

OFFICE OF THE CITY CONTROLLER



**GENERAL SERVICES DEPARTMENT
FUEL MANAGEMENT PERFORMANCE AUDIT**

Ronald C. Green, City Controller

David A. Schroeder, City Auditor

Report No. 2010-18



OFFICE OF THE CITY CONTROLLER
CITY OF HOUSTON
TEXAS

RONALD C. GREEN

June 30, 2010

The Honorable Annise D. Parker, Mayor
City of Houston, Texas

SUBJECT: Report No. 2010-18 General Services Department – Fuel Management Performance Audit

Dear Mayor Parker:

The Audit Division within the Office of the City Controller has completed an audit of selected elements of fuel management in relationship to the General Services Department (GSD). The objectives of the audit were to determine whether:

- The Department is in compliance with existing Policies and Procedures, Federal, State, and Local laws, codes, and other regulatory guidelines in regard to procurement, transportation, storage, and issuance of fuel;
- The City's fuel procurement process ensures the City is receiving fuel from an approved vendor, and at a fair price;
- The Department's fuel transportation processes ensure the City receives the contracted amount of fuel at the desired locations timely;
- The Department's fuel issuance processes are adequate in safeguarding the asset;
- The equipment used in the storage of fuel by the Department are properly maintained;
- There is proper accountability and assigned responsibility for the Department's fuel accounting processes; and
- The fuel inventory is adequate.

The focus of this audit was primarily on the fuel related functions that are controlled and managed by GSD. In some cases, the effect of the processes reached beyond GSD and involved other departments. Any related findings are addressed in the attached report, separated by department. Because fuel management impacts most City Departments and interacts with many other business processes, the potential scope of our engagement began very broad and subsequently narrowed based on magnitude, complexity and available time and resources. Additionally, the Audit Division staff used this engagement as an opportunity to learn operational practices at a deeper level to provide a knowledge base internally. Based on the learning curve and the fact that this project straddled two administrations, there was an increase in the timeframe that it took to re-verify the underlying facts and prepare the report. The Audit Division accepts responsibility for most of this expanded time line and views it as an opportunity to build intellectual capital and eliminate future inefficiencies in our processes.

The attached report provides details of our work, conclusions, recommendations, and management responses. Some key points that the team concluded are:

- GSD has a reliable and efficient method for ordering fuel and maintaining adequate fuel inventory levels; the City purchases its fuel from reliable and approved vendors, is charged the market rate, and the fuel is delivered timely;
- There is no formal Citywide Fuel Standard Operating Procedure (SOP). The existing Fuel Administrative Procedure (AP 5-1) was last updated in 1986. Therefore, we recommend a Fuel SOP be prepared and AP 5-1 be updated. Both should be distributed to the various City fueling sites to provide a basis for consistent compliance with regulations and guidelines;
- As of June 2009, approximately 20 percent of the active fuel storage tanks have reached or exceeded their estimated useful life. Estimated cost to replace these tanks is \$6.5 million. It is important to note that challenging economic times puts a strain on the City's budget and sometimes creates an incentive to defer investment in infrastructure maintenance and/or repairs. We are not implying intentional delays, but rather want to communicate our concerns to management. These should be viewed as deferred liabilities to additional costs for replacement, and can create additional risks of leaks, environmental issues, fines, etc.;
- GSD has proper accountability and assigned responsibility of the accounting processes for ordering, payment and departmental charge backs. There is; however, a lack of proper accountability and assigned responsibility over the verification of accuracy of inventory levels. Under the current practice, this reconciliation should be performed at the fuel sites and verified by GSD. However, installing automatic tank gauges to all underground storage tanks and connecting them to a centralized monitoring system, would enhance efficiencies for inventory control, tank leak detection, fuel ordering, and allow for a perpetual inventory to be maintained; and
- There are disparate systems used throughout the City to account for fuel activity, which creates complexities and a need for additional controls for adequate monitoring. This also requires added levels of review and manual transactions to accurately interface critical data from one system to another, allowing for errors, delays, and inefficiencies. We recommend considering alternatives to the current decentralized nature of the City's fuel operations in order to gain efficiencies; provide consistency for the City's fueling operations, related activities, and accounting processes.

We commend GSD, Administration and Regulatory Affairs Department, Finance Department, and Legal Department management for their timely efforts and/or proposals of action to remedy the issues identified. We also appreciate the cooperation extended to our auditors by these department's personnel during the course of the audit.

Respectfully submitted,



Ronald C. Green, City Controller

xc: City Council Members
Waynette Chan, Chief of Staff, Mayor's Office
Bob Christy, Interim Director, General Services Department
Alfred Moran, Jr., Director, Administration and Regulatory Affairs Department
Richard Lewis, Director, Information Technology Department
David Feldman; City Attorney, Legal Department
Michelle Mitchell, Director, Finance Department

TABLE OF CONTENTS

LETTER OF TRANSMITTAL	i
EXECUTIVE SUMMARY.....	2-5
• AUDIT OBJECTIVES	2
• BACKGROUND, SCOPE, AND AUDIT METHODOLOGY	2
• PROCEDURES PERFORMED	4
• CONCLUSION	4
• SUMMARY RECOMMENDATIONS.....	5
DETAILED REPORT	6-23
BACKGROUND	6
DETAILED FINDINGS, RECOMMENDATIONS, AND MANAGEMENT RESPONSES	11
GENERAL SERVICES DEPARTMENT (GSD):	
1. FUEL INVENTORY RECONCILIATION	11
2. RECORDING FUEL ACTIVITY.....	12
3. FUEL RELATED INVOICES	14
GSD AND FINANCE DEPARTMENT (FIN):	
CAPITALIZATION OF FIXED ASSETS	15
ADMINISTRATION & REGULATORY AFFAIRS DEPARTMENT (ARA):	
FUEL RELATED ADMINISTRATIVE PROCEDURES (AP)	18
ARA AND LEGAL DEPARTMENT:	
1. MONITORING CONTRACTS.....	19
2. FINAL CONTRACT REVIEW	20
CITYWIDE:	
1. QUALITY OF DIESEL FUEL FOR GENERATORS	21
2. FUEL SITE MAINTENANCE INVOICING	22

APPENDICES

GSD's "City of Houston Fuel Site Assessment Report" dated July 2007 (Report and Recommendations).....	APPENDIX A
GSD's "City of Houston Fuel Site Assessment Report" dated December 2008 Update (Report and Recommendations).....	APPENDIX B

EXECUTIVE SUMMARY

AUDIT OBJECTIVES

The Audit Division of the Office of the City Controller has completed a performance audit of General Service Department's (GSD), Energy Division, Fuel Management Section (GSD Fuel) fuel purchasing and transportation activities. The initial Audit Notification Letter was distributed Citywide and listed nine audit objectives for the fuel audits to be conducted. In the GSD Fuel Audit we analyzed the original objectives and determined seven of the nine audit objectives were relevant to GSD. They were:

- Determine whether the Department is in compliance with existing Policies and Procedures, Federal, State, and Local laws, codes, and other regulatory guidelines in regard to procurement, transportation, storage, and issuance of fuel;
- Determine whether the City's fuel procurement process ensures the City is receiving fuel from an approved vendor, and at a fair price;
- Determine whether the Department's fuel transportation processes ensure the City receives the contracted amount of fuel at the desired locations timely;
- Determine whether the Department's fuel issuance processes are adequate in safeguarding the asset;
- Determine whether the equipment used in the storage of fuel by the Department are properly maintained;
- Determine whether there is proper accountability and assigned responsibility for the Department's fuel accounting processes; and
- Determine whether the fuel inventory is adequate.

BACKGROUND, SCOPE, AND AUDIT METHODOLOGY

The City of Houston currently allocates responsibility and accountability of fuel among the following eight Departments:

- General Services Department (GSD)
- Administrative and Regulatory Affairs Department (ARA)
- Public Works and Engineering Department (PWE)
- Houston Fire Department (HFD)
- Houston Police Department (HPD)
- Houston Airport System (HAS)
- Solid Waste Management (SWM)
- Parks and Recreation Department (PARC)

Further, major fuel activities are separated into: (1) selected centralized functions under GSD and (2) other decentralized activities for the remaining departments that manage the current population of 94 fueling sites as follows:

(1) Primary Centralized Functions (GSD):

- Developing and updating the Citywide fuel budget;
- Procuring, transporting, delivering of fuel, and paying fuel invoices;
- Performing some accounting functions for fuel processes, departmental charge backs, and fuel inventory;

- Performing some interface of fuel data between systems and maintenance of the automated software programs;
- Managing the City's ComData (fuel) charge cards;
- Assisting in fuel storage tank certification and arranging for fuel tank construction, renovations and removal; and
- Managing the fuel related contracts (except for maintenance.)

(2) Decentralized Functions:

- Manage physical fuel sites, personnel and/or their training;
- Approve fuel storage tank construction, and encumber funding for fuel storage tank renovations, replacements, or retirements;
- Monitor the maintenance contracts;
- Arrange for updating and funding fuel site equipment;
- Ownership of fuel; and
- Security of fuel sites.

To better manage and facilitate the audit process, we selected departments based on coverage related to both centralized and decentralized areas of responsibility. In this audit, we selected the department with centralized functions (GSD). GSD's Mission Statement indicates that it "provides a variety of citywide management and operational support services to other city departments ..." This includes centralized management of energy, property, security, real estate, environmental programs, and project management for renovations or construction related to Capital Improvement Projects (CIP), which involves annual spending of approximately \$190 million for electricity, liquid fuel, and natural gas.

Our audit was designed to evaluate and test compliance with procedures and the adequacy of internal controls related to: fuel purchasing; transportation; and delivery to City fueling sites. The scope period of the Audit was from July 1, 2007 through May 31, 2009, and included reviewing quality control, security, and record keeping throughout the three areas of concentration. Our audit did not include a review of the procurement card fuel purchases or activities related to jet fuel. During the audit, it came to our attention that GSD's accounting methods for closing construction to fixed assets did not appear to be in compliance with the City's policy, therefore, we reviewed the SAP accounting records of two completed construction projects to test for proper capitalization.

The audit procedures, designed to meet the audit objectives, required us to interact with departments outside of GSD. For example, to test the third objective, we needed to verify the receiving function of fuel, which is performed by a different department than GSD, who orders the fuel. This reflects the fact that some functions have processes that are split between multiple departments, making accountability, control, and monitoring difficult. This expanded our scope outside of GSD to the extent necessary to reasonably satisfy the audit objectives. It also impacted the recommendations as they pertain to accountability because there may be competing interests or lack of control over the function by a single department.

The Audit Team has attached two reports prepared by GSD Fuel, as requested by the previous administration. The first was issued in July 2007. The second was updated and issued in December 2008. They are provided as appendices to this report because their initial distribution was limited. As indicated in the PROCEDURES PERFORMED section, we used these reports as a basis for limited testing and support for our conclusions.

The scope of our work did not constitute an evaluation of the overall internal control structure of the department. Department management is responsible for establishing and maintaining a system of internal controls to ensure compliance with the City's administrative policies and procedures and executive orders. The objectives are to provide management with reasonable, but not absolute, assurance that fuel activities are approved, computed, supported, and reported in compliance with applicable City executive orders, administrative procedures, and departmental standard operating procedures, if any.

PROCEDURES PERFORMED

In order to meet the objectives and scope outlined above, and provide a basis of evidence sufficient to render our conclusion, the Audit Team performed the following audit procedures:

Obtained and Reviewed:

- Citywide and GSD policies and procedures;
- Local, State, and Federal guidelines;
- Relevant contracts selected to test for compliance;
- Previous Assessments of City of Houston Fuel Sites performed by GSD (2007 and 2008); and
- Accuracy of various databases used to accumulate fueling data and the condition of storage tanks.

Determined the adequacy and/or accuracy of the:

- Valuation methods for fuel inventory;
- Reconciliation process for fuel inventory and reporting;

Judgmentally selected a sample population of invoices related to two contracts and substantively tested supporting source documentation for:

- Completeness;
- Accuracy;
- Compliance with State and Federal Laws, and Contract terms; and
- Timely payment and recording into the financial records.

CONCLUSION

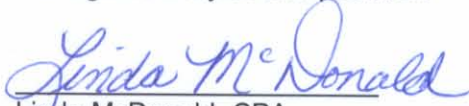
Based on the audit procedures performed in relationship to each of the objectives as outlined above, and within the scope of our audit, we conclude that:

- There is no formal Citywide Fuel Standard Operating Procedure (SOP). The existing Fuel Administrative Procedure (AP 5-1) was last updated in 1986. Therefore, we recommend a Fuel SOP be prepared and AP 5-1 be updated. Both should be distributed to the various City fueling sites to provide a basis for consistent compliance with regulations and guidelines.
- The City purchases its fuel from reliable and approved vendors, is charged the market rate as published in the daily *Platts Oilgram Price Report* and the *Oil Price Information Service*.

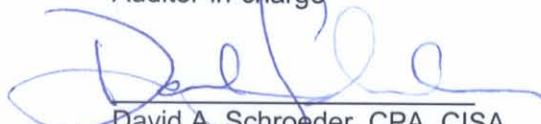
- We were able to determine the fuel was delivered timely; however, the current reconciliation procedure does not match the actual physical amounts of fuel delivered to the fuel delivery ticket. We recommend a documented procedure be developed and put into place that would require the site attendant to record the actual gallons on the delivery ticket.
- During the course of our audit, it was reported that fraud, waste, and abuse had occurred at some fuel sites, triggering further investigation by the appropriate enforcement agencies. To better safeguard the asset, we suggest such items as cameras, closing underutilized sites, automation of the remaining manual sites (see Appendix B, Page 13 and 14), and restricted access be reviewed for their effectiveness and implemented accordingly.
- As of June 2009, approximately 20 percent of the active fuel storage tanks have reached or exceeded their estimated useful life. Estimated cost to replace these tanks is \$6.5 million (see Appendix B, Page 16). Additionally, an error was noted in the capitalization of storage tanks upon completion of the construction of a new HFD facility. This resulted in a lack of specific identification and a longer depreciation period than required by City Policy, which impacts financial reporting of depreciation expense.
- GSD has proper accountability and assigned responsibility of the accounting processes for ordering, payment and departmental charge backs. There is; however, a lack of proper accountability and assigned responsibility over the verification of accuracy of inventory levels. This reconciliation should be performed at the fuel sites and verified by GSD.
- GSD has a reliable and efficient method for ordering fuel and maintaining adequate fuel inventory levels.

SUMMARY RECOMMENDATIONS

Based on the results of our audit, the City should consider alternatives to the current decentralized nature of the City's fuel operations in order to gain efficiencies; provide consistency for the City's fueling operations, related activities, and accounting. Additionally, installing automatic tank gauges to underground storage tanks and connecting them to a monitoring system, would enhance efficiencies for inventory control, tank leak detection, and fuel ordering. Fuel is a highly regulated commodity and as such, it may be prudent to have the asset managed by a single entity, rather than several departments with differing management styles and priorities.


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DETAILED REPORT

BACKGROUND

The General Services Department's (GSD) Mission Statement states that it "provides a variety of Citywide management and operational support services to other City of Houston (City) departments. This allows those other departments, acting as external service providers, to concentrate on their core functions." GSD relies on funding from the other City departments for the services they provide to them.

GSD supports the operational needs of client departments through centralized management of energy, property, security, real estate, environmental programs, and project management for renovations or construction related to Capital Improvement Projects (CIP). Operational decisions in City departments impact the daily allocation and deployment of resources made by GSD. Their department activities include:

- Property maintenance and management for over 300 City owned or leased facilities;
- Periodic review and revision of disaster recovery / business continuity plans;
- Management of energy and energy conservation efforts;
- Procurement of over \$190 million in electricity, liquid fuel, and natural gas;
- Environmental inspections, evaluations, and remediation or abatement of contaminated materials;
- Oversight of physical security for various properties;
- Administration of photo identification badges for access control; and
- Financial transaction accountability to all client departments for activities managed through the department.

In July 2006, GSD assumed the responsibility for purchasing fuel for the City and arranging for its transportation and delivery to the various fueling sites. Additionally, GSD's Energy Division, Fuel Management Section (GSD Fuel) is responsible for payment of the City's fuel procurement cards used by HPD and HFD, and for the jet fuel for HPD helicopters. Our audit did not include a review of the procurement cards or jet fuel.

In early 2007, GSD was tasked by the Mayor's Office to review the Citywide fuel site operations. In July 2007 (See Appendix A for 2007 Report) a report titled "City of Houston Fuel Site Assessment Report" was issued. The report included:

- An assessment of the conditions of each of the City owned fuel sites;
- Establishment of standards for current and future fuel sites;
- Recommendations for improving operations;
- Reductions in operating costs; and
- Establishment of a more centralized data and inventory control program.

The review was updated by GSD Fuel in December 2008 (See Appendix B for 2008 Report). This report:

- Updated the site conditions;
- Discussed steps taken to reduce operating costs;
- Reviewed recommendations from the 2007 report; and
- Made additional recommendations.

GSD Fuel's 2008 Report supports a more centralized process regarding fueling activities and states the following:

"The decentralized nature of the City's fuel operations has led to varying degrees of quality control in terms of site maintenance, staff training and regulatory compliance. In recent years, the number of issues and their potential impact has become more apparent and the need to replace aging tanks and equipment is obvious. Movement to more centralized control, in conjunction with the installation of new equipment, will lead to: better inventory control; improved monitoring for potential environmental problems; development of procedures for new site approval; site design and equipment standardization; improved monitoring of site maintenance and repair; and more complete data on vehicle fuel usage."

During the conduct of this audit and as a result of the many facets of the City that fuel impacts, certain issues came to our attention that included other departments. These issues are addressed in this report.

Table 1 (below) details the total amount spent on City fuel and delivery charges for the period of April 1, 2008 through March 31, 2009.

Table 1

Amount Spent on Fuel and Delivery Gallons Purchased Average per Gallon			
Vendor	Amount	Number of Gallons (% of total Gallons)	Avg Price per Gallon
Fuel Charges			
Motiva Enterprises, LLC (diesel and unleaded)	\$28,529,699	10,260,881 (91%)	\$2.78
ComData (gasoline credit cards - used by HPD and HFD)	\$2,336,923	878,797 (8%)	\$2.66
ADA (jet fuel)	\$362,463	116,850 (1%)	\$3.10
Subtotal Fuel	\$31,229,085		
Delivery Charges (Excluding Jet Fuel)			
* City of Houston's PWE	\$1,160,811		
Oil Patch-Brazos Valley, Inc.	\$848,197		
ADA (jet fuel)	\$389		
Subtotal Delivery	\$2,009,397	10,260,881	\$0.20
Total	\$33,238,482	11,256,528	\$2.95

*PWE's charge for fuel delivered to smaller City fuel sites for nine of the twelve months, April through December 2008.

The City purchased 11,256,528 gallons of unleaded, diesel, and jet fuel. For nine of the twelve months, the Public Works and Engineering Department (PWE) delivered fuel to the smaller City fuel sites charging the various City departments a total of \$1,160,811 for this service. PWE ceased delivering fuel in December 2008, at which time Oil Patch began delivery to all City fuel sites. When PWE discontinued delivering fuel, the ability of the City to continue operations for extended periods during an emergency, was significantly diminished.¹

The bulk of fuel purchases (91%) is purchased from Motiva Enterprises, LLC (Motiva) and transported by Brazos Valley, Inc (Oil Patch.) Our audit focused on the larger portion of GSD's fueling responsibilities. Table 2 includes the Motiva data along with the associated transportation and fuel tank maintenance fees.

Table 2

Amount Spent on Fuel, Delivery, and Storage Tank Maintenance (Excluding Jet fuel and charge card purchases)			
Vendor	Amount	Number of Gallons	Avg Price per Gallon
<i>Fuel Charges</i>			
Motiva Enterprises, LLC (diesel and unleaded)	\$28,529,699	10,260,881	\$2.78
<i>Delivery Charges</i>			
* City of Houston's PWE	\$1,160,811		
Oil Patch-Brazos Valley, Inc.	\$848,197		
Subtotal Delivery	\$2,009,008	10,260,881	\$0.20
<i>Fuel Tank Maintenance Fees</i>			
2008 Maintenance and Testing	\$414,723	10,260,881	\$0.04
Total	\$30,953,430	10,260,881	\$3.02

* PWE's charge for fuel delivered to smaller City fuel sites for nine of the twelve months, April through December 2008.

¹ At the time of the issuance of this report, PWE stated, they were having their fuel delivery vehicles repaired for certification and they are compiling a list of qualified City drivers so that by July 1, 2010, the City would be prepared to deliver fuel in emergency situations.

At the time of this report, there were 94 active fueling sites located throughout the City. These fueling sites are operated and maintained by the following six departments²:

- HFD (46 sites)
- Public Works and Engineering (16 sites)
- Parks and Recreation (14 sites)
- HPD (11 sites)
- Solid Waste Management (4 sites)
- Houston Airport System (3 sites)

Individual City departments are responsible for managing their own sites, including management of inventory levels; obtaining certifications; maintenance and operation of the fueling sites; the storage and issuance of fuel; training of personnel; site security; and recordkeeping. GSD Fuel is responsible for determining the quantity of fuel to order daily; arranging for delivery; valuing the inventory; paying the fuel and transportation invoices; charging the appropriate departments for their share of the costs; and arranging for some of the maintenance of the fueling equipment, among other fuel-related activities.

Other GSD Divisions determine if the storage tanks meet state guidelines, assist in obtaining required certifications, oversee the replacement of aging equipment, the construction of fuel sites, and arrange for camera surveillance if requested and funded by the City department. Further, GSD Fuel has begun to take a more active role in the maintenance of fuel dispensing equipment, and the review of contractor's maintenance invoices.

Forty-seven of the 94 sites (50%) are connected to the City's Fuel Force automated fuel system. Fuel Force is a database which provides the following functions:

- Authorizes the dispensing of fuel for City vehicles;
- Automatically records fuel dispensing transactions;
- Allows for the manual data input by GSD Fuel of fuel deliveries; and
- Produces usage reports and interfaces with the City's Fleet Management System (FMS) and the Fleet Billing System.

The remaining 47 sites are manual systems. The manual systems represent approximately 14% of the City's total fuel usage (14% X \$28,529,699 = \$3,994,158, and 1,436,523 gallons). Each of these transactions (dispensing and deliveries) must be manually entered into the FMS. It is important to note that after Fieldwork and prior to the distribution of this report, GEMS2000 was the City's FMS and was being replaced by another system (M5). As of the writing of this report, the M5 System was not operational.

The process for recording fuel deliveries and dispensing in both Fuel Force and the City's FMS is as follows:

- Manual sites enter the amount of fuel dispensed into the City's FMS;
- GSD Fuel enters the fuel deliveries for all departments except HPD;
- Fuel Force is downloaded into the City's FMS;
- The combined data in the City's FMS is downloaded to create a report titled the "*Fleet Billing Summary*" (managed by GSD Fuel);

² At the beginning of the audit, Administration and Regulatory Affairs operated one site. This was previously operated by the Houston Department of Health and Human Services (HDHHS.). Prior to the printing of this report, this site was closed.

- The *Fleet Billing Summary* separates the costs into Cost Centers and this is posted on a City Intranet website;
- The various City departments download the data provided in the *Fleet Billing Summary* once a month and record the fuel charges into SAP;
- GSD Fuel accumulates end of the month fuel inventory quantities (gallons) and prepares an inventory report to distribute to the various City departments; and
- GSD Fuel informs the various City departments what fuel price to use for monthly fuel billing.

The majority of the City's 94 fueling sites report their fuel tank balances to GSD Fuel on a daily (weekday) basis. GSD Fuel determines the amount of fuel to be ordered based on certain predetermined criteria, and places the order with Oil Patch.

DETAILED FINDINGS, RECOMMENDATIONS AND MANAGEMENT RESPONSES

GSD:

1. FUEL INVENTORY RECONCILIATION

BACKGROUND:

Oil Patch picks up the fuel at the fueling terminal and delivers it to the various City fueling sites. The driver has a Bill of Lading from the fueling terminal and a delivery ticket to be signed by the City employee that specifies the quantity and type of fuel delivered. The contract requires the driver and City employee to measure the City tank(s) before and after the fuel delivery. This is typically accomplished by "sticking" the fuel tank with a measuring stick calibrated in inches.

In our testing of 61 delivery tickets, *sixteen* did not have the stick measurements notated on the delivery ticket; and *two* of the 61 were not signed by a City employee. We did not see any delivery tickets where the inches had been converted to gallons.

Our discussions with Oil Patch and City employees revealed that there were rare occasions when Oil Patch has pumped the fuel into the fuel tanks even though a City employee was not present to witness the stick measurement or to sign and accept the delivery ticket.

At the end of the month, the City records the fuel inventory on its books. This inventory is based on the reported in-ground inventory (gallons) at the end of month valued at that date's market value, plus any transportation cost. By using this method to record book inventory, any shortage or shrinkage amount is lost. Under this type of adjustment, the fuel inventory balance on the books is a "plugged" amount. Accurate and reliable data are essential to maintain efficient and effective control and accounting over fuel usage and available inventory on hand. To have effective controls, the City should maintain accurate perpetual fuel inventory balances and these balances should be periodically reconciled with the actual physical inventory on hand.

FINDING:

GSD Fuel does not maintain a perpetual Citywide fuel inventory balance and they are not verifying that the quantity of fuel listed on Oil Patch's delivery ticket is the quantity that went into the storage tank.

RECOMMENDATION:

GSD Fuel should devise a method for maintaining a perpetual fuel inventory balance. Additionally, GSD Fuel should perform a periodic reconciliation of the system balance with the actual physical in-ground fuel quantities. One part of this process would be to ensure compliance with the contract requirements by having the station attendant and the Oil Patch driver take a stick measurement before and after the fuel delivery. To add further value to this control, the measurements taken should be converted into gallons and recorded on the bill of lading.

MANAGEMENT'S RESPONSE – GSD

“GSD will speak with Oil Patch to ensure that all deliveries have a before and after stick reading. In some cases the conversion from inches to gallons may not be possible if a conversion chart is not available for the driver.

GSD agrees that a perpetual fuel inventory, which includes the reconciling of each site, is necessary. However, complete reconciliation of manual sites may be difficult. GSD and ITD are working with the vendor for the new fleet management system to develop the fuel interface with Fuel Force. Once the interface is developed and sites setup in the new system, GSD will be working with the operating departments to establish the beginning inventory for each tank. This process will lead to a perpetual inventory in the fleet management system. Once complete, GSD, in conjunction with the operating departments, will establish a schedule to periodically adjust the inventory to the in-ground volume.”

2. RECORDING FUEL ACTIVITY

BACKGROUND:

GSD Fuel is responsible for the Fuel Force system. This automated system performs the following functions:

- Authorizes the dispensing of fuel for City vehicles;
- Automatically records fuel dispensing transactions;
- Allows for the manual data input by GSD Fuel of fuel deliveries (except for HPD); and
- Produces usage reports and interfaces with FMS and the Fleet Billing System.



Fuel Force Key Pad

As listed above, GSD Fuel is responsible for recording all fuel deliveries into the Fuel Force system (except for HPD). The sites equipped with Fuel Force automatically record their distribution of fuel directly into Fuel Force; however, department personnel at the non-automated sites must manually enter their fuel dispensed into Fuel Force.

In order for a City employee to receive fuel, they must enter certain information into the Fuel Force system: 1) their employee ID number; 2) the vehicle shop number; 3) the mileage on the vehicle (or hours); and 4) the hose number. If any of this information does not meet certain programmed criteria, Fuel Force will not dispense fuel. However, certain designated City employees have the ability to override the mileage requirement within the system so that fuel can be dispensed without satisfying the mileage criterion. Fuel Force captures these transactions and they can be viewed in a report.

FINDING:

We reviewed a sample of 164 PWE Motiva Enterprises, LLC (Motiva) invoices for the period January 1, 2009 through March 31, 2009 and noted the following:

- Nine of 164 (5.48%) invoices were not included in Fuel Force. This amounted to 33,502 gallons of fuel at a cost of approximately \$51,204.
- There were three fuel deliveries recorded in Fuel Force with no corresponding Motiva invoices. This amounted to 6,063 gallons of fuel, which were determined by GSD to be duplicates (items were entered twice).
- There were seven deliveries recorded in Fuel Force whose total gallons entered did not agree with the amount of gallons invoiced. Total gallons entered for these seven was 16,100 and the invoiced quantity totaled 14,027; a difference of 2,073 gallons.
- There were two deliveries recorded in Fuel Force (3,298 and 30 gallons) that were determined to be in error. The 3,298 gallons was recorded to the wrong delivery point, while the 30 gallons were consumed, but erroneously recorded as a delivery.

RECOMMENDATION:

We recommend GSD management provide the necessary oversight to ensure that the number of gallons reflected on the invoices is correctly recorded in the two databases.

It is also imperative the responsible departments record all the dispensing activity at the manual sites into the City's FMS.

MANAGEMENT'S RESPONSE – GSD

“The errors have been corrected and procedures put in place to prevent the reoccurrence in the future.”

3. FUEL RELATED INVOICES

BACKGROUND:

GSD Fuel is currently using an Access database to record the individual Motiva and Oil Patch invoices related to fueling activities. The invoices are generally received on a daily basis.

GSD Fuel waits until they have several invoices; then they batch individual invoices together and record them as one invoice in the SAP system. When GSD Fuel batches these invoices into one payment, the details for each invoice is unavailable for review in SAP. The data has the appearance of being only one invoice, rather than several in SAP.

FINDING:

The City is obligated to pay interest to vendors if the payment exceeds 30 days from the date the proper invoice or the goods were actually received. By batching the invoices, it becomes difficult for the Controller's Office to recognize if the payment should include interest.

RECOMMENDATION:

GSD Fuel should begin recording the individual invoices directly into the SAP system. The individual invoices and their corresponding date(s) are critical for interest calculation and clarity of detail.

MANAGEMENT'S RESPONSE – GSD

“Entering invoices individually into SAP instead of by batch as is presently done will be very time consuming and most likely require additional staff. The current Access database would still be needed to perform the verifications discussed in other sections of the report. Therefore, the data entry would have to be done twice. GSD, however, is investigating the possibility of downloading a file from the Access database to SAP so individual invoices can be recorded in SAP. This would accomplish what Controllars is recommending, but without the duplicate data entry. Until that download is available, any invoice that is over 30 days will be entered individually by GSD Fuel Management into SAP.”

GSD AND FIN:

CAPITALIZATION OF FIXED ASSETS

BACKGROUND:

Three City departments manage and account for construction projects; Houston Airport System (HAS), PWE, and GSD. HAS manages and accounts for all its construction; PWE manages and accounts for the majority of its own construction; and GSD manages and accounts for all the remaining construction projects.

The Audit Team attempted to trace new underground fuel storage tanks installed with the recently completed HFD Station 8 to the fixed asset ledger. We also tried to trace three underground storage tanks replaced in 2008 for the HPD at 61 Riesner which were also accounted for by GSD.



Underground Storage Tank being installed

GSD informed the Audit Team that there were several fixed asset components with varying useful lives associated with the construction. However, all the related costs (construction, furnishings, radio equipment, antennas, concrete parking lot, exercise equipment, furniture and appliances, etc.) were categorized as a **BUILDING**, and are now being depreciated with a 45 year useful life, rather than their appropriate useful life.

The FIN is the fixed assets process owner for the City and as such is responsible for ensuring that the City's assets are accounted for properly. FIN has a 158 page Administrative Procedure, "*Fixed Asset Accounting and Management Procedures Manual*" (AP), whose purpose is to "establish organizational responsibilities of City departments and managers for fixed asset management, control, accounting, and record keeping and to define fixed assets and control management for their capitalization."

Additionally, in 2009 FIN created a two page form titled, "WBS costs breakdown for TECO status" (TECO stands for technically complete) which serves as a guide for the project manager/accountant to allocate assets into certain categories when transferring and recording construction costs to depreciable fixed asset status. There are 10 basic categories with further delineation by useful life. The AP further states that one of its

objectives is "To ensure proper financial accounting and reporting in accordance with Generally Accepted Accounting Principles, the Governmental Accounting Standards Board, the National Association of Regulatory Utility Commissioners, and other applicable government accounting standards."

When fixed assets are consolidated into one line item, there are certain risks that can come into play. The risks include, but are not limited to:

- Depreciation may be under/over reported for individual component items;
- Assets lose their individual identity within SAP;
- Assets may not be inventoried properly (failure to be tagged);
- Grant money may not be accounted for properly; and
- Ultimately, the City's Credit Rating could be affected.

GSD closed the \$8.7 million HFD Station 8 to a single asset classification rather than allocating the fixed assets according to City guidelines.

GSD replaced three underground storage tanks for the HPD at 61 Riesner at a cost of \$1,128,031. A Request for Council Action (RCA) to accept the work and approve the final payment was completed on January 3, 2008. As of December 2009 (24 months later), the costs are still in Work in Progress, and have not been closed to fixed assets.

FINDING:

The HFD Station and the three underground storage tanks were not closed in compliance with FIN's Fixed Asset AP or according to Generally Accepted Accounting Principles (GAAP).

RECOMMENDATION:

GSD and Finance should review their roles and relationship for closing construction costs to ensure the costs are captured and categorized according to the AP and GAAP. They should also discuss closing completed projects in a timely manner. Further, they should review and correct previous fixed asset entries not categorized per the guidelines.

The FIN should perform a more thorough review process of construction closings to ensure proper accountability. If the closings are not according to the guidelines and/or in compliance with GAAP, Finance should take the appropriate steps to ensure the City's fixed assets are recorded correctly, timely, and in conformance with GAAP.

MANAGEMENT'S RESPONSE - GSD:

"...below are the roles of both GSD and Finance:

- a. GSD Project Manager Roles
 - i. Build project in SAP
 - ii. Create the budget document and submit it to GSD accounting for processing
 - iii. Create Purchase Order (PRO) in SAP
 - iv. Enter the Service Entry Sheet in SAP

- v. Inspect project site to ensure work is done correctly prior to signing off on pay estimates
- b. GSD Accounting Roles
 - i. Double check project setup in SAP to ensure correct funding information
 - ii. Coordinate with the Project Managers/ Admin Assistants as well as ERP to set up the funded program for the project
 - iii. Enter and pre-post the budget document
 - iv. Work with Finance to resolve issues relating to the budget and with the Controllers Office on any issues regarding the project if required
 - v. Review and approve CIP pay estimates to ensure that the correct amount has been entered on the Service Entry Sheet and that the correct amount of retainage (if applicable) has been held
 - vi. Act as liaison between GSD Design and Construction Division and Finance Department (Ron Kissner)
- c. Finance Roles
 - i. Set project status to TECO
 - ii. Set up asset shells based on Schedule of Values provided by the project manager
 - iii. Provide accounting information on CIP projects for the CAFR report

Note: Prior to FY10, GSD had access to TECO projects and to assist with setting up asset shells to ensure that CAFR deadlines were met. This was done in accordance with guidelines provided by the ERP support team and the Finance Department”

MANAGEMENT’S RESPONSE - FIN:

“Finance agrees that the GSD accounting methodology has not been in compliance with the AP (Fixed Asset Capitalization Policy). Finance has taken the first two steps below, and will take the third step immediately to address this error:

- The FIN department assumed from the GSD project management team the performance of the manual SAP system step which initiates the transference of costs from substantially completed GSD-managed projects to the completed capital asset records. When the completed assets are placed into service, FIN will first ensure proper break out by asset sub-category, i.e., by service life, before commencing depreciation.
- The previous error in capitalizing Fire Station No. 8 has been adjusted. Instead of the value of the fuel tanks being classified along with the rest of the project in a single asset sub-category (having the same estimated service life), the value is now broken out into multiple asset sub-categories by service life.
- Supporting documentation was provided to Mr. Adams and Ms. McDonald of that breakout.

Finance will complete here in fiscal year 2010, a similar breakout of the tanks at the 61 Riesner location also cited in the audit findings.”

ARA:

FUEL RELATED ADMINISTRATIVE PROCEDURES

BACKGROUND:

There are several laws, regulations, and other guidance pertaining to the purchase, delivery, storage, and dispensing of fuel. The City is obligated to follow these laws or be subject to possible penalties and/or closures of fueling sites. GSD Fuel drafted a Standard Operating Procedure (SOP) that provides a step by step daily operating routine which complies with the laws and regulations; however it was never approved by management or distributed to the fueling sites.

FINDING:

The existing AP 5-1, *Centralization of Vehicle Fuel Purchases*, effective March 6, 1986, needs updating. Additionally, the City does not have a formal written SOP to distribute to the 94 fueling sites regarding the operation of fueling stations; an SOP will provide consistency of operations and improve compliance with laws and regulations

RECOMMENDATION:

ARA should update the existing AP 5-1 and also prepare and distribute appropriate guidance to the various City fueling sites to provide the basis for consistent compliance with regulations and guidelines.

Note: ARA management may want to consider using GSD Fuel's draft SOP as a basis which details the day to day activities required in order to comply with the Texas Administrative Code (TAC.)

MANAGEMENT'S RESPONSE – ARA

"We concur with the recommendation to update AP 5-1 and will ensure citywide distribution upon the Mayor's approval, per E.O. 1-1. The update to AP 5-1 will include a new compliance section to address enforcement responsibilities.

We also agree that there is an immediate need for a Fuel SOP and will confer with GSD to guarantee a comprehensive guideline is established and distributed to the 94 fueling sites."

MANAGEMENT'S RESPONSE – GSD

"GSD agrees with the recommendations, but action on them should be delayed until the Mayor has finalized plans for fuel and fleet maintenance consolidation since responsibilities are likely to change."

ARA AND LEGAL DEPARTMENT

1. MONITORING CONTRACTS

BACKGROUND:

AP 5-2, *Procurement Process*, states that the contract requirements are to be reviewed and maintained by the department serviced by the contract. The Audit Team tested two contracts in regards to fuel and fuel maintenance within the City. The first was a single contract for one department and the other was a single contract for more than one department. In both scenarios, prior to contract award, ARA's Strategic Purchasing Division (SPD) is responsible for insuring the potential vendors meet all contract requirements such as insurance coverage verification, adherence to the Mayor's Drug Policy and/or Commercial Driver License. For subsequent monitoring, department representatives are trained to verify that the insurance policy meets strict standards and the drug policy conforms to the Mayor's policy.

FINDING:

The AP noted above does not define who owns specific compliance responsibilities after a City contract is awarded that involves more than one department.

RECOMMENDATION:

For contracts that involve more than one department, SPD should determine who will be responsible for monitoring all aspects of contractor compliance based on predefined criteria (i.e. which department has the expertise; which department derives the most benefit, etc), and notify that department in writing what is expected.

MANAGEMENT'S RESPONSE – SPD

The Strategic Purchasing Division (SPD) agrees with the City Auditor's finding and recommendation.

SPD, in collaboration with the Legal Department, will develop a contract provision for multi-department contracts. The new provision will require the contractor to provide all contract compliance documents, subsequent to award to the contract's major stakeholder. The major stakeholder will be identified in the contract provision as well as at the pre-performance conference. The major stakeholder will be advised of its responsibilities as they relate to contract administration.

2. FINAL CONTRACT REVIEW

BACKGROUND:

The Motiva contract is a standard City contract that includes many generic requirements and exhibits. Our review of the contract revealed several errors. The Motiva contract had the following errors:

- Page 3 and 5 of 22 defines Exhibit B as "Scope of Services"; Exhibit B is "Specifications";
- Page 7 of 22 Section H refers to Exhibit C for the City's Equal Employment Opportunity Ordinance". Exhibit C is "Fees and Costs"; there is no Exhibit that includes the City's "Equal Employment Opportunity Ordinance";
- Page 8 of 22 Section III A. Payment Terms refers to unit prices provided in Exhibit "H". The "Fees and Costs" are provided in Exhibit "C".

The Oil Patch contract is also a standard City contract that includes many generic requirements and exhibits. Our review of the contract revealed the following errors:

- Page 9 of 22 Section J, (2), (b) refers to Exhibit D for the "Drug Policy Compliance Agreement". There is no Exhibit D, and no copy of the "Drug Policy Compliance Agreement".
- Page 9 of 22 Section J, (2), (c) refers to Exhibit E for the "Certification of No Safety Impact Positions". There is no Exhibit E and no copy of the "Certification of No Safety Impact Positions".
- Page 10 of 22 Section J refers to Exhibit F for the "Drug Policy Compliance Declaration". There is no Exhibit F and no copy of the "Drug Policy Compliance Declaration".
- Page 12 of 22 Section III. DUTIES OF CITY A. Payment Terms refers to unit prices provided in Exhibit "H". The unit prices are provided in Exhibit "C".

The Audit Team, in its research of this issue, determined that there were many responsibilities within the review of contracts prior to final approval and signature. The department requiring the contract has the responsibility to ensure the appropriate business process is followed. SPD has the responsibility to ensure the proper purchasing process is followed and the Legal Department has the responsibility to ensure that the City's interests are protected prior to and during the execution of the contract. The Audit Team could not identify an existing Administrative Procedure detailing contract drafting and reviewing responsibilities.

FINDING:

There is a general framework within AP 5-2 for contract preparation; however, specific responsibilities are not delineated related to preparing and reviewing City contracts prior to signing them to ensure business, financial, and legal requirements are accurate.

RECOMMENDATION:

SPD should collaborate with the Legal Department to develop a Standard Operating Procedure (SOP) to further define the responsibilities involved in preparing and reviewing contracts.

MANAGEMENT’S RESPONSE – SPD

“The Strategic Purchasing Division (SPD) agrees with the City Auditor’s finding and recommendation.

SPD will collaborate with the Legal Department to publish a standard operating procedure to further define responsibilities as they relate to contract review. SPD will also develop an internal checklist for the buyer and manager to use to ensure that reference documents, identified in the contract provisions, correlate to the contract’s exhibits and are properly titled.”

CITYWIDE:

1 QUALITY OF DIESEL FOR GENERATORS

BACKGROUND:

Unleaded and diesel fuel have an “expiration date” or anticipated shelf-life. Most unleaded fuel contains ethanol (a corn by-product) and as a result has a 90-day shelf life. Diesel has a 6-month to two-year shelf life according to our supplier and internet research. The City has 84 fuel tanks with capacity greater than 1,000 gallons dedicated to fueling generators when electrical service is interrupted. Using substandard fuel can have damaging effects on the City’s generators leading to costly repairs and/or replacement.

Our sample included only diesel fuel tanks with a capacity of 1,000 gallons and greater. We requested the departments furnish us with the latest fuel delivery date. We calculated the time lapsed from the last fuel delivery date. If the department had no record of when the last fuel date was, we included it in our testing. If the lapsed time was two or more years, we considered the fuel for testing.

Table 3 (below) provides details of the cost to test the fuel, and the **worst case** estimated cost to remove the fuel (if the tanks were at capacity), should it be deemed necessary to do so. Note: All individual cost information was provided by GSD.

Table 3

Department	Diesel Generators greater than 1,000 Gallons	Diesel Generators with fuel older than 2-years	Total Capacity	Cost to test quality of fuel (\$550 per tank)	Cost to remove fuel from tanks (*)	Total Approximate Cost
PWE	62	26	70,200	\$14,300	\$133,515	\$147,815
HFD	7	5	16,450	\$2,750	\$31,390	\$34,140
HAS	9	2	7,000	\$1,100	\$13,435	\$14,535
HDHHS	3	2	7,000	\$1,100	\$13,435	\$14,535
Muni-Courts	1	0	-	\$0	\$0	\$0
GSD	2	0	-	\$0	\$0	\$0
	84	35		\$19,250	\$191,775	\$211,025

*Note: We do not know the actual quantity of diesel fuel contained in the tanks.

It is also important to note that there are 109 other fuel tanks with a unit capacity of less than 1,000 gallons that have a total storage capacity of 38,000 gallons, which were not included in the results just outlined.

FINDING:

Based on our analysis, 35 of the 84 (42%) fuel tanks with a capacity of 1,000 gallons or greater have diesel fuel exceeding two years old. The fuel can be tested to determine its condition.

RECOMMENDATION:

Arrange for each fuel tank with fuel greater than two years old to be tested for quality. Depending on the results of the testing, management must determine the most effective way to remedy the situation. The Audit Team has heard of several remedies ranging from chemical additives to reselling the old fuel to secondary markets.

Additionally, the departments should keep documentation of fuel deliveries in order to determine the age of the fuel in the tanks. Fuel testing of aging fuel could become routine and not be a recurring issue in the future.

MANAGEMENT'S RESPONSE – GSD

"While some of the diesel fuel in the generators is old, GSD is not aware of any problems occurring during Hurricane Ike or generator testing. Removing the fuel and replacing it would lead to logistical issues. Generator fuel is seldom used, but fuel levels must be kept high during hurricane season. Removing the fuel once or twice a year will take a lot of resources and time and will be costly. One option for addressing this issue would be to connect generators to the underground diesel fuel tanks at the fuel sites whenever possible. Since that supply has a much higher turnover rate, there would not be an issue with old fuel."

2. FUEL SITE MAINTENANCE INVOICING

BACKGROUND:

The City has a Fuel Site Maintenance Contract for \$1.5 million for repair and maintenance of fuel dispensing equipment and fuel tanks. Each of the six departments owning fuel sites is currently responsible for its own fuel site maintenance. When a repair is needed, fuel site personnel make (and document) a request to the contractor.

When the contractor completes a service call, an invoice is sent to the department for review and payment. The department personnel responsible for payment of the invoice may not necessarily have the background or training to determine if the repair was necessary, proper, or even performed.

At the beginning of this audit, it came to our attention that several contractor invoices had been questioned by the respective departments and were forwarded to GSD Fuel for further analysis as to their validity, correctness, and necessity. GSD Fuel was able to provide valuable input in the invoice review process because they have an expert technician on staff able to review the invoices for legitimacy, reasonableness, and necessity of the work performed. The individual departments may not have the expertise to adequately review the invoices to determine their legitimacy.

FINDING:

Overall, the department's accounting staff does not have the expertise to validate the correctness and necessity of fuel site maintenance performed or not performed and yet invoiced.

RECOMMENDATION:

Due to the irregularities discovered in the invoices received from the contractor, we recommend the City have requests for maintenance and repairs and the subsequent approval of the resulting invoices be reviewed by one of GSD Fuel's technical experts.

MANAGEMENT'S RESPONSE – GSD

"... effective July 1, 2010 three departments (Police, Fire and Parks) have agreed that all requests for fuel site repairs will be routed through GSD Fuel Management. GSD will determine whether to assign the repair in-house or to the vendor. Vendor invoices for these repairs will be sent to GSD which will review and pay the invoices and track warranties."

APPENDIX A

City of Houston Fuel Site Assessment Report

**GENERAL SERVICES DEPARTMENT
ENERGY DIVISION
FUEL MANAGEMENT SECTION
JULY 2007**

CITY OF HOUSTON FUEL SITE ASSESSMENT REPORT



**General Services Department
Energy Division
Fuel Management Section
July 2007**



City of Houston
General Services Department
Fuel Site Assessment Report

Table of Contents

Purpose of Report	1
Executive Summary	2
Summary of Current Fuel Operations	4
Site Assessments	7
Environmental Issues and Regulatory Compliance	10
Fuel Storage Tanks	11
Cost Reductions	13
Recommendations	18
Conclusion	19

Attachments

Purpose of Report

The General Services Department (GSD), Fuel Management Section, was tasked to review the citywide fuel site operations. The review included an assessment of the conditions of each of the City owned fuel sites, establishment of standards for current and future fuel sites, making recommendations for improving operations, reducing operating costs, and establishment of a more centralized data and inventory control program.

Executive Summary

The City had a total of 102 city-owned fuel sites in FY05. These sites were operated by seven departments, with the Fire Department operating 53 of the sites. Historically, each department has been responsible for the operation and maintenance of its own sites with fuel ordering and payment centrally managed by the Finance and Administration Department, *a function transferred to GSD in July 2006*. Of the 102 sites, 35 were connected to the City's FuelForce automated fuel system (AFS), which is a database system that provides the following functions: authorizing fuel for City vehicles, recording of fuel transactions and deliveries, monitoring of tank inventories, usage reports and interfacing with the City's Fleet Management System (GEMS2000). Maintenance for each site is covered under a citywide contract. The testing of the City's 221 underground and aboveground storage tanks is covered under a separate citywide contract. In FY05 the City spent over \$500,000 on site maintenance, tank testing and miscellaneous costs.

The decentralized nature of the City's fuel operations has led to varying degrees of quality control in terms of site maintenance, staff training and regulatory compliance. In the past year, the number of issues and their potential impact has become more apparent. These issues have become more obvious due to the following:

- Requiring each department to report the in-ground fuel inventory by site and fuel type to GSD each morning;
- The Public Works Department assuming responsibility for the delivery of fuel to the smaller fuel sites;
- Meetings, sponsored by the Mayor's Office, to address fleet and fuel issues.

Concerns about the quality and cost of site operations, the number of sites, potential regulatory and environmental issues, the lack of centralized control and the cost of fuel resulted in the Mayor's Office requesting this assessment. Through this assessment, it has been determined that there are opportunities for the City to close and consolidate fuel sites, reduce maintenance and testing costs, improve the accuracy and timeliness of inventory data and reduce the risk and impact of environmental problems.

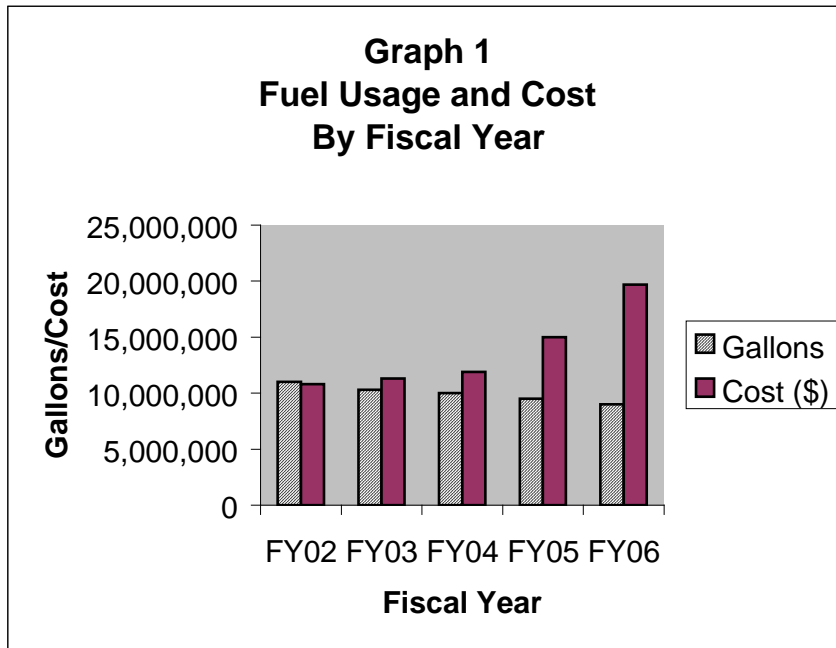
Once all recommendations are implemented, the Fire Department will realize an estimated \$1,117,859 in cost savings over a five-year period. Savings should continue beyond FY12 at a rate of approximately \$234,000 annually. The Police Department will realize an annual cost saving of either \$44,000 or \$5,700 depending on the decision for fueling vehicles at the Northwest Command.

The City will also avoid costs in the amount of 770,000 by not replacing tanks at fourteen fire stations. There will also be other avoided costs, by not replacing the tank at the Police departments Northwest Command; however, the costs were not calculated this since this tank was not scheduled for replacement until 2023.

Other departments will not see a quantifiable annual savings. However, the City will realize non-quantifiable benefits from better inventory control, such as a reduced risk and avoidance of potential fines due to environmental issues.

Summary of Current Fuel Operations

The City purchased approximately 9.4 million gallons of fuel in FY05 at a cost of \$15 million. In FY06 the volume of bulk fuel purchased was approximately 9 million gallons, however the cost increased significantly to \$19.7 million as a result of Hurricanes Katrina and Rita. Graph 1 shows fuel usage and cost for the five-year period FY02 through FY06. During this period, annual fuel usage decreased by two million gallons while annual fuel cost increased by almost nine million dollars. Cost per gallon more than doubled from an average of \$0.98 per gallon to \$2.19 per gallon.



The method for the purchase and delivery of bulk fuel has changed within the past year. Historically, the City has purchased fuel from vendors who deliver the fuel to each site. Pricing was tied to an index price with a differential (plus or minus) based on the fuel type and the size of the delivery. Individual deliveries over 6,000 gallons were a lower price than those of 6,000 gallons or less. Prices changed once a month, however under the last contract of this type the pricing change was weekly.

During FY06 the City began a pilot project whereby one- and two-thousand gallon tanker trucks, that were owned and operated by the Department of Public Works (PWE), delivered fuel to the smaller City fuel sites. PWE charged a rate of \$62.07 per hour for this service with the average delivery taking approximately one hour. This operation became full-time late in FY06 when the existing fuel purchase contract was cancelled.

In FY07 the City entered into an agreement with Motiva to purchase fuel at the Shell refinery in Pasadena. The City also hired a transport company to transport full tanker loads of fuel from the refinery to the large City owned fuel sites. PWE then redistributes the fuel to the smaller fuel sites. In order to facilitate the redelivery of the fuel, and to track the transfers, in 2006 PWE installed rapid fuel

dispensers at both its 101 Japhet and 7101 Renwick locations and connected these dispensers to the automated fuel system at these sites. The total cost of these installations was \$273,720. These dispensers enable PWE to fill the tanker trucks at a rate of approximately 70 gallons per minute.

PWE currently has a fleet of twelve tanker trucks and six trailers that can be used to transport or store fuel. These trucks were purchased for emergency use, but have been pressed into daily, high mileage, service. The trucks have capacities ranging from 500 gallons to 10,000 gallons. The six trailers each have a capacity of 5,000 gallons. Total capacity for all trucks and trailers is approximately 70,000 gallons, although only 85 to 90 percent (63,000 gallons) is usable capacity. The trucks range in age from nine to twenty-eight years old. All the trailers are forty years old. Due to the age of the tanker trucks, they are subject to frequent mechanical problems. Normally, there are only three to five trucks available for service on any given day and PWE has only four trained drivers. New trucks are needed for the daily deliveries with the current trucks being relegated back to their original purpose, for back-up and emergency service. Additional trained drivers that can be pulled from their daily jobs to replace the primary tanker drivers, when needed, would also be helpful.

While the cost of the fuel is the largest annual expense, there are other costs associated with the operation of the fuel sites. Tanks must be tested and registered annually and equipment must be maintained to meet regulatory and operational requirements. In FY05 the City departments spent a total of \$574,570 on site maintenance, tank testing and miscellaneous costs. Based on gallons purchased, this is an average of \$.06 per gallon. Table A below shows the FY05 maintenance, tank testing (M&T) and miscellaneous costs for each department.

Dept.	No. of Sites	FY05 Total M&T and Misc. Costs	Avg. Cost/Site	FY05 Bulk Gallons	Avg. Cost/Gallon
Aviation	3	\$8,316	\$2,772	319,395	\$0.03
Fire	53	\$120,961	\$2,282	1,532,661	\$0.08
Health	1	\$615	\$615	54,828	\$0.01
Parks	14	\$16,140	\$1,153	365,313	\$0.04
Police	11	\$212,095	\$19,281	3,230,144	\$0.07
PW&E	16	\$132,076	\$8,255	2,656,019	\$0.05
SWM	4	\$84,367	\$21,092	1,234,727	\$0.07
Grand Total	102	\$574,570	\$5,633	9,393,087	\$0.06

The City has over 10,700 units in its vehicle fleet that use either unleaded or diesel fuel. These units fueled over 650,000 times in FY05. More than 85% of those transactions took place at one of the 35 FuelForce automated sites or one of the three Aviation sites that are automated by a separate system. Table B shows the number of sites, by department, the total number of FY05 fuel transactions, the

number of fuel transactions from automated sites, and the number of fuel transactions from manual sites.

**Table B
Fuel Sites and
Transactions by
Department**

Dept.	No. Of Sites	No. Of Automated Sites*	FY05 Total transactions	Automated Transactions	Manual Transactions
Aviation	3	3	25,749	25,749	0
Fire	53	4	69,887	19,307	50,580
Health	1	1	4,208	4,208	0
Parks	14	2	28,988	15,453	13,535
Police**	11	10	314,252	314,252	0
PW&E**	16	14	150,448	150,448	0
SWM	4	4	60,683	60,683	0
Grand Total	102	38	654,215	564,351	89,864

* Aviation sites are automated by a separate system and not included in references to the 35 FuelForce automated sites.

** Police has one manual location and PWE has two, but no records were located on these transactions. Total fuel purchases for these three sites in FY05 was less than 60,000 gallons.

Spectrum Consultants conducted a review of the City’s fleet fueling program in 2000. One recommendation from that report was that “Authority and responsibility for the entire fueling function in the City of Houston should be centralized...” While the City does not have complete centralized authority, steps have been taken towards a more centralized management with the creation of the Fuel Management section within the General Services Department. The Spectrum study further recommended that the centralized fuel section “...be provided the authority and responsibility to assess the cost effectiveness of all new City fueling sites proposed by City Departments.” The Spectrum study also referenced a 1990 study of the City’s fuel operations conducted by Deloitte and Touche. That study recommended the closure of 28 City fuel sites. The Deloitte and Touche study also pointed out that smaller fuel tanks generally are not economical, although in some cases they may be necessary. Both the Spectrum and the Deloitte and Touche studies recognized that the City had too many fuel sites, a problem that still persists today. Currently the City does not have a centralized review of planned fuel sites. Each department decides separately when and where it will build a fuel site and the size of the tanks. This has led to fuel sites being located in close proximity to each other, such as the Fire, PWE and Police sites located next to each other at 5800, 5900 and 6000 Teague. It has also led to undersized tanks, as is the case at many fire stations. The General Services Department with its Fuel Management and Environmental Management Sections is in a good position to review for approval all

requests for new fuel sites, renovations or closing of existing fuel sites. By requiring the operating departments to submit, to GSD Fuel Management, a written justification of the need and plans for all proposed fuel sites the City will have a centralized control over the building of new sites. Once Fuel Management approves the proposed site, then the Environmental Management Section of the Design and Construction Division in GSD can design the fuel site and ensure that the specifications include all federal, state and local requirements.

The current policy for maintaining in-ground fuel inventory is a minimum reorder point of 65% of capacity for diesel fuel and 50% for unleaded during hurricane season (June 1 through November 30). Outside of hurricane season, the reorder point is based on a two-week supply. Both the Spectrum and Deloitte and Touche reports recommended lowering the inventory reorder point to a one-week supply year round. GSD Fuel Management does not agree with this recommendation. Based on the FY08 forecasted fuel prices, lowering the inventory level would result in a one-time savings of between \$654,000 and \$742,000, depending on the time of year that the reduction is made. Using the same 9% annual carrying cost that was used in the Deloitte report, the City would save an additional \$63,000 annually. This represents less than one quarter of one percent of the FY08 fuel budget. The Spectrum and Deloitte reports based their recommendation on the assumption that there is plenty of fuel available at local refineries and that it can be delivered in one to three days. Both reports were written when prices were low and fuel was in a more plentiful supply. In today's market, fuel is in much shorter supply and subject to many possible supply disruptions. The City's experience during hurricanes Katrina and Rita, when deliveries were delayed for several days, should be ample proof that a one-week supply is not sufficient to support the City's emergency operations. Even outside of hurricane season the possibility of supply disruption exists. Additionally, there are constraints in the number of trucks and drivers available to make deliveries. Also, the nature of unleaded fuel has changed since the two reports were issued. Unleaded fuel is now a ten percent ethanol mix. Ethanol cannot be shipped by pipeline. It is shipped mostly by rail and blended at the rack with the gasoline as it is dispensed into the delivery trucks. Any disruption of rail service, would affect the City's ability to get unleaded fuel. An annual savings of \$63,000 does not offset the huge risk that the City would be assuming by reducing its fuel inventory.

Site Assessments

As mentioned previously, GSD conducted an assessment of each of the City's fuel sites due to concerns related to the age of the fuel storage tanks, accurate and timely fuel inventory data and the potential for environmental problems. The Environmental Management Section of GSD addressed the issue of the age of the fuel storage tanks and establishing a replacement cycle for them. The findings and recommendations on this issue will be discussed later in this report.

Obtaining accurate and timely fuel inventory data has been a historical problem, especially at the Fire and Parks department's sites that are largely not automated. The Fleet Management staff at the Fire Department is dependent upon the firefighters at the stations to manually measure the fuel tank inventory and submit an inventory report each morning. The accuracy of the data varies by station and by shift. The availability of the firefighters to provide the data is also an issue. Most days there is at least one station, and usually more, that is out on an emergency call at the time that the inventories are

normally reported. Compounding the problem for the fire stations is the small capacity of the tanks, usually 1,000 gallons, and the cost of the small deliveries. The emergency, and public safety, nature of the Fire Departments operations, and the small tank capacities, makes fuel inventory accuracy and availability an important issue. The Parks Department has a similar issue, but on a much smaller scale.

The areas addressed by the site assessments include:

- The number and condition of the fuel dispensers and the fuel island;
- Verification of tank capacity and fuel type;
- Presence and location of a working tank gauging system that automatically measures tank inventory and detects leaks;
- Installation of the FuelForce automated fuel system;
- Availability and location of emergency shut-off switches;
- Potential environmental/regulatory issues.

One of the findings from the assessments was the number of sites that do not have an automatic tank gauging system to measure the fuel inventory and detect leaks. Some sites have a tank gauging system originally manufactured by Red Jacket. This company is no longer in business and replacement parts are hard to obtain. Many of the fire stations have leak detection systems, but they do not measure the tank inventory. At these sites the firefighters must manually “stick” the tanks to measure the inventory. The assessment identified 44 locations citywide in need of an automatic tank gauging system.

Other problems related to the lack of an automatic tank gauging system or its location at the site also were identified. There have been incidences, during fuel deliveries, when the overfill protection valve on the tank did not work properly and the site either did not have an automatic tank gauging system, which provides an audible overfill alarm when the tank inventory level is near capacity, or the system was located in an area where the delivery driver could not hear the alarm. These incidences resulted in spills. In all cases the spills were cleaned up and no fines were levied.

In the case of the Fire Department, the current leak detection systems are located in the watch office of each station. If a new system is installed in the same location, delivery drivers would not be able to hear an alarm, nor would they have access to check the inventory level if the station personnel are not on-site. GSD is recommending that all future installations at fire stations be in the equipment bays near the overhead doors so the delivery drivers can hear the alarm. Additionally, there are many sites, particularly in the Fire Department, where the personnel are not properly trained on the system. When an alarm is activated the staff does not know what it is and it frequently goes unreported.

The assessments also revealed that 28 sites are in need of an emergency shut-off switch, as required by the fire code. One other site needs its emergency shut-off repositioned so it is easily visible from the fuel island.

As noted previously, the City has 35 fuel sites connected to the FuelForce automated fuel system. Each department that operates fuel sites, except for the Aviation Department, has one or more sites connected to this system. By performing mileage verification and recording each fuel transaction, the system provides fuel usage data with a high degree of accuracy. This data is used in the fleet budget

process and in determining preventive maintenance schedules. The data has also been used in investigations by the Inspector Generals Office.

The three Aviation Department fuel sites are connected to an automated system manufactured by Petrovend. This system is approximately ten years old and due for an upgrade or replacement. The Petrovend system does not interface with either the FuelForce system or with the City’s fleet management system. As a result, the fleet management system has very little fuel data on Aviation Department vehicles. Replacing the Petrovend system with FuelForce will put Aviation on the same system as the other departments and utilize the existing interface between FuelForce and the fleet management system to update the vehicle fuel and usage data in that system. It will also allow the Aviation staff access to department vehicles fueling information from non-Aviation sites. Additionally, other departments will have access to fuel at Aviation locations during emergencies.

The Fire Department has 53 fuel sites of which only four are connected to the FuelForce system. Those sites are the Logistics Center at 1205 Dart and fire stations 33, 54 and 94, all other fire stations are manual. The Fire Department used 1.5 million gallons of fuel in FY05 or about 16% of the total City bulk fuel consumption. Of this amount, over 1.26 million gallons, or over 13% of the total City fuel usage, was from manual fuel sites. During that same time period, there were almost 70,000 fuel transactions from Fire Department fuel sites, of which 50,580 were manual transactions. Those manual transactions represent 7.7% of the 654,215 total citywide fuel transactions for FY05. As these numbers demonstrate, a significant portion of the City’s fuel consumption and transactions are from manual sites. Each of the manual transactions must be entered into the City’s fleet maintenance system. This, of course, is very time consuming and represents over 50,000 opportunities for human error. Connecting the fire stations to the FuelForce system will significantly reduce the amount of manual data entry and result in more timely and accurate data.

Table C

Departments

Number of Sites Requiring Work

Type of Work	Aviation	Fire	Health	Parks	Police	PWE	Solid Waste	Total
Emergency fuel shut-off	0	25	0	3	1	0	0	29
Replace/Install TLS system	3	28	1	6	0	3	3	44
Overfill Alarms	1	9	0	10	0	1	0	21
FuelForce automated fuel system	3	25	0	0	0	3	0	31

Note: TLS - Tank Level Sensor

Table C is a summary by department of the major areas that were examined and the number of sites that need upgrading and/or repair.

Environmental Issues and Regulatory Compliance

Environmental issues are always a concern when fuel is involved. The City has had incidences of fuel spills during deliveries, and ruptured or leaking underground storage tanks. Ruptured or leaking tanks can be expensive to remediate. For a small 1,000 gallon tank, such as those at the fire stations, remediation costs can range from \$50,000 - \$100,000 in addition to the cost of replacing the tank. At larger sites, which have up to 25,000-gallon underground tanks, remediation can exceed \$500,000. The City is subject to fines if it is aware of and fails to report a leak or if it is reported, but the City fails to meet all the requirements for cleanup. In these cases, the Texas Commission on Environmental Quality (TCEQ) can impose administrative penalties of up to \$10,000 per day and civil penalties of up to \$25,000 per violation per day. GSD is not aware of any penalties that have been levied against the City. However, the cost of the penalties and site remediation is a strong justification for having a working automatic tank gauging system at each site with underground tanks and for connecting those systems to a central monitoring system.

There weren't any major environmental/regulatory issues discovered during the assessments. However, minor issues, such as torn vapor recovery hoses, broken spill bucket chains or spill buckets filled with water were found. The departments manage minor issues through routine maintenance, which, if left unresolved, can result in fines. As an example, TCEQ could fine the City up to \$3,500 for failure to provide spill containment and overfill protection. A spill bucket filled with water cannot contain a fuel spill.

Departments generally do a good job of managing the site maintenance. However, in departments such as Fire and Parks, which have a large number of small sites that are geographically spread out, it is difficult to keep up with the site maintenance. These departments do not have sufficient staff to routinely check each site. The Fleet Management staff in the Fire Department is dependent upon the fire fighters to report problems. The Parks Department has personnel assigned to handle fuel at each site, however, it is not their main responsibility and the staffing may change periodically. This can lead to under-trained persons responsible for this function. Both Fire and Parks do a good job with maintenance at their main sites, 1205 Dart and 1600 Wheeler respectively. The staff members responsible for fuel in these departments are located at these two sites.

The previously mentioned study by Spectrum pointed out the lack of a regular preventive maintenance (PM) program to review the fuel sites and equipment. GSD Fuel Management, after hiring additional staff, can work with the operating departments and the City contractor to establish a regular PM schedule for the equipment. GSD Fuel Management should also be copied on all work orders sent to the contractor for repairs. Fuel Management will track all calls and support the operating departments to ensure that all repairs are made within the terms specified in the contract. The operating departments should also report all repairs and costs to GSD Fuel Management, which will maintain a centralized database that will track all costs and warranties.

Fuel Storage Tanks

As noted earlier, the City has 221 fuel tanks at its 102 locations. These tanks have a total capacity of 1,275,530 gallons, although only 80% or 1,020,000 gallons is usable capacity. Tanks can only be filled to 90% of capacity because there must be space for the fuel vapor at the top and as much as 10% at the bottom of the tank would not be useable because the pumps pull fuel from a few inches above the bottom in order to avoid water or sediment at the bottom. Table D shows the number of tanks and capacity by department.

Department	<u>Unleaded</u>		<u>Diesel</u>		<u>Total</u>	
	No. of Tanks	Total Capacity (Gallons)	No. of Tanks	Total Capacity (Gallons)	No. of Tanks	Total Capacity (Gallons)
Aviation	5	40,500	3	18,500	8	59,000
Fire	54	92,630	54	92,150	108	184,780
Health	1	10,000	0	0	1	10,000
Parks	13	39,750	15	31,750	28	71,500
Police	21	235,000	0	0	21	235,000
PW&E	25	366,500	17	208,750	42	575,250
SWM	4	40,000	9	100,000	13	140,000
Total	123	824,380	98	451,150	221	1,275,530

Note: Numbers represent 100% of tank capacity. Usable capacity is approximately 80%, which is 659,500 gals. for unleaded, 360,900 gals. for diesel and 1,020,000 gals. total.

The departments have historically been responsible for the fuel tanks, including testing and replacement. The City does not have an established policy concerning when fuel tanks should be replaced. As a result, there are active tanks as old as 35 years of age. In most cases, tanks have not been replaced until there is a problem, such as a leak, or when required by a regulatory change. As

noted earlier, waiting until a problem occurs leads to thousands of dollars in additional costs for remediation.

The table in Attachment 1 is a ranking of each of the fuel sites based on the age of the fuel tanks and an assigned risk factor. Sites with tanks 30 years of age or older were considered high risk, those 25 – 29 years were medium high risk. There were 28 sites ranked as medium high or high risk.

Table E				
Capital Improvement Plan (CIP) Costs				
5% Inflation Rate				
For Tank Costs				
Fire Station No.	Address	Dept.	Fiscal Year	CIP Cost
FS No. 13	2215 WEST 43RD & T.C. JESTER	Fire	FY08	\$163,200
FS No. 18	619 TELEPHONE ROAD & LOCKWOOD	Fire	FY08	\$180,150
FS No. 56	5820 EAST LITTLE YORK & MAPLELEAF	Fire	FY08	\$88,200
FS No. 66	5800 TEAGUE & HARTISON	Fire	FY08	\$88,200
	17000 ALDINE WESTFIELD	Police	FY08	\$357,525
	6200 WHEELER STREET	Parks	FY08	\$460,478
		FY08 Total		\$1,337,753
FS No. 30	6702 IRVINGTON & FRISCO	Fire	FY09	\$92,400
FS No. 36	7720 AIRPORT BOULEVARD & DOVER	Fire	FY09	\$188,300
FS No. 44	675 MAXEY ROAD & CHURCH	Fire	FY09	\$161,900
FS No. 55	11212 CULLEN & SELINSKI	Fire	FY09	\$188,300
		FY09 Total		\$630,900
FS No. 5	2020 HOLLISTER & HAMMERLY	Fire	FY10	\$168,850
FS No. 25	3902 SCOTT ST. & ROSEWOOD	Fire	FY10	\$163,100
FS No. 29	4831 GALVESTON ROAD & AHRENS	Fire	FY10	\$96,600
FS No. 46	3902 CORDER & SCOTT	Fire	FY10	\$196,450
	100 JAPHET	PW&E	FY10	\$1,284,413
		FY10 Total		\$1,909,413
FS No. 3	3735 W. ALABAMA & CUMMINS	Fire	FY11	\$100,800
FS No. 16	1700 RICHMOND & DUNLAVY	Fire	FY11	\$100,800
FS No. 19	1811 GREGG & NEW ORLEANS	Fire	FY11	\$100,800
FS No. 32	8614 EAST TIDWELL & MESA	Fire	FY11	\$100,800
		FY11 Total		\$403,200
FS No. 31	222 WEST CROSSTIMBERS & O.YALE	Fire	FY12	\$212,750
FS No. 42	8675 CLINTON & MISSISSIPPI	Fire	FY12	\$105,000
FS No. 69	1102 WEST BELT SOUTH & VALLEY FORGE	Fire	FY12	\$182,750
		FY12 Total		\$500,500
		Total 5 Year Cost		\$4,781,765

As part of this report, GSD was asked to establish a tank replacement schedule. The GSD Environmental Management Section established a criteria of replacing all tanks that are 30 years of age

or older. This was based on tank manufacturers life expectancy of 30 years for double walled fiberglass tanks. Tanks that will attain this criterion within the next five years have been included in the Capital Improvement Plan (CIP) for FY08 through FY12. GSD has coordinated the CIP projects and discussed them with each of the affected departments and all are in agreement with these projects. Table E is a list of the sites by fiscal year scheduled for upgrade or closure. In some cases the fuel site is being closed and the tanks removed as part of a site consolidation effort that will be discussed later in this report.

As part of the tank replacement program some sites will have tanks replaced with larger tanks or have additional tanks installed. Of those sites scheduled in FY08 – FY12 only the PWE site at 101 Japhet will have an additional tank installed. The Japhet location currently has two 25,000 gallon unleaded and one 25,000 gallon diesel tank. As previously mentioned, PWE installed rapid fuel dispensers at this location resulting in this site becoming a hub for redistributing fuel to smaller sites. This has led to a significant increase in the amount of fuel that flows through this site. The 50,000-gallon capacity for unleaded fuel is sufficient to handle this increase, however the 25,000-gallon diesel capacity is insufficient. Therefore, PWE requested an additional diesel tank. Additionally, the Police location at 61 Riesner is in the process of being renovated due to 30-year old leaking tanks. As part of this project, two 12,000-gallon tanks will be replaced with two 15,000-gallon tanks and a 5,000-gallon diesel tank will be added. As other sites reach their date for tank replacement, the tank size will be evaluated. Some fire stations will have larger tanks installed, as discussed in the next section.

The PWE facility at 801 Gillette has fuel tanks that meet the criteria for replacement. This facility was not included in the FY08 CIP because it is GSD's understanding that this property is in the process of being sold. Likewise, the PWE facility at 2200 Patterson was also not included in the FY08 CIP because PWE is in the process of determining whether or not to close this facility. If the decision is made to keep it open, the tank replacement will be added to the CIP for a future year.

Attachment 2 is a list of sites scheduled for tank replacement from FY13 through FY27. These projects have not been discussed with the affected departments. As they come up for addition to the CIP, the costs will be estimated and the projects discussed with each department.

Cost Reductions

The main costs associated with the operation of the fuel sites are: maintenance, tank testing, personnel, delivery, the fuel itself and, in the long term, tank replacement.

The price of the fuel is set by contract and subject to market swings. While the City purchases over nine million gallons per year, this volume is relatively insignificant to the major oil companies. Due to the high demand for fuel, these companies can sell all their production and therefore do not have an incentive to discount the price for a buyer the size of the City of Houston. Therefore, there is little that the City can do to reduce its price in the short term. Since the city recently entered into a new contract with Motiva that began October 1, 2006, more time is needed to see what effect, if any, this has on the City's cost. The primary way that the City can significantly reduce its fuel cost is to reduce its fuel

usage. This would require the purchase of more fuel-efficient vehicles, reduced mileage and/or a reduction in the services provided by the City, areas outside the scope of this project.

A portion of the cost to deliver the fuel is also set by contract. Oil Patch – Brazos Valley Inc. transports fuel from the Shell refinery to the large City of Houston fuel sites. Since this cost is set by contract, it cannot be reduced in the short term. However, the cost for redistributing the fuel to small fuel sites by PWE can possibly be reduced. The department undertook this function on short notice as a result of the sudden cancellation of the City's fuel purchase contract. As the drivers gain experience and become more efficient, the opportunity exists to reduce the time required per delivery. Larger cost reductions can be realized by reducing the number of deliveries and increasing the size of the deliveries. As an example, PWE charges \$62.07 per hour for the redelivery with the average delivery taking approximately one hour. This includes both driving time and time on-site. Time on-site normally takes about fifteen minutes for the small deliveries to the fire stations. If an average load is assumed to be 300 gallons, the delivery charge amounts to approximately \$0.21 per gallon. If the number of loads can be cut in half and the quantity doubled with only a 25% increase in time, the price per gallon will decrease. Using the numbers above, the delivery charge for 1.25 hours would be \$77.59. The size of the delivery would increase to 600 gallons and the cost per gallon would drop to \$0.13 per gallon. Additionally, there would be a savings of \$62.07 for every delivery eliminated. In this example, if the site originally received one delivery per week and that changes to one delivery every two weeks, there is a net reduction of 26 deliveries. The annual cost savings would be $(\$62.07 * 52) - (\$77.59 * 26) = \$1,210$.

In order to achieve these savings, a site would need either more or larger tanks. The fire stations currently have a 1,000-gallon tank for diesel and another for unleaded. The stations generally do not have enough space to have more tanks, however, the current tanks could be replaced with larger tanks as they come due under the 30-year replacement schedule. Of the nineteen fire stations listed in Table E for the five year CIP, nine are scheduled to be closed, five to have the tanks replaced with a 2,000 gallon tank that has two 1,000 gallon compartments and the five remaining, which have higher fuel usage, will have a 5,000 gallon tank installed that has a 2,000 and a 3,000 gallon compartment. As other stations reach their replacement time, the replacement tank size will be determined based on usage.

Further cost reductions will be achieved in the Fire Department by converting the unleaded tanks at most sites to diesel, thus doubling the diesel capacity. This will permit larger, and fewer, diesel loads, thereby reducing delivery costs. Unleaded vehicles, such as ambulances and squads, will be given fuel cards, through the City's contract with Comdata, to fuel at commercial fuel sites. Both the Motiva and Comdata unleaded fuel prices are tied to posted prices plus a differential for Motiva, or adder for Comdata. When all costs are considered for the deliveries to the fire stations (PWE charge, Motiva differential, Oil Patch Transport cost, and State fuel taxes), the Comdata unleaded price is cheaper, by approximately \$0.22 per gallon. This makes it economical to convert the unleaded tanks to diesel fuel and use the commercial sites for unleaded fueling. Fire will keep unleaded fuel at fourteen locations for emergency purposes. The ARFF stations at the airport will also retain the unleaded tanks. Additionally, the unleaded emergency vehicles will have access to other departments' fuel sites during emergencies. The diesel vehicles, such as the pumper and ladder trucks, were considered a liability risk

for commercial sites due to their large size, therefore the Comdata card was not considered for these vehicles. Additionally, the diesel price difference between Comdata and the Motiva/PWE delivered cost is less than the unleaded, approximately \$0.15 per gallon. The difference should decrease due to the larger and fewer deliveries.

The cost to convert the unleaded tanks to diesel is minimal. Both the unleaded and diesel tanks will be cleaned and the unleaded hose and nozzle replaced and the dispensers relabeled. Total cost per site are estimated at \$1,300. Sites scheduled for closing in FY09 through FY12 will be converted in FY08, but those scheduled to close in FY08 will not be converted. The existing diesel tanks will be cleaned as part of the conversion to relieve a problem with clogging of the filters on the diesel dispensers from sediment in the tanks. The diesel tanks at stations 83, 86 and 94 will not be cleaned, as these tanks are less than three years old. The cost to convert 29 sites is estimated at \$40,100. Table F shows the payback for converting the sites to diesel only.

Table F	
Fire Dept.	
Unleaded Fuel Tank Conversion Cost	
Cost/Site to convert UN tank and hose to DS	\$800
Cost to clean existing DS tank	\$500
Total Site Cost	<u>\$1,300</u>
No. of Sites*	29
Total Cost**	<u>\$40,100</u>
* Does not include ARFF and FY08 Closures	
** Stations 83, 86 and 94 - Clean only UN tank	
Estimated FY08 UN Savings using Comdata	\$141,851
Estimated FY08 DS Savings from Reduced Deliveries	\$57,880
Maint. & Testing Savings (FY07 - FY08 Closed Sites)	<u>\$13,802</u>
Total FY08 savings from Conversion and Closings	<u>\$213,533</u>
Average FY08 Savings per month	\$17,794
No. of Months to Payback conversion cost	2.3

The Fire Department will also reduce costs by closing the fuel sites at several stations. In addition to the nine listed in the CIP, Fire is closing fuel sites at five stations in FY07. The closings of these

fourteen sites will generate additional savings since they will no longer have the maintenance and testing costs associated with operating a fuel site. The closing of these fourteen fuel sites will also save the City \$770,000 in tank replacement costs under the CIP for the years FY07 – FY12. The unleaded vehicles at these stations will also be given the Comdata card. Diesel vehicles will fuel at other fire stations or other City fuel sites. No logistical problems are expected from the closings of these fuel sites, however, should any occur, the closings of the sites scheduled for later years could be re-evaluated before the work begins.

The conversion of sites to diesel only and the closings of fourteen Fire Department fuel sites will generate cost savings. The savings will come from the Comdata savings for unleaded fuel of \$0.22 per gallon, the reduced number of diesel deliveries and the avoidance of maintenance and testing costs at the closed sites. Table G shows the savings generated over the next five fiscal years. The maintenance and testing costs were based on the actual costs for each site in FY05, the most recent year for which data was available. The gallons and number of deliveries used in the unleaded and diesel savings were based on FY06 data. Should the unleaded fuel use increase, the savings will be greater.

Table G						
Estimated Fire Dept. Savings						
Type	Fiscal Year					Total
	FY08	FY09	FY10	FY11	FY12	
Unleaded Fuel Savings	\$141,851	\$143,615	\$143,615	\$143,615	\$143,615	\$716,311
Diesel Fuel Savings	\$57,880	\$59,060	\$61,139	\$66,105	\$67,191	\$311,374
Total Fuel Savings	\$199,731	\$202,675	\$204,754	\$209,720	\$210,806	\$1,027,686
Maintenance & Testing Savings	\$13,802	\$14,969	\$16,254	\$21,687	\$23,461	\$90,173
Total Cost Savings	\$213,533	\$217,644	\$221,008	\$231,407	\$234,267	\$1,117,859

In addition to the Fire Department site closings, GSD is recommending closure of the fuel site at the Police Departments Northwest Command located at 6000 Teague. This site is located adjacent to the PWE facility at 5900 Teague. On the other side of the PWE site is Fire Station No.66 at 5800 Teague, which is on the list to be closed in FY08. The Police location has had problems with flooding around the dispensers and tanks for years. The flooding around the dispensers has been remedied, but the problem still exists around the tanks. The FY05 maintenance and testing cost for this site was \$13,024. Based on the FY07 projected volume of 142,000 gallons, that equates to \$0.09 per gallon. This puts this location in the highest 50% of all City fuel sites based on cost per gallon.

GSD examined the fueling at the Northwest Command for the six-month period of October 1, 2006 through March 31, 2007. During this period 303 vehicles fueled at this location, but 212 of those fueled ten or fewer times. Only 59 units fueled an average of one time per week. During the six month period examined there were 7,851 fuel transactions or 15,702 annualized. Based on the Police Departments 24/7 operation this would be an average of 1.8 transactions per hour throughout the year. While this does not take into consideration the peak time fueling, the Police transactions would be

spread across three shifts. The neighboring PWE location has a total capacity for unleaded fuel of 24,000 gallons, is currently being renovated and should be capable of managing the additional traffic from the Police vehicles. However, this is not the only option. Police could be given the Comdata card to use for fueling.

Table H is a comparison of the cost savings between fueling with the Comdata card and fueling at the PWE Teague location. Both options offer the same savings for the maintenance and testing costs. The Comdata card generates the previously mentioned \$0.22 per gallon savings. Utilizing the PWE site offers a \$0.30 per gallon savings, however this is offset by the 15% markup that PWE charges other departments for fueling at its sites. Based on the FY08 forecasted average unleaded cost of \$2.35 per gallon, the 15% markup would amount to \$0.35 per gallon. This could be higher or lower depending on the actual cost for FY08. The total annual savings would be \$44,020 using the Comdata card and \$5,680 fueling at the PWE location. This does not take into consideration any cost efficiencies that might be generated by the increased usage of the PWE site. Also, the additional cost of using the PWE site is an internal cost to the City, although in different funds. Another consideration, the cost of which was not analyzed, is installing a gate between the PWE and Police properties with a card reader to allow access after hours.

If the Comdata card were used, Police would still have access to the PWE site during emergencies; therefore there should not be any loss in operational effectiveness. GSD is not making a recommendation on which option should be used. This choice should be made by the Police Department, in conjunction with the Mayor’s office.

Table H		
Police Department Cost Savings Comparison Closure of Northwest Command 6000 Teague		
	Fueling With Comdata Card	Fueling at PWE Teague Location
Projected FY07 Gallons	142,000	142,000
Maint. & Testing Cost/gallon	\$0.09	\$0.09
Savings/Gallon	\$0.22	\$0.30
Gross Annual Savings	\$44,020	\$55,380
Est.PWE 15% Markup		\$49,700
Net Annual Savings Using PWE Site		\$5,680

One other location that was considered for closure is the PWE location at 747 Evergreen. This is a historically low usage location that is near other large automated sites. According to PWE, this location is for sale and will be consolidated with the Gillette and other locations in the future. Since the fuel site will be closed at the time of sale, no recommendation is being made to close it at this time.

The Police fuel site at 4503 Beechnut is located at the opposite end of the building that houses the PWE fuel site at 8430 Newcastle. GSD planned to recommend consolidation of these two sites, however, according to PWE, the Newcastle site is also for sale and would be consolidated in the same location that will house the Gillette operation. This will affect the Police site because the Police fuel site, but not the command building, is located on the PWE property. When the PWE site is sold, Police will lose its fuel site.

The Health Department fuel site at 2700 Evella is another low usage site, approximately 55,000 gallons annually. However, it is also a low cost site with maintenance and testing costs of \$0.01 per gallon. This site contains one 10,000 gallon unleaded tank. It is used primarily to fuel the BARC animal control trucks. The tank at this location is not scheduled for replacement until 2019. GSD is not recommending closing of this site at this time. Due to its close-in location, low usage, low maintenance and testing cost and medium size unleaded tank, this location can be used in an emergency to store additional unleaded fuel inventory. Should a more suitable location be found to store emergency supplies this site can be closed. Otherwise, it can be closed in 2019 rather than replace the tank.

After FY12, when all recommended closings are complete, and with the addition of one fire station since FY05, the City will have a total of 88 fuel sites with 110 unleaded tanks and 87 diesel tanks, as shown in Table I. The disparity between the number of sites and number of diesel tanks is due to the Police sites not having diesel tanks. These totals do not account for the consolidation of sites in PWE, nor any new sites that may be opened.

Table I			
	Current	Proposed	Change
No. of Fuel Sites	102	88	(14)
No. of Fuel Tanks	221	197	(24)

Recommendations

GSD offers the following recommendations regarding the City of Houston’s fuel operations, all of which are covered in other sections of this report:

- Closing of fourteen fuel sites at fire stations;

- Conversion of 29 fire stations to diesel only and issuance of the Comdata cards to the unleaded vehicles at the affected locations;
- Installation of the FuelForce automated fuel system at 35 fire stations (25 with O&M funds and 10 through CIP);
- Installation of emergency shut-offs at 29 sites that do not currently have them;
- Installation of automatic tank gauging systems at 44 sites, which includes replacement of all obsolete Red Jacket systems. The Parks Department has also elected to install these systems at three additional sites to improve inventory control;
- Connection of all automatic tank-gauging systems to a centralized monitoring system. This will allow GSD and the departments to monitor the tank inventories without relying on manual “sticking” of the tanks. It will also serve as a central source for monitoring leak and other types of alarms, reducing the environmental impact of leaks. These systems charge a monthly fee which is included in Attachment 3;
- Replacement of all underground fuel storage tanks on a 30 year schedule;
- Closing the fuel site at the Police Departments Northwest Command station located at 6000 Teague with the Police Department deciding which alternate fueling method to use.
- Installation of the FuelForce automated fuel system to replace the Petrovend system at three Aviation fuel sites;
- Install the FuelForce automated fuel system at three PWE Water and Wastewater locations. These installations are already planned by PWE in order to capture fuel data that is not currently being captured. Also, due to the importance of Water and Wastewater operations during emergencies PWE and GSD will have better data for inventory control;
- Hiring in GSD Fuel Management of an additional staff member. Responsibilities will include: periodic inspections of each fuel site to insure regulatory compliance and report needed maintenance; coordinate site repairs for the departments and inspect repairs by City contractors when operating department personnel are not available; track repair costs and warranties; monitor all federal and state regulatory changes and ensure compliance; and ensure that departments and site staff comply with the proposed fuel site standard operating procedures. Estimated annual cost, including benefits, is \$65,000.
- Require all departments to submit to GSD Fuel Management a written justification of the need and plans for all proposed fuel sites. The GSD Environmental Management Section will design all fuel sites.
- Finalizing a draft fuel site SOP and formalizing it in an Administrative Procedure for the Mayor’s signature.

Conclusion

The Fuel Management Section of the General Services Department has assessed the conditions and operations of all City Of Houston fuel sites. GSD staff has met with representatives of each department concerning the recommendations offered in this report. Each department is in agreement with the recommendations that are specific to that department. Since the departments have already submitted their FY08 operating budgets, the cost of these recommendations is not included. However, each

department is in the process of reviewing their budgets to identify funding sources. The Fire Department, which has the highest cost of \$658,066, plans to contact the Finance and Administration Department for assistance in financing these costs so the recommendations can be implemented in FY08. The cost of the CIP projects is already included in the current CIP for all departments.

APPENDIX B

City of Houston Fuel Site Assessment Report

**GENERAL SERVICES DEPARTMENT
ENERGY DIVISION
FUEL MANAGEMENT SECTION
DECEMBER 2008 UPDATE**

CITY OF HOUSTON FUEL SITE ASSESSMENT REPORT



**General Services Department
Energy Division
Fuel Management Section
December 2008 Update**



City of Houston
General Services Department
Fuel Site Assessment Report
December 2008 Update

Table of Contents

Purpose of Report	3
Executive Summary	4
Commodity	5
Fuel Storage Tanks	14
Emergency Preparedness	17
New Recommendations	22
Conclusion	22

Purpose of Report

In 2007, the General Services Department (GSD), Fuel Management Section, was tasked to review the citywide fuel site operations. The review included: 1) an assessment of the conditions of each of the City owned fuel sites; 2) establishment of standards for current and future fuel sites; 3) making recommendations for improving operations; 4) reducing operating costs; and 5) establishment of a more centralized data and inventory control program. The 2008 report will: 1) update the site conditions; 2) discuss steps already taken to reduce operating costs; 3) review recommendations from the 2007 report; and 4) make additional recommendations.

Executive Summary

The City had a total of 102 city-owned fuel sites at the beginning of FY08, the same number as reported for FY05 in the 2007 report. By the end of FY08 that number had been reduced to 97 as a result of the closure of fuel sites at seven fire stations and the opening of two new stations. Of the 97 sites, 39 are connected to the **City's FuelForce automated fuel system (AFS), which is a database system that provides the following functions: authorizing fuel for City vehicles, recording of fuel transactions and deliveries, monitoring of tank inventories, usage reports and interfacing with the City's Fleet Management System (GEMS2000).** The three Aviation sites are connected to a similar, but separate system. While the automated sites represent approximately forty percent of the sites, they account for over ninety percent of the fuel transactions.

The fuel sites are operated by seven departments, with the Fire Department operating 48 of the sites, down from 53 in FY05. **Each department is responsible for the operation, maintenance and repair, and tank testing for its own sites with fuel ordering and payment centrally managed by the General Services Department (GSD). GSD also manages the replacement of the fuel tanks, subject to the availability of funds in the CIP for each department. The maintenance and repair of each site is covered under a citywide contract.** The testing of the City's underground and aboveground storage tanks is covered under a separate citywide contract. The operating departments pay for these services from their operating budgets. In FY08 the departments paid over \$400,000 for site maintenance and repair, tank testing and miscellaneous costs. This is a decrease of almost 28% from FY05.

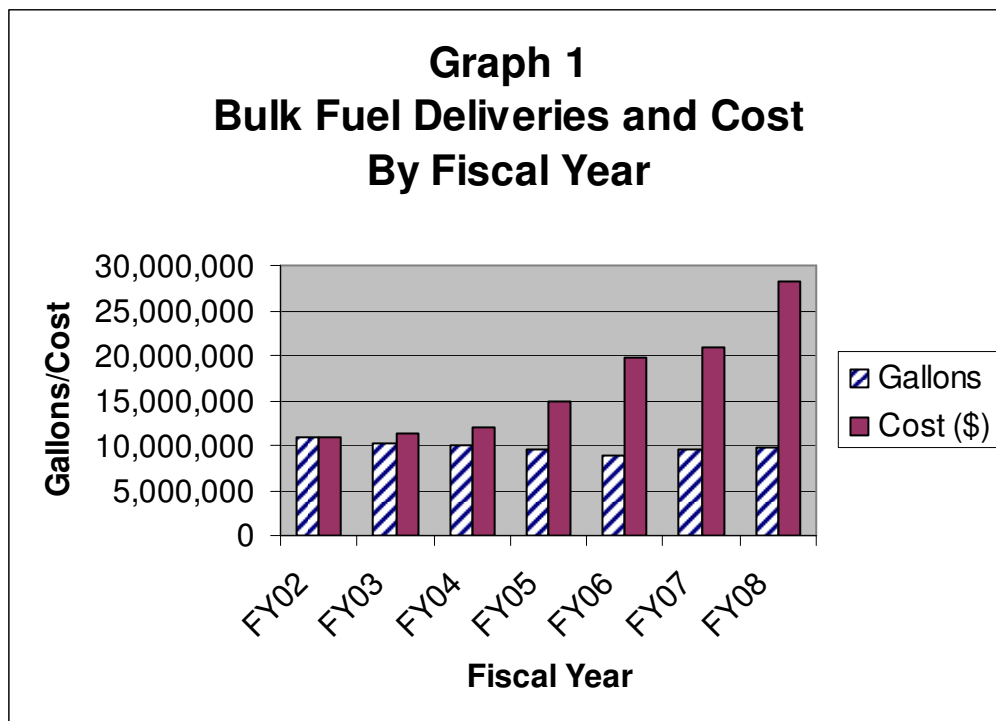
The decentralized nature of the City's fuel operations has led to varying degrees of quality control in terms of site maintenance, staff training and regulatory compliance. In recent years, the number of issues and their potential impact has become more apparent and the need to replace aging tanks and equipment is obvious. Movement to more centralized control, in conjunction with the installation of new equipment, will lead to: better inventory control; improved monitoring for potential environmental problems; development of procedures for new site approval; site design and equipment standardization; improved monitoring of site maintenance and repair; and more complete data on vehicle fuel usage.

Concerns about the quality and cost of site operations, the number of sites, potential regulatory and environmental issues, the lack of centralized control and the cost of fuel resulted in the Mayor's Office requesting the 2007 assessment. Through that assessment, it was determined that there are opportunities for the City to close and consolidate fuel sites, reduce maintenance and testing costs, improve the accuracy and timeliness of inventory data and reduce the risk and impact of environmental problems. The Fire Department is already realizing cost savings of approximately \$7,700 per month from converting unleaded tanks to diesel at 27 locations. All departments should see savings in maintenance and repair costs as old equipment is replaced. Maintenance and repair costs will be reduced further, along with tank testing costs, as sites are closed. The City will also avoid costs by not replacing tanks at fourteen fire stations and one Police Department location.

Other departments will not see a quantifiable annual savings. However, the City will realize non-quantifiable benefits from better inventory control and reduced risk of tank leakage and environmental damage.

Commodity

Bulk fuel deliveries for the City of Houston declined annually from approximately 11 million gallons in FY02 to approximately 9 million gallons in FY06, a decrease of 18.2 percent. However cost during that time period increased annually from \$10.8 million in FY02 to \$19.7 million in FY06, an increase of 82%. Beginning in FY07 bulk fuel usage increased, to almost 9.5 million gallons, and that trend continued in FY08. The City purchased approximately 9.8 million gallons of bulk fuel in FY08 at a cost of \$28.3 million. Graph 1 shows the annual bulk fuel deliveries and cost for the seven-year period FY02 through FY08.



As noted in the 2007 report, in FY07 the City entered into an agreement with Motiva to purchase fuel at the Shell refinery in Pasadena. That contract is still in effect and Motiva has provided the City with a secure source of fuel.

The current policy for maintaining in-ground fuel inventory is a minimum reorder point of 65% of total tank capacity for diesel fuel and 50% for unleaded during hurricane season (June 1 through November 30). Outside of hurricane season, the reorder point is based on a two-week supply. As mentioned in GSD's 2007 report, Spectrum Consultants conducted a review of the City's fleet fueling program in 2000. That study and a 1990 study by Deloitte and Touche, recommended lowering the inventory reorder point to a one-week supply year round. GSD Fuel Management does not agree with this recommendation. If the Deloitte calculations are updated using the December 1, 2008 prices of \$1.39 per gallon for unleaded and \$2.00 for diesel, a 5% carrying cost (Deloitte used 9% in 1990), and the FY09 budget of \$32.4 million, the one time savings ranges from \$429,000 to \$487,000, depending on the time of year that the change is made, and the annual savings is \$23,000.

This represents less than one-tenth of one percent of the FY09 fuel budget. The merit of the current policy was once again reinforced as a result of the City's experience with Hurricane Ike, just as it was after Hurricanes Rita and Katrina. As noted in the 2007 report, the small savings generated by an inventory reduction does not offset the huge risk that the City would assume. Additionally, maintaining the lower inventory level would require smaller and more frequent fuel deliveries which cost a minimum of twenty cents more per gallon. At that rate it would only take 115,000 gallons to offset the entire annual savings and just 2.4 million gallons to offset the maximum one time savings of \$487,000. The Spectrum and Deloitte reports based their recommendation on the assumption that there is plenty of fuel available at local refineries and that it can be delivered in one to three days. Both reports were written when prices were low and fuel was in a more plentiful supply. In today's market, fuel is in much shorter supply and subject to many possible supply disruptions. Additionally, there are constraints in the number of trucks and drivers available to make deliveries. Also, the nature of unleaded fuel has changed since the two reports were issued. Unleaded fuel is now a ten percent ethanol mix. Ethanol cannot be shipped by pipeline. It is shipped mostly by rail and blended at the rack with the gasoline as it is dispensed into the delivery trucks. Any disruption of rail service, would affect the City's ability to get unleaded fuel.

Commodity Recommendation: Maintain the current policy on fuel inventory levels.

Transport

Transportation of fuel can be divided into two components: transport loads (TL) and less than transport loads (LTL). Transport loads are full size 18-wheeler loads usually brought from the refinery to the fuel site. A transport load of unleaded is approximately 8,600 gallons and for diesel it is approximately 7,600 gallons. The difference is due to diesel fuel being heavier than unleaded. LTL loads vary from just a few gallons up to approximately 6,000 gallons. An LTL load could also come from the refinery or it can be transferred between sites.

In FY07, the City hired Oil Patch - Brazos Valley Inc. to carry full transport loads of fuel from the Shell refinery to the large City owned fuel sites. The cost, currently \$340 per transport load, is set by contract and increases annually. Additional charges apply if a transport load is split between multiple locations. The City of Houston spent over \$400,000 under the Oil Patch contract in FY08. Oil Patch has provided excellent service to the City. The company also provided invaluable assistance to the City in the first few days after Hurricane Ike by selling the City fuel from its own storage facilities until the Motiva refinery was back in operation.

The second component of the fuel transportation, the LTL deliveries, has been handled by PWE since near the end of FY06. PWE redistributes the fuel to the smaller fuel sites. In order to facilitate the redelivery of the fuel, and to track the transfers, in 2006 PWE installed rapid fuel dispensers at both its 101 Japhet and 7101 Renwick locations and connected these dispensers to the automated fuel system at these sites. The total cost of these installations was \$273,720. The rapid fuel dispensers enable PWE to fill the tanker trucks at a rate of approximately 70 gallons per minute. Since the 2007 report, PWE has added rapid fuel to a third location, 5900 Teague. The rapid fuel at that site dispenses at a rate of approximately 150 gallons per minute.

PWE currently has a fleet of nineteen tanker trucks, an increase of seven since the last report. The trucks were purchased for emergency use, but have been used in daily, high mileage, service. The trucks have capacities ranging from 500 gallons to 10,000 gallons. Total capacity for all trucks is approximately 88,000 gallons, although only about 90 percent (79,000 gallons) is usable capacity. The trucks range in age from eleven to twenty-nine years old. Due to the age of the tanker trucks, they are subject to frequent mechanical problems. Normally, there are only three to five trucks available for service on any given day and PWE has only four trained drivers. The PWE trucks and drivers proved to be valuable assets to the City in the aftermath of Hurricane Ike. Due to the damage to the City’s electrical grid, much of the City’s water and wastewater operations along with many buildings were forced to switch to generator power. Without the PWE trucks and drivers to supply diesel fuel for the generators the City would not have been able to maintain full services to the citizens.

PWE initially charged for delivery based on an hourly rate of \$62.07 with most deliveries taking approximately one hour. However, in FY08 PWE changed to a percentage markup based on the Motiva price on the date of delivery. The percentage markup in FY08 was fifteen percent of the Motiva price. When the cost of fuel rose dramatically toward the end of FY08, PWE reduced the markup to ten percent. PWE transported over 3.3 million gallons to City of Houston fuel sites in FY08.

PWE began FY09 with a fifteen percent markup for transporting fuel. As fuel prices decreased that charge increased to thirty percent above the Motiva delivered price in September and October. Since prices continued to fall in November, to an average of \$1.55 for unleaded and \$2.21 for diesel, the markup increased to sixty-nine percent. PWE has informed GSD Fuel Management that it will no longer transport fuel effective January 1, 2009. PWE will maintain its trucks for use in emergency situations.

Table A	
Oil Patch Transport Rates For Less Than Truck Load Deliveries	
Size of Delivery (Gallons)	Transportation Rate Per Gallon
50 - 249	\$0.45
250 - 749	\$0.35
750 - 1,499	\$0.25
1,500 - 4,500	\$0.20
Note: Minimum charge of 50 gallons and a \$50.00 charge for stops requiring a hose trailer or extra manpower.	

GSD does not anticipate any problems with the daily deliveries as a result of PWE discontinuing the LTL deliveries because the City has recently added deliveries of LTL loads to the Oil Patch contract. This service began in October of 2008 to see if it will provide a more cost effective means of delivering the small loads previously handled entirely by PWE. The Oil Patch charges for the smaller

deliveries are shown in Table B. Deliveries approaching the size of one-half of a full transport load (8,600 gallons for unleaded and 7,600 gallons for diesel) will be scheduled as split load deliveries to reduce the cost to the City.

Recommendations:

- Monitor the cost and effectiveness of the LTL deliveries by Oil Patch
- Finance Dept. should work with PWE to develop a better format to account for costs associated with PWE delivering fuel so costs to other departments can be reduced and PWE can resume this function.

Sites and Storage

The City of Houston had 102 fuel sites at the beginning of FY08, the same number as reported in 2007 for FY05. Progress has been made in reducing the number of fuel sites. Since the 2007 report, the number of sites has decreased to 97. This resulted from the closure of fuel sites at seven fire stations and the opening of two new fire stations, one of which is the new downtown superstation no. 8.

Dept.	No. of Sites	FY08 Total M,R&T and Misc. Costs	Avg. Cost/Site	FY08 Bulk Gallons	Avg. Cost/Gallon
Aviation	3	\$7,117	\$2,372	321,050	\$0.02
Fire	52	\$187,470	\$3,605	1,389,631	\$0.13
Health	1	\$1,663	\$1,663	57,217	\$0.03
Parks	14	\$21,575	\$1,541	355,460	\$0.06
Police	11	\$58,795	\$5,345	3,396,610	\$0.02
PW&E	17	\$87,977	\$5,175	6,070,988	\$0.01
SWM	4	\$50,126	\$12,532	1,535,995	\$0.03
Grand Total	102	\$414,723	\$4,066	13,126,952	\$0.03

Note: Number of sites is as of 7/1/07 and is the same number as in FY05. The gallons include the rapid fuel quantities that are redistributed to other sites and therefore counted twice. If excluded, the average cost/gallon would be \$0.042. The M,R,T & Misc. cost for FY05 was \$574,570 or \$0.06 per gallon. Total M&T cost decreased 27.8% between FY05 and FY08.

The cost to operate a fuel site includes the maintenance and repair of the equipment, such as dispensers, the FuelForce automated fuel system, and automatic tank gauge systems (ATG's) under the City's maintenance and repair services contract. Fuel tanks must also be tested and registered annually and other miscellaneous costs periodically occur. In FY05 the City departments spent a total of \$574,570 on site maintenance and repair, tank testing and miscellaneous costs. Based on gallons purchased, that was an average of \$.06 per gallon. Table B, above, shows that these costs declined by almost 28% in FY08 to \$414,723 or \$0.03 per gallon.

The City has over 11,300 units in its vehicle fleet that use either unleaded or diesel fuel. These units fueled over 760,000 times in FY08, an increase of 17% over FY05. Approximately 91% of those transactions took place at one of the 39 FuelForce automated sites or one of the three Aviation sites that are automated by a separate system. Table C shows the number of sites, by department, the total number of FY08 fuel transactions, the number of fuel transactions from automated sites, and the number of fuel transactions from manual sites.

Dept.	No. of Sites	No. of Automated Sites*	Percentage	FY08 Total Transactions	FY08 Automated Transactions	FY08 Manual Transactions	% of ****	% of ****	
			of Sites Automated				Transactions Automated	Gallons Automated	
Aviation	3	3	100%	25,416	25,416	0	100%	100%	
Fire**	48	8	17%	82,897	26,414	56,483	32%	28%	
Health	1	1	100%	3,742	3,742	0	100%	100%	
Parks	14	2	14%	29,087	16,168	12,919	56%	32%	
Police***	11	10	91%	380,565	380,565	0	100%	100%	
PW&E***	16	14	88%	180,380	180,380	0	100%	100%	
SWM	4	4	100%	66,780	66,780	0	100%	100%	
Grand Total	97	42	43%	768,867	699,465	69,402	91%	87%	
								=100-	
								87=	13%
<p>* Aviation sites are automated by a separate system and not included in references to the 39 FuelForce automated sites. These sites are scheduled to convert to FuelForce by the end of FY09.</p> <p>** Fire Station 82 was added as an automated site in July 2008. It is included in the 8 automated sites for the Fire Dept., but FY08 transactions are included in the count of manual transactions.</p> <p>*** Police has one manual location and PWE has two, but no records were located on these transactions. Total fuel purchases for these three sites in FY08 was less than 65,000 gallons.</p> <p>**** Percentage of transactions on FuelForce is 88%. Percentage of gallons is 84%.</p>									

The main costs associated with the operation of the fuel sites are: maintenance, tank testing, personnel, fuel delivery, the fuel itself and, in the long term, tank replacement. The price of the fuel is set by contract and subject to market swings. While the City purchases over nine million gallons per year, this volume is relatively insignificant to the major oil companies. Due to the high demand for fuel, these companies can sell all their production and therefore do not have an incentive to discount the price for a buyer the size of the City of Houston. Therefore, there is little that the City can do to reduce its price in the short term. The City's current contract with Motiva began October 1, 2006. The contract pricing is tied to a posted market price and therefore subject to the market swings noted above. Motiva has proven to be a valuable vendor to the City and has worked with GSD Fuel Management whenever allocation issues have arisen. Motiva gave the City a high priority after Hurricane Ike once it was able to resume operation. The primary way that the City can significantly reduce its fuel cost is to reduce its fuel usage. This would require the purchase of more fuel-efficient vehicles, reduced mileage and/or a reduction in the services provided by the City, areas outside the scope of this report.

As noted in Table B, the FY08 fuel site maintenance and testing cost decreased by almost 28% compared to the FY05 costs. At the end of FY08, GSD Fuel Management hired a technician to handle some of the fuel site maintenance. This occurred too late in the year to have an effect on the FY08 costs. However, in FY09 this person has proved valuable in handling a portion of the maintenance work. GSD plans to hire additional staff so the majority of the site maintenance can be handled internally in FY10. GSD Fuel management estimates that three technicians, including the one currently on staff, and one supervisor will be needed. Annual personnel cost, including benefits is estimated to be approximately \$286,000. Parts and other supplies could be as much as \$279,000 annually. Costs, especially parts should come down as the old equipment is replaced with new. The City would still maintain a contract to handle work requiring special licenses, emergencies, and as a backup during periods of high demand. Table D lists the expected costs for handling this service internally.

Table D		
Fuel Site Maintenance		
Personnel Costs		
	Quantity	Salary & Benefits
Inspectors	3	\$201,600
Sr. Inspector	1	\$84,000
Total Personnel Costs		\$285,600
Supplies and Miscellaneous Costs		
		Other Costs
Parts		\$250,000
Training		\$10,000
Clothing		\$4,000
Parking		\$1,800
Vehicle Maintenance		\$3,000
Vehicle Fuel		\$10,200
Total Other Costs		\$279,000
Total Annual Costs		\$564,600
Equipment Costs		
Laptops/Blackberry's		\$5,000
New Vehicles	3	\$69,000
Tools		\$10,000
Total Equipment Cost		\$84,000

The 2007 report recommended closure of the fuel site at the Police Departments Northwest Command located at 6000 Teague. This site is located adjacent to the PWE facility at 5900 Teague. GSD had initial discussions with the Police Department about the site closure. However, GSD did not move forward on this issue because the PWE facility was temporarily closed for construction. The PWE site reopened in July of 2008 and GSD has re-evaluated the closing of the Police site. In FY08 this site

dispensed over 160,000 gallons of unleaded fuel. The cost of fuel for this site, inclusive of the PWE delivery costs, site maintenance and the amortized cost of fuel tank replacement was \$3.33 per gallon. Had the vehicles at this site fueled at retail locations using the Comdata card, the fuel cost would have averaged \$2.995 per gallon, a savings of \$0.335 per gallon or over \$54,000 for the year. However, had the option been available for Oil Patch to deliver the small loads and the costs been managed, the costs for FY08 would have been an estimated \$2.661 per gallon. This would be a savings of \$0.669 per gallon over the actual FY08 cost and \$0.334 per gallon over the Comdata cost. Therefore, GSD is not recommending closure of this site at this time. GSD will manage the fuel deliveries using Oil Patch and re-evaluate this location in about one year.

The Police fuel site at 4503 Beechnut is located at the opposite end of the building that houses the PWE fuel site at 8430 Newcastle. GSD did not recommend closure of this site in 2007 because, at that time, it was expected that the PWE Newcastle site was to be sold and would be consolidated in the same location that would house the new Gillette operation. It is GSD's understanding now that the Newcastle site will not be sold and will remain in operation. Using the same evaluation for the Beechnut location as was used for Teague, the actual FY08 cost for the over 210,000 gallons of unleaded fuel issued from this site was \$3.20 per gallon. The Comdata cost would have been \$2.995, a savings of \$0.205 per gallon. Since Oil Patch delivered a greater percentage of the fuel at Beechnut, using that company for all deliveries does not generate as great of a savings as it did for Teague. The estimated price for using Oil Patch exclusively is \$3.025 per gallon, a saving of \$0.175 per gallon over current deliveries, but \$0.03 per gallon higher than using Comdata. The savings could vary depending on actual dates and quantities of deliveries using Oil Patch; however, GSD is recommending closure of this Police location by the end of FY10. Vehicles would be given the Comdata card, but could fuel at the PWE location during its regular business hours. The PWE location would also be available during emergencies, such as Hurricane Ike. Estimated annual savings to the Police Department is \$43,000.

The previously mentioned study by Spectrum Consultants recommended that "Authority and responsibility for the entire fueling function in the City of Houston should be centralized..." While the City does not have complete centralized authority, steps have been taken towards a more centralized management with the creation of the Fuel Management section within the General Services Department. The Spectrum study further recommended that the centralized fuel section "...be provided the authority and responsibility to assess the cost effectiveness of all new City fueling sites proposed by City Departments." The 1990 study of the City's fuel operations conducted by Deloitte and Touche recommended the closure of 28 City fuel sites. Both the Spectrum and the Deloitte and Touche studies recognized that the City had too many fuel sites, a problem that still persists today. Currently the City does not have a centralized review of planned fuel sites. Each department decides separately when and where it will build a fuel site and the size of the tanks. This has led to fuel sites being located in close proximity to each other, such as the Fire, PWE and Police sites located next to each other at 5800, 5900 and 6000 Teague. It has also led to undersized tanks, as is the case at many fire stations. The General Services Department with its Fuel Management and Environmental Management Sections is in a good position to review for approval all requests for new fuel sites, renovations or closing of existing fuel sites. By requiring the operating departments to submit a written justification of the need, and plans, for all proposed fuel sites to GSD Fuel Management the City will have a centralized control over the building of new sites. Once Fuel Management approves the proposed site, then the Environmental Management Section of the Design and Construction Division in GSD can design the fuel site and ensure that the specifications include all federal, state and local requirements.

The Deloitte and Touche study also pointed out that smaller fuel tanks generally are not economical, although in some cases they may be necessary. There has been progress on the issue of small fuel tanks. The typical fire station fuel site has historically been constructed with two 1,000 gallon tanks. In FY08 the Fire Department converted 27 of its fuel sites to diesel only. This was accomplished by removing the unleaded fuel from these sites, cleaning the tanks, replacing hoses and nozzles and putting diesel fuel in the old unleaded tank. This doubles the diesel storage capacity at these sites which permits fewer, but larger, diesel deliveries. It also eliminated the need for unleaded fuel deliveries. The unleaded vehicles at these sites were given Comdata cards to fuel at retail locations. During emergencies, such as Hurricane Ike, these vehicles can fuel at other City fuel sites should the retail locations be closed. This system worked well after Hurricane Ike. Fuel tanks must be tested and registered annually and equipment must be maintained to meet regulatory and operational requirements.

The Fire Department realized a quick payout on the tank conversions. The cost of the conversions totaled \$52,550. As shown in Table E, Fire saved over \$46,000 in the first six months after the completion of the conversions, March through August 2008. The savings resulted primarily from the unleaded fuel. The unleaded vehicles based at these locations consumed over 90,000 gallons during this six month period through the Comdata card at an average price of \$3.45 per gallon compared to the estimated PWE delivered price of \$3.89 per gallon. Additional savings came through the reduced number of diesel deliveries to these sites.

Table E	
Fire Department Unleaded Fuel Tank Conversion	
Actual UN Savings Using Comdata (March - August 2008)	\$39,729
Estimated DS Savings from Reduced Deliveries (March - August 2008)	\$6,827
Total Savings (March - August)	\$46,556
Estimated Savings Per Month	\$7,759
Actual Conversion Cost	\$52,550
Payback Period (Months)	7
Note: Diesel Savings based on reduced number of deliveries.	

The Comdata card, which provides access for fueling at retail locations, has been a good benefit to the City. Without the card the unleaded fuel tanks could not have been converted to diesel at the fire stations. It has also allowed the City to avoid building new fuel sites in areas of the city, such as Kingwood, that do not have access to City owned sites. In FY08 the Fire Department purchased over 290,000 gallons of fuel for less than \$935,000. Those purchases should increase in FY09 due to the above mentioned tank conversions. The Police Department purchased over 285,000 gallons of fuel in FY09 for just over \$825,000. The City is piggybacking the State contract with Comdata which expires on August 31, 2009. GSD Fuel Management will coordinate with the State and the Strategic

Purchasing Division of the Administration and Regulatory Affairs Department to insure that a replacement contract is in place.

The 2007 report discussed the historical problem of obtaining accurate and timely fuel inventory data especially at the Fire and Parks department's sites. The Fleet Management staff at the Fire Department is dependent upon the firefighters at the stations to manually measure the fuel tank inventory and submit an inventory report each morning. The accuracy of the data varies by station and by shift. The availability of the firefighters to provide the data is also an issue. The emergency and public safety nature of the Fire Departments operations, and the small tank capacities, makes fuel inventory accuracy and availability an important issue. The Parks Department has a similar issue, but on a much smaller scale.

Related to this issue is the number of sites that do not have an automatic tank gauge (ATG) system to measure the fuel inventory and detect leaks. Some sites have a tank gauge system originally manufactured by Red Jacket. This company is no longer in business and replacement parts are hard to obtain. Many of the fire stations have leak detection systems, but they do not measure the tank inventory. At these sites the firefighters must manually "stick" the tanks to measure the inventory. There are 44 locations citywide in need of an automatic tank gauge system. Additionally, as noted in the 2007 report, there are many sites, particularly in the Fire Department, where the personnel are not properly trained on the system. When an alarm is activated the staff does not know what it is and it frequently goes unreported.

As noted previously, the City has 39 fuel sites connected to the FuelForce automated fuel system. Each department that operates fuel sites, except for the Aviation Department, has one or more sites connected to this system. By performing mileage verification and recording each fuel transaction, the system provides fuel usage data with a high degree of accuracy. This data is used in the fleet budget process and in determining preventive maintenance schedules. The data has also been used in investigations by the Office of the Inspector General.

The three Aviation Department fuel sites are connected to an automated system manufactured by Petrovend. This system is approximately ten years old and due for an upgrade or replacement. The Petrovend system does not interface with either FuelForce or with the City's fleet management system. As a result, the fleet management system has very little fuel data on Aviation Department vehicles.

Installing the FuelForce system and ATG systems at the fuel sites is an important factor in improving fuel site operations and the quantity and quality of the data from the sites. To this end, GSD is working with the departments to install this equipment in FY09. Little progress was made in FY08 because department budgets were already finalized when the 2007 report was released. The individual departments have been very cooperative in working with GSD towards the goal of automating sites and installing ATG's. The Aviation Department has budgeted funds to convert its three fuel sites to the FuelForce system and install new ATG's at those locations. Aviation has also budgeted for the installation of FuelForce at the two ARFF stations that are not already automated and for the installation of ATG's at all four ARFF stations.

The Fire Department, which now has eight of its forty-eight sites automated, has already purchased nine FuelForce controllers to be installed in FY09 along with ATG's at those sites. The Parks

Department is also making funds available for FuelForce and ATG installation at several of its sites. The Solid Waste Department, which already has FuelForce at its sites, has budgeted for replacement of its ATG's at three locations. The Health Department is prepared to replace the ATG at its one location and the Police Department, which is fully automated and has working ATG's, will be funding the connection of the ATG's to the WAN as will the other departments.

GSD Fuel Management, SPD and the operating departments are in the process of developing bid specifications for the funded portion of the work mentioned above. The bid specifications will not include the installation of the same equipment at additional sites for which the departments do not currently have available funding. Since installation of this equipment is important to citywide fuel management, GSD will request that the Mayor's office find funding in FY10 for the additional work. Table F below is a summary of the work that needs to be completed, including replacement of old dispensers.

Table F						
FY09 Equipment Installation						
Department	Dispenser	ATG	FuelForce	Total Cost	Available Funding	Unfunded
Aviation	\$0	\$389,300	\$79,000	\$468,300	\$468,300	\$0
Health	\$10,000	\$10,000	\$0	\$20,000	\$20,000	\$0
Police	\$20,000	\$61,800	\$0	\$81,800	\$81,800	\$0
Fire	\$420,000	\$829,800	\$489,000	\$1,738,800	\$500,000	\$1,238,800
Parks	\$0	\$72,800	\$0	\$72,800	\$72,800	\$0
Solid Waste	\$0	\$59,800	\$0	\$59,800	\$59,800	\$0
PWE	\$0	\$160,400	\$0	\$160,400	\$0	\$160,400
Total	\$450,000	\$1,583,900	\$568,000	\$2,601,900	\$1,202,700	\$1,399,200

Recommendations:

- Hire two Inspectors and one Senior Inspector in GSD Fuel Management to handle fuel site maintenance and repair. Add \$565,000 to the GSD Fuel Management FY10 budget to cover annual cost and \$84,000 for the purchase of equipment.
- Close the Police fuel site at the 4503 Beechnut location.
- Provide funding in the amount of \$1.4 million to cover the unfunded portion of the ATG and FuelForce installations in FY10.
- Centralized authority within GSD to review and approve all requests for new fuel sites and renovation or closing of existing sites. GSD will also design all new construction and renovation.

Fuel Storage Tanks

The City had 221 fuel tanks at its 102 locations at the beginning of FY07. Those tanks had a total capacity of 1,275,530 gallons. Since then, as stated earlier, the fuel sites have been closed at seven fire

stations and two new stations opened. Twenty seven fire stations have also had the unleaded tanks converted to diesel. Tanks at the central Police facility at 61 Riesner and the PWE location at 5900 Teague have been replaced with larger tanks. As a result, the number of tanks has decreased to 209. The usable unleaded capacity has decreased by about 10,000 gallons while the usable diesel capacity has increased by almost 60,000 gallons. Table G, above, shows the number of tanks and total capacity by department. Tanks can only be filled to 90% of capacity because there must be space for the fuel vapor at the top and as much as 10% at the bottom of the tank would not be usable because the pumps pull fuel from a few inches above the bottom in order to avoid water or sediment at the bottom.

Table G

**City of Houston
Fuel Tank Capacity**

Department	<u>Unleaded</u>		<u>Diesel</u>		<u>Total</u>	
	No. of Tanks	Total Capacity (Gallons)	No. of Tanks	Total Capacity (Gallons)	No. of Tanks	Total Capacity (Gallons)
Aviation	5	40,500	3	18,500	8	59,000
Fire	19	62,950	74	117,000	93	179,950
Health	1	10,000	0	0	1	10,000
Parks	12	35,750	14	31,250	26	67,000
Police	21	239,000	1	5,000	22	244,000
PW&E	26	391,500	20	251,750	46	643,250
SWM	4	32,000	9	100,000	13	132,000
Total	88	811,700	121	523,500	209	1,335,200
Usable Capacity:		649,360		418,800		1,068,160

Note: Usable capacity is approximately 80% of total capacity.

The departments have historically been responsible for the fuel tanks, including testing and replacement. Only within the last two years, has the City established a policy concerning when fuel tanks should be replaced. In the 2007 report that age was established as 30 years, but it has since been reduced to 25 years. Due to the previous lack of policy, there are active tanks older than 30 years of age. In most cases, tanks have not been replaced until there is a problem, such as a leak, or when required by a regulatory change. Waiting until a problem occurs leads to thousands of dollars in additional costs for remediation.

Table H is the revised GSD tank replacement/removal schedule through FY12. As previously mentioned, tanks have been removed and sites closed at seven fire stations. The GSD Environmental Management Section has developed this schedule and worked with each department on funding. However, twenty of the remaining twenty-three projects are still not funded. In order to avoid potential future environmental problems, GSD recommends that these projects be given a high priority and

funding found so they can be completed as scheduled. The estimated funding that is needed through FY12 is \$6,535,000 of which \$3,075,000 is needed in FY09.

Table H							
<u>Fuel Tank Replacement/Removal Through FY2012</u>							
OWNER DEPT.	SITE NAME	YEAR INSTALLED	FUEL SITE STATUS	REMOVE OR REPLACE	SCHEDULED FY	STATUS	ESTIMATED UNFUNDED COSTS
HFD	Fire Station #45	1985	CLOSED	Remove	2007	Completed	
HFD	Fire Station #49	1977	CLOSED	Remove	2007	Completed	
HFD	Fire Station #59	1977	CLOSED	Remove	2007	Completed	
HFD	Fire Station #65	1984	CLOSED	Remove	2007	Completed	
HFD	Fire Station #73	1985	CLOSED	Remove	2007	Completed	
HFD	Fire Station #56	1972	CLOSED	Remove	2008	Completed	
HFD	Fire Station #66	1974	CLOSED	Remove	2008	Completed	
HFD	Fire Station #13	1977	ACTIVE	Replace	2009	Funded	
HFD	Fire Station #18	1977	ACTIVE	Replace	2009	Not Funded	\$375,000
HFD	Fire Station #17	1983	ACTIVE	Replace	2009	Not Funded	\$375,000
HFD	Fire Station #55	1977	ACTIVE	Replace	2009	Not Funded	\$375,000
HFD	Fire Station #30	1977	ACTIVE	Remove	2009	Not Funded	\$375,000
HFD	Fire Station #36	1977	ACTIVE	Replace	2009	Not Funded	\$375,000
HFD	Fire Station #44	1977	ACTIVE	Replace	2009	Not Funded	\$375,000
HFD	Fire Station #46	1977	ACTIVE	Replace	2009	Not Funded	\$375,000
HFD	Fire Station #25 (DS Only)	1977	ACTIVE	Replace	2010	Not Funded	\$375,000
HFD	Fire Station #5	1977	ACTIVE	Replace	2010	Not Funded	\$375,000
HFD	Fire Station #29	1977	ACTIVE	Remove	2010	Not Funded	\$90,000
HFD	Fire Station #3	1977	ACTIVE	Remove	2011	Not Funded	\$90,000
HFD	Fire Station #19	1978	ACTIVE	Remove	2011	Not Funded	\$90,000
HFD	Fire Station #16	1979	ACTIVE	Remove	2011	Not Funded	\$90,000
HFD	Fire Station #32	1980	ACTIVE	Remove	2011	Not Funded	\$90,000
HFD	Fire Station #42	1980	ACTIVE	Remove	2012	Not Funded	\$90,000
HFD	Fire Station #69	1980	ACTIVE	Replace	2012	Not Funded	\$375,000
HFD	Fire Station #31	1981	ACTIVE	Replace	2012	Not Funded	\$375,000
HPD	Police Academy	1979	ACTIVE	Replace	2009	Funded	
PARD	Gragg Park Complex	1980	ACTIVE	Replace	2009	Funded	
PWE	Traffic Management	1979	ACTIVE	Replace	2009	Not Funded	\$450,000
PWE	Wastewater, Japhet	1980	ACTIVE	Replace	2010	Not Funded	\$1,300,000
PWE	Maintenance & Operations	1981	CLOSED	Remove	2010	Not Funded	\$120,000
SWM	Northeast Substation, Eastex	1978	CLOSED	Remove	2009	Funded	
Total Unfunded Costs							\$6,535,000

The PWE facility at 801 Gillette has fuel tanks that meet the criteria for replacement. This facility has not been included in the schedule because GSD understands that this property will be sold and is scheduled for closure by the end of FY10. It should be noted that closure of the Gillette facility will

result in the loss of 80,000 gallons in unleaded fuel storage capacity and 20,000 gallons for diesel. PWE plans to move the operations from Gillette to several other PWE locations, but does not have plans to increase fuel storage at any of these sites. The loss of this large amount of fuel storage could affect the City during an emergency. Additionally, this location dispensed over 500,000 gallons of fuel in FY08 which is approximately five percent of the total City volume. Based on GSD's analysis of the parking locations of the vehicles that fueled at this location in FY08, there was over 200,000 gallons dispensed to vehicles that are located in, or near, the downtown area. These vehicles would need to find an alternative location at which to fuel. The nearest location would be the Fire Departments Logistics Center at 1205 Dart. This facility has 40,000 gallons in unleaded fuel capacity and another 40,000 in diesel. However, the real issue would be this sites ability to handle the increased traffic. The area around the fuel island and tanks is limited because it is used for parking. This would restrict the ability to add tanks since the parked vehicles would interfere with a fuel tanker delivering fuel to the new tanks. There is only one fuel island, which has ten hoses, but normally only two or three vehicles could fuel at the same time. The over 18,000 transactions per year that could potentially shift to this location, approximately seventy per day, would cause long lines, traffic problems and long delays for drivers. The long lines could also interfere with the large firefighting apparatus that move through this area daily.

Recommendations:

- Continue replacement of tanks on a 25 year lifecycle.
- Make available \$6,535,000 is funding to cover all currently unfunded tank replacement and closures scheduled through FY12.
- Replace the Gillette facilities storage capacity and construct a fuel site to handle the fueling currently done at this location.

Emergency Preparedness

Hurricane Ike provided a good test of the emergency preparedness of the City's fuel operations. Due to a large portion o the City's electrical grid being damaged, many areas of the City's operations were forced to switch to generator power. GSD Fuel Management operated out of the PWE facility at 7101 Renwick in order to coordinate deliveries with PWE. During the period September 11 – 26, PWE delivered approximately 160,000 gallons of fuel to generators. Total diesel fuel deliveries to City facilities during this time period were over 338,000 gallons, an increase of over 145,000 gallons for the same period in 2007. Unleaded deliveries during this time were over 503,000 gallons, an increase of over 164,000 gallons over 2007 levels. Both the Oil Patch and PWE fuel truck drivers worked extremely long hours to insure a continued fuel supply for the City's operations.

GSD Fuel Management was able to make note of several areas, both positive and negative, during the two weeks following the hurricane. Areas of note:

- The PWE tanker trucks were a valuable asset during this emergency. While the trucks are old and have maintenance issues, the City could not have maintained fuel deliveries to its generators without these vehicles.
- The PWE drivers also performed very well during this time. The concern is that there are not enough drivers for a prolonged emergency. PWE has had four drivers for the daily deliveries it

has been performing. This has been enough for normal deliveries. However, during the emergency, these drivers were pressed into service for 18 – 20 hour days for several days. This led to exhaustion for the drivers. PWE was eventually able to identify additional drivers with the proper licenses and hire additional temporary drivers. GSD recommends that a list of qualified drivers be kept and that those drivers be periodically rotated through training drills so they stay familiar with the equipment.

- The Shell refinery, like many others was shutdown for the hurricane. It took several days to restore power and inspect the facility before it came back on line. Once it returned to operation, there were long lines at the rack awaiting fuel. This cutoff the City's access to fuel for several days and limited it for several more. While the City's fuel supplies proved adequate during this emergency, there would have been problems had the refineries been without electrical power for an extended period of time.
- Oil Patch proved to be a valuable vendor for the City during this emergency. There were some initial delays in getting deliveries because the drivers had been evacuated from the area, but they quickly returned after the storms passage. Oil Patch gave the City's deliveries a high priority and supplied emergency fuel from its own inventory. Without this supply, the City would have had difficulty replenishing its supplies. The Oil Patch drivers also worked long hours and experienced fatigue, just as the PWE drivers did.
- Both PWE and GSD received calls through their respective Director's offices and the HEC for fuel to be delivered to non-City facilities. At times this severely stretched the City's fuel supplies and the drivers' abilities to deliver fuel. Another concern in this area, however, is that there was no clear cut chain of command for authorizing these deliveries. Normally, only the Mayor can authorize such deliveries. However, during an emergency the Mayor cannot personally review and authorize each request. GSD recommends though that there be a single point of contact for this situation and the identity of that contact be communicated to all concerned ahead of the emergency. Additionally, vendors who provide needed services to the City, such as internet and cable access, should be informed prior to hurricane season that they will be expected to have adequate supplies of fuel available for generators so they can maintain services to the City.
- Many City buildings have diesel powered emergency generators. This creates a large demand for diesel fuel and strains the City's fuel supply during a prolonged emergency. GSD recommends that generators be converted to natural gas power. Natural gas has proven to be a much more reliable source during emergencies. GSD is not aware of any times when natural gas supplies have been curtailed in the aftermath of a hurricane. Diesel fuel supplies, however, can be curtailed or limited. Additionally, many City facilities were without generators so some were obtained through FEMA. Facilities should be evaluated to determine if generators are needed to maintain essential functions.
- Generator sites, especially in Wastewater Operations, were sometimes difficult to get access into and sometimes once drivers were able to access the facility they found a lock on the generator and no one on-site with a key. This led to drivers either waiting for someone to let them in or having to return.
- GSD Fuel Management has attempted to compile a complete list of generators in the City and works with the departments during hurricane season to get the generator fuel levels up in order to avoid a rash of last minute deliveries prior to a hurricane. However, during Ike GSD Fuel Management found there were a lot more generators than it was aware existed. Also, most site personnel did not know the tank capacity, how many gallons were needed to fill the generator

or how long the fuel would last. GSD needs a complete list from all departments of all generators, tank capacities and estimated run time on a full tank, and a list of contacts.

The single most important aspect of the City's emergency fuel supply is having an adequate supply to maintain fuel sites and generators for an extended period. As noted earlier, had Hurricane Ike disabled the refineries for a longer time period, the City would have had problems maintaining its fuel supplies. The City has a large storage capacity of fuel. On September 11, just prior to the storm, citywide unleaded inventories were at 74% of total capacity and emergency sites were at 75%. Diesel inventories citywide were also at 74% and emergency sites at 77%. It would be hard to achieve higher inventory levels while fuel is being used. The citywide levels equate to over 600,000 gallons of unleaded and over 390,000 gallons of diesel. However, as noted earlier, up to as much as ten percent of the total capacity can not be used since it is below the point from which the pumps pull fuel. This reduced the usable amount of fuel to approximately 500,000 gallons of unleaded and 345,000 gallons of diesel. These inventories are large; however, the weak link in the chain is the incoming supply and the locations of the inventory. Sites with large tank capacities receive direct deliveries through Oil Patch while smaller sites and generators are supplied through the three PWE locations that have rapid fill. The three PWE rapid fill locations have usable capacity of 76,000 gallons for unleaded and 56,000 gallons for diesel. If the incoming fuel supply is cutoff or severely reduced, these sites will quickly run out of fuel, especially diesel if there is a high generator demand. The other large sites may also run out of fuel if Oil Patch is unable to get fuel from the refinery. Some sites, with lower demand, may still have fuel in the ground when the heavy use sites run out. So the City could be in a situation where it still may have supplies in the ground, but not at the locations where it is needed. Once the supplies at the rapid fuel sites are gone, the City's tankers would have to fuel at other sites using regular dispensers that pump at approximately ten gallons per minute. At that rate, it would take over six and a half hours to put 4,000 gallons in a tanker.

The City does have limited ability to pump fuel directly from a tank, but this is a time consuming process. While fuel can be pumped from the tank at a rate of up to 150 gallons per minute, setup and breakdown of the equipment takes about 1 hour and PWE has only one truck and three portable pumps capable of doing this. While the City has some ability to go to retail locations and remove fuel from those tanks, it would be using the same time consuming methods already noted. Additionally, much time would be lost locating adequate supplies since many of those tanks would have been depleted. Emergency supplies would of course be sent in by FEMA and other agencies. However, experience tells us that there would be delays in those supplies and they would be spread across several agencies, municipalities and emergency facilities.

New trucks are needed for the daily deliveries with the current trucks being relegated back to their original purpose, for back-up and emergency service. Additional trained drivers that can be pulled from their daily jobs to replace the primary tanker drivers, when needed, would also be helpful.

Recommendations:

There is, of course, no way to guarantee adequate supplies to meet all emergency needs on a timely basis. However, GSD Fuel Management recommends several steps that should be taken to minimize the risk and potential impact of supply curtailment and improve emergency operations:

- Continue with previously recommended plans to increase storage capacity by replacing existing tanks with larger tanks as they come due for replacement.
- Replace the Gillette facility and its lost storage capacity.
- Identify at least two existing locations where significant storage capacity can be added along with rapid fuel dispensers. These sites should each have at least 100,000 gallons of diesel storage capacity and 50,000 gallons of unleaded. If this is done at existing sites when existing tanks are replaced, GSD Environmental Management estimates each site would cost approximately \$2.35 million which would be about \$600,000 more than if the tanks are replaced as is.
- Each department should develop a plan, before the 2009 hurricane season, to reduce vehicle fuel usage during emergencies. The plan should identify which operations are not of an emergency nature and establish a procedure to insure that the associated vehicles do not fuel during an emergency. Plans should be filed with the Mayor's Office, the Office of Emergency Management and with GSD Fuel Management. The Mayor can then decide whether or not to put these plans into effect during an emergency.
- Contract with a vendor to supply fuel from outside the Houston area during emergencies.
- Each department should supply GSD Fuel Management with a list of generators, tank capacities, run time and contacts.
- Departments should develop plans for access to generator locations for fuel truck drivers.
- Establish a single point of contact for approval of fuel deliveries to non-City of Houston facilities during emergencies.

Recommendations Update

GSD offered several recommendations in the 2007 report. Table I lists those recommendations and the status of each. Due to the unavailability of funds in FY08, much of the work was postponed until FY09. As stated earlier in Table F, GSD estimates that over \$2.6 million will be need to complete the recommended work. However, at least \$1.4 million of that is not yet funded. That amount could increase depending on Fire Department funding.

Table I	
Status of Recommendations From 2007 Report	
Recommendation	Status
Closing of fourteen fuel sites at fire stations	Seven closed; seven others to be closed as tanks become due for replacement (Funding not identified – See Table H)
Conversion of 29 fire stations to diesel only	27 converted. Two remaining sites will be converted when tanks are replaced.
<ul style="list-style-type: none"> • Installation of the FuelForce automated fuel system at 35 fire stations • Installation of emergency shut-offs at 29 sites. • Installation of ATG's at 44 sites, including replacement of all obsolete Red Jacket systems. • Connection of all ATG's to a centralized monitoring system. • Installation of the FuelForce to replace the Petrovend system at three Aviation fuel sites 	Funds were not available in FY08. Bid specifications are being prepared for installation in FY09. Only partial funding is available. Still need approximately \$1.4 million. See Table F.
Replacement of all underground fuel storage tanks on a 30 year schedule	Revised to 25 year replacement schedule. Tanks are to be replaced as they come due on the schedule. Only partial funding has been identified for those scheduled through FY12. Still need \$6.5 million. See Table H.
Closing the fuel site at the Police Departments Northwest Command station	Recommendation revised – continue operation of site for at least one more year.
Hiring in GSD Fuel Management of a staff member to perform maintenance and repair at fuel sites	Accomplished
Require all departments to submit to GSD Fuel Management a written justification of the need and plans for all proposed fuel sites. The GSD Environmental Management Section will design all fuel sites.	Will be included in an AP to be submitted to Mayor before the end of FY09.
Finalizing a draft fuel site SOP and formalizing it in an AP for the Mayor's signature	Will be completed before the end of FY09.
Install the FuelForce at three PWE locations.	One site automated, but not operational due to Hurricane Ike. Funding not available for remaining two sites.

New Recommendations

GSD offers these additional recommendations based on experience since the 2007 report. Each recommendation is covered in another section:

- Provide funding in the amount of \$1.4 million to cover the unfunded portion of the ATG and FuelForce installations in FY10.
- Make available \$6,535,000 is funding to cover all currently unfunded tank replacement and closures scheduled through FY12.
- Finance Dept. should work with PWE to develop a better format to account for costs associated with PWE delivering fuel so costs to other departments can be reduced and PWE can resume this function.
- Hire two Inspectors and one Senior Inspector in GSD Fuel Management to handle fuel site maintenance and repair. Add \$565,000 to the GSD Fuel Management FY10 budget to cover annual cost and \$84,000 for the purchase of equipment.
- Close the Police fuel site at the 4503 Beechnut location.
- Establish a single point of contact during emergencies to authorize emergency fuel deliveries to non-COH locations.
- Convert diesel generators to natural gas.
- Replace the Gillette facilities storage capacity and construct a fuel site to handle the fueling currently done at this location.
- Modify at least two current sites to serve as emergency storage with increased tank capacity and rapid fuel dispensers.
- Departments should develop written plans to stop non-emergency fuel consumption during emergencies.
- Each department should supply GSD Fuel Management with a list of generators, tank capacities, run time and contacts.
- Departments should develop plans for access to generator locations for fuel truck drivers.

Conclusion

The Fuel Management Section of the General Services Department has developed a plan for improved management of fuel inventories and maintenance of site equipment. Funding is needed to insure that these plans can be carried out. The Environmental Management section of GSD has also developed a plan for replacement of old tanks and equipment, but funding is also needed to move forward with these plans. The City's emergency fuel operations performed well in the wake of Hurricane Ike, but some changes are needed to insure smoother operation and to reduce the risk that fuel supplies may run short during an extended emergency.