

Citywide Fuel Expenditures Water Department

Report 3 of 4

November 2013



Audit Staff

City Auditor: Laura L. Doud
Assistant City Auditor: Deborah K. Ellis
Deputy City Auditor: Terra Van Andel
Senior Auditor: Hannah Morgan
Staff Auditor: Katie Boman
Staff Auditor: Marcos Chagollan

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Executive Summary

We have conducted an audit of Citywide fuel expenditures. The City currently has three fueling operations overseen by the Fleet Services Bureau (Fleet Services), the Harbor Department (Harbor) and the Water Department (Water). Due to the use of multiple fuel systems and the size and complexity of the fuel operations, the results of our audit will be communicated throughout a series of four reports. The first report, issued on July 10, 2013, focused on the City's largest fuel operations, which is overseen by Fleet Services. The second report focused on the Harbor's fuel operations and was issued on September 5, 2013. This report (the third in the series of four) focuses on audit results related to the fuel operation overseen by Water. The final report will explore the possibility of consolidating the fueling operations Citywide. Therefore, numbers and information discussed throughout this report pertain to the Water fuel operation only.

During fiscal year (FY) 2012, Water purchased approximately 132,000 gallons of fuel costing over \$408,000. Diesel and unleaded fuel usage are tracked through the fuel system. Employees can access fuel by using vehicle fuel keys or the master key. During the six-month audit period, nearly half of the transactions tracked through the fuel system were initiated with the master key, which is located at the pump.

The manner in which the vehicle fuel keys and master key are being used essentially allows unlimited fueling to any vehicle, City owned or not. Water relies on security cameras and guards to monitor access to the yard and fuel pumps, which reduces the risk of inappropriate fueling. However, yard restriction does not necessarily eliminate all risk, as anyone with entry into the yard could freely access fuel by using the master key.

We reviewed transactional data from the fuel system, and it does not appear that unusual or inappropriate fueling was prevalent. However, we did identify areas where control weaknesses exist, and the use of additional controls could provide further protection against misuse.

Water has been using the current fuel system since 1996 and has selected a new fuel system that will be implemented in the near future. Upgrading to a new system will provide the opportunity for better controls, and Water should capitalize on the system's new and expanded functionality, such as system parameters and effective reporting, to strengthen areas where weaknesses exist.

The topic of consolidating systems with the City and Harbor will be explored more in the final report on Citywide fueling operations. Even if Water decides not to consolidate, immediate action can be taken to strengthen controls, such as improving accountability

for the master key, enforcing policies surrounding fuel usage, and increasing transactional review.

We want to thank Water staff for their cooperation, and we appreciate their efforts and desire to improve processes to secure and safeguard City resources. We respectfully request that in one year, management provide status of the progress made in implementation of the recommendations detailed in this report.

Background

The City of Long Beach (City) has three separate fueling operations. The Fleet Services Bureau (Fleet Services) within the Department of Financial Management oversees the fuel operations for all City departments with the exception of the Water Department (Water) and Harbor Department (Harbor). Water and Harbor each have their own independent fueling systems that are operated and managed by their own departments. This report focuses on Water's fuel operations, and all numbers and examples discussed throughout the report pertain to Water only.

Water Fuel Operations

Formal written policy pertaining to fuel consumption by employees does not currently exist at Water. Policy regarding fuel usage is verbally communicated to employees during staff meetings. Management acknowledged they are currently revising their department-wide policy manual and will incorporate policy relating to fuel consumption into the manual.

In fiscal year (FY) 2012, Water purchased approximately 132,000 gallons of fuel at a cost of over \$408,000. Table 1 shows fuel purchases over the last five fiscal years.

Table 1
Water Fuel Purchases
Fiscal Year 2008 – 2012

Fiscal Year (FY)	Fuel Purchases
FY 2008	\$ 448,184
FY 2009	241,646
FY 2010	324,927
FY 2011	401,518
FY 2012	408,728

Water’s fuel system is currently monitoring four main fuel pumps dispensing diesel and unleaded fuel at the Administrative Building. Activity for these pumps is detailed in Table 2 below. During our testwork, we noticed that the fuel system was indicating unusual transactions for pump #2. When brought to the attention of Water staff, it was determined that transactional readings for this pump were incorrect. The problem has since been corrected. The activity shown in Table 2 includes pump #2’s misreadings as it was not possible to estimate the appropriate number of transactions or gallons. However, it is likely the transaction level is too low.

Besides the four pumps at the Administrative Building, there is one additional diesel pump at the Treatment Plant, which is used sparingly to fuel generators and equipment. Information regarding usage was acquired from fuel tank transactions, which indicated actual usage on this pump was less than 500 gallons during the audit period.

Table 2
Fuel Usage by Pump Number
April – September 2012

Pump by Location	No. of Fuel Transactions	Fuel Quantity (in Gallons)
Administration Building		
#1 - Unleaded	929	14,232
#2 - Unleaded*	190	10,096
#3 - Diesel	753	16,987
#4 - Diesel	481	10,405
Treatment Plant - Diesel	**	491
Total	2,353	52,211

*During fieldwork a misread at pump #2 was identified. Therefore, the number of transactions and/or gallons listed above for pump #2 represent what was recorded on fuel transaction reports, but may not reflect actual usage.

**The Treatment Plant is not connected to the fuel system. Therefore, we used tank level readings to calculate the number of gallons used. The number of fuel transactions were not available.

Water employees can also access liquefied natural gas (LNG) at the Fleet Services LNG site and compressed natural gas (CNG) from a CNG pump at the Administrative Building. Our audit did not review transactions related to these fuel types with actual usage estimated at 20% of total Water fuel consumption during our audit period.

Fueling Methods

Diesel and unleaded fuel can be obtained for vehicles and equipment at Water’s Administration Building through two methods: vehicle fuel keys and a master key.

Vehicle fuel keys are physical keys retained with ignition keys for Water fleet vehicles. Water vehicles can be assigned to specific employees, to a work group, or as a pool vehicle that is used as needed by various employees. According to Water’s fleet inventory listing, there are 165 fuel keys assigned to vehicles and equipment.

One master key resides at the Administrative Building site. The key hangs at the fuel pumps and can be used by anyone who has access to the fuel site. No PIN number or asset information needs to be entered in order to access or activate the master key. According to management, employees are instructed to use the master key to fuel cans for small off-road equipment only.

Table 3 below provides a breakdown of the number of fuel transactions conducted and amount of gallons dispensed by each fueling method for the pumps connected to Water’s fuel system. The table shows that approximately 46% of fueling transactions were performed with the master key.

Table 3
Fueling Methods & Activity Level
April – September 2012

Fueling Method	No. of Devices	No. of Fuel Transactions*	Fuel Quantity (in Gallons)*	% of Fuel Transactions
Vehicle Keys	165	1,264	30,414	54%
Master Key	1	1,089	21,306	46%
Total	166	2,353	51,720	100%

*During fieldwork a misread at pump #2 was identified. Therefore, the number of transactions and/or gallons listed above for pump #2 represent what was recorded on fuel transaction reports, but may not reflect actual usage.

Note: Physical keys are not used at the Treatment Plant pump, nor are the number of fueling transactions available. Therefore, the 491 gallons fueled at the Treatment Plant were not included in Table 3.

Security

Water has a sophisticated security system that is used to limit access to their facilities, including the Administrative Building’s fuel yard where the fuel pumps are located. Four devices (fleet vehicle tags, personal vehicle tags, employee identification badges, and remote controls) allow access to the fuel pump yard through two large gates. Security personnel continuously monitor access via a control room located at the treatment plant. Further, a security guard is on duty at the main gate from 6 a.m. to 6 p.m.

Fuel System

Orpak USA (Orpak) is the supplier of Water’s fuel system, FuelOmat (Fuel System). The Fuel System keeps track of transaction activity by asset number and fuel pump. This Fuel System is only connected to the four fuel pumps at the Administrative Building; it is not used at the Treatment Plant location. Prior to recent charges in FY2013 of \$1,544 for system troubleshooting and fuel keys, the last payment to Orpak occurred in FY2010 for \$1,397. There were no payments in FY2011 or FY2012.

In August 2013, Water executed a purchase order for approximately \$24,000 with Orpak for the purchase and installation of upgraded software, hardware, and new fuel dispense devices, as well as a 12-month maintenance agreement for \$3,800. They plan to implement the new system in FY2014.

Objective & Methodology

The objective of our audit was to assess the appropriateness of the City's fuel expenditures. The first report focused on the City's largest fuel operation, which is overseen by Fleet Services and was issued on July 10, 2013. The second report focused on the Harbor Department's fuel operation and was issued on September 5, 2013. This report (the third in a series of four) focuses on our audit results related to the fuel operation overseen by the Water Department. The final report will explore the possibility of consolidation of the fueling operations Citywide. Our audit scope covered Water fuel transactions that occurred from April 1, 2012 through September 30, 2012. During our audit, we performed the following procedures:

- Reviewed applicable policies and procedures to gain an understanding of critical processes and responsibilities;
- Interviewed Water Department personnel and obtained an understanding of the internal controls related to our audit objectives;
- Evaluated the fuel system capabilities and access controls;
- Gained an understanding of security access to the area where fuel is dispensed;
- Reviewed vehicle information and maintenance records; and
- Analyzed fuel transactions that occurred during the audit period.

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

Results

Water uses vehicle fuel keys and a master key to access fuel. The vehicle fuel key is assigned to a fleet vehicle, and the master key is kept at the pump. Either type of key allows unlimited access to fuel any vehicle, City owned or not. However, Water relies heavily on a system of security controls to mitigate this risk by restricting access to the fuel pump yard. While we did not fully audit Water's security system and its controls, we gained an understanding of how it works to restrict access and protect fuel consumption from misuse. While the security system does appear to provide significant control over physical access to the fuel yard, it does not necessarily eliminate the risk of misappropriation. Anyone gaining access to the fuel yard has the ability to access fuel through the use of the master key located at the pump.

While inappropriate fueling did not appear prevalent for the transactions we reviewed, we did identify areas where control weaknesses exist and where the use of additional controls could provide further protection for Water's valuable fuel resource. The pending implementation of a new software system should also provide the opportunity for increased controls. We categorized the control weaknesses into four areas:

- Master Key Does Not Appear to be Used as Intended
- System Parameters Not Used to Control Fuel Use
- Inadequate Review Allows Unusual Activity to Go Undetected
- Lack of a Complete Inventory of Fuel Keys

1. Master Key Does Not Appear to be Used as Intended

According to management, employees are verbally instructed to use their vehicle key to fuel their specific vehicle and to only use the master key to fuel cans for small off-road equipment. The master key hangs unsecured next to the fuel pumps within the fuel yard at the Administrative Building and can be used by anyone who has access to the fuel yard. No PIN, asset, or employee number is required to activate the master key. The limited access to the yard is the only control limiting the use of the master key.

During the six-month period we reviewed, the Fuel System reported that Water conducted just under 2,400 transactions, using almost 52,000 gallons of fuel.¹ Almost half, 46%, of these fuel transactions were performed by the master key.

While we did not see transactions that were necessarily indicative of abuse, master key fuel transactions were performed for purposes other than the key's intended use. Further, since no identifying information is required to activate the master key, there is no record in the system of what vehicles were actually fueled when this key is used.

Examples:

- *32% of vehicles and equipment sampled that appear to have assigned fuel keys and be actively maintained did not have fuel transactions during our six-month audit period. If the vehicles and equipment are actively maintained that would indicate a need for fuel. However, management could not explain why these vehicles did not have recorded fuel transactions. If the vehicles are receiving fuel, it is most likely they are being fueled with the master key.*
- *The master key is intended to fuel cans for equipment use. However, we noted numerous examples of the master key being used to fuel higher gallon transactions multiple times within a short period of time. For example, four individual transactions totaling 20 to 30 gallons each were conducted within 18 minutes of each other using the master key. This type of activity indicates the master key is being used to fuel vehicles or larger equipment.*
 - **Overall Result:** *There is no identifying information associated with transactions performed via the master key so it is virtually impossible to determine if the transactions are appropriate or not. Additionally, it is important that employees follow, and management enforces, the department policies surrounding how fuel keys should be used to facilitate improved tracking of fuel.*

It is crucial to effectively limit the amount of fuel used by the master key because it has the least controls and its transactions lack information that allows management to analyze the activity.

¹ During fieldwork a misread at pump #2 was identified. Therefore, the numbers of transactions and/or gallons represent what was recorded on the fuel transaction reports, but may not reflect actual usage.

2. System Parameters Not Used to Control Fuel Use

The purpose of fuel system parameters is to restrict the use of fuel based on user needs. Different parameters (such as odometer readings, maximum travel distance, maximum quantity, maximum daily visits) can be set to further restrict fuel access.

Based on our observation of the system, parameter options restricting fuel usage are available (such as “check odometer” and “trip number option”), but not in use. Instead, Water staff acknowledged programming fuel keys with default settings. Default settings (such as “any odometer”, “skip driver number”, and “skip vehicle number”) do not appear to impose any restriction on fuel usage.

Example:

- *Table 4 indicates 26% of fuel transactions in April and July 2012 had odometer readings that appeared unusual. Parameters are not set effectively; therefore, the transactions were allowed to occur. Further, because no one is monitoring unusual transactions and investigating the reasons for them, we were unable to obtain explanations for the unusual odometer readings.*

Table 4
Unusual Odometer Readings
April and July 2012

Actual Change in Odometer	No. of Fuel Transactions	% of Fuel Transactions
Excessive Mileage Change (>1,000 Miles)	44	11%
No Change in Mileage	23	6%
Negative Mileage Change	20	5%
Blank Odometer Input	18	5%
Total Unreasonable Odometer Changes	105	26%
Reasonable Odometer Changes	294	74%
Total	399	100%

- **Overall Result:** *Without parameters in place, unusual or inappropriate transactions are allowed to occur, and without a routine review of detailed transactions, they will go undetected.*

It would not be productive for Water to establish parameters in their current Fuel System since they will be upgrading to a new system in the near future. However, Water should establish reasonable parameters within the new system and monitor transactions that

fall outside those parameters to ensure they are explainable and justifiable to further protect Water's fuel from misuse.

3. *Inadequate Review Allows Unusual Activity to Go Undetected*

The current Fuel System is antiquated and has limited features. This fact, combined with ineffectual use of system parameters and no controls on fuel key usage, makes it crucial that staff actively monitor existing data to prevent and detect misuse. However, it does not appear staff is reviewing fuel transactions consistently.

As part of our audit we analyzed transactions over a six-month period from April 1, 2012 to September 30, 2012. Through our review, we identified numerous high gallon transactions (from 75 gallons up to 460 gallons) occurring with both vehicle keys and the master key. We brought these unusual transactions to the attention of Water staff and after investigation, it was determined pump #2 was misreading fuel transactions. Water subsequently contacted Orpak and the issue was corrected in June of 2013. However, prior to our inquiries into this issue, Water was not aware of any problem with pump #2.

Also, through our review of the fuel transaction reports, it became apparent there were a significant number of master key transactions occurring between 6 p.m. and 6 a.m. This issue was also brought to the attention of Water staff and upon investigation, it was determined the recorded time on the transaction reports was inaccurate by approximately three hours. Once the three hour time differential was taken into consideration, it was determined that most of these master key transactions occurred during normal business hours. However, prior to our inquiries into this issue, Water was not aware of the time differential and that the transaction reports were wrong.

Examples:

- *Unit 596 recorded 457.65 gallons on 7/19/12 at pump #2. Besides being a significantly high transaction, the actual underground fuel tank recorded only a decrease of 170 gallons on that same day.*
- *The initial fuel transaction reports provided by Water showed over 62% of the master key transactions were recorded between 6 p.m. and 6 a.m. However, once it was learned the recorded time was incorrect and the time differential was applied, it was determined that only 3% of master key transactions actually occurred between 6 p.m. and 6 a.m.*

- **Overall Result:** *Without an adequate review of fuel reports, potential issues with the recording of fuel transactions or inappropriate transactions would not be identified.*

4. Lack of a Complete Inventory of Fuel Keys

An inventory of fuel keys (or whatever fueling equipment is used) including the number of keys purchased, assigned, unassigned, and disposed of should be maintained so that misappropriation of fuel keys can be detected. Further, keys should be sequentially numbered and used in order to facilitate easier tracking.

A listing of Water fleet assets is manually maintained along with an associated fuel key number. However, based on our limited review of this listing, it does not appear to be a complete key listing or an entirely accurate listing of Water assets.

Water does not maintain an independent list of all fuel keys owned by the department, including identification of those not assigned, discarded and/or lost. Without a complete inventory, it is difficult to account for all fuel keys.

Examples:

- *Unit 575, a 2002 Ford F-350 valve truck, and Unit 581, a 2003 Ford F-350 valve truck both show that they are assigned to fuel key 104131.*
- *Water staff represented that Unit 4981 was put out of service a few years ago; however, the key assigned to this unit was used for two transactions in June and July of 2012 totaling 43.34 gallons.*
 - **Overall Result:** *Without a complete and accurate current inventory of fuel keys, we cannot determine if all fuel keys are accounted for and accurately reflect the asset they are fueling.*

Recommendations

Water has been using the current Fuel System since 1996 and recognizes that a system upgrade is needed. A new fuel system has already been selected and a purchase order for upgraded software, hardware, and new fueling devices was executed in August 2013. Although upgrading to a new system will provide better controls over the use of fuel, Water needs to fully capitalize on the new system's capabilities and implement mitigating controls to help minimize risk of misuse in areas where weaknesses exist.

In addition to the Fuel System overseen by Water, other City fuel systems are managed by Fleet Services and the Harbor Department. Our final report on Citywide fuel operations will discuss the possibility of consolidating resources to provide efficiencies in system costs and shared allocation of dedicated personnel to monitor controls and transactional data.

Although Water will be implementing a new software system in the near future, there are steps that can be taken immediately to strengthen controls over fuel use. Establishing the following mitigating controls will reduce the risk of misappropriation of fuel for non-City purposes.

- Strengthen controls and record tracking surrounding the master key, such as requiring a PIN, asset, or employee number before fueling is allowed. In addition, the master key should be secured and limited in use.
- Reiterate policy surrounding how the master key should be used and enforce policy whenever possible to ensure it is used only for its specified purposes.
- Perform periodic reviews of fuel transactions to identify anomalies that may need explanation. Focus on transactions performed with the master key since it has the most risk and least amount of information, but also stay aware of indications of larger problems with the system's data.

When the new fuel system is implemented, Water should ensure that the following recommendations are addressed to further strengthen controls. These include, but are not limited to:

- Establish appropriate system parameters based on vehicle specifications and user needs and monitor activity to ensure transactions occur within reasonable parameters.

- Develop system reports to identify such things as system overrides, unusual transactions, and system edits. Review these reports timely and follow up on occurrences that require further explanation to ensure they were necessary and justified.
- Develop an inventory showing the serial number for each fuel key and the asset it is assigned to. Track all fuel keys in the inventory, even those that are not in use and perform periodic reviews of the inventory to ensure all fuel keys are accounted for.

Appendix A

Management's Response



Long Beach Water Department
The Standard in Water Conservation &
Environmental Stewardship

Date: November 3, 2013
To: Terra Van Andel, Deputy City Auditor
From: Tai Tseng, Director of Operations 
Subject: Water Department Response to Fuel Operations Audit

The Long Beach Water Department (LBWD) would like to thank the Office of the City Auditor for conducting a thorough review of LBWD's Fuel Operations. LBWD recognizes the need to strengthen controls to protect against the potential for misappropriation of fuel for non-City purposes and appreciates the Audit team's recommendations toward this goal. LBWD is improving controls in two phases; immediate actions and long-term actions, which is consistent with the recommendations of the report. The following sections describe the steps that have already been taken and those that will be taken.

Immediate Actions

In concurrence with the audit recommendation, LBWD recognized that immediate actions were needed to strengthen the control of fuel use and have already instituted control measures while LBWD continues to finalize installation of the new fuel control system. The control measures that have already been implemented are:

- LBWD has installed security key boxes to control all Water Operation Division vehicles keys and associated fuel keys. The two keys are paired together using a tamper resistant electronic key ring, which is stored in a security key box. To access the keys, employees must use their LBWD issued employee identification. If access is granted, the security key box software will limit and track who accessed the vehicle/fuel keys, and automatically report keys not returned by sending an email alert to management.
- To strengthen control of the master fuel key for fueling small equipment, such as fuel cans, the master key has already been removed the location identified in the report. Instead, master keys are now kept in the security key boxes described above for Water Operations Division. Again, keeping the master fuel key in the security key box will ensure there will be a record of master key usage, including who accessed it, what time they took it, and when they returned it. Sewer and Treatment Plant Divisions are in the process of installing security key boxes. In the mean time, master fuel keys have been issued to the Division supervisors and the supervisors are responsible for monitoring master fuel key issuance and usage.

- An interim master fuel key policy has been written and supervisors have been reiterating the policy to employees at tailgate meetings. Any failure to comply with these policies may result in disciplinary action. Enforcement will be facilitated, in part, through implementation of the next action item.
- Monthly reviews of all fuel transactions will be done to identify potential problems. Special attention will be given to master key transactions to verify that it is being used in accordance with LBWD policy. In addition, any vehicle that is in active operation but does not show any fuel transactions for the month will also be investigated to determine if there is a reasonable justification for the lack of fuel data on that vehicle. Records will be kept on file documenting any such inquiries, including outcome, and next steps.

Long-Term Actions

As indicated in the report, LBWD has already committed to upgrading the fuel control system and has been working with the vendor to finalize control strategies. The control strategies to be deployed are as follows:

- The system will use a two step authentication procedure. In order to activate the fueling system, the user must first authenticate using their LBWD issued badge, which will allow LBWD staff to identify the employee attempting to activate the fueling system. Second, a valid radio frequency identification tag (Mifare tag™) must be authenticated by the system to identify the equipment that needs to be fueled.
- The fuel system will limit the volume of fuel that can be dispensed based on the specifications of the equipment. The pre-set limit will be implemented for all authorized equipment. If the fuel system reaches the pre-set limit, the pumps will automatically shut off, discontinuing the dispensing of fuel. In addition, an "Exception Report" will be generated by the system to notify management of this occurrence and allow management to investigate the transaction in a timely manner.
- In addition to fueling limits, the system will also track equipment run hours (e.g., compressors) or odometer readings (e.g., vehicles), where applicable. System reports will then be developed to compare the usage pattern against fuel consumption. These reports will be reviewed on a quarterly basis to assess if the transactions were necessary and justified.
- The new system will allow LBWD to better track and keep updated records on the complete Mifare tag™ inventory. This should include all tags as they are purchased, issued to equipment/employees, and removed from service. Quarterly reviews of this inventory will be conducted to ensure all tags are properly accounted for.

- In addition to the upgraded system, LBWD is also investigating the potential of implementing a fuel ring system. This system works through a wireless nozzle reader at the pump, and a fuel ring attached to the equipment at the tank inlet, which will ensure that fuel is being dispensed to the intended equipment. Once affixed, the rings would be very difficult to remove and misuse with another vehicle.

In addition to the actions LBWD has already taken to address many of the concerns raised and recommended in the report, staff expects to fully execute all of the long-term actions by the end of the 1-year time frame. LBWD will provide a status report in approximately one year to update the Auditor's office on the progress made toward implementation of the control measures described in the long-term actions. Thank you once again for your effort and assistance throughout this process.

cc: Kevin Wattier, General Manager