



Office of Internal Audit

**AUDIT OF THE UNIVERSITY'S FUEL
INVENTORY CONTROLS**

Report No. 11/12-01

August 1, 2011



OFFICE OF INTERNAL AUDIT

Date: August 1, 2011

To: Kenneth Jessell, Chief Financial Officer and Senior Vice President
Liane Martinez, Associate Vice President, Business and Finance

From: Allen Vann, Audit Director 

Subject: **Audit of the University's Fuel Inventory Controls**
Report No. 11/12-01

We have completed an audit of the University's Fuel Inventory Controls. The primary objective of our audit was to determine whether established controls and procedures over fuel inventories, purchases, and distribution were adequate to safeguard the assets and maintain accurate fuel records.

Overall, our audit disclosed that the fuel was procured in accordance with University policies, procedures and applicable State laws. Nevertheless, during the period covered by our audit, we found significant weaknesses in the internal controls over fuel inventory monitoring and distributing resulting in large amount of missing and/or unaccounted for fuel.

The audit resulted in thirteen recommendations, which management agreed to implement.

We wish to express our appreciation for the cooperation and courtesies extended to us by Vehicle Services while conducting the audit.

C: Sukrit Agrawal, Chair, Board of Trustees & Finance and Audit Committee Members
Mark B. Rosenberg, University President
Javier I. Marques, Chief of Staff, Office of the President
Bill Foster, Executive Director, Parking and Transportation

TABLE OF CONTENTS

	<u>Page</u>
BACKGROUND	1
OBJECTIVES, SCOPE, AND METHODOLOGY	3
FINDINGS AND RECOMMENDATIONS	
1. Recordkeeping Controls.....	5
a. Fuel Inventory Not Properly Tracked.....	5
b. Fuel Inventory Not Reconciled.....	5
2. Distribution Controls	7
3. Controls Over Vehicle Services Fuel Usage.....	12
4. Identity Management.....	13
5. Physical Security Over Fuel Sites and FMS Keys.....	14
6. Fuel Master System Not Being Fully Utilized	15

BACKGROUND

The Department of Parking and Transportation's Vehicle Services Unit provides oversight and maintenance for approximately 440 University owned vehicles and other mobile equipment that require fuel. The Unit is responsible for the related procurement, storage and distribution of fuel inventories necessary to operate them.

Fuel is procured mainly via a blanket purchase order issued to a local wholesale fuel vendor. The fuel cost paid by the University is the Oil Price Information Service (OPIS) average rack price for Miami plus taxes and a fixed surcharge. The fuel is stored and dispensed at the University's two major campuses: 1) Modesto A. Maidique (MMC) and 2) Biscayne Bay (BBC). The fuel inventory storage capacity of 19,000 gallons, not including fixed inventories in backup generator tanks, includes three types of regularly dispensed fuel:

- 10,000 gallons for unleaded fuel,
- 4,000 gallons for on-road diesel, and
- 5,000 gallons for biodiesel.

On average, Vehicles Services purchased over 9,000 gallons of unleaded fuel and over 800 gallons of diesel fuel monthly. Fuel inventory purchases for the audit period follow:

Vehicle Services Unit Fuel Inventory Purchases				
	Fiscal Year Ended June 30, 2010		For the 10 months Ended April 30, 2011	
Type of Fuel	Gallons Purchased	Amount Paid	Gallons Purchased	Amount Paid
Unleaded Gasoline	109,447	\$276,700	90,607	\$253,527
Diesel Fuel	9,860	\$ 25,450	8,744	\$ 25,016

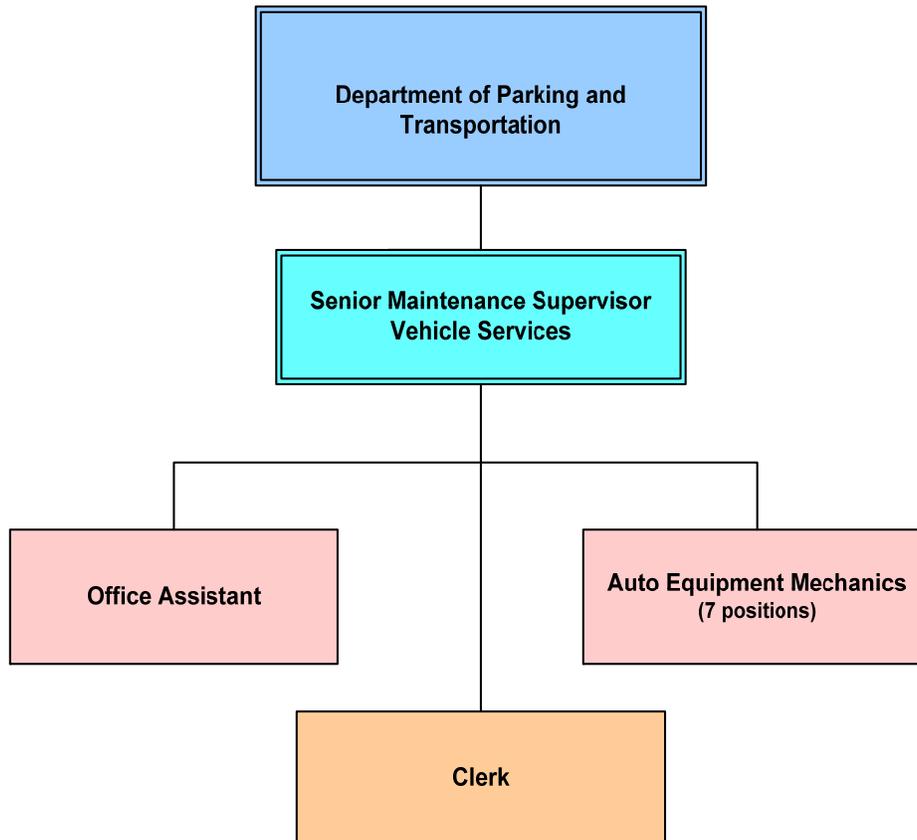
Fueling at Vehicle Services sites is restricted to vehicles and equipment owned by the University and a few FIU contractors. In order to account for fuel, Vehicle Services has two automated systems: 1) the Fuel Master System (FMS) and 2) the Automated Information Module System (AIM). It also employs various manual processes to manage fuel.

The table below details the amount of fuel dispensed for the audit period, according to FMS records and Vehicle Services manual records.

Vehicle Services Unit Fuel Inventory Dispensed Information						
	For Fiscal Year ended June 30, 2010			For the 10 months ended April 30, 2011		
Type of fuel	Gallons dispensed	Gallons automatic	Gallons manual	Gallons dispensed	Gallons automatic	Gallons manual
Unleaded gasoline	99,241	68,953	30,288	89,234	53,617	35,617
Diesel fuel	9,539	5,457	4,082	9,334	3,485	5,849

The University departments and outside vendors are billed monthly for fuel consumption. University departments are billed for cost, plus a 5% surcharge per gallon of fuel, while outside vendors are billed for cost, plus a 16% surcharge per gallon of fuel.

An organizational chart for Vehicle Services is shown below.



OBJECTIVES, SCOPE, AND METHODOLOGY

We conducted an audit of controls over fuel inventory managed by the Vehicle Services unit of the Parking and Transportation Department for the period July 1, 2009 through April 30, 2011. The primary objective of our audit was to determine whether adequate controls were in place to ensure that accurate quantities of fuel are received, properly dispensed, charged and accounted for. For this audit, we did not review relatively static fuel inventories maintained by other operating units used mainly for backup generators.

The audit was conducted in accordance with the *International Standards for the Professional Practice of Internal Auditing*, and included test of the accounting records and such other auditing procedures as we considered necessary under the circumstances. Audit fieldwork was conducted from April 25, 2011 to May 25, 2011.

We reviewed University policies and procedures and applicable Federal and State laws and regulations, observed current practices and processing techniques, interviewed responsible personnel, and tested selected transactions. Sample size and transactions selected for testing were determined on a judgmental basis. We tested 100% of the unleaded and diesel fuel purchases, 55% of Vehicle Services departmental billings and 18% of the Veeder Root and manual fuel station reading logs for the period July 1, 2009 through April 30, 2011.

As part of our audit, we reviewed internal and external audit reports issued during the last three years to determine whether there were any prior recommendations related to scope and objective of this audit and whether management had effectively addressed prior audit concerns. In this regard, we followed up on prior recommendations, issued by the Office of Internal Audit (Report No. 07/08-09, dated July 8, 2008), relating to controls over fuel billing and fuel pump calibration.

FINDINGS AND RECOMMENDATIONS

Overall, our audit disclosed that the fuel was procured in accordance with University policies, procedures and applicable State laws. Nevertheless, during the period covered by our audit, we found significant weaknesses in the internal controls over fuel inventory monitoring and distributing resulting in a large amount of missing and/or unaccounted for fuel.

Our overall evaluation of fuel inventory controls is summarized in the table below.

INTERNAL CONTROLS RATING			
CRITERIA	SATISFACTORY	FAIR	INADEQUATE
Process Controls			x
Policy & Procedures Compliance			x
Effect			x
Information Risk			x
INTERNAL CONTROLS LEGEND			
CRITERIA	SATISFACTORY	FAIR	INADEQUATE
Process Controls	Effective	Opportunities exist to improve effectiveness.	Do not exist or are not reliable.
Policy & Procedures Compliance	Non-compliance issues are minor.	Non-Compliance Issues may be systemic.	Non-compliance issues are pervasive, significant, or have severe consequences.
Effect	No impact on operations or program outcomes.	Impact on outcomes contained.	Negative impact on outcomes.
Information Risk	Information systems are reliable.	Data systems are mostly accurate but can be improved.	Systems produce incomplete or inaccurate data which may cause inappropriate financial and operational decisions.

The areas of necessary improvement identified in our audit are detailed below.

1. Recordkeeping Controls

We analyzed the supporting documentation for fuel inventory tracking and purchases for the audit period. Our test disclosed significant control deficiencies as follows:

a) Fuel Inventory Not Properly Tracked

Vehicle Services uses two different methods to track actual fuel inventory in their tanks:

1. At the BBC campus Vehicle Services uses the “Veeder Root” (VR) System. VR is an automated fuel monitoring system installed directly in the storage tanks. The system generates daily reports of each tank’s inventory, temperature, and water levels.
2. At the MMC campus Vehicle Services uses a manual dip stick method to monitor fuel inventory. Fuel inventory levels are manually recorded on a Vehicle Services Fuel Station Reading (FSR) log.

We reviewed the VR reports and FSR logs for the period July 1, 2010 through April 30, 2011. While fuel inventory readings are tracked consistently at BBC, readings at MMC are tracked sporadically i.e., sometimes only once or twice per week. Without taking fuel inventory consistently, it is difficult to reconcile fuel inventory and identify missing fuel.

Due to EPA requirements, the underground fuel tank at MMC was replaced with an aboveground tank. During the construction period March 23, 2010 through October 5, 2010, fuel was dispensed via an onsite temporary fuel station with a capacity of 1,000 gallons of unleaded fuel and 1,000 gallons of diesel fuel. However, we noted that there was a lack of accountability (no FRS logs maintained) for the period between March 24, 2010 and November 17, 2010. Vehicle Services staff indicated that logs were not kept due to the installation of the new fuel tanks. However, 5,000 gallons of fuel was delivered to the new tank on October 8, 2010, the resumption of FRS logs did not occur until November 17, 2010. Nevertheless, the FRS logs should have been maintained continuously.

b) Fuel Inventory Not Reconciled

Fuel inventory reconciliations are not being performed by Vehicle Services. The reconciliation would entail comparing book inventory to actual physical inventory and investigating the reason for any variances. Vehicle Services currently does not have established reconciliation procedures.

We performed reconciliations for four months based on available records: inventory purchases, billings, VR and FSR logs. Our analysis assumes the opening balance was correct. For any given test month the unexplained variance was between 3 to 38 percent. The table below summarizes our analysis.

Monthly Fuel Reconciliation For the four months ended October 31, 2009							
Month	Beginning Inventory	Plus: Purchases	Less: Distribution	Ending Inventory	Actual Readings Per Logs	Unexplained Monthly Variance	Percentage Variance
July	3,231	10,450	6,482	7,199	4,487	2,712	38%
Aug.	4,487	10,798	9,465	5,820	5,626	194	3%
Sept.	5,626	6,950	9,082	3,494	2,661	833	24%
Oct.	2,661	12,102	10,123	4,640	2,983	1,657	36%

Based on our analysis, there appears to be significant unexplained monthly variances between fuel records and actual inventory. Because of the limitations of the available records, we were unable to determine if the variances were a result of delivery errors, theft, shrinkage, and/or inadequate record keeping.

Perpetual inventory controls should provide for consistent accurate and timely information pertaining to current fuel inventory levels, deliveries, and sales. The lack of procedures and a mechanism to account for fuel inventory represent a key control deficiency.

Recommendation

1.1	Vehicle Services should ensure that fuel inventory is tracked on a consistent basis and establish procedures to ensure that monthly fuel inventory reconciliations are performed.
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Management Response/Action Plan:

- 1.1 New forms have been created to better track manual fuel dispensing, delivery verification, and daily tank measurement. Information gathered from these sheets will be used to create monthly fuel inventory reconciliations.

Implementation date: Immediately

2. Distribution Controls

Fueling at Vehicle Services sites was mostly limited to FIU vehicles and equipment. However, for accommodation purposes, two contractors: 1) Aramark and 2) Jedi were permitted to fuel their vehicles and equipment.

According to FMS and Vehicle Services manual logs, 108,780 gallons of fuel were distributed in the fiscal year 2009-10 and 98,568 gallons for the 10 months ended April 30, 2011. Fuel is distributed and accounted for in four ways: 1) Automated Information Module System (AIM); 2) Fuel Master System (FMS) User Key; 3) FMS Supervisory Key and 4) Master Fuel Cabinet Key (manual fueling).

Our evaluation of the four methods follows:

- 1) **AIM** - Most University owned vehicles and equipment have AIM installed. A special sensor is installed in the vehicle, which activates the pump. AIM is the preferred method of fueling as it is the only completely automated method for dispensing fuel. This method makes it easier for the vehicle operator to refuel and provides accurate reporting of vehicle fuel usage.¹



AIM also allows capturing specific vehicle information such as registration number, odometer readings, fuel mileage, driving times, speed driven, idle time and engine diagnostic codes. The system also has a built-in security feature in that once the connection between AIM and the pump is broken, the pump automatically stop dispensing fuel. This feature helps to prevent unauthorized fueling. Hence a user cannot dispense fuel to an unauthorized vehicle directly after obtaining the access to fuel for an authorized vehicle.

- 2) **FMS User Key** is the second method to dispense fuel. Keys are assigned and issued to user department supervisors and fueling information is tracked by FMS. Once the key is inserted into the FMS control box, the user is prompted to

¹ Assuming accurately calibrated pumps.

enter vehicle information. This method generally provides accurate billing and accountability for fuel usage. However, several major control weaknesses were observed as follows:

- There is no accountability for the keys, as Vehicle Services is unsure how many keys were issued and they do not have a list of key holders.
- The user can bypass this step or enter the incorrect information and the fuel pump will nevertheless be activated. This results in distorted vehicle fuel utilization data.
- Once the pump is activated, fuel can be placed in a portable container or any non-University vehicle/equipment, thus increasing the ability of unauthorized fueling.

Three FMS key holders/users were surveyed regarding fuel key safeguard, usage, tracking and billing.

- 100% of the surveyed users indicated that they did not received written procedure from Vehicle Services about appropriate fuel usage and safeguards.
- 33% of the users indicated that their department does not have established procedures to ensure that fuel dispensed via FMS key is for official University business.
- The fuel usage ID transfer payment is processed before the detailed fuel activity report is provided to the user department for review and approval.

3) **FMS Supervisory Key** is the third preferred method. Fuel Master designed this key as a system override to facilitate manual fueling and account for fuel usage. The key functions are the same as the FMS User Key except Vehicle Services staff is prompted to enter a vehicle or department number. This enables Vehicles Services to assign the dispensed fuel to the correct user eliminating the need for a manual fuel log.

The following control weaknesses of the FMS Supervisory Key use were noted:

- As with the FMS User Key, the Supervisory Key allows for fueling into any vehicle or container.
- Vehicle Services staff can enter the incorrect vehicle or department number; therefore, the fuel usage can be assigned and charged to the incorrect department/vehicle. This will also distort the vehicle fuel utilization data.

- Vehicle Services staff can bypass the tracking step and the fuel dispensed fuel will automatically be assigned to the Vehicles Services unit.
- Management indicated that fueling using this method is time consuming and does not use it much.

4) **Fuel Master Cabinet Key (Master Key) –**

This key is assigned to Vehicle Services and it allows any staff member with access to this key to unlock the fuel pump, shut off the fuel tracking system and dispense fuel. From a control perspective it is the least preferred method for fueling because it provides the least amount of accountability over fuel usage, reporting and billings.

Currently, this key is the most commonly used method used by Vehicle Services for fueling. From FY 2010 and FY 2011² fueling using this method increased from 32% to 42% of all fueling activities.



The control weaknesses of the FMS Mater Key are as follows:

- Fuel can be dispensed into any vehicle, equipment or container without automatic tracking.
- Dispensing fuel using this key is cumbersome and error prone. It also requires manual record keeping in the form of a hand written log. The data from the log is manually entered onto an excel worksheet by a Clerk. The Office Assistant prepares invoices based on the data in the worksheet prepared by the Clerk. We reviewed the manual and departmental billings for the period January 2010 through May 2010. The following discrepancies³ were noted:
 - Aramark was under-billed in April for 128 gallons and in May for 28 gallons of unleaded fuel, which resulted in revenue loss of \$499.
 - Jedi was over-billed for 10 gallons of diesel fuel in May 2010.
- There is no supervisory review over this process.

² Fiscal Year 2011 data used based on the 10 months ended April 30, 2011.

³ A similar finding was noted in our audit report, dated July 8, 2008 regarding untimely calibration of fuel pumps and fuel distribution billing errors.

Vehicle Services staff indicated that the increased reliance on the manual override system of fueling is due to system failures and pump calibration issues, which have not been addressed. According to Facilities Management staff, the issue is not calibration related, but rather pump failures, as the pumps were not designed for the current volume of fuel dispensed. Vehicle Services estimates that approximately 3% of the volume of fuel actually dispensed was not reflected on the pump meter. The estimated cost to replace the pumps is approximately \$25,000.

The practice of dispensing fuel, recording and billing using a manual process increases the likelihood of recording and billing errors. The lack of a review process limits management’s ability to identify and correct the errors in a timely manner.

Recommendations

Vehicle Services should:	
2.1	Reduce the dependence on the Master Key (manual fueling); in favor of the FMS Supervisory Key.
2.2	Develop and maintain a log of all FMS User Key holders.
2.3	Review the FMS User Key log to ensure that all key holders are active University employees and take necessary steps to cancel, deactivate and collect all FMS User Keys that may be assigned to non-active employees.
2.4	Establish procedures to ensure that manual fuel logs and worksheets are reviewed.
2.5	Take necessary steps to ensure that pump readings are accurate.
2.6	Take necessary steps to collect the amounts under billed to outside vendors.
2.7	Provide a detailed fuel usage report to user for review and approval before the payment is processed.

Management Response/Action Plan:

2.1 The use of the FMS Supervisory Key will be the primary method of fueling vehicles.

Implementation date: January 1, 2012

2.2 A new log of all FMS User Key holders will be created and maintained.

Implementation date: Immediately

- 2.3 Vehicle Services will send an email to all FMS User Key holders/registered departments and any other person who may possibly be in possession of a key. Any users who do not respond to the inquiry will be removed from the system and notified. Everyone issued a new key will be required to fill out a form that will be entered and tracked in the new log.

Implementation date: October 1, 2011

- 2.4 Manual fuel logs will be reviewed and entered on an Excel spreadsheet on a daily basis and reconciled monthly.

Implementation date: Immediately

- 2.5 We have established a procedure that will ensure that all pump meters are calibrated on an annual basis. Also, any variances will be identified in reconciliations and handled accordingly.

Implementation date: Immediately

- 2.6 We are currently in process of attaining backup information and will subsequently send invoices.

Implementation date: Immediately

- 2.7 Charges are posted to the account of the user at the end of the month. A report is sent to the user and any adjustments would be processed after discussions. This process was changed two years ago due to user review and approval delays or inaction.

Implementation date: Immediately

3. Controls Over Vehicle Services Fuel Usage

Vehicle Services dispenses fuel for its own equipment and vehicles, including University rental vehicles. Fuel is dispensed using AIM, the FMS Supervisor Key and the Master Key. While their Vehicle Services fuel usage is being recorded, there is no supervisory oversight to verify the propriety of dispensed fuel. In the absence of oversight, there is no assurance that fuel is being used strictly for business purposes.

Recommendation

3.1	The Parking & Transportation Department should establish procedures to ensure management oversight over Vehicle Services own fuel usage.
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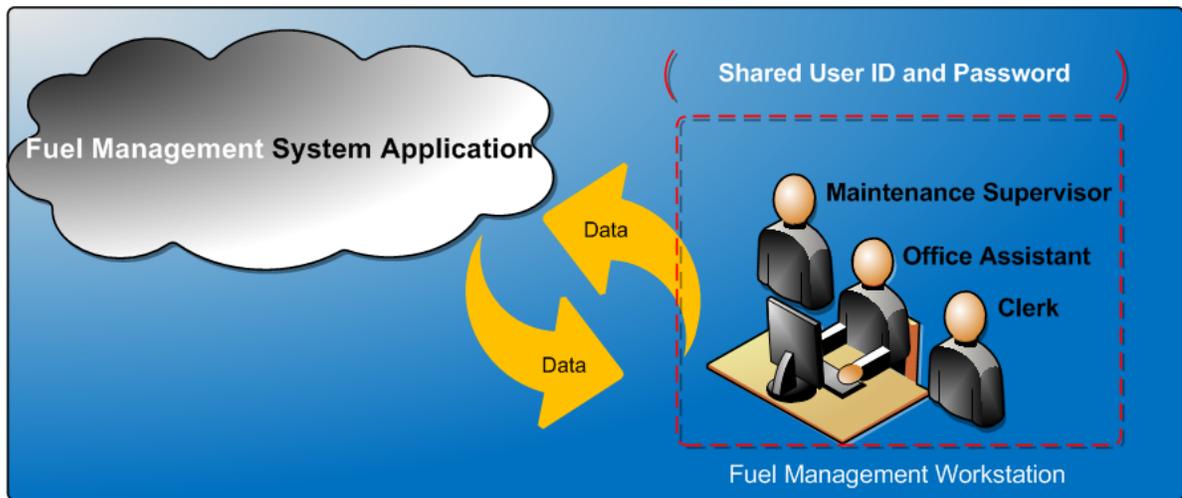
Management Response/Action Plan:

- 3.1 Parking and Transportation will implement a process to use the fuel logs and the mileage logs to reconcile usage of the Vehicle Services vehicles.

Implementation date: Immediately

4. Identity Management

The purpose of identity management is to uniquely identify user accounts so that they can be appropriately managed within the Fuel Management System Application. During the audit, we noted that there is only one user ID and password assigned to the Fuel Management System application. The user account and password is shared between the Maintenance Supervisor, the Office Assistant, and the Clerk.



The application of user account passwords is an effective means to authenticate and ensure that the user account is being used by the individual that the account was intended for. The continued sharing of the Fuel Management System application account greatly reduces accountability and increases the risk of unauthorized fuel use going undetected.

Recommendation

4.1	Vehicle Services should discontinue shared usage of Fuel Management System application account.
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Management Response/Action Plan:

4.1 Sharing FMS application account ID has been discontinued and all users have been issued separate user ID's.

Implementation date: September 1, 2011

5. Physical Security Over Fuel Sites and FMS Keys

We performed observation at both fueling sites and noted that each site contains some level of physical security controls. For example, both sites fuel pumps are locked and are located in clearly visible, fenced areas. However, the fencing surrounding the tanks is not locked and the area is accessible by unauthorized vehicles. Both sites are accessible 24 hours/7 days and there are no cameras or other devices recording fuel area activities.



All Vehicles Service staff has access to the FMS Supervisory and the Master Keys. The keys are kept in a locked drawer in the Maintenance Supervisor's Office. However, during operating hours these keys are accessible to all Vehicle Services staff members. We also observed that each Vehicle Services staff, except for the Office Assistant, is authorized and trained to dispense fuel manually. The lack of fuel station security and open access to the FMS Supervisory and Master Keys decrease fuel accountability and increase the possibility of unauthorized fuel usage without detection.

Recommendations

Vehicle Services should:	
5.1	Take necessary measure to ensure that fuel area is secured at all times.
5.2	Limit the amount of personnel that have access and authority to use the Fuel Management System Supervisory and the Master Keys.

Management Response/Action Plan:

5.1 We are in the process of identifying fuel safety measures, including looking into cameras to monitor fueling activities.

Implementation date: December 31, 2011

5.2 A procedure will be established for limiting personnel having access to FMS Supervisory and Master Keys.

Implementation date: September 1, 2011

6. Fuel Master System Not Being Fully Utilized

Vehicle Services uses the Fuel Management System to assist with fuel inventory management. The system performs various functions including:

- Electronic read/write key.
- Real-time on-site transaction journal receipt and backups.
- Vehicle preventative maintenance alerts and fuel efficiency reports.
- Inventory control/tank monitor interface.
- Transaction billing reports and invoicing.

The FMS was designed to save money and increase accountability by eliminating the need for manual fuel tracking, continuous monitoring of fuel inventory levels and fuel distribution. However, during our audit we observed several control issues, as follows:

- Fuel inventory is not being consistently tracked.
- Fuel inventory is not being reconciled.
- Manual fuel dispensing is increasing without adequate controls.
- Fuel pumps reading and calibration errors are not always timely identified and repaired.
- Staff is not adequately trained to optimize FMS capabilities.
- The full features of FMS, which can assist in the effective and efficient management of the fuel inventory, are underutilized.

Recommendation

6.1	Vehicle Services should take greater advantage of the Fuel Management System's functionality for managing University fueling activities.
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Management Response/Action Plan:

6.1 As the fueling systems come on-line, procedures will be updated and implemented to maximize capabilities of the Fuel Management System.

Implementation: January 1, 2012