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Office of Inspector General
640 City Hall

Synopsis of OIG Final Memorandum #2011-155 (DGS)

Hon. President and Members of the City Council
400 City Hall

08/16//2012

Attached please find the Office of the Inspector General's (OIG) Final Report of Investigation and Exhibits relating to fuel theft and fueling protocol. The fueling system is managed by the Department of General Services (hereinafter "DGS").

The OIG investigation began with information pertaining to a series of small fuel thefts by an ex-employee and led to a more thorough examination of the fueling process and system capabilities currently in place. The report reflects several inherent weaknesses in the existing system. Numerous recommendation have been made that would substantially strengthen the system.

The OIG appreciates the assistance provided by the DGS and the written responses to the draft memorandum by the DGS and the Department of Recreation and Parks. The OIG remains committed to providing independent investigations and audits that provide for transparency of government, a solid foundation for meaningful policy review, and a platform for staff accountability.

Attachment

DNM/

cc: OIG Admin/Case file
E:/mcclintock/public synopsis/2011-0155 combined

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OFFICE OF THE INSPECTOR GENERAL BALTIMORE CITY

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Synopsis of OIG Report #2011-0155: Department of General Services Fueling System Thefts and System Protocol

Introduction

An individual who was terminated from City employment was arrested for pumping City fuel into fuel cans at the Department of General Services (hereinafter “DGS”) Northeast Substation at 4325 York Road. When the individual was arrested, he was in possession of a City fuel card and had been using a fuel code belonging to a City employee. The Office of the Inspector General (hereinafter “OIG”) initiated an investigation to identify the issues that permitted the theft to occur and determine the amount of fuel stolen.

Summary

On 11/18/2011 at approximately 8:00am, a DGS Fuel Specialist contacted the OIG to report an individual that had been seen pumping fuel into fuel cans stored in a personal vehicle at the Northeast Substation. The pumping had been witnessed by two Fuel Station Attendants. The OIG advised staff to instruct the attendants to call the Baltimore City Police Department (hereinafter “BCPD”) if they observed the individual return. At approximately 8:40am on the same day the attendants called the BCPD when they observed the individual return and begin fueling into cans. The BCPD responded and eventually placed the subject, a Mr. Lamont Harden, under arrest for theft.

The police report stated that Mr. Harden had (6) five gallon fuel cans in the trunk of his personal vehicle, a white Oldsmobile Cutlass Supreme. The fuel cans were empty except for one that had 3.1 gallons of diesel that Mr. Harden was in the process of filling. At the time of the arrest, Mr. Harden had a City identification card and fuel card in his possession. The police report also stated that the officer had responded to the same location on 11/17/2011 when 24 gallons of diesel were taken using the same fuel card. The officer was also informed by DGS staff that 28.9 gallons of diesel had been stolen on 11/16/2011 with the same fuel card. Mr. Harden was subsequently charged with three counts of a theft less than \$1,000, two counts of a theft scheme less than \$1,000, one count of reckless endangerment and one count of trespassing on posted property.

The OIG’s investigation considered both the process of obtaining fuel in the City and the actions of Mr. Harden and City staff in addressing Mr. Harden from a personnel processing perspective.

City Fueling Processes - *This section altered to maintain security of the existing system*

The City uses a three point verification/authentication system to access fuel. This system requires 1) the entry of an employee code, 2) the swiping of a vehicle assigned fuel card, and 3) the entry of vehicle mileage into fueling kiosk. The current system as administered presents several control weaknesses discussed in the following section.

Employee Code

All City employees that are authorized to utilize City vehicles are issued an employee code that must be entered into the fueling kiosk prior to pumping fuel. The employee codes are based on a combination of information easily recalled by the employee. While this standardized code is easy for City employees to remember it is also an inherent weak code formula. The first weakness is that the first half of the code is known to everyone that knows an employee's name. As such the first half of the code presents virtually no realistic security safeguard. Therefore, to the extent that the employee code acts as an effective safeguard it is only so due to second half of the code.

The second half of the code, comprised of certain numerical data that is more difficult to determine, but by no means impossible for an employee or ex-employee who understand the codes structure. The relevant information can be found in several places on City issued material and can be accessible to certain administrative employees and supervisors. Based on the availability of the data needed to complete the employee fuel code the OIG believes that the employee authentication code is particularly weak in the modern password oriented environment.

Once an employee's code has been compromised, the code may be used by anyone to fuel any City vehicle at any City location at any time that the pumps are open. Currently, there are no mechanisms to require a minimum duration of time between usages of an employee's fuel code or verify employee identification by fuel station attendants.

Vehicle Fuel Card

The second step in the three point verification/authentication system to access fuel is the swiping of a vehicle assigned fuel card. All City vehicles are issued a fueling card that is assigned specifically to that vehicle. The fuel card has parameters set for the type of vehicle it is registered to such as limiting fuel type and fueling volume based on fuel capacity. These parameters prevent authorization of unleaded fuel being pumped after swiping a fuel card for a diesel vehicle and vice versa. The parameters also stop the fuel pumps after the fueling reaches the maximum number of gallons set for the vehicle card swiped.

One weakness of the parameters is that there is no minimum duration of time that must occur before the fuel card can be used again. An additional weakness is that fuel cards and their respective vehicles are not limited to being fueled from certain locations, during specific hours, or by specific employees. However, most City vehicles are limited to being fueled five times in a day. The OIG believes this control is inherently ineffective in preventing theft.

Vehicle Odometer

The third step in the system is the entering of the vehicles odometer reading into the fueling kiosk. Although the City's fueling system has required the entry of vehicle mileage by the person fueling since its initial implementation, the accuracy of the entry had not been mandated since prior to 2007.¹ In the Fall of 2011 several City initiatives were underway that included investigations into improper fuel

¹ The OIG understands that shortly after the system came online a decision was made to "turn off" that control function as a result of a significant number of denials of fuel resulting from entry errors.

access/theft conducted by the OIG and, in some circumstances, the BCPD; Citi-stat reviews of fuel use issues, and efforts by the DGS to reduce waste and abuse in the City fueling system. During this period the OIG and the DPW discussed strategies to increase fueling oversight. A portion of these discussions resulted in the DPW making the decision to lead the City's effort of reinstating the use of the mileage entry as an effective control.

DGS in conjunction with DPW reinstated this control beginning in November of 2011 for its fleet. This effort has been carried through to a majority of the City fleet and as of the writing of this report approximately 4000 of the City's 4700 vehicles have had the mileage control reinstated. Therefore, the entering of an odometer reading outside of the programmed range will result in a denial of fuel. This requires the employee to have actual knowledge of the odometer or correctly guess the odometer to within the parameters set by DGS. One remaining weakness of this system is that once an employee knows or estimates an odometer that is recognized as valid, an employee would be able to begin fueling unauthorized vehicles and fuel cans by artificially inflating the odometer reading in reasonable increments. However, it is recognized that the use of an accurate mileage control should result in significantly reducing the period between a theft scheme beginning and its detection.

Canceivers

In an effort to increase the mileage control efficiency and eliminate intentionally inaccurate mileage entries the City has also equipped a number of City vehicles with the Ward Canceiver Fuel Management and Reporting System (hereinafter "Canceivers"). Approximately 1,000 City vehicles are equipped with Canceivers and the City places Canceivers onto new vehicles as they are purchased. Each Canceiver unit costs approximately \$600. Vehicles equipped with Canceivers wirelessly communicate with the fueling kiosk and fueling system. The wireless communications relay odometer information and can also be programmed to transmit other vehicle information such as engine hours, max vehicle speeds, stop & total idle times, maximum engine RPMs, and diagnostic summaries.

The Canceivers eliminate the manual entry of the odometer while verifying that the vehicle at the pump matches the vehicle recognized at the fueling kiosk. This system significantly reduces the weaknesses regarding the entry of the odometer readings and the fueling of unauthorized vehicles with City fuel cards. While the Canceivers effectively replace the need for vehicle fuel cards, the OIG has noted that vehicles equipped with Canceivers are also issued fuel cards as a back-up in case problems with the Canceiver system arise.

Fuel Cans

Fuel cans are also used extensively by the City for fueling small equipment and non-road eligible vehicles. Fuel cans present additional challenges to effective oversight as they are not tied to a specific vehicle nor is the fuel use able to be tracked, in part, by mileage. The City policy for fuel cans is similar to that used for vehicles except that a fuel can card is used in lieu of a vehicle card. In addition, it is common for multiple fuel cans of various sizes to be filled with a single fuel can card during any one fueling event.

The controls for fuel cans, as noted above, are significantly weaker than those in place for vehicles. The use of a fuel can card permits fuel to be dispensed directly into an unauthorized vehicle or transferred after the fact into non-City vehicles or equipment. Fuel cans may also be equipped with radio frequency identification (hereinafter “RFID”) tags that are similar to the Canceivers which would provide additional controls by assuring that only City cans may be fueled and reporting accurately the amount of fuel dispensed by can. The RFID tags cost approximately \$35 each. Currently, the City does not have any fuel cans equipped with RFID tags.

Mr. Harden and City Personnel Processing Concerns

The OIG’s investigation determined that Mr. Harden had been a street-sweeper operator working out of the Department of Public Works (hereinafter “DPW”) Kane Street Facility until his separation from employment on 10/7/2011. During the term of Mr. Harden’s employment he had been assigned a standard fueling account number based on the common formula discussed above.

By reviewing the transactions associated with Mr. Harden’s fuel identification code the OIG was able to determine which vehicles he was most frequently fueling and analyze that pattern of fueling. Once the vehicles were identified it was possible to review the fueling history and employee codes associated with the fueling of each of those vehicles over time. In addition it was possible to compare GPS information for the vehicles purportedly being fueled against the fueling records to determine if the vehicle was located at the pumps at the time.

What became apparent was that two employee codes became associated with the fueling of loadpackers that Mr. Harden operated from time to time. Further, that these employees, one a DGS mechanic and the other a Department of Recreation and Parks small engine mechanic, had no occasion to operate or history of contact with the vehicles in question. It was further determined that the vehicles fuel consumption was extremely high and that on some occasion where information was available the vehicles were not even present at the fueling stations at the time record reflect they were being fueled. This indicates only that the vehicle card was used not that the vehicle was present.

A review of the DRP Small Engine Mechanic’s fuel transaction report covering 1/1/2011 to 11/22/2011 revealed that 2,364.9 gallons of fuel had been dispensed over 121 transactions. The following chart illustrates the transactions and the associated fuel card and amount dispensed:

Number of Transactions	Fuel Card	Registered Vehicle	Fuel Type	Gallons
25	13459	10-5841 Terex Wheel Loader	Diesel	216.9
2	10507	01-2767 DRP Ford Truck	Unleaded	5.7
1	13307	10-5799 DRP Terex Backhoe Loader	Diesel	11.5
2	12788	06-3164 DPW Mitsubishi Fuso Loadpacker	Diesel	11.8
91	5298	02-3559 DPW Freightliner Loadpacker	Diesel	2,119.0
121				2,364.9

A review of the DGS Diesel Mechanic's fuel transaction report covering 1/1/2011 to 12/7/2011 revealed that 252.6 gallons of fuel had been dispensed over 11 transactions. The following chart illustrates the transactions and the associated fuel card and amount dispensed:

Number of Transactions	Fuel Card	Registered Vehicle	Fuel Type	Gallons
1	224	02-2105 DGS Pickup Truck	Unleaded	25.3
3	13223	82-7316 DRP Gas Can	Unleaded	15.3
7	5298	02-3559 DPW Freightliner Loadpacker	Diesel	212.0
11				252.6

A review of Mr. Harden's fuel transaction report covering 2/19/2010 to 10/6/2011 revealed that 5,220.5 gallons of fuel had been dispensed over 219 transactions. The following chart illustrates the transactions under the pertinent employee code and the associated fuel card and amount dispensed:

Number of Transactions	Fuel Card	Registered Vehicle	Fuel Type	Gallons
15	5298	02-3559 DPW Freightliner Loadpacker	Diesel	348.6
11	12788	06-3164 DPW Mitsubishi Fuso Loadpacker	Diesel	348.1
193	Multiple	42 Different Vehicles <small>Error! Bookmark not defined.</small>	Mixed	4,523.8
219				5,220.5

Document Review

In the course of the investigation, the OIG obtained and reviewed the following documents:

1. Police Report – Complaint Number 115K08000
2. MD Case Search Record – Case Number 2B02148050
3. DGS Fuel Transaction Reports:
 - a. Northeast Substation 11/17/2011
 - b. DGS Employee whose code was used 1/1/2011 – 12/07/2011
 - c. DRP Employee whose code was used 1/1/2011 – 11/22/2011
 - d. Lamont Harden – 2/19/2010 – 10/6/2011
 - e. Vehicle 02-3559 9/1/2011 – 11/17/2011
 - f. Fuel Can 82-7316 1/1/2011 – 12/31/2011
4. DGS Fuel Card Information Reports
 - a. Fuel Card 5298 – Registered to DPW 02-3559 Freightliner loadpacker
 - b. Fuel Card 12788 – Registered to DPW Mitsubishi Fuso loadpacker
 - c. Fuel Card 13307 – Registered to DRP Terex Backhoe Loader
 - d. Fuel Card 10507 – Registered to DRP Ford Truck
 - e. Fuel Card 13459 – Registered to DRP Terex Wheel Loader
5. DGS Employee Information Reports
6. E-Time Printout – Lamont Harden Time Detail 1/1/2005 – 11/21/2011
7. Telogis GPS Vehicle Tracking Information for City Vehicles

Chronology of Events

- Summer 2011: Mr. Harden is assigned to the Western Sanitation Yard and Northwest Transfer Station to operate loadpackers when those facilities are short staffed.
- 7/26/2011 at 10:25am: Mr. Harden's fuel code is entered in conjunction with the fuel card for DPW vehicle 06-3164 at the Northeast Substation. 5.2 gallons of diesel fuel pumped. According to Telogis, vehicle 06-3164 is on Quarantine Road in Curtis Bay at that time. It is believed this transaction was the filling of a fuel can.
- 7/26/2011 at 10:57am: The DRP employee whose code is associated with this event pumps 11.5 gallons of diesel fuel into DRP vehicle 10-5799 at Druid Hill Park. This vehicle is not GPS equipped.
- 7/26/2011 at 11:01am: The DRP employee's code is entered in conjunction with the fuel card for DPW vehicle 06-3164 at Druid Hill Park just 4 minutes after being used at the same facility. No fuel is pumped. According to Telogis vehicle 06-3164 is in Dundalk at that time.
- 7/26/2011 at 11:04am: The DRP employee's code is entered in conjunction with the fuel card for DPW vehicle 06-3164 at Druid Hill Park. 11.8 gallons of diesel fuel pumped.
- 8/1/2011 – 11/18/2011: The DRP employee's fuel code is used in conjunction with the fuel card for DPW vehicle 02-3559 on 91 occasions. These transactions occur at the Midtown Fueling Facility, Northwest Substation, Winfield Fleet Management Facility, Northeast Substation, Western Sanitation Yard, and Druid Hill Park.
- 8/22/2011: Mr. Harden's fuel code is used in conjunction with the fuel card for DPW vehicle 02-3559 at Druid Hill Park. 23.8 gallons of diesel pumped. Vehicle 02-3559 did not leave the Western Sanitation Yard that day.²
- 10/4/2011–10/21/2011: Mr. Lucas' fuel code is used in conjunction with the fuel card for DPW vehicle 02-3559 and is used on 7 occasions between the Winfield Fleet Management Facility, Western Sanitation Yard, and Druid Hill Park.
- 10/7/2011: Mr. Harden's City employment is terminated.
- 10/21/2011: The DGS employee's fuel code is used in conjunction with the fuel card for a DRP gas can for three transactions at Druid Hill Park.
- 11/18/2011: Mr. Harden is arrested at the Northeast Substation. Mr. Harden had the vehicle fuel card for DPW loadpacker 02-3559 in his possession.
- 2/22/2012: Fuel identification codes for both the DPR and DGS employee were changed after request by OIG.

² This was the last time Mr. Harden's fuel code was used in conjunction with the fuel card from DPW vehicle 02-3559. This second-to-last time this combination of fuel code and vehicle fuel card was used was on 8/8/2011. No Telogis data is available for this date because the GPS unit in vehicle 02-3559 had been tampered with and disabled. The GPS unit was repaired on 8/15/2011.

Findings

As a result of the investigation and document review the OIG has made a series of findings concerning the processes and actions noted above.

1. From 1/11/2011 to 10/7/2011, Mr. Harden was employed by the City as a Seasonal Maintenance Aide for the Department of Public Works.
2. Mr. Harden operated street sweepers and loadpackers out of the Kane Street Facility, Northwest Sanitation Yard, and Western Sanitation Yard.
3. Mr. Harden had access to different fuel cards from the City vehicles he operated.
4. The fueling record of a DGS Diesel Mechanic who does not work on loadpackers reflected that a total of 227.3 gallons of fuel was pumped using his employee code in conjunction with the fuel cards for vehicle DPW vehicles 02-3559 and gas can 82-7316.
 - a. Of the 227.3 gallons, 80.7 gallons were pumped after Mr. Harden's City employment was terminated.
5. The fueling record of a DRP Small Engine Mechanic I who does not operate or work on loadpackers reflected that total of 2,130.8 gallons of diesel fuel was pumped using the DGS employee's fuel identification code in conjunction with the fuel cards for vehicles 06-3164 and 02-3559.
 - a. Of the 2,130.8 gallons, 666.3 gallons were pumped after Mr. Harden's City employment was terminated.
6. The total amount of fuel pumped using both the DGS and the DPR employee's fuel identification codes in conjunction with fuel cards for vehicles and gas cans that they have never fueled is 2,358.1 gallons.
7. Using a cost estimate of \$3.00 per gallon, the total value of unauthorized fuel pumped is approximately \$7,074.³
8. The City has reinstated the use of accurate vehicle mileage entries for the 4000 of the 4700 vehicles in the fleet.

Recommendations

The primary goal of the OIG's efforts is to identify areas of weakness or inefficiency that can be eliminated or improved. As such, the OIG has made a series of recommendations that, if enacted, would reduce the opportunity for fraud, waste and abuse of City fuel and reduce the overall cost.

The OIG recognizes that in late 2011, the City began to reinstate the control requiring accurate odometer readings. The changes were implemented after a series of inquiries into fuel misuse and theft, however, the OIG believes that earlier implementation would have prevented and or detected a theft of this size. This control will limit the opportunity for fuel theft using vehicle cards from vehicles not equipped with the Canceivers because the operator needs to have knowledge of the vehicles actual odometer or correctly estimate the odometer within the parameters set by DGS.

³ Given the wide range in dates that unauthorized diesel and unleaded gasoline were pumped and that the City purchases fuel in large quantities to maintain an inventory; calculating the exact cost of the unauthorized fuel pumped would be exceedingly difficult. The OIG has used \$3.00 as an estimate and DGS Fuel Specialist Robert Holste agreed that this is a conservative and appropriate.

Recommendation #1

The OIG recommends continuing the implementation of the Canceivers through the inclusion of the devices as standard equipment on new vehicle purchases. Additionally, the OIG strongly recommends targeted installations on older City vehicles assigned to areas most prone to fueling issues, demonstrating unusually high fuel consumption or those expected to see extended service life. The wireless communications between the vehicles equipped with Canceivers and the fuel kiosk and fuel system improve controls by replacing the use of vehicle fuel cards and the manual input of odometer information. Because the fueling and mileage information is more reliable for vehicles equipped with Canceivers, the City can place more reliance on the metrics for those vehicles and then begin to develop better mileage parameters that will reduce the opportunity for fuel theft by skimming from authorized fill ups.

Recommendation #2

The OIG recommends breaking away from the existing structure used to assign employee fueling codes. There are a multitude of other options that would be less easily deciphered. Increasing the variability of what the standardized fuel codes are based on will reduce the chances of City employees obtaining other employee's fuel codes. The City could further increase fuel code security by utilizing random number and letter generators for any portion of the code.

Recommendation #3

The OIG recommends implementing limits on the frequency of fuel distribution by instituting minimum durations between fueling events for the same vehicle and/or driver. In this case, the DGS employee's code was used multiple times per day, often within minutes of the previous transaction. By prohibiting authorization for driver and vehicle combinations that have been used within the previous 4 or 6 hours would significantly reduce the potential for unauthorized fueling events.

Recommendation #4

The OIG recommends exploring the capabilities of the fueling system to place limits based on location, time, employee assignment, and vehicle assignment where feasible across the City fleet. The OIG recognizes that there are some employees and certain vehicles that will not be reasonably able to be subjected to limitations; however, it is believed that significant portions of the staff and the fleet can be reasonable restricted. The following are restriction limits that would add valuable controls to City fueling oversight and control, as well as, aid in the early detection of theft:

- Limit employees of a specific department of agency to only being authorized to fuel vehicles assigned to that entity.
- Limit employees assigned to specific duties to only fueling at specific sites located in their region of operation.
- Limit employees to fueling within their normal working hours.
- Limit employees working fixed shifts from fueling during off hours.
- Limit fueling during weekends only to staff authorized to work.
- Record and report of attempts made outside of established parameters.

In addition, the OIG recommends locking the vehicle fuel cards after a predetermined number of fueling attempts. Understanding that there will be a certain number of legitimate mistakes, it is

suggested that DGS fueling attendants be provided with override ability that can be used when identity of the staff and vehicle are confirmed and documented.

Recommendation #5

The OIG recommends the systematic review of denied transactions. There are many options for instilling a review process such as through e-mail alerts to supervisors, a DGS reporting and evaluation process and protocol, or review by Citi-stat analyst. Examination of denied transactions can illustrate possible single attempts of misuse or patterns representative of larger theft attempts involving the misuse of vehicle fuel cards or employee fuel codes. The examination of denied transactions may also reveal problems in the restrictions that prevent otherwise authorized fueling transactions. Refining the restrictions would then reduce the likelihood of denying legitimate fueling transactions and therefore reduce the number of denied transactions to review.

Recommendation #6

The OIG recommends active monitoring of fuel efficiency for City vehicles. As the odometer readings become more reliable, the City can generate more accurate data on fuel efficiency which can provide significant opportunities to reduce fuel expense. By calculating and comparing miles per gallon between vehicles of the same make and model, the City can find vehicles that are in need of repair, that may be involved in fuel theft, or are being excessively idled. Addressing these issues can result in significant savings.

Recommendation #7

The OIG also recommends thorough consideration of transitioning to RFID tagged fuel cans. Currently fuel cans present one of the more significant areas of control weaknesses in the fueling system. Under the current system it is difficult to ensure that the fuel is actually dispensed into a fuel can, that the fuel can is a City fuel can and which equipment the fuel is actually utilized in. The RFID process would permit the City to have some assurance of the first two components.

Attachment

1. Visual Timeline of Events

Timeline of Events

