of several key components, each playing a vital role in monitoring and managing water usage efficiently. At the core is the smart water meter, equipped with sensors to measure water flow accurately and in real time. These smart meters typically have an embedded communication module, which can transmit data wirelessly to the utility company. Supporting this communication is the communication network infrastructure, often comprising a combination of cellular, radio frequency, or fixed network systems that ensure reliable data transmission. The data collection units or gateways, strategically placed within the coverage area, aggregate the data sent by the smart meters and forward it to the utility company's central system.

Central to the management and analysis of this data is the meter data management system. This system processes and stores the received data, enabling detailed analytics, reporting, and integration with billing systems. Another critical component is the consumer interface, such as a web portal or mobile app, which allows customers to access their usage data, receive alerts about unusual consumption patterns or leaks, and make informed decisions to optimize their water usage. Together, these components form a cohesive AMI water meter system that enhances operational efficiency, improves customer service, and promotes water conservation through advanced monitoring and data analytics.

The purpose of the AMI: Water Meter Upgrades project was to upgrade residential and commercial water meters for County potable and reclaimed water customers. The County departments engaged in the AMI: Water Meter Upgrades project were PCU and Public Works. The participating companies included the following:

- Badger
- Jacobs
- PVI
- Reynolds, Smith & Hills, Inc. (RS&H)
- V&A Consulting Engineers, Inc. (V&A)
- VertexOne Software, LLC (VertexOne)

PCU managed the AMI: Water Meter Upgrades project primarily. However, for inspection services, PCU relied on the expertise of the Public Works Department's contracted companies, RS&H and V&A. Additionally, while PCU was the County department responsible for the AMI: Water Meter Upgrades project, it contracted with Jacobs to manage the project.

Prior to the AMI: Water Meter Upgrades project, PCU and VertexOne had an agreement wherein VertexOne provided software and services for a customer information system. In June 2022, this agreement was amended to include upgrades to the software and services, ensuring integration with AMI technology. In June 2022, PCU entered into a services agreement with Badger to install an AMI system for potable and reclaimed water utilities. Badger engaged its installation partner, PVI, for the installation of AMI water meters. Additionally, PCU assigned its Maintenance Division to handle installations of AMI water meters.

At the inception of audit fieldwork, we noted the County had a mixture of analog and AMR water meters for potable and reclaimed water customers, which PCU and PVI began replacing with AMI water meters. Analog, AMR, and AMI water meters each offer distinct methods of monitoring water usage. Analog meters, the most traditional form, require manual reading by utility workers to record water usage, typically once every month or two. These meters involve mechanical parts and provide a single cumulative reading. AMR meters automate this process by enabling remote readings, often through drive-by systems that allow utility workers to gather data without accessing each meter physically. This is achieved through radio frequency signals, which transmit usage data periodically. AMI meters take automation a step further by providing real-time data transmission and two-way communication between the meter and the utility company. In summary, while analog meters depend on more manual labor and provide limited data, AMR meters offer automated readings with improved efficiency, and AMI meters deliver real-time data with advanced management capabilities, revolutionizing water utility operations.

Regarding the term "real-time," while the data transmission from AMI meters might not be continuous, the intervals are frequent enough to give utility companies a near-real-time picture of water usage. So, although the data is sent in bursts at set intervals rather than continuously, it is still considered real-time because it allows for timely monitoring and responsive actions. Essentially, it provides a level of immediacy and insight that traditional meters cannot match.

Before the AMI: Water Meter Upgrades project, the County only metered reclaimed water for commercial customers, leaving residential customers without metered reclaimed water usage. Reclaimed water, derived from the County's advanced wastewater processing and rainfall, is a precious resource ideal for landscape and lawn irrigation. Using reclaimed water for these purposes conserves the County's potable water, which is more costly and reserved for human consumption and household use. Over the past two decades, demand for reclaimed water has surged, even as the volume entering the system has diminished due to

more efficient toilets and showers. To ensure the continued availability of reclaimed water for all customers, PCU began installing digital meters and promoting smart watering practices.

PVI was responsible for installing the AMI meters for residential customers (i.e., water meters of sizes 1" or smaller), and PCU's Maintenance Division was responsible for installing the AMI meters for commercial customers (i.e., water meters over 1" in size). As of project inception, approximately 90% of the County's water meters were residential, and 10% were commercial. For more complex water meter systems, such as those with backflow combinations, the Maintenance Division staff was responsible for AMI water meter installations, regardless of size. PCU assigned Field Services staff from its Business and Customer Services Division to complete AMI water meter changeouts of broken or stuck residential analog water meters. Badger oversaw PVI as it handled the AMI residential water meter installations throughout the County.

The beginning dates and end dates for each phase of the AMI: Water Meter Upgrades project were planned as such:

- Phase I Preconstruction: August 4, 2022 - December 26, 2022
- Phase II Proof-of-Concept: January 6, 2023 - March 8, 2023
- Phase III Year 1 Installations: March 15, 2023 - December 26, 2023
- Phase IV Year 2 Installations: January 3, 2024 - December 31, 2024
- Phase V Year 3 Installations: January 2, 2025 - December 31, 2025
- Phase VI Year 4 Installations and Closeout: January 1, 2026 - June 30, 2026

PCU experienced delays in phases I through III, which extended the overall project start date to May 2023 and planned project completion date to October 2026. Once PCU completes the AMI: Water Meter Upgrades project, it will continue using Badger for services related to the AMI water meter system, but it will no longer use PVI to install AMI water meters. PCU will continue new installations, as necessary, of residential and commercial AMI water meters using its staff after the project's completion in 2026.

Badger supplied PCU with AMI water meters from its Recordall product family and cellular endpoints from its ORION product family for the AMI: Water Meter Upgrades project. These devices were designed to use cellular networks for reliable and secure data transmission, including data collection and transmission every 15 minutes during weekdays, with four daily transmissions to BEACON AMA, ensuring real-time monitoring and improved operational efficiency. Badger also provided PCU with BEACON AMA with ORION Network as a Service, a comprehensive solution combining Badger's BEACON AMA software with ORION's cellular network capabilities. This integrated system provided PCU with real-time data and advanced analytics to optimize water management.

Prior to May 2023, PCU selected a small group of customers to participate in Phase II Proof-of-Concept and receive AMI water meters. In May 2023, after PCU confirmed that Badger,

PVI, and VertexOne met all the required criteria for the proof-of-concept, it authorized Badger to initiate the AMI Implementation phase. This marked the beginning of Phase III Year 1 Installations for the AMI: Water Meter Upgrades project. Starting May 2023, all customers gradually began receiving new digital water meters at no cost. PCU acknowledged that new residential constructions in the County would coincide with the AMI project implementation. PCU mandated a $630 charge for installing digital reclaimed meters on all residential reclaimed accounts with inactive services, upon customer request for activation on or after October 1, 2022.

PCU planned to complete approximately 129,318 meter services, including new AMI water meter installations where none previously existed and transitions from existing analog and AMR meters to AMI water meters. From January 2024 to December 11, 2024, PCU completed 41,772 meter services for the AMI project. This achievement consistently met the monthly target of 3,400 meter services. By December 11, 2024, a total of 59,605 meter services had been completed, which was approximately 46% of the project's overall goal of 129,318 meter services.

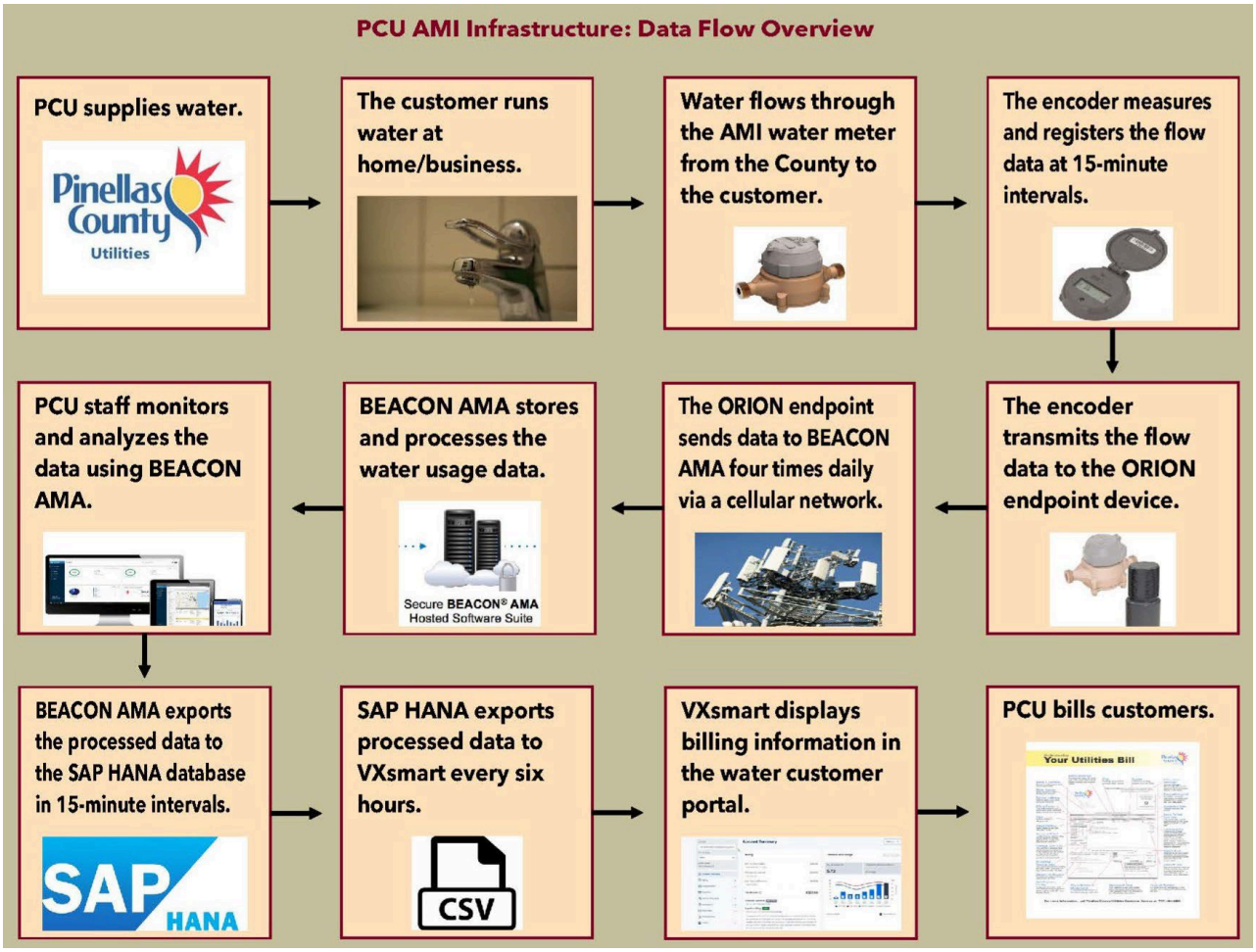
With the initiation of the Phase III Year 1 Installations for the AMI: Water Meter Upgrades project, PCU transitioned to partially reading meters digitally instead of manually. Additionally, a new fee structure for residential customers using reclaimed water transitioned to billing based on actual usage rather than a flat fee. Since January 16, 2024, all reclaimed water customers were granted four months from the availability of their digitally metered water usage data in the new water customer portal before the new rates were applied to their bills. See further discussion of the customer portal in the succeeding paragraphs. Due to the digital technology infrastructure, PCU planned to reduce its meter reading workload drastically and reassign its meter reading staff to other positions in PCU.

SAP HANA software is a powerful in-memory database and analytics platform developed by SAP. PCU used it prior to the AMI project and planned to continue using it throughout the project and beyond. HANA proved integral to PCU's billing operations and the AMI project's progress. The software records water meter usage data from analog and digital meters by communicating and importing data from BEACON AMA, and exporting it to the water customer portal for bill viewing and payment. It also stores detailed customer account information alongside relevant meter data.

PCU leveraged an existing relationship with VertexOne to provide customers with a self-service portal in conjunction with the AMI system implementation. On June 21, 2022, PCU amended its services agreement with VertexOne, directing VertexOne to upgrade the systems it had been providing PCU to align with the AMI system implementation. PCU purchased VertexOne VXsmart Usage Analytics and Dynamic Customer Engagement (VXsmart), a customer engagement and analytics platform that will expand PCU's current instance of VertexOne VXengage Utility Customer Engagement. VerxtexOne, with County authorization, was tasked to deploy the VertexOne VXenterprise SAP Utility Customer Information System (VXenterprise) to capture data from smart meters. On June 11, 2023,

PCU launched its upgraded water customer portal, which allowed its customers to access advanced water monitoring features that aimed to save them money and water.

The diagram below illustrates the data flow process at PCU for its AMI infrastructure. It shows how the ORION cellular endpoints and BEACON AMA data collection systems transmit data from the installed Badger meters, eventually integrating with PCU's billing system, SAP HANA, and customer engagement platform, VXsmart.



For more information on the AMI: Water Meter Upgrades project, visit PCU's website at https://pinellas.gov/projects/advanced-metering-infrastructure-project/.

Accomplishments and Other Projects

PCU's FY 2024 accomplishments included:

- Delivered 18 billion gallons of safe drinking water to residents and visitors, treated 10.3 billion gallons of wastewater, and produced 6.9 billion gallons of reclaimed water

- Installed nearly 200 new potable water service lines and upgraded over 7,500 potable water meters and 1,900 reclaimed meters to digital meters
- Launched the new customer portal to provide customers with water readings, bill comparison, and water conservation information
- Adopted a new water rate tiered structure and supported 932 customers with $693,660 of assistance through a partnership with the Promise Network, accessing Low-Income Household Water Assistance Program federal funds

Attributed to the AMI: Water Meter Upgrades project, PCU's upgrading of thousands of water meters to digital meters and launching its new customer portal in a single year were significant accomplishments. Moreover, PCU demonstrated its commitment to fulfilling its plan for making improvements to aging infrastructure to better serve its customers.

Budget

PCU funds, as self-contained enterprise funds, provide goods and services to County citizens. Operated like private businesses, PCU aims to recover costs through user charges, such as utility rates, as intended by the County Board of County Commissioners (BCC). Other County agencies using enterprise funds include St. Pete-Clearwater International Airport and the County Solid Waste Department.

Pinellas County Utilities FY 2025 Adopted Budget				
Pinellas County Utilities	**FY 2022 Actual**	**FY 2023 Actual**	**FY 2024 Budget**	**FY 2025 Budget**
Customer Services, Education, and Outreach	$-	$-	$-	$32,702,710
Debt Service Program-General	14,157,383	14,031,092	14,301,040	14,184,240
Emergency Events	556,976	491,567	-	-
Reclaimed Water	-	-	-	13,593,630
Reserves	-	-	122,668,220	125,666,990
Sewer	81,577,153	89,707,971	131,909,990	149,333,220
Site Operations	571,780	685,822	418,360	310,260
Transfers Program	69,772,670	73,932,700	54,196,950	93,827,310
Water	83,557,176	87,835,589	142,127,160	127,992,400
Water Quality	-	-	-	6,391,610
Total Expenditures	**$250,193,138**	**$266,684,741**	**$465,621,720**	**$564,002,370**

In FY 2025, PCU experienced a budget increase of $55.8 million, or 19.3%, as compared to FY 2024, bringing the total budget to $344.5 million, excluding transfers and reserves. The FY 2025 PCU budget presents notable changes and strategic investments as compared to FY 2024. One of the most significant introductions is the allocation for customer services, education, and outreach, amounting to $32.7 million and reflecting a new emphasis on

engaging and educating the public. The budget for reclaimed water also saw a new allocation of $13.6 million, highlighting an increased focus on sustainable water management. Additionally, the sewer budget increased by $17.4 million, which underscores a heightened investment in sewer infrastructure and services. Several other factors contributed to the rise in expenditures, including additional funds for capital outlay, operating expenses, and personnel services. These changes in the budget reflect PCU's ongoing commitment to new initiatives and its efforts to enhance funding in key areas, supporting its strategic goals and operational improvements.

When the County presented the CIP plan for FYs 2023-2028, approximately half of the projected $145.2 million total CIP budget in FY 2023 - FY 2025 was an investment in the AMI: Water Meter Upgrades project. PCU estimated the cost of changing the County's 128,000 meters to be $72,000,000. As of the CIP plan for FYs 2025-2030, the total estimated cost increased to $77,100,000 due to the cost of materials related to the reclaimed water installations.

The Southwest Florida Water Management District (SFWMD) committed to providing additional funding to the County effective October 1, 2021, and expiring February 1, 2029, for the AMI: Water Meter Upgrades project. The SFWMD is one of five regional agencies supervised by the FDEP and directed by state law to protect and preserve water resources within its boundaries. Florida counties Citrus, DeSoto, Hardee, Hernando, Hillsborough, Manatee, Pasco, Pinellas, Sarasota, and Sumter are in the SFWMD. Portions of Florida counties Charlotte, Highlands, Lake, Levy, Marion, and Polk are also in the SFWMD. Through its Cooperative Funding Initiative, the SFWMD approved $139,414 for FY 2022 to aid the County in implementing a software platform, a utility dashboard, and associated training. The SFWMD anticipated its funding would impact 112,900 retail potable water customers in the County and help to conserve an estimated 111,100 gallons per day if PCU fully implements the AMI project. As of October 2024, no additional funding was approved or is anticipated to be approved by SFWMD in subsequent FYs for the AMI project.

OPPORTUNITIES FOR IMPROVEMENT

1. PCU's Operational Efficiency Was Adversely Affected By AMI Water Meter Data Issues And Understaffing.

MEDIUM

During the AMI implementation, PCU encountered operational challenges in its Business and Customer Services Division due to incomplete, unavailable, and inaccurate water consumption data recorded in both the utility management platform (BEACON AMA) and the customer information management platform (SAP HANA). BEACON AMA is a cloud-based platform that empowers utility departments with efficient meter readings, analytics, and real-time data for its customers. VXenterprise, powered by SAP HANA, is a cloud-based platform built to manage customer data, streamline billing processes, and enhance overall utility operations. AMI water meter consumption data flows from the water meters to their endpoints, transmitting interval meter reading packets to BEACON AMA via a cellular connection. BEACON AMA systematically updates the consumption data from its storage into the corresponding SAP accounts daily and overnight.

Following AMI water-meter installations, the PCU Business and Customer Services Division staff handled releasing the installation data into the BEACON AMA and SAP HANA applications for new and replacement service connections. Without the release of installation data, PCU was unable to establish cloud-based profiles for each meter-endpoint service connection, resulting in consumption data remaining isolated within the endpoint, devoid of BEACON AMA communication.

Our reconciliation test of water consumption data between BEACON AMA and SAP HANA for the accounts created from September 2022 through early November 2023 revealed unexpected discrepancies between the two systems. We identified discrepancies, including instances where SAP HANA recorded consumption data either higher or lower than BEACON AMA, as well as cases where SAP HANA showed no consumption data despite BEACON AMA indicating consumption. Additionally, we observed accounts identified in one system that had no corresponding record in the other system.

In February 2024, the PCU Business and Customer Services Division explained the discrepancies in the cloud-based systems' usage data, thereby alleviating concerns related to potential billing errors. The following are some actions taken by PCU to remedy the situation and prevent billing errors:

1. Continued Manual Entry Efforts: Through its dedicated efforts to manually enter data and meet billing obligations, management identified the opportunity for a more sustainable solution moving forward.

2. Resynchronized Systems: Management reset accounts affected during the problematic billing periods and ensured synchronization between the BEACON AMA and SAP systems.
3. Deferred Billing: Management delayed billing for water consumption for affected customer accounts to subsequent months once the systems could be properly synchronized.

The reasons for the discrepancies encompassed variations in meter reading dates, the use of manual data entry for temporary estimates, and consumption thresholds of 1,000 gallons that were not reached, resulting in BEACON AMA consumption data not appearing in SAP HANA. During a February 2024 inspection with the contracted inspectors, we identified an AMI reclaimed water meter with unreleased installation data. We liaised with the PCU Business and Customer Services Division, and it delegated staff to resolve the issue. We subsequently verified the meter's installation date and ensured, through a two-period bill example provided by PCU, that the customer was not overcharged due to the data backlog.

We requested a report detailing the water meter installations and application profile activations as of the report's production date to analyze the timing discrepancy between installations and their data releases (i.e., the date the associated meters were added to the system). The dataset was current as of March 21, 2024. Using the install and activation data spreadsheet, we could not analyze the timing difference between installations and their data releases. Specifically, we aimed to collect data on the profile activation dates of meters and endpoints in BEACON AMA. However, the activation dates reported in BEACON AMA corresponded to when the endpoints were activated during, before, or after installation and not when the profiles were activated in the system.

We observed there were missing install and activation date records in the data and quantified the amount of missing install and activation data from each system. In PCU's work order, maintenance and asset management system, Cityworks, 2,650 installation dates were missing from a total of 24,548 records, representing approximately 11% of the dataset. For BEACON AMA, there was one missing installation date out of the same 24,548 records, accounting for less than 1% of the dataset. Additionally, in BEACON AMA, 497 records lacked activation dates, constituting approximately 2% of the dataset. The activation date data in BEACON AMA corresponded to the dates when the endpoints were activated. In contrast, the SAP HANA records exhibited no missing installation dates across all 24,548 records.

The missing installation and activation date records indicated gaps in data management, which lead to operational inefficiencies. These discrepancies in data completeness between the systems (Cityworks, BEACON AMA, and SAP HANA) necessitated manual rectification and data entry, increasing the workload for staff and diverting resources from other essential tasks.

Accidental damage to water meters by customers and other individuals led to gaps and inconsistencies in meter reads and endpoint communications. Also, backlogs of unreleased AMI installation data caused County meter readers to manually enter incorrect consumption data into PCU systems. Additionally, synchronization issues between BEACON AMA and SAP HANA, along with manual processes to reconcile legacy meter data with AMI meters, resulted in discrepancies. Understaffing in key roles handling AMI water meter data further contributed to infrequent data collection.

During a meeting with PCU Business and Customer Services Division staff, we confirmed the water meter consumption data's unavailability, incompleteness, and inaccuracy in both systems led to operational challenges for the PCU Business and Customer Services Division. Incomplete and inaccurate water meter consumption data impacted staff decision-making during billing tasks. Consequently, staff manually entered information into the SAP HANA billing system to fulfill schedule obligations. Efforts to rectify previously manually entered data further impeded operational efficiency.

The PCU Business and Customer Services Division faced challenges related to understaffing and a shortage of expert personnel with specialized knowledge in SAP HANA configuration and manipulation during the AMI implementation. The training provided to staff for working with SAP HANA in the context of the AMI project was insufficient. As a result, team members had to quickly adapt and learn on the job to effectively navigate the SAP HANA system and manage AMI data. The integration of AMI infrastructure into existing customer information management systems presented a steep learning curve. Consequently, there is a genuine need for skilled SAP HANA users who can promptly address and mitigate any issues that arise. The operational efficiency of the PCU Business and Customer Services Division is under strain due to the combination of increased staffing requirements and the existing availability issue with AMI water meter data.

Maintaining accurate records is an essential business practice. Data should be available and reliable for the department's operational needs and for the public to access when necessary.

According to the AMI Services Agreement in Exhibit A:

> *"The time from installation or meter change for an account to the time the data is provided to PCU to enter into SAP HANA will not exceed 1 week. It will be PCU's responsibility to release the installation data into SAP HANA and then into the BEACON AMA system….*
>
> *The (PVI) data analyst assigned to your project will work closely with the utility billing department throughout the project to ensure any data integration issues are handled swiftly and correctly."*

Insufficient or erroneous data disrupts effective water management and impedes informed decision-making. The unavailability of data poses challenges for revenue recovery and

financial planning. Billing inaccuracies arising from data discrepancies could adversely impact customer satisfaction and revenue if not corrected timely. Moreover, persistent issues related to incomplete, inaccurate, and unavailable data could result in additional delays in the AMI project and contractual breaches. With limited resources, management may experience challenges maintaining quality control, and overworked team members may experience burnout.

We determined this OFI's priority was medium, as the potential for financial loss existed; however, its occurrence was not pervasive.

We Recommend Management:

A. Within the PCU Business and Customer Services Division engage with the Department Director and the AMI project managers to discuss the AMI data issue and explain its broader negative implications for the AMI rollout. By doing so, the department can collaboratively devise strategies to enhance operational efficiency as the AMI project progresses in the coming years.

B. Consider hiring or contracting with qualified external candidates or realigning existing PCU Business and Customer Services Division staff to fill the vacant positions within the PCU Business and Customer Services Division.

C. Within the PCU Business and Customer Services Division continuously monitor the import of data into both cloud-based systems to ensure timeliness, completeness, and accuracy of AMI water meter installation and consumption data.

Management Response and Action Plan:

A. **Management Partially Concurs.** The BEACON platform/system is a Badger Meter management system, not a utility management platform. Badger provides PCU access to the system only. PCU is addressing the data issue, and we have initiated a staff realignment strategy and will continue to monitor through better protocols.

   - ✓ ***Individual(s) Responsible for Implementation:*** Isaiah Jackson, Business and Customer Services Division Director, PCU
   - ✓ ***Planned Implementation Completion Date:*** September 30, 2026

B. **Management Partially Concurs.** Refer to management's response in Recommendation A.

   - ✓ ***Individual(s) Responsible for Implementation:*** Isaiah Jackson, Business and Customer Services Division Director, PCU
   - ✓ ***Planned Implementation Completion Date:*** September 30, 2026

C. **Management Partially Concurs.** Refer to management's response in Recommendation A.

- ✓ ***Individual(s) Responsible for Implementation:*** Isaiah Jackson, Business and Customer Services Division Director, PCU
- ✓ ***Planned Implementation Completion Date:*** September 30, 2026

2. PCU's Logical Security Controls For Its SAP HANA System Required Improvement.

MEDIUM

During our audit of user access to PCU's SAP HANA application, we identified areas for improvement in the SAP HANA logical security controls. Both SAP HANA and BEACON AMA are critical systems used by PCU for managing customer information, billing, and water meter data readings. PCU presently obtains its SAP HANA system licenses through VertexOne and engages the County's Business Technology Services (BTS) Department for the addition and removal of users within the SAP HANA system. PCU provides access to the SAP HANA system not only for County team members but also for selected team members in the County municipalities of Largo and Treasure Island.

According to the SAP HANA user roles list shared with us in June 2024, PCU distributed 115 SAP HANA licenses to County users, 18 to City of Largo users, and 4 to City of Treasure Island users, including 2 system accounts. We raised concerns about the accuracy of the active user list for County users with PCU management. Our review of the SAP HANA users with roles list revealed the following:

- Inaccurately assigned transaction codes
- Temporary users who retained active accounts
- Temporary users who retained unnecessary privileges
- Separated team members with active accounts

Subsequent to our identification of the concerns, PCU's IAS team within the Customer Services Section, which handles the addition and removal of users from SAP HANA through the Jira ticketing system, initiated partial cleanup to update the SAP HANA users and roles list.

We identified nine PCU Field Services team members from the Business and Customer Services Division who had been granted the Revenue Management role for using a single transaction in addition to their assigned Field Services role. The Revenue Management role encompassed over 300 distinct tasks, including handling financial transactions and reconciliations, meter reading and installation, billing and invoicing, as well as managing business partner and relationship management. Given the capacity of the Revenue Management role compared to the SAP HANA system needs of the nine PCU Field Services team members, the role was unnecessary. As a result, PCU management created and

submitted a ticket for transferring the necessary transaction from the Revenue Management role to the Field Services role. PCU planned to generate and submit subsequent tickets to remove the Revenue Management role from these nine team members. After completion, the Field Services role would provide them with adequate access to the required transaction and other permissions that align with their job responsibilities.

In addition, we noted two team members from the Water Quality Division who were granted temporary access to the SAP HANA Revenue Management role to support the IAS team with return mail processing. Once their support for the IAS team concluded, retaining SAP HANA access and the Revenue Management role was deemed unnecessary for the two team members. Following our concerns raised with PCU, its management initiated and submitted requests to revoke the SAP HANA system access for the two individuals in the Water Quality Division. We confirmed through a review of the most recent SAP HANA active user listing provided on July 22, 2024, that both user accounts were no longer included.

Our review also identified two active SAP HANA users from PCU's former Engineering Division who were granted temporary access to the SAP Revenue Management role to aid the IAS team with service requests and new installations; however, they no longer needed access to this security role. While these two PCU Engineering team members will continue to require SAP HANA access, management recognized the need for it to be restricted to the Customer Service Inquiry role, which permits view-only access to data such as billing documents, consumption reports, and customer address records. Once their support for the IAS team concluded, retaining the Revenue Management role for these two team members was deemed unnecessary. We notified PCU about the Engineering Division team members who had unnecessary access within the SAP HANA application. Consequently, PCU management decided that it would initiate tickets to revoke the Revenue Management role from the noted team members while retaining their access to the Customer Service Inquiry role. We confirmed through a review of the most recent SAP HANA user listing provided on July 22, 2024, that both user accounts no longer had access to the Revenue Management role.

We also performed an analysis to identify any active SAP HANA users who separated employment with the County. Using the most recent SAP HANA user listing provided on July 22, 2024, we noted four former County team members were still listed as active users in the SAP HANA system. These individuals' separation dates ranged from June 30, 2023, to July 15, 2024. While this is noteworthy, the risk is considered low due to PCU's logical security compensating controls. Specifically, SAP HANA access requires virtual private network (VPN) permissions and PCU management works with BTS and VertexOne to ensure access to SAP HANA is revoked for all separated team members on their last day. Therefore, an active SAP HANA account on its own would not grant access without the active VPN permissions. The four SAP HANA active users were former team members of the following: PCU Billing, PCU Call Center, PCU IAS, and the Clerk's Finance Division.

Business and Customer Services management confirmed PCU's process was to revoke SAP HANA access for all separated team members on the separation date. However, during the audit, we informed management of the inaccuracies in the user list, which led to IAS being tasked with a partial user clean-up. Thus, while PCU had a revocation process in place, there was a lack of effective communication between PCU management and the IAS team regarding alerts or notifications about PCU team members who had separated from the County but retained SAP HANA access, as well as active team members whose temporary access should have been revoked. Moreover, PCU did not implement a formal policy and communication framework to support it.

Furthermore, PCU did not have a formal policy instructing the IAS team to conduct regular reviews of the SAP HANA active user and roles list, a practice that would have ensured better management of the system's logical security controls. The incomplete clean-ups of PCU's SAP system active user and roles list highlighted the necessity for improving the system's logical security controls.

According to National Institute of Standards and Technology (NIST) Special Publication (SP) 800-53-R5, AC-2 Account Management, an organization is responsible for disabling or deactivating accounts in the following situations:

> *"Notify account managers and [Assignment: organization-defined personnel or roles] within:*
>
> *1. [Assignment: organization-defined time period] when accounts are no longer required;*
> *2. [Assignment: organization-defined time period] when users are terminated or transferred; and*
> *3. [Assignment: organization-defined time period] when system usage or need-to-know changes for an individual;"*

NIST SP 800-53-R5, also provided the following information related to account management:

> *"Disabling expired, inactive, or otherwise anomalous accounts supports the concepts of least privilege and least functionality which reduce the attack surface of the system."*

Inappropriately assigned transaction codes could pose a risk of accessing and disclosing sensitive information, either inadvertently or deliberately. Temporary users with active accounts who no longer need access to the SAP HANA system or select roles therein could result in unauthorized activities. Additionally, former team members who retain system access are a potential source of data breaches, unauthorized modifications, or information leaks.

We omitted specific user account details from this report but provided them separately to management.

We determined this OFI's priority was medium, as the potential for financial loss existed; however, its occurrence was not pervasive.

We Recommend Management:

A. Ensure the identified transaction is removed from the Revenue Management role and added to the Field Services role and that the nine noted Field Services team members be removed from the Revenue Management role.

B. Revoke the four separated team members' access to the SAP HANA application and remove them from the application's active user list.

C. Create a written policy instructing the IAS team to conduct periodic reviews, as defined by management, and cleanups of the SAP HANA user and roles list. This will ensure that access for separated users, both in PCU and in other municipalities granted access, is revoked promptly following their separation, appropriate roles are assigned to users, and access for temporary users is either revoked or adjusted, as necessary.

Management Response and Action Plan:

A. **Management Concurs**. We have already made the change for final configuration and will develop the written policy.

   - ✓ ***Individual(s) Responsible for Implementation:*** Keith McCawley, Business and Customer Services Manager, PCU
   - ✓ ***Planned Implementation Completion Date:*** June 1, 2025

B. **Management Concurs.** Refer to management's response in Recommendation A.

   - ✓ ***Individual(s) Responsible for Implementation:*** Keith McCawley, Business and Customer Services Manager, PCU
   - ✓ ***Planned Implementation Completion Date:*** June 1, 2025

C. **Management Concurs.** Refer to management's response in Recommendation A.

   - ✓ ***Individual(s) Responsible for Implementation:*** Keith McCawley, Business and Customer Services Manager, PCU
   - ✓ ***Planned Implementation Completion Date:*** June 1, 2025

3. PCU's Logical Security Controls For Its BEACON AMA System Required Improvement.

MEDIUM

During our audit of user access to PCU's BEACON AMA application, we identified areas for improvement in the BEACON AMA logical security controls. PCU's services agreement with Badger included the BEACON AMA software suite, essential for upgrading analog and AMR water meters to Badger AMI water meters. The water meters purchased from Badger featured AMI encoders instead of the standard analog registers. The AMI encoders monitor interval water meter data and transmit it via a wired connection to cellular two-way water endpoint devices, which then broadcast the necessary output message via the cellular network to the BEACON AMA software suite. Once received, the data populates the required fields in the BEACON AMA software suite as configured by the user.

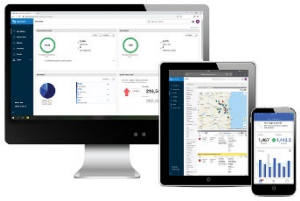
The BEACON AMA software suite is a cloud-based platform providing PCU with analytics, efficient meter readings, and real-time data. Access to BEACON AMA is achieved through a standard web browser with user logins providing secure access. As PCU's primary AMI utility management tool, the BEACON AMA software suite also communicates with endpoints to request additional information, synchronize clocks, and upgrade firmware over the air, if necessary. BEACON AMA's customizable dashboard delivers information based on the user's security access level.

As a result of our review, we identified concerns related to BEACON AMA logical security controls where former team members retained software access subsequent to employment separation and where users still employed had excessive permissions. These instances are included in the two subsequent subheadings.

We omitted specific user account details from this report but provided them separately to management.

A. Seven Former PCU Team Members Retained User Access To BEACON AMA After Employment Separation.

As of May 16, 2024, we identified seven former team members of PCU who remained on the active user list for BEACON AMA. On June 12, 2024, we confirmed PCU deactivated all seven former PCU team members' user accounts in BEACON AMA during June 2024. On June 25, 2024, we confirmed the effective termination dates for each former team member through the County's Human Resources (HR) Department. Our review identified that it took PCU approximately one to three months to clean up the user access list of separated team members.



No predefined or custom user roles in BEACON AMA allowed for the modification of water consumption data reported by a meter for a specific period of time used for billing purposes. Predefined BEACON AMA roles included:

- Admin
- Manager
- Installer
- Support
- Custom roles created by PCU Admin users

The BEACON AMA active user list identified individuals and system accounts representing PCU, as well as third-party individuals and system accounts that occupied various roles within the AMI project. As of May 16, 2024, PCU reported 100 active users within BEACON, distributed as follows: Admin role (28), Manager role (33), Installer role (0), and Support role (39). PCU deactivated one Admin user, three Manager users, and three Support users from BEACON AMA. The deactivation of seven active user accounts by PCU decreased the number of Admin users to 27, Manager users to 30, Support users to 36, and the total number of BEACON AMA users to 93.

In the Admin role, users had the ability to provision endpoints, modify asset cards, and invite new users. Associating Account IDs, Location IDs, Service Point IDs, and Meter IDs in BEACON to a single endpoint is the act of provisioning. Each card is associated with an AMI water meter and presents information such as consumption data, Location ID and Name, endpoint health data, and details on meter readings.

In the Manager role, users had access to the "At a Glance" page and could view the "Monitor" page. The At a Glance page acts like a dashboard, giving users quick access to vital information through modules. The BEACON AMA Monitor page gives PCU access to water consumption data and vital details about each meter in PCU's water system. In the Installer role, users could view the Monitor page; however, at the time of our review, PCU had not assigned any users this role. In the Support role, users had access to view all service point data and analytics.

In May 2024, auditee management stated it routinely audited the BEACON AMA system by reviewing current users, verifying when users logged in, and verifying they had been deactivated if they were no longer users. However, auditee management also noted the absence of a set frequency for auditing active users and their last login dates. Furthermore, only one of the two team members initially tasked with these audits was still with the County.

As of June 2024, auditee management assigned the user audit duties to another team member within PCU Field Services. Consequently, there were two individuals, as originally intended, responsible for auditing the active user list and last login dates. Additionally, PCU management decided to perform these audits monthly, using resources from its Cityworks

system and the County's HR Department to confirm the employment status of active users in PCU.

The absence of a specified audit frequency for reviewing active users and their last login dates in BEACON AMA compromised the internal control environment, hindering the prompt deactivation of users who no longer required access to BEACON AMA. Additionally, the lack of performing active team member reviews also contributed to the compromised internal control environment.

According to NIST SP 800-53-R5, AC-2 Account Management, an organization is responsible for disabling or deactivating accounts in the following situations:

> *"Notify account managers and [Assignment: organization-defined personnel or roles] within:*
>
> *1. [Assignment: organization-defined time period] when accounts are no longer required;*
> *2. [Assignment: organization-defined time period] when users are terminated or transferred; and*
> *3. [Assignment: organization-defined time period] when system usage or need-to-know changes for an individual;"*

Therefore, all BEACON AMA accounts belonging to former team members that were no longer necessary should have been removed timely as soon as the associated users were no longer authorized.

NIST SP 800-53-R5, also provided the following information related to account management:

> *"Disabling expired, inactive, or otherwise anomalous accounts supports the concepts of least privilege and least functionality which reduce the attack surface of the system."*

Separated and transferred team members with lingering access to BEACON AMA could export and misuse customer data. Unauthorized access to data in BEACON AMA could also enable former team members to alter customer portal account details causing service disruptions.

B. Twenty-Five Users Of BEACON AMA Received Permissions Exceeding Their Necessary Job Functions.

During our audit in May 2024, we inquired about the necessity of PCU having 28 active Admin role users in its BEACON AMA. Auditee management clarified that only two users assigned to the Admin role were tasked with adding and altering dashboard users, which

was a permission the Admin role granted. According to management, the remaining users holding an active Admin role were not fully aware of all the permissions associated with that role. However, they relied on Admin permissions to access the Events Layer and Analytics functions, which were essential for their job duties.

In the Admin role, users had the ability to provision endpoints, modify asset cards, and invite new users. PCU management stated certain users required specific permissions contained within the Admin role, yet these users were also unaware of the extra permissions they did not use. During a meeting in May 2024, PCU management expressed its plan to contact Badger for help in establishing custom roles. This would allow the department to distinguish between users needing specific permissions of the Admin role but not all of them.

During a meeting on June 12, 2024, we confirmed with PCU management that an authorized PCU Admin user created the custom "Active Events" role to transfer users who did not need the Admin role. Also, during the meeting, PCU management provided us with the updated BEACON user roles list. PCU action reassigned 53 active user accounts to the custom role of Active Events, distributing them from existing roles, including 18 from Support, 17 from Manager, and 18 from Admin. Also, after we identified the issue of separated team members retaining access to BEACON AMA and reported it to PCU management, PCU deactivated a total of seven active user accounts, including one with the Admin role, three with the Manager role, and three with the Support role. This left a total of nine users assigned the Admin role.

In the Active Events role, users can view, import and export data, and create and edit their own Events. Applicable to network meters, the Events feature facilitates the effective monitoring of crucial system events, including significant leaks, constant flows, communication failures, and reverse flows, by managing thresholds and parameters associated with data from networked meters.

On June 25, 2024, we inquired about the possibility of PCU reassigning seven active Admin users to various predefined and custom roles since only two of the nine users were responsible for performing tasks associated with the Admin role. On the same day as our inquiry, the two authorized Admin role users confirmed they reassigned the other seven active users with the Admin role to the Active Events role and provided an updated screenshot of the User Roles page on the dashboard. As of June 25, 2024, the total number of active users remained at 93. The Active Events user count increased by 7, reaching a total of 60, while the Admin user count decreased by 7, dropping to a total of 2. PCU reassigned a total of 25 active users from the Admin role to other roles following our notification regarding the issue of excessive permissions among some users.

PCU management was not aware that active users with the Admin role in BEACON AMA had the capability to create custom roles so the Admin role could be segregated into more restrictive roles for users who did not need access to it. Consequently, auditee management

believed it was necessary to assign active users to these predefined roles despite certain permissions being unnecessary for the users to carry out their authorized job functions.

NIST SP 800-53-R5, provided the following information related to role-based access control:

> *"Role-based access control (RBAC) is an access control policy that enforces access to objects and system functions based on the defined role (i.e., job function) of the subject. Organizations can create specific roles based on job functions and the authorizations (i.e., privileges) to perform needed operations on the systems associated with the organization-defined roles. When users are assigned to specific roles, they inherit the authorizations or privileges defined for those roles. RBAC simplifies privilege administration for organizations because privileges are not assigned directly to every user (which can be a large number of individuals) but are instead acquired through role assignments. RBAC can also increase privacy and security risk if individuals assigned to a role are given access to information beyond what they need to support organizational missions or business functions."*

Active users with Admin access could introduce superfluous accounts or initiate unauthorized account updates into the system. Additionally, users within BEACON AMA may experience role modifications by other users possessing Admin permissions, potentially disrupting PCU operations.

We determined this OFI's priority was medium, as it represented a moderate impediment to achieving management's strategic objectives; however, its occurrence was not pervasive.

We Recommend Management:

A. Create a written policy to verify on a monthly basis that each active PCU user of BEACON AMA remains a team member of PCU, using exportable team member data from the Cityworks system and information requested from the County's HR Department.

B. In concurrence with the monthly review of active PCU users, contact third-party contractors to verify their team members who are active users of BEACON AMA still require permissions.

C. Ensure that, in the future, the only users with the Admin role are active users authorized to have all the permissions associated with the Admin role.

D. Develop a written policy to periodically review all active users with Admin role permissions in BEACON AMA to ensure each user requires that level of access. This review could be incorporated into the monthly active user audit.

Management Response and Action Plan:

A. **Management Concurs.** Only the following two PCU positions (Field Services Maintenance Supervisor and Utilities Maintenance Division Project Management Specialist) are currently assigned BEACON Administrator rights. BEACON Administrators receive a termination report from HR on a biweekly basis and update the security controls by removing any employees that have separated employment from PCU. Furthermore, additional security levels were created to limit the administrative responsibilities for specific employees as necessary. Supervisors must submit requests to BEACON Administrators for new or changed security access rights for BEACON.

   - ✓ ***Individual(s) Responsible for Implementation:*** Joan Luttmann, Technical Services Manager, PCU
   - ✓ ***Planned Implementation Completion Date:*** June 1, 2025

B. **Management Concurs.** Refer to management's response in Recommendation A.

   - ✓ ***Individual(s) Responsible for Implementation:*** Joan Luttmann, Technical Services Manager, PCU
   - ✓ ***Planned Implementation Completion Date:*** June 1, 2025

C. **Management Concurs.** Refer to management's response in Recommendation A.

   - ✓ ***Individual(s) Responsible for Implementation:*** Joan Luttmann, Technical Services Manager, PCU
   - ✓ ***Planned Implementation Completion Date:*** October 8, 2024

D. **Management Concurs.** Refer to management's response in Recommendation A.

   - ✓ ***Individual(s) Responsible for Implementation:*** Joan Luttmann, Technical Services Manager, PCU
   - ✓ ***Planned Implementation Completion Date:*** June1, 2025

4. PVI Used Potable Water Meter Box Lids On Some Installations Of AMI Reclaimed Water Meters.

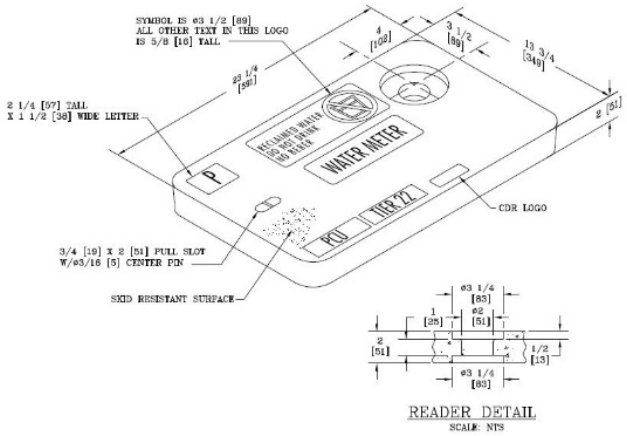
PVI used water meter box lids engraved with a potable water designation instead of meter box lids engraved with a reclaimed designation in some instances when installing AMI reclaimed water meters. PCU tasked Badger's installation partner, PVI, with performing all installations of residential potable and reclaimed AMI water meters for the duration of the AMI project. PVI was obligated to complete 14,549 reclaimed AMI water meter installations. By October 2024, Badger had reported around 2,000 reclaimed water lids in stock, with 1,034 new reclaimed water installations and 1,948 potable water lid swaps still pending.

During field visits in November 2023 and February 2024, we observed AMI reclaimed water meter boxes with potable lids and purple stickers affixed reading, "RECLAIM DO NOT DRINK," which were used as a temporary measure to conceal the engraved potable designations. PCU employed its Field Services staff to conduct quality assurance (QA) inspections of PVI's installations. Additionally, PCU engaged a team of contracted inspectors to verify PVI's work.

During these inspections, the QA staff and contracted inspectors observed and documented improper use of potable lids on reclaimed water meter boxes. Both parties promptly communicated these findings to PVI for necessary correction. PVI acknowledged the issue and initiated the process of replacing the applicable potable lids with reclaimed lids, while continuing with new installations.

We contacted PCU's AMI project managers to clarify the costs of replacing the potable lids with reclaimed lids, and they contacted the contracted installers at PVI. Badger and PVI will not bill PCU for the replacement of potable lids with reclaimed ones, as it falls under the contractor's duty to rectify any tasks associated with the meter or its box/lid replacement. The exchange process involves PCU acquiring new reclaimed lids inventory, a cost already accounted for in the AMI Services Agreement. Subsequently, PVI will remove the potable lids for use in new potable installations and install the reclaimed lids on the reclaimed installations.

As of October 2024, Badger instructed PVI to pause swapping potable water lids with reclaimed water lids until all new reclaimed water installations are completed to avoid having non-transferable reclaimed water lids in stock post-project. Once PVI completes all the new reclaimed water installations, Badger stated that it will prioritize ordering the precise number of reclaimed water lids necessary and finalizing all water meter lid swaps. PCU management stated it would continuously discuss the issue at its weekly meetings as the project progresses.



Some reclaimed water customers received potable lids on their reclaimed water meter boxes because PCU strategically expedited the installation of reclaimed water meters even though PVI was experiencing a shortage of reclaimed water meter box lids. PCU's decision was prompted by its plan to allow its customers to monitor and adjust usage ahead of upcoming reclaimed water rate schedule changes. The illustration to the right is an engineer's drawing of a reclaimed water meter lid obtained from the AMI Services Agreement. It details the lid's dimensions, features, and engravings.

As stated in the AMI Services Agreement – Exhibit A – Statement of Work:

> *"The Contractor shall be responsible for investigating all customer complaints with respect to remote and/or meter replacement and correcting such deficiencies including, but not limited to, leaks, restoration, debris in the customer building (see previous information about the licensed plumber) or any work directly related to the meter or meter box/lid replacement."*

The removal, damage, or wear of reclaimed stickers while the meter boxes await replacement lids could result in misidentification of the water meters within the meter boxes by stakeholders, including customers and the County. This could result in stakeholders misusing the water source, which would be unsanitary.

We determined this OFI's priority was medium, as the potential for reputation damage existed; however, its occurrence was not pervasive.

We Recommend Management:

A. Ensure PVI replaces all potable water lids on reclaimed water boxes with appropriate reclaimed water lids by the specified deadline for the AMI project.

B. Monitor PVI's documentation of AMI reclaimed water meters with incorrect meter box lids and the progress made in replacing them with the correct lids during weekly meetings.

Management Response and Action Plan:

A. **Management Concurs.** This approach was taken on an interim basis to keep the project moving forward given that the reclaimed lids had long manufacturing lead times and reclaimed meters were prioritized for early completion. We have already initiated replacement of these lids and currently 4,810 lid swaps are completed as of December 31, 2024. The remaining 335 lids are scheduled to be replaced by February 2025. The lid swap effort is monitored weekly during the regular ongoing AMI Core Team progress meeting.

   - ✓ ***Individual(s) Responsible for Implementation:*** Joan Luttmann, Technical Services Manager, PCU
   - ✓ ***Planned Implementation Completion Date:*** June 1, 2025

B. **Management Concurs.** Refer to management's response in Recommendation A.

   - ✓ ***Individual(s) Responsible for Implementation:*** Joan Luttmann, Technical Services Manager, PCU
   - ✓ ***Planned Implementation Completion Date:*** June 1, 2025

5. Some AMI Installations Did Not Include A Recently Implemented Tamper-Resistant Feature.

MEDIUM

PCU initiated the AMI project in August 2022 and installed the initial round of water meters without tamper tags until December 2023 when PCU implemented the policy to install them to prevent unauthorized disconnection of the encoders and endpoints. Management reported that, prior to the introduction of tamper tags in installations, PCU and PVI completed 16,271 work orders for potable and reclaimed water meters, all of which necessitated retrofitting with tamper tags.

Prior to including tamper tags in the installations, PCU mitigated the issue of unauthorized disconnections of AMI water meter components by ensuring that the cords connecting encoders and endpoints were defect-free and securely connected during installation. For both AMI water meter installations without tamper tags and those with them, PCU leveraged the features of BEACON AMA to detect any disconnections of encoders and endpoints. This allowed them to receive alerts and promptly dispatch staff to repair the issue.

In November 2023, PCU acquired 130,000 Nicor tamper tags for its AMI project, which consisted of 129,318 meters. The purchase amounted to $71,500, with PCU scheduled to receive the tags in increments of 5,000 units per shipment. PCU received its first shipment of

tamper tags on December 8, 2023. Subsequently, PCU and PVI began installing tamper tag devices on the connection cords of encoders and endpoints to ensure no interruption in the vital two-way communication required for accessing customer water consumption data and meter information, including leak detection, and to preserve the integrity of the data being transmitted.

A water meter encoder is a device found in water meters that converts flow data into an electronic format. This electronic data is then transmitted through a wired connection to a water meter endpoint. The battery-powered endpoint, situated in the lid of the water meter box, tracks both the encoder and the water meter. Using a cellular connection, the endpoint broadcasts the totalized reading value and other meter data to an existing cloud network managed by PCU. The connection cords of the encoders and endpoints are susceptible to becoming disconnected when the lids are lifted away from the water meter boxes, whether intentionally or unintentionally, absent the tamper-resistant device.

In February 2024, during our scheduled field visit with the contracted inspection team, we gained insight into the verification process. The inspection team revealed that part of the verification process was to examine the installed AMI water meters for the presence of tamper tags. The inspection team clarified that these devices were not part of the initial checks during the early stages of the AMI rollout, as neither PCU nor PVI were utilizing these tamper tags at that time. Subsequent to our field visits with the contracted inspection team, we organized separate field visits with the installation teams from both PCU and PVI, also in February 2024. During these visits, the installation teams and their respective management provided further details on their recent adoption of tamper tags in all future AMI installations.

PCU and PVI communicated their intention to continue applying the tamper tags to the AMI installations as they completed new work orders. During a meeting on May 28, 2024, auditee management committed to performing semi-annual field inspections on each water meter after the full installation of AMI water meters. Consequently, after one year of the expected completion of the AMI water meter rollout in October 2026, each meter would be inspected to ensure it was equipped with a tamper tag device. No additional labor costs are anticipated to be incurred for the installation of the tamper tags.

The PCU AMI project managers were unaware of the vulnerability in the connection cords initially. However, as the project progressed, they identified the issue. Consequently, both PCU and PVI began requiring tamper tags in new AMI installations. Tamper tags help prevent unauthorized access or interference with the metering equipment. By securing the connection cords, PCU can deter any attempts at tampering or unauthorized access.

The United States Environmental Protection Agency's publication "Using Advanced Metering Infrastructure in a Water Quality Surveillance and Response System" defined tampering as follows:

> *"Unauthorized handling or damage of an AMI meter."*

NIST SP 800-12 Rev 1, "An Introduction to Information Security," provided the following information as the definition of data integrity:

> *"Data Integrity – The property that data has not been altered in an unauthorized manner. Data integrity covers data in storage, during processing, and while in transit."*

NIST SP 800-53-R5, provided the following information related to data transmission integrity:

> *"Protecting the confidentiality and integrity of transmitted information applies to internal and external networks as well as any system components that can transmit information, including servers, notebook computers, desktop computers, mobile devices, printers, copiers, scanners, facsimile machines, and radios. Unprotected communication paths are exposed to the possibility of*

interception and modification. Protecting the confidentiality and integrity of information can be accomplished by physical or logical means."

Tampering incidents, whether intentional or not, necessitate allocating additional resources for investigation, repair, and replacement. When meter tampering occurs, the meters' ability to detect leaks may be compromised, resulting in delayed identification. Additionally, tampered connection cords could adversely impact the communication between encoders and endpoints by eliminating two-way communication. These cumulative effects could strain operations and escalate maintenance costs.

We determined this OFI's priority was medium, as the potential for financial loss existed; however, its occurrence was not pervasive.

We Recommend Management:

A. Ensure its internal and contracted installation teams prioritize completing future AMI installations with the tamper tag device.

B. Maintain the detailed data of existing AMI installations that require retrofitting with a tamper tag or other appropriate tamper-resistant device to secure the encoder and endpoint connection. This AMI installation data will continue to help management oversee the progress of its department as it completes the necessary work to ensure all AMI installations have secure encoder and endpoint connections.

C. Implement its plan to retrofit all AMI installations lacking a tamper tag with the appropriate tamper tag or tamper-resistant device to secure the encoder and endpoint connection in the future.

Management Response and Action Plan:

A. **Management Concurs.** After the project began, we realized that endpoints were becoming disconnected because BEACON alarms were going off. We quickly determined the cause was inadvertent wire disconnects whenever the box lids were lifted off. Therefore, we purchased enough Tamper-Resistant Features (130,000 tamper tags) for the entire project and began having PVI and PCU crews use the tamper tags on installations going forward. For the meters that were installed before the tamper tags were received, Field Services is installing the tamper tags as time permits. Furthermore, in the event that any wires are disconnected on earlier installations, a BEACON alarm will indicate the location of the disconnected meter and a tamper tag will be installed at that location.

   - ✓ ***Individual(s) Responsible for Implementation:*** Joan Luttmann, Technical Services Manager, PCU
   - ✓ ***Planned Implementation Completion Date:*** September 30, 2026

B. **Management Concurs.** Refer to management's response in Recommendation A.

- ✓ ***Individual(s) Responsible for Implementation:*** Joan Luttmann, Technical Services Manager, PCU
- ✓ ***Planned Implementation Completion Date:*** September 30, 2026

C. **Management Concurs.** Refer to management's response in Recommendation A.

- ✓ ***Individual(s) Responsible for Implementation:*** Joan Luttmann, Technical Services Manager, PCU
- ✓ ***Planned Implementation Completion Date:*** September 30, 2026

6. PCU Did Not Create SOPs And Schedules For The Maintenance And Replacement Of AMI Water Meters.

MEDIUM

PCU's transition from analog and AMR water meters to AMI water meters for its customers necessitated updating its standardized procedures and schedules regarding the preventive maintenance, repair, and replacement of its water meters. PCU employed analog and some AMR water meters for its customers previously. In 2022, PCU initiated the AMI: Water Meter Upgrades project, transitioning from analog to AMI technology and converting AMR meters to AMI. The project was initiated by PCU's Maintenance and Business and Customer Services Divisions, with external support from Badger and PVI. Post-project, PCU will continue AMI installations for new service connections independently.

During the audit, we met with management from the Maintenance and Business and Customer Services Divisions to discuss the AMI project. We inquired about the maintenance and replacement of AMI water meters. PCU management explained that its SOPs covered the repair and replacement of analog meters and the conversion from AMR to AMI. Post-meeting, management shared approved documents for team member dissemination. Our review confirmed three SOPs: one each for analog water meter repair, AMR to AMI conversion, and analog to AMI replacement.

PCU management outlined its preventive maintenance and replacement strategy for AMI water meters, which relied on the warranty program stipulated in the AMI Services Agreement with Badger. This warranty covers replacements for a decade or more, depending on the AMI components. Nevertheless, PCU did not have specific schedules for the post-warranty expiration of each AMI component to effectively manage preventive maintenance or replacements. Moreover, PCU was missing standardized procedures for corrective maintenance of AMI technology. Preventive maintenance is a proactive approach designed to reduce the likelihood of unexpected breakdowns or interruptions in equipment operation. It requires careful planning and organization, developing a schedule based on

the equipment's usage and manufacturer recommendations, documenting each maintenance task, and ensuring the maintenance team is fully engaged in the process. Corrective maintenance is a responsive approach focusing on addressing and repairing equipment after a failure occurs.

Following the AMI project, the existing SOPs for analog and AMR water meters at PCU will be outdated. Moreover, the end of PCU's warranty program will require the establishment of new maintenance and replacement schedules for its AMI technology. These upcoming changes are crucial for the efficient management of AMI technology maintenance and replacements at PCU. The creation of new SOPs for both preventive and corrective maintenance, as well as for the replacement of AMI technology, is vital for ensuring the devices' ongoing functionality.

The unavailability of SOPs, preventive maintenance schedules, and replacement schedules for the repair, replacement, and maintenance of AMI water meters in PCU was primarily due to the department being in the initial phase of AMI implementation. At this initial stage, there was no significant population of AMI meters that required repair or replacement. Furthermore, the potential of faulty AMI meters was efficiently managed by an existing warranty program. It is also important to note, at the time of the audit, PCU still operated a larger number of analog and AMR meters in the field compared to AMI meters. This focus on older meter types also contributed to the absence of specific SOPs and schedules for AMI water meters.

The October 2022 edition of the United States Department of Energy's (DOE) Federal Metering Guidance stated the following:

> *"**Operations and Maintenance (O&M)***
>
> *Although advanced meters and associated hardware can be expected to offer reliable operation and require less periodic maintenance compared to other building systems, a metering program will not operate smoothly and consistently without human intervention. Therefore, agencies should plan accordingly when considering staffing and budgetary needs to meet the O&M requirements of their specific metering programs. O&M plans should include the following elements:*
>
> - *Meter performance monitoring: Design a process for monitoring advanced meters' reporting status and a diagnostic checklist for identifying the root cause of interruptions in communication. Document the status of advanced meters at regular intervals.*
> - *Preventive maintenance and ongoing commissioning: Develop plans to proactively identify and correct issues such as advanced meters and associated hardware that have not been properly commissioned, are not*

reading data correctly, or have data communication problems on an ongoing basis.

- *Responsive maintenance and troubleshooting: Develop plans to respond to issues such as malfunctioning hardware, communications outages, power outages, uncoordinated IT security actions such as software security patches resulting in equipment incompatibilities, and personnel communication issues.*

Trained Personnel Roles and Responsibilities

Staffing resources needed to install, maintain, and operate a metering system, as well as analyze the metered data, are critical to a successful metering program. Personnel need to be appropriately trained on the requirements for each specific meter type (electricity, gas, steam, and water) and afforded the necessary time to operate and maintain the metering equipment and AMI in order to gain the benefits of the metering system."

The Badger Installation Guides in Exhibit I of the AMI Services Agreement stated the following:

*"**Preventive Maintenance***

The purpose of preventive maintenance is to ensure efficient operation and long life of the meter by detecting and correcting any defect that might damage the meter or cause it to fail. Preventive maintenance consists of periodic inspection, accuracy testing and cleaning procedures.

Periodic Inspection

- *Visually inspect the meter for missing hardware, loose screws, broken or scratched register lenses or any other signs of wear or deterioration.*

- *Verify that the meter is operating at the proper flow rate and pressure. A loss in pressure, coupled with a decrease in flow rate, may indicate that the screen in the upstream pipeline—or the meter itself—is clogged with foreign material and needs cleaning."*

The use of obsolete SOPs and schedules for AMI water meters in PCU while expressing sole reliance on product warranties could lead to delayed issue resolution, inefficient resource use, supply chain challenges, billing inaccuracies, budgetary inaccuracies, and difficulties in staff training. The actual impact would depend on how quickly SOPs and schedules for AMI water meters are developed and implemented.

We determined this OFI's priority was medium, as policies and procedures did not exist for water meter maintenance and replacement; however, this was an isolated instance.

We Recommend Management:

A. Research the most current guidance manuals, standards, and practice guides pertaining to the upkeep and renewal of AMI technology and distribute this knowledge among its staff.

B. Leverage its experiential knowledge and authoritative research to develop comprehensive SOPs that outline the department's strategy for executing preventive and corrective maintenance and replacements of Badger AMI water meters.

C. Leverage its experiential knowledge and authoritative research to develop provisional schedules for servicing and replacing Badger AMI water meters.

Management Response and Action Plan:

A. **Management Concurs.** PCU is working with the contractor to develop SOPs and schedules to address maintenance requirements before and after the AMI meter warranty period expires.

   - ✓ ***Individual(s) Responsible for Implementation:*** Felix Montalvo, Maintenance Supervisor, PCU
   - ✓ ***Planned Implementation Completion Date:*** September 30, 2026

B. **Management Concurs.** Refer to management's response in Recommendation A.

   - ✓ ***Individual(s) Responsible for Implementation:*** Felix Montalvo, Maintenance Supervisor, PCU
   - ✓ ***Planned Implementation Completion Date:*** September 30, 2026

C. **Management Concurs.** Refer to management's response in Recommendation A.

   - ✓ ***Individual(s) Responsible for Implementation:*** Felix Montalvo, Maintenance Supervisor, PCU
   - ✓ ***Planned Implementation Completion Date:*** September 30, 2026

7. PCU Field Services Did Not Have A Defined Plan To Address The Change In The Essential Job Functions Of Its Meter Readers Following The Completion Of The AMI Project.

MEDIUM

During a meeting with PCU Field Services, management stated it needed to develop a detailed plan to address the change in the essential job functions of its meter readers following the completion of the AMI project. The technology installed with AMI water meters allows the meters to transmit meter readings and other data electronically using cellular data. This technology will make PCU's meter reader class specifications obsolete. PCU Field Services, having numerous staff in the meter reader class specifications, will need a defined plan to ensure an efficient transition of responsibilities upon completion of the AMI project.

Management had not yet developed new naming conventions, roles and responsibilities, training requirements, or policies and procedures for the new position(s). Management stated it was too early to finalize its plans on how to utilize its meter reader staff in the AMI project post-implementation, as the AMI project was still in its first year of water meter installations. PCU Field Services tentatively planned to expand its maintenance group to install and troubleshoot AMI water meters 1" and smaller after the AMI project completion. The expansion of the PCU Field Services maintenance group could result in reassigning team members from the meter reader class specifications to the maintenance specialist class specifications.

Therefore, the duration and complexity of the AMI project made it a premature task to plan future roles and responsibilities in the early stages of implementation.

As stated in the DOE's Federal Metering Guidance:

> *"Staffing resources needed to install, maintain, and operate a metering system, as well as analyze the metered data, are critical to a successful metering program. Personnel need to be appropriately trained on the requirements for each specific meter type (electricity, gas, steam, and water) and afforded the necessary time to operate and maintain the metering equipment and AMI in order to gain the benefits of the metering system. Therefore, agencies should define the necessary personnel and required training to ensure metering systems can be operated and maintained appropriately. Agencies should scale the number of required personnel relative to the size of their program."*

Management, specifically, the PCU Program Coordinator, should have a well-defined long-term plan in place to ensure a seamless transition of team member responsibilities after completion of the AMI project. The County communicates in its class specification of a Program Coordinator that one of the essential job functions is as follows:

> *"Coordinates long- and short-term activities for programs, to ensure efficient utilization of resources."*

When management does not have a plan to utilize team members efficiently and effectively after a project is completed, it can lead to a decline in productivity, quality of work, increased turnover rates, and the need for management to recruit new team members.

We determined this OFI's priority was medium, as it represented a moderate impediment to achieving management's strategic objectives; however, its occurrence was not pervasive.

We Recommend Management:

A. Implement a structured, phased plan for transitioning meter reader positions in alignment with the completion of the AMI project. This plan, at a minimum, should incorporate the following key components:

   - New essential job functions and associated class specifications
   - Training program for meter readers addressing the maintenance, repair, and replacement of AMI water meters
   - Policies and procedures governing the maintenance, repair, and replacement of the AMI water meters

B. Evaluate staffing levels for its meter readers to ensure sufficient staff is available to fulfill maintenance, repair, and replacement responsibilities for the AMI meters. Conversely, if staffing levels are in excess of those required to fulfill required responsibilities, management should coordinate internally or with other departments to ensure resource maximization.

Management Response and Action Plan:

A. **Management Concurs.** Business & Customer Services Field Services has a transition plan in place with new jobs/functions. In addition:

   - Team members are getting the opportunity to cross observe these areas to learn these job functions.
   - Field Services is also cross training team members on functions related to AMI devices such as tampering and alerts out of the BEACON system.

- ✓ ***Individual(s) Responsible for Implementation:*** Charles Richards, Field Services Manager, PCU
- ✓ ***Planned Implementation Completion Date:*** September 30, 2026

B. **Management Concurs.** Refer to management's response in Recommendation A.

- ✓ ***Individual(s) Responsible for Implementation:*** Charles Richards, Field Services Manager, PCU
- ✓ ***Planned Implementation Completion Date:*** September 30, 2026

8. The PCU Policy Manual Required Revisions And Approval From The BCC.

The PCU Utilities Policy Manual required revisions and approval from the BCC to ensure its relevance for stakeholders seeking to understand PCU's service policies and future customer development plans. During a meeting with PCU Business and Customer Services Division management, we assessed the relevance of the PCU Utilities Policy Manual Section 7 (Billing Policy). Management indicated PCU's Billing Policy remained applicable to both the organization and its customers.

The Administrative Manager initiated revisions to PCU's Utilities Policy Manual in October 2019. As of October 2024, PCU was in the final stages of editing. However, management was determining the timeline for finalizing revisions to the PCU Utilities Policy Manual and obtaining approval from the BCC.

PCU was actively implementing the AMI: Water Meter Upgrades project during 2024. This initiative aimed to modernize all County-owned water meters—both potable and reclaimed—by replacing them with digital AMI water meters that utilized cellular technology. Management stated that, upon reaching approximately 50% completion of the planned installations for the AMI project, PCU would transition from bi-monthly billing to monthly billing for its retail customers. Notably, PCU already employed a monthly billing process for its wholesale customers, and neighboring counties, such as Hillsborough, Manatee, and Pasco, also adopted monthly billing for their customer bases. PCU should memorialize billing frequency changes and upcoming billing policy adjustments in the PCU Utilities Policy Manual revisions. Additionally, PCU should update its PCU Utilities Policy Manual to align with current departmental processes.

Undertaking a comprehensive revision of the PCU Utilities Policy Manual is a critical endeavor, subject to ongoing improvements driven by the policy implications stemming from active PCU initiatives, most notably the full-scale implementation of AMI. Addressing these intricate operational challenges has led management to postpone the finalization of the policy manual, allowing for the seamless integration of recent policy updates.

Written policies and procedures provide the necessary guidance to perform departmental activities consistently and adequately at a required level of quality. By developing procedures, management can ensure adequate processes and internal controls have been established. SOPs support the cross-training and backup for essential staff functions.

The Committee of Sponsoring Organizations of the Treadway Commission stated the following regarding control activities:

> *"Control activities are the actions established through policies and procedures that help ensure that management's directives to mitigate risks to the achievement of objectives are carried out."*

The PCU Utilities Policy Manual stated the following:

> *"On September 17, 1996, the Board of County Commissioners approved RESOLUTION No. 96-243, which establishes a Director of Utilities….*
>
> *This manual has been prepared in order to keep the customers informed of the policies of the rapidly growing Pinellas County Utilities."*

Customers refer to the PCU Utilities Policy Manual to understand the policies for services available to existing customers, water main extensions and connection policies for new customers, and policies for planning the development of future customers. Maintaining an up-to-date PCU Utilities Policy Manual is essential for operational efficiency, risk management, and overall organizational effectiveness. Outdated policies may not align with current practices or technology, resulting in inefficiencies and confusion. Additionally, clear communication is essential to ensure effective policy implementation.

We determined this OFI's priority was low, as current procedures were not formally documented; however, this was an isolated instance.

We Recommend Management:

Complete revisions to the PCU Utilities Policy Manual to incorporate clear language in the policies and procedures clarifying any changes to the billing process, as applicable, resulting from the implementation of the AMI project, as well as other necessary policy modifications, and obtain approval from the BCC.

Management Response and Action Plan:

Management Concurs. PCU began the AMI meter replacement project in 2022. Lessons have been learned along the way and adjustments have been made. By 2024, the Utilities Policy Manual revisions are complete and we are working through the legislative process to get BCC approval of the revised policy manual.

- ✓ ***Individual(s) Responsible for Implementation:*** Patsy Heiss, Senior Administrative Manager, PCU
- ✓ ***Planned Implementation Completion Date:*** June 1, 2026. (Contingent upon BCC adoption.)

DIVISION OF INSPECTOR GENERAL

KEN BURKE, CPA
Clerk of the Circuit Court & Comptroller
Pinellas County, FL

SERVING YOU:

AUDIT SERVICES
INVESTIGATIONS
GUARDIANSHIP SERVICES
CONSULTING
TRAINING
COUNTY FRAUD HOTLINE
GUARDIANSHIP FRAUD HOTLINE
PCSO PREA HOTLINE

mypinellasclerk.gov/Home/Inspector-General

x.com/PinellasIG

facebook.com/igpinellas

Call: (727) 464-8371
Fax: (727) 464-8386
Fraud: (727) 45FRAUD
(727) 453-7283

Write:
Division of Inspector General
510 Bay Avenue
Clearwater, FL 33756