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MONTEREY, CALIFORNIA

MBA PROFESSIONAL REPORT

**Factors Affecting Navy Working Capital Fund (NWCF)
Net Operating Result: A Case Study of
Naval Facilities Engineering Command Washington,
Washington D.C.**

**By: Tamanh Q. Duong,
 Greg R. Johnson, and
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 December 2009**

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OPERATING RESULT: A CASE STUDY OF NAVAL FACILITIES
ENGINEERING COMMAND WASHINGTON, WASHINGTON D.C.**

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**FACTORS AFFECTING NAVY WORKING CAPITAL FUND
(NWCF) NET OPERATING RESULT: A CASE STUDY OF NAVAL
FACILITIES ENGINEERING COMMAND WASHINGTON,
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ABSTRACT

Over the past four years, Naval Facilities Engineering Command (NAVFAC) Washington has encountered net operating result (NOR) losses not anticipated in the Navy Working Capital Fund (NWCF) budget. These unanticipated losses primarily stemmed from three major factors associated with financial operations. The first factor is the creation of stabilized rates that turned out to be insufficient during fiscal years 2006, 2007 and 2008. The second factor is the disparity between the budgeted and actual average labor hours worked. The third factor is the continued rising cost of purchased utility commodities in support of the services rendered to the customers, coupled with the inadequate revenues generated from utilities services performed. This MBA research project uses the labor and budget information provided by the command to assist in: (1) determining the financial impacts due to inaccurate projected labor hours, (2) evaluating the current policy concerning stabilized rates, (3) mitigating the impact associated with the rising cost of purchased utilities, and (4) developing an improved model for estimating future expenses and revenues.

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LIST OF ACRONYMS AND ABBREVIATIONS

ABB	Activity Based Budgeting
ABC	Activity Based Costing
AOR	Accumulated Operating Result
CESE	Civil Engineering Support Equipment
CL	Center Line
CNI	Commander Navy Installations
CNO	Chief of Naval Operations
CONUS	Continental U.S.
CSE	Contractual Services Expenses
DIA	Defense Intelligence Agency
DoD	Department of Defense
FBI	Federal Bureau of Investigation
FEC	Facilities Engineering Command
FMB	Financial Management Board
FSC	Facility Support Contract
FTE	Full Time Equivalent
FY	Fiscal Year
G&A	General and Administrative
GAO	Government Accountability Office
GF	General Fund
IBIS	Industrial Budget Information System
JON	Job Order Number
LCL	Lower Control Limit
MEO	Most Efficient Organization
MILCON	Military Construction
NAVAIR	Naval Air Systems Command
NAVFAC	Naval Facilities Engineering Command
NAVSEA	Naval Sea Systems Command
NDW	Naval District Washington
NOR	Net Operating Result
NRL	Naval Research Laboratory
NSWC	Naval Surface Warfare Center
NWCF	Navy Working Capital Fund

OCONUS	Outside Continental U.S.
OMB	Office of Management Budget
OT	Overtime
PWD	Public Works Department
PWS	Performance Work Statement
RAP	Resource Allocation Plan
ROICC	Resident Officer in Charge of Construction
SRM	Sustainment, Restoration & Modernization
ST	Straight Time
UCL	Upper Control Limit
UEM	Utilities & Energy Management
USR	Utilities Services Revenue

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ABOUT THE AUTHORS

Lieutenant Commander Tamanh Q. Duong graduated from University of California, Riverside in 1999 with double Bachelor of Science Degrees in Chemical Engineering and Chemistry, and was commissioned as an Ensign, United States Navy after completing Officer Candidate School in Pensacola, FL.

His first assignment in the Navy Civil Engineer Corps was an independent Public Works Officer at the Naval Outlying Landing Field (OLF)—San Nicolas Island, Naval Air Weapons Station, China Lake, CA. In 2001, he transferred to serve as an Assistant Resident Officer in Charge of Construction at Point Mugu, which is now combined with Port Hueneme as part of the Naval Base Ventura County, CA. After Naval Base Ventura County, he reported to the Naval Mobile Construction Battalion (NMCB) FORTY in 2003 and served as Company Commander of Headquarters and Bravo “Camp Maintenance” companies, and forward deployed to Iraq as a Individual Augmentee (IA) for six months in the role of a FOB engineer of Multi-National Security Transition Command—Iraq (MNSTC-I).

Following the Battalion tour in 2005, he reported to the Public Works Department of South Potomac—Naval Support Facilities Indian Head, MD and Dahlgren, VA, where he served as Production Officer of 215 maintenance, utilities, and transportation skilled workers. In 2007, he then transferred to the Naval Air Station Headquarters at Patuxent River, MD and served as head of Facilities Engineering Management and Services Division. During his assignment at Patuxent River in 2008, he volunteered to serve with the U.S. Army Corps of Engineer as an Individual Augmentee (IA) in the role of an Infrastructure Engineer of the Joint Reconstruction Operation Center (JROC) in Baghdad, Iraq. Upon return from Baghdad in summer 2008, LCDR Duong reported to the Naval Postgraduate School (NPS) of Monterey, CA where he is completing a Master in Business Administration (MBA) with a subspecialty in Financial Management. LCDR Duong is scheduled to depart NPS on November 30, 2009 to participate in Chief of Naval

Operations (CNO) Strategic Studies Group (SSG) XXIX in support of the CNO's future warfare innovations—"Maritime Operations in the Age of Hypersonic and Directed Energy Weapons."

Lieutenant Commander Duong is a qualified Seabee Combat Warfare Officer and a certified level II DIWIA member. He is a registered Professional Engineer in the State of California. His personal awards include the Joint Defense Meritorious Service Medal, the Joint Commendation Medal, and the Navy/Marine Corps Commendation Medal and two Navy/Marine Corps Achievement Medals.

Major Greg R. Johnson, USMC graduated from Utah Valley University in 1997 with a Bachelor of Science degree in Business Management with a sub-specialty in Accounting. Subsequently after graduation, he was commissioned a second lieutenant in the United States Marine Corps and attended The Basic School for officers in Quantico, Virginia.

Upon completion of the Basic School in 1998, 2nd Lt Johnson was assigned the Financial Management Military Occupational Specialty and attended the Financial Management Officers Course at Camp Johnson, NC. His first duty station was II Marine Expeditionary Force (MEF) at Camp Lejeune, NC where he was assigned to be the budget officer and exercise budget officer. Upon being promoted to the rank of Captain in 2002, he was assigned to be the Deputy Comptroller for II MEF.

After a successful tour with II MEF, Capt Johnson transferred to be the comptroller at Marine Forces South, the Marine component to Southern Command located in Miami, Florida. Capt Johnson was often called upon to assist in training missions conducted in various countries in South American as a language qualified Foreign Area Officer.

In 2005, Capt Johnson reported for duty at III MEF, located in Okinawa, Japan where he was assigned to work as the budget officer. His III MEF tour would be interrupted as he volunteered as an Individual Augmentee to work in the Multi-National Force—Iraq Comptroller office in Baghdad, Iraq as the budget and execution officer for

the period of one year. Capt Johnson returned to Japan, where he was transferred to the 3rd Marine Division to work as the deputy comptroller. Capt Johnson was promoted to the rank of Major in May 2008.

In June 2008, Major Johnson transferred to Monterey, CA to attend the Naval Postgraduate School where he would obtain his Masters in Business Administration with a sub-specialty in Financial Management.

Major Johnson is an experienced Marine Corps comptroller and financial manager. His personal awards include the Defense Meritorious Service Medal and three Navy-Marine Corps Commendation Medals.

Lieutenant Commander Juan Carlos Uribe graduated from Texas A&M University in 1996 and from Naval Officer Candidate School in 1999. He is currently enrolled in the Financial Management MBA program at the Naval Postgraduate School in Monterey, CA.

In October 2000, ENS Uribe reported onboard USS Ticonderoga (CG 47) as the Disbursing/Sales Officer he advanced to the position of Food Service Officer half way through the tour. During this time, USS Ticonderoga deployed to South America to conduct counter drug operations and took part in an international naval exercise.

In February 2003, LTjg Uribe was selected for an Integrated Logistics Support internship at Space and Naval Warfare Systems Command (SPAWAR). He earned a subspecialty code in logistics and proceeded to finish his tour nine months early to take “hot fill” orders to the USS Cleveland (LPD 7)

In July 2004, LT Uribe reported onboard USS Cleveland as the Supply Officer, where he commanded a department of 70 sailors, five Chief Petty Officers and two officers. USS Cleveland deployed to the Western Pacific ocean, the Persian Gulf and the Mediterranean Sea.

In July 2006, LT Uribe reported to Fleet and Industrial Supply Center, Sigonella, where he served as the Fleet Services Officer. During that time, he took part in a Joint Task Force Exercise off the west coast of Africa and deployed as an individual augmentee (IA) to the Al-Anbar province of Iraq from July to December 2007.

I. INTRODUCTION

A. PURPOSE OF THIS STUDY

This MBA research project examines various factors affecting the command Navy Working Capital Fund (NWCF) net operating results using budgeted and actual fiscal year 2006, 2007 and 2008 data. The results of this study are to assist the command in: (1) determining the financial impacts due to inaccurate projected labor hours, (2) evaluating the current policy concerning stabilized rates, (3) mitigating the impact associated with the rising cost of purchased utilities, and (4) developing an improved model for estimating future expenses and revenues.

B. BACKGROUND

1. Facilities Engineering Command (FEC) Washington Operational and Financial Challenges

FEC Washington experienced operational and financial challenges since fiscal year 2006, including: (1) the continued integration of engineering field activity Chesapeake, Public Works Department Washington and Naval District Washington Regional Engineer organizations, as part of the global Naval Facilities Engineering Command (NAVFAC) transformation mandate, (2) the continued efforts to implement a work force reshaping plan to meet right-sizing objectives through commercial activities (OMB Circular A-76), and (3) the continued efforts to meet established net operating result targets.

Figure 1 shows that NAVFAC headquarters command and FEC Washington are co-located at the Navy Yard, Washington D.C. Figure 2 illustrates that NAVFAC headquarters is an echelon II command—commanded by the Navy Chief of Civil Engineer Corps, a Rear Admiral (O-8), whereas FEC Washington is an echelon IV command—commanded by a Navy Captain (O-6). They are two separate organizations intertwined in unique missions and functions. FEC Washington reports directly to NAVFAC Atlantic—commanded by a Rear Admiral (O-7) located in Norfolk, VA.

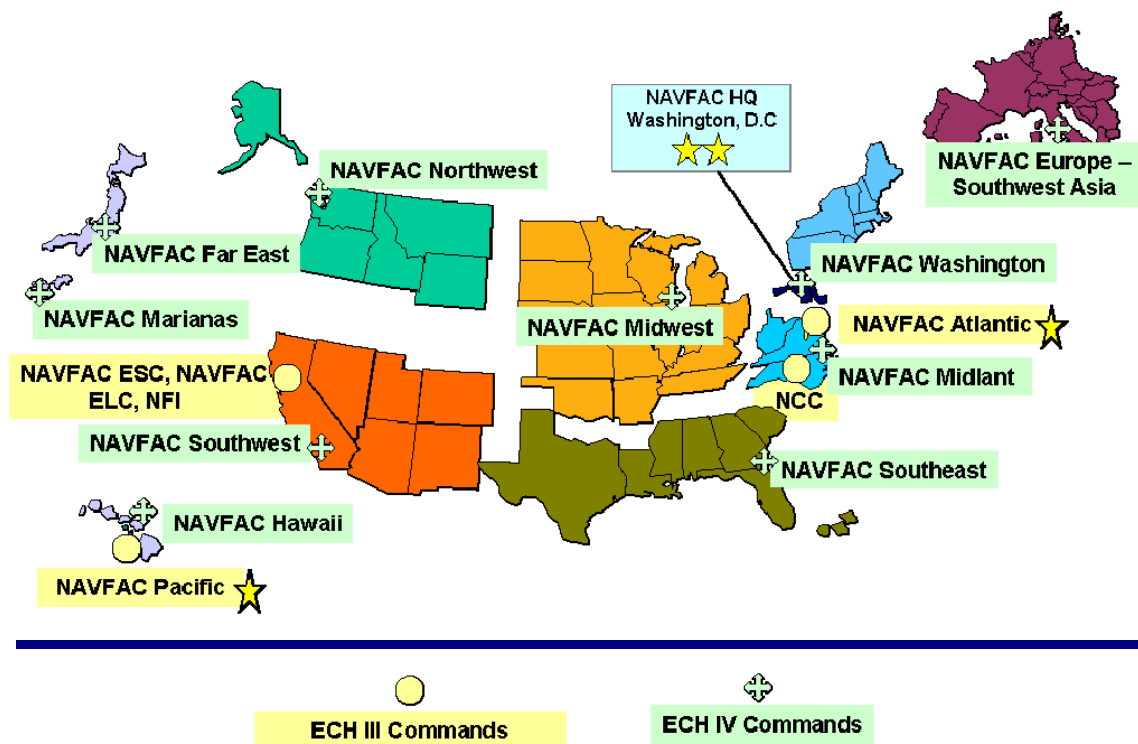


Figure 1. NAVFAC Global Enterprise (From: NAVFAC Concept of Operations, 2009)



Figure 2. Navy Shore Installation Facilities Support (From: FEC Washington, 2009)

In fiscal year 2004, FEC Washington marked its first transformation initiative. This transformation combined three separate organizations—Engineering Field Activity (EFA) Chesapeake, Public Works Center (PWC) Washington and Naval District Washington Regional Engineer to form one public works organization that would be a single touch point for all facilities engineering command products and services. This transformation objective was designed to accomplish several goals: (1) restructure and distribute duplicated engineering services to a multitude of customers, (2) increase collaboration between regional engineering and supported commands, and (3) align properly the organizational business structure in support of combatant commanders. This transformation enabled FEC Washington to produce five fully integrated area expertise Public Works Departments, namely PWD Washington, PWD North Potomac, PWD South Potomac, PWD Annapolis, and PWD Patuxent River. See Appendix B for the PWD organization template.

This transformation is one of several issues facing FEC Washington. Another serious issue was unanticipated and escalating costs relating to the purchased of utilities and fuels. Dramatic and unanticipated cost fluctuations negatively affect most organizations. In the case of FEC Washington, the potentially negative impact on its net operating results and AOR is worth examining (Department of Defense [DoD] Fiscal Estimates, 2007).

2. FEC Washington Products, Services, and Clients

FEC Washington products, services and clients consist of the planning, design, and construction of shore facilities for the U.S. Navy, U.S. Marine Corps, and other federal clients in the District of Columbia, Maryland, and northern Virginia. The command has a workforce of approximately 1,350 military and civilian engineers, architects, realty specialists, attorneys, contract specialists, craftsmen, support personnel and other skilled professionals. They organize, plan, coordinate and supervise all phases of base facilities maintenance, construction, operations, transportation and utilities to provide the full range of first-class facilities engineering products and services, including the following.

- Acquisition
- Base development, planning, and design
- Base operating support
- Capital improvements
- Facilities Maintenance
- Utilities
- Facility Support Contracts (FSC)
- Environmental programs and services
- Military construction (MILCON)
- Real Estate
- Transportation

FEC Washington is also home to several unique functions: White House Special Programs Office, residence support for the Vice President of the United States, Navy Medical Facility Design Office, NAVFAC Litigation, and the Navy Utilities Rate Intervention Group. The command is headquartered at the historic Washington Navy Yard, part of Naval District Washington, and has Resident Officer in Charge of Construction (ROICC) offices at the following.

- Annapolis, MD
- Bethesda, MD
- Dahlgren, VA
- DIA, Bolling Air Force Base, MD
- Indian Head, MD
- Patuxent River, MD
- Quantico, VA
- Thurmont, MD
- Washington Navy Yard, DC

NAVFAC Washington works with a diverse clientele, including 11 major claimants, 23 naval activities, and 18 DoD/other federal clients, including the following.

- Chief of Naval Operations (CNO)
- Headquarters, U.S. Marine Corps
- Commander Navy Installations (CNI)
- Commandant Naval District Washington
- Naval Research Laboratory (NRL)
- Naval Air Systems Command (NAVAIR)
- Naval Sea Systems Command (NAVSEA)
- U.S. Naval Academy
- Federal Bureau of Investigation (FBI)
- Department of Homeland Security
- Architect of the Capitol
- Defense Intelligence Agency (DIA) (NAVFAC, 2009)

C. RESEARCH QUESTIONS

This research addresses the following questions.

1. Primary Research Question

What are the factors affecting the command Net Operating Results (NOR) at FEC Washington in fiscal years 2006, 2007, and 2008?

2. Secondary Research Questions

- What are the overall financial impacts of projecting inaccurate straight and overtime labor hour estimates?
- How did escalating market utilities costs (e.g., fuel, electricity and natural gas) affect NOR and AOR?
- Based on the data provided from fiscal years 2006, 2007 and 2008, can forecasting models be used for estimating projected labor hours and utilities cost in the market?
- What does FEC Washington know about the budget execution in fiscal year 2009 that could possibly be used to improve financial performance objectives in future years?

D. PROJECT SCOPE AND LIMITATIONS

FEC Washington provided existing data for labor and budget information. This project analyzes the data to examine and to understand processes for determining the various factors affecting net operating results (NOR) from fiscal years 2006, 2007, and 2008. A variance analysis was conducted to assess the economic effect associated with the budget information presented. Various statistical tools, such as control charts and descriptive analysis, are used to understand the contributing factors, for instance, utility and labor costs, to their impact on NOR. The scope of this project is limited to the nature of the data collected and does not reflect the impact of influences, such as seasonality, workload allocation, and workload fluctuation.

E. RESEARCH METHODOLOGY

The methodology in this research project consists of literature reviews; interviews with key members of the FEC Washington organization; historical data collection and analysis for fiscal years 2006, 2007 and 2008; and evaluation of existing methods.

The literature review includes Department of Defense and NAVFAC approved publications, General Accounting Office (GAO) reports, previous theses, Department of Defense budget material, relevance textbooks, RAND research publications, and scholarly articles.

Interviews are expected to be conducted to assess qualitative measures with key personnel at FEC Washington, to include command comptroller, financial management and budget staff members, business line managers (e.g., utilities, transportation, and facilities management and services), and public works officers at various Public Works departments.

Raw data on direct labor hours, overhead, and general and administrative (G&A) expenses for all civil servants at FEC Washington was collected for the three most recently completed years (e.g., fiscal years 2006, 2007, and 2008). The data was analyzed for its adequacy with respect to the current business model. In addition to the command publications, the command operational reports for the three most recent years were also collected to show executed and planned workload.

Various statistical tools and business modeling techniques are used to provide detailed analysis of raw numerical data in fiscal years 2006, 2007, and 2008. The results of the analysis determine the feasibility of the model, and recommend an implementation plan via policy analysis.

F. ORGANIZATION OF THE REMAINING CHAPTERS

Chapter II, titled “Literature Review” introduces some of the latest literature related to this topic. Several doctrinal materials related to the FEC Washington organization are also included in this review. This chapter also discusses NWCF activities and operations.

Chapter III, titled “Data Collection and Analysis”, is a variance analysis of: the budgeted and actual NOR, the disparity of the budgeted and actual average labor hours worked, and the impact of the rising cost of purchased utilities. The purpose of this chapter is to analyze the data collected from FEC Washington.

Chapter IV, titled “Findings and Analysis” examines the data analyzed in Chapter III. The results of the analysis are interpreted using qualitative and quantitative methods to present a framework that addresses the issues identified.

Chapter V, titled “Conclusion and Recommendations” takes the information from all of the previous chapters and applies them to answer the primary and secondary research questions. Recommendations for further research are also presented.

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II. LITERATURE REVIEW

A. PURPOSE

The purpose of this chapter is to introduce the reader to the NAVFAC global transformation update, the fundamental framework of defense financial regulation, the NAVFAC Washington financial management systems, the Navy working capital fund (NWCF) fundamental framework, and factors affecting net operating results through activity base costing and budgeting lenses. This chapter also helps the reader understand various cost elements, unit cost concept, stabilized rate setting, and the implications to managers of activity based costing and activity based budgeting.

B. NAVFAC GLOBAL UPDATE

The Naval Facilities Engineering Command (NAVFAC) continues with the command “global transformation” of its worldwide enterprise. This initiative started in 2006 when 28 PWDs were transferred into the FEC group. In 2007, eleven additional Continental U.S. (CONUS) PWDs and the Outside Continental U.S. (OCONUS) PWDs in Japan were integrated into the FEC organization. In 2008, the final phase of the NAVFAC reshaping took place by bringing in the remaining five PWDs. All activities are now NWCF organizations (NAVFAC, 2008, p. 1).

C. DEFENSE FINANCIAL MANAGEMENT REGULATIONS

NAVFAC global command, along with its FEC organizations, is operating under the umbrella of the Department of Defense Financial Management Regulations (FMR), DoD 7000.14-R. DoD FMR 7000.14-R offers the guiding principle that provides policy, regulations, and procedures for DoD activities and is issued by the Under Secretary of Defense. Of the fifteen volumes in the regulation, Volume 11B, titled Reimbursable Operations, Policy and Procedures-Working Capital Funds (WCF), is among the most relevant documents to how FEC Washington implements their NWCF financial management policies (Department of Defense [DoD], 2009).

D. NAVFAC FINANCIAL MANAGEMENT SYSTEMS AND OBJECTIVES

FEC Washington uses two financial systems, the General Fund (GF) and the Navy Working Capital Fund (NWCF), which are interconnected in a way that direct and indirect labor hours can be charged to both financial systems.

1. Navy Working Capital Fund (NWCF) Financial System

According to the command concept of operations,

...all business costs under the NWCF financial system are included in the rates charged for work executed, as NWCF has no direct appropriation of funds. Capital investment and depreciation are built into the rates. Each Component Command budgets an annual net operating result (NOR), including projected costs and revenues for one fiscal year. This NOR is projected two years in advance and culminates in rate development, in coordination with the Headquarters Public Works and Environmental Business Lines. The NWCF NOR is a key metric of each command. The Accumulated Operating Result (AOR) reflects the cumulative summation of the NOR since inception of that command. If a command carries a negative AOR from prior years, future year rates will likely to increase in order to capture losses in prior years. If a command is carrying a positive AOR, future year rates are likely to decrease. Supported commands initiated work by sending a work request to NAVFAC. Once funds are received, NAVFAC provides the product or service. (NAVFAC Concept of Operations, 2009, p. 19)

2. General Fund (GF) Financial System

NAVFAC concept of operations continues to state that,

...NAVFAC Washington GF financial system is managed through the NAVFAC Resource Allocation Plan (RAP) process. The RAP is based on each Component Command's workload by product and service line. The RAP includes the work hours and funds required to execute this workload, as well as associated labor, travel, IT, and other support costs. (NAVFAC Concept of Operations, 2009, p. 19)

Figure 3 shows the different steps of the RAP process.

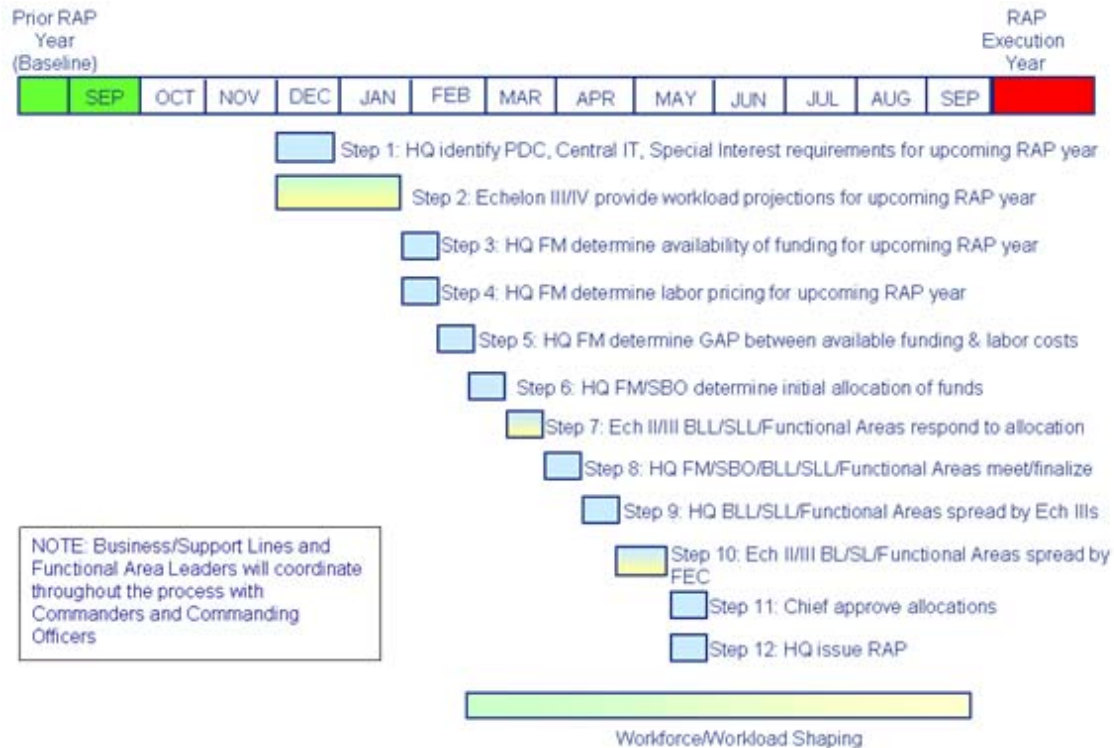


Figure 3. General Fund RAP Process (From: NAVFAC Concept of Operations, 2009)

3. NAVFAC Integrated Financial Management System

NAVFAC receives funds in several ways. Figure 4, the integrated financial management system, illustrates the following.

- NAVFAC receives funding directly from the Navy Financial Management Board (FMB) for mission-funded programs. Funds are allocated annually using the Resource Allocation Process (RAP).
- NAVFAC can receive funds from clients to provide reimbursable support for project development.
- NAVFAC also receives client funds for work output through established Navy Working Capital Fund (NWCF) rates (NAVFAC PWD Management Guide, 2008, pp. 1–8).

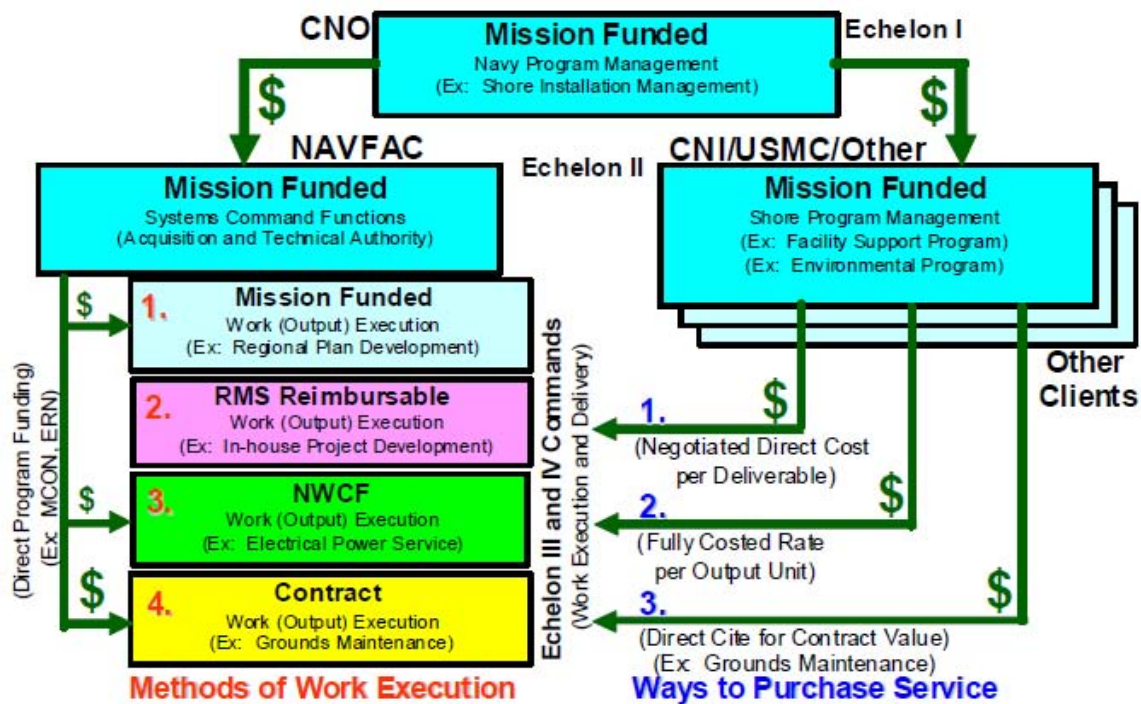


Figure 4. Integrated Financial Management System (From: NAVFAC Concept of Operations, 2008)

4. Key Financial Performance Objectives

According to the FEC Washington execution plan for 2009, the command's financial performance strategy focuses on reducing the effort required both internally and from customers for financial processes, while maintaining "fiduciary accountability." In doing so, the organization looks at improving its ability to manage and account for financial resources through three specific objectives. The 2009 execution plan explicitly states the following (NAVFAC Execution Plan, 2009, p. 11).

a. Key Financial Objective 1

Ensure facilities engineers, business line coordinators, financial management individuals, and functional support staffs understand how to use and optimize the organization financial processes to include the following.

- Improving quality of financial data input into work induction process and discipline of use
- Promoting Job Order Number (JON) awareness and education for individuals dealing with JONs and timekeeping on a regular basis
- Tracking work from inception to closeout (funding available for return)

b. Key Financial Objective 2

Determine and ensure there are appropriate financial management skill sets in the right place to supported commanders.

c. Key Financial Objective 3

Standardize, timely, and accurate output reporting to supported commanders.

E. FEC WASHINGTON'S NAVY WORKING CAPITAL FUND (NWCF) MODEL

1. The Mission of Facilities Engineering Commands (FECs) NWCF

The mission of the NWCF operations of the Facilities Engineering Commands (FECs) is to provide the Navy, the DoD, and other Federal clients with quality public works support and services. The FECs provide utilities services, facilities maintenance, transportation support, engineering services, and environmental services required by afloat and ashore operating forces and other activities (Department of the Navy [DoN], 2009).

2. NWCF Model Operating Like a Business in Some Ways

According to Cooper and Nakasone (2009), two of NAVFAC Pacific Command NWCF experts, the NWCF business model runs like a commercial business in some ways. Customers provide orders and pay their bills using appropriated funds; and like a business, the NWCF generates its own money by charging its customers for services rendered. The revenue generated from work performed pays employee salaries, as well as for materials and other costs needed to do the job. In other ways, the NWCF does not operate like a typical commercial business. The NWCF does not operate for profit like

most commercial businesses; rather, it provides services with prices designed to break even (with full cost recovery) over a long period of time. Every year, rates are recalculated to ensure that appropriate income is designed is generated to pay for the resources needed to provide customer-required services at the cost and quality they want and at the quantity they need. Therefore, the NWCF manages its deliverables as much like a business, but with some notable differences.

In its simplest form, the NWCF can be broken into a single equation.

$$\text{Net Operating Results (NOR)} = \text{REVENUE} - \text{COST} \approx 0$$

Notice that the revenue is often generated from sales of products and services, whereas cost in the equation is full recovery cost or expenses in providing products and services to the customers. Another important point is that the equation realistically tends to approach zero in normal peacetime operations as the end goal, but never equates to zero in most circumstances during budget execution cycle (normally every two years).

Under a different notion, Fawls (2006) suggested that a dual-emphasis approach be placed on the NWCF model, one that leverages the benefits of the current system and places a greater emphasis on revenue generation for maintaining or even growing existing capabilities (as driven by demand). Failure to understand the underlying long-term value of an in-house technical capability—the result of limitations brought on by a strict focus on the short-term bottom line—can lead to a lack of critical long term war fighting capabilities.

3. NWCF Stabilized Rates

Cooper and Nakasone (2009) also noted that the NWCF uses stabilized rates that are not common in commercial business. Overhead costs are tracked in two categories (e.g., production and general and administrative), as well as materials, and labor, to determine the costs to provide the goods and services to its customers. This fundamental framework is similar to that of the activity base costing and budgeting in that the recovery of all costs of operations is built into the specific commodity rate or fixed labor rate (e.g., engineering, facilities maintenance, transportation, and utilities services) and is

held firm during the period of execution. These stabilized rates allow activity commanders to develop budgets and execute their program within resources. These stabilized rates also represent a difference between the NWCF and commercial entities.

4. How FEC Organization Managers Recover Losses

Under the same notion, NWCF rates (and how managers recover losses) are particularly germane in light of recent sharp changes in purchased or self-produced energy cost (e.g., fuel and natural gas). If the cost of energy increases, the rate that managers charge their customers remains the same until the NWCF budget can recapture the losses through upward rate adjustments in out-year budgets. In some circumstances, supplemental funding from Congress can finance these increases. The Department of Navy (DoN) cannot depend on receiving supplemental funding (J. Cooper & Nakasone, 2009).

5. Net Operating Results (NOR) and Accumulated Operating Results (AOR)

Net operating results (NOR) and Accumulated Operating Results (AOR) are the two most important areas of the NWCF. Under a revolving fund's recovery concept, stabilized rates are set so that each business area manages its gains and losses to break even over time. By definition, the net operating result is the current year net gain or loss (e.g., difference between revenue and cost) from operations in a non-profit organization like FEC Washington. During budget execution, each business area experiences a positive or a negative NOR. The accumulated operating result reflects a cumulative summary of the NOR in dollars carried forward each fiscal year since the inception of the NWCF. This AOR figure (either a gain or a loss) is used as the basis in the budget formulation phase and the stabilized rate setting process (J. Cooper & Nakasone, 2009).

F. ACTIVITY BASED COSTING (ABC) AND ACTIVITY BASED BUDGETING (ABB) AND THEIR IMPLICATIONS FOR FEC WASHINGTON MANAGERS

Naval Facilities Engineering Command (FEC) Washington's NWCF financial, accounting and budgeting systems inherently exhibit the fundamental framework of Activity Based Costing (ABC) and Activity Based Budgeting (ABB) in the following general activities.

- Facility-sustaining activities (utilities, building and grounds maintenance, transportation, and plant management)
- Product-sustaining activities (construction design and engineering, products specs, product enhancement)
- Batch-level activities (maintenance and machine setups, purchase orders, and construction inspection)
- Unit-level activities (direct-labor, materials, machine costs, and energy) (Keating & Gates 1999)

1. Activity Based Costing (ABC)

a. Overview

Activity Based Costing (ABC) proposed as an alternative to the traditional (general ledger) accounting systems because the facilities engineering production operation and services are viewed as a set of activities. According to Cooper and Kaplan (1998), one of the most serious problems in the traditional costing is the overhead cost-allocation process. As production processes have become more and more complex, a greater proportion of total production costs are described as "overhead" and are arbitrarily allocated to output. Unlike ABC costing strategies, the traditional costing strategies tend to attribute too much overhead to less-complex products and products produced in high-volume. Conversely, they seriously underestimate low-volume, complex products and services (Keating & Gates, 1999).

b. Cost Traceability

It is important for all costs to be traced, where practical and economically feasible, to the activities that consume those costs. A rule of thumb is that 80 to 90 percent of a department's costs should be traceable to activities. Tracing less than 80 to

90 percent does not provide the visibility necessary to manage costs; tracing more could prove to be uneconomical. However, non-traceable costs should be clearly identified. The remaining 10 to 20 percent of cost, which is considered non-traceable can be allocated if the accounting requirement is to have activities fully absorb all costs (Brimson, Antos, & Collins, 1999).

c. Characteristics of Successful Implementation of Activity Based Costing (ABC)

There are three essential characteristics of any successful implementation of activity based costing (Noreen, Brewer, & Garrison, 2008).

- The initiative to implement activity based costing must be strongly supported by top management.
- The design and implementation of an ABC system should be the responsibility of a cross-functional team rather than of the accounting department. That is, the team should include representatives from each area that will use the data provided (e.g., production, transportation, engineering, and top management as well as technically trained accounting staff).
- The ABC data should be linked to how people are evaluated and rewarded.

d. Implications for Managers

Under ABC, managers are asked to consider the resources consumed by these different activities, and only then to assign activities to products and/or customers. After assessing the relationship between an activity and a product or customer, indirect costs can be more appropriately assigned to those products or customers. The most important thing is that service providers must know what needs to be done to create a product before they can ascertain how much that product costs (Keating & Gates, 1999).

Breaking down costs in this way can motivate managers to consider a wider array of cost-saving strategies. Up until that time, most cost-cutting efforts have focused on the unit-level activities because those costs were most visible. It is also possible to argue that there are significant opportunities for cost savings in batch-level and product-sustaining activities (Keating & Gates, 1999).

Managers need to consider the cost of excess capacity as a separate line item, rather than wrapping it up into an estimate of incremental costs. This is because the cost of excess capacity does not reflect anything about the productivity of the capital or labor. Calculating per-unit costs on the basis of product volume can lead to a “death spiral” because it appears per-unit costs are rising dramatically when volume declines; management raises prices; higher prices lead to further volume declines; and these volume declines lead to further price increases (Keating & Gates, 1999).

For a useful implementation focused overview of ABC and its trade-offs, Cokins, Stratton, and Helbling (1993) suggest that organizations should focus on particularly expensive resources, whose consumption varies by product, or on resources whose demand patterns are not correlated with the traditional allocation measures (Cokins, Stratton, & Helbling, 1993).

2. Activity Based Budgeting (ABB)

a. Overview

Activity Based Costing (ABC) information is useful in budgeting. Cooper and Kaplan (1998) described activity based budgeting (ABB) as “ABC in reverse.”

b. Implications for Managers

Using ABB, managers are asked to consider what resources are actually needed. First, managers develop an estimate of the production and sales volume for the next period. Then, they forecast demand for activity within the organization. Next, they calculate the demand for resources stemming from those required activities. The next step is to determine the actual resource supply based on spending patterns and the activity capacity. The activity capacity may differ from estimated production volume because some resources are scarce. For instance, the organization might only need 1.2 trucks but must purchase two because they cannot buy a fraction of a truck (Brimson, Antos, & Collins, 1999).

Traceability in ABB helps bring management’s attention to overhead or shared costs (e.g., general and administrative, engineering, and corporate costs) that are

otherwise difficult to manage. When organizations allocate those costs to specific products and services or business units, it represents a charge against earnings. Managers with gain-or-loss responsibilities carefully scrutinize and challenge the charges. When costs are identified as traceable, they become more controllable (Brimson, Antos, & Collins, 1999).

G. QUANTITATIVE FACTORS AFFECTING NOR

1. Unit Cost

The concept of unit costs is fundamental to working capital fund (WCF) management. The revolving fund model defines the unit cost as the costs divided by some measurement of output. These measures of output are “cost drivers” and some examples are direct labor hours, unit cost of goods sold, cost per dollar of sales, or cost per unit shipped. In the ABC model, the providing activity influences the numerator, while the customer influences the denominator. The WCF activity desires to maintain as low a cost as possible to maintain a low rate overall. This allows for a competitive price to the market place and the ability to maintain or gain market share (Potvin, 2009; Moreau, 2002).

2. Cost Elements

To calculate and allocate costs among products and services, an understanding of the nature of the costs is necessary (Noreen, Brewer, & Garrison, 2008).

- **Direct Costs**—Direct costs are those directly attributable to the end product or output. Direct costs are allocated over individual output units.
- **Indirect Costs**—Indirect costs are those not directly tied to the operational output and normally allocated over a selected number of outputs. Indirect costs are those that are part of the end product, but are not economical to account for an individual basis. Indirect cost is similar to that of overhead costs.
- **General and Administrative Overhead Costs (G&A)**—G&A costs are those that do not contribute directly to a specific product or output; but are applied to the overall operation and are allocated across all outputs. These costs are overhead costs as well and remain relatively constant.
- **Fixed Costs**—Fixed costs are those that remain the same during operations. Variations in workload do not affect fixed cost.

- Variable Costs—Variable costs are those that are direct and indirect and that vary with regard to workload. Labor and material costs would normally change with a change in workload.

3. Transfer Pricing Unique to FEC Washington

Transfer pricing is the cornerstone of the FEC Washington business model since resources (e.g., unique expertise and engineering assets) are geographically spread out across the organization in support of the customers. These resources are often leveraged from one business segment (e.g., transportation department) in selling products and services (35-ton crane for lifting support, sweeper truck) to another business segment (e.g., utilities department) of the organization.

Managers need to be intensely interested in how transfer prices are set because they can dramatically affect the reported gain or loss for their divisions or departments. One must keep in mind that the fundamental objective in setting transfer prices is to motivate the managers to act in the best interest of the overall organization. Three common approaches are used to set transfer prices (Noreen, Brewer, & Garrison, 2008).

- Allow the managers involved in the transfer to negotiate their own transfer price.
- Set transfer prices at cost using either variable cost or full (absorption) cost.
- Set transfer prices at the market price. This research views the approach to setting transfer prices at the market price as an acquisition strategy challenge due to mandatory statutes, regulations and requirements. As a result, this approach can present problems in estimation.

H. OTHER POTENTIAL IMPACTS ON NET OPERATING RESULTS (NOR)—AN ONGOING A-76 FUNCTIONAL STUDY

1. Statutes, Regulations, Executive Policies, and Purpose

Outsourcing of DoD activities is governed by several overlapping and sometimes conflicting legislative and executive directives. Choosing between in-house and contract performance is governed by Title 10, United States Code (10 USC 2461-2471); additional miscellaneous provisions and restrictions contained in annual national defense authorization and appropriation acts; OMB Circular A-76 (OMB, 1983); DoD Directive

4100.15 (DoD, 1989); and DoD instruction 4100.33 (DoD, 1985). Treatment of displaced employees is governed by Title 5, Code of Federal Regulations (5 CFR). Contract administration is governed by Titles 40 and 41, USC (Robbert, Gates, & Elliott, 1997).

The purpose of the A-76 is to encourage economy and enhance productivity. To do so, it is important to keep inherent functions “in-house” and rely on the commercial sector for products and services determined more economically advantageous (Moreau, 2002).

2. The A-76 Process

In general, the A-76 process consists of six key activities as shown in Figure 5: (1) developing a performance work statement (PWS) and quality assurance surveillance plan; (2) conducting a management study to determine the government’s most efficient organization (MEO); (3) developing an in-house government cost estimate for the MEO; (4) issuing a Request for Proposals or Invitation for Bids; (5) evaluating the proposals or bids and comparing the in-house estimate with a private sector offer or inter-service support agreement and selecting the inner of the cost comparison; and (6) addressing any appeals submitted under the administrative appeals process, which is designed to ensure that all costs are fair, accurate, and calculated in the manner prescribed by the A-76 handbook (GAO, 1999).

According to the OMB’s A-76 guidance, the government’s in-house estimate wins the competition unless the private sector’s offer meets a threshold of savings that is at least 10 percent of direct personnel costs or \$10 million over the performance period. OMB, to ensure that government service would not be contracted out for marginal estimated savings (GAO, 1999), established this minimum cost differential.

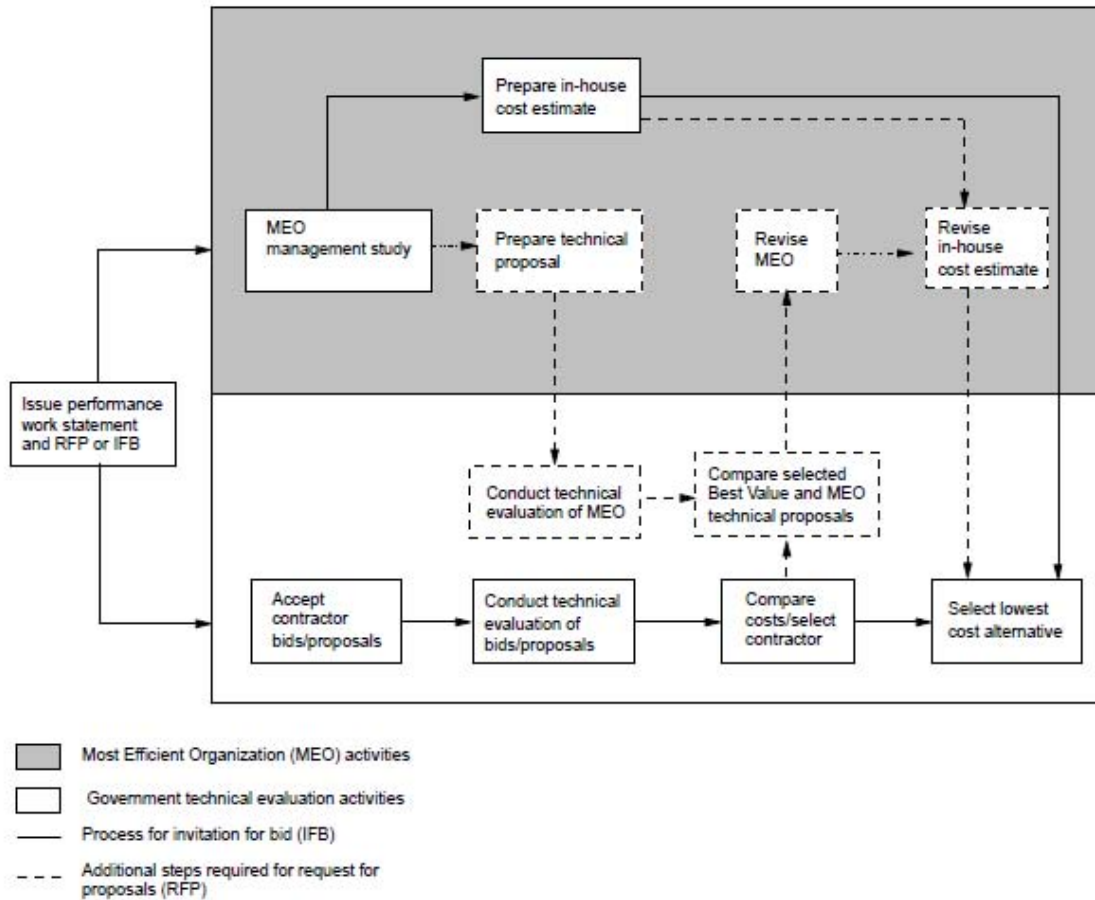


Figure 5. The A-76 Process (From: GAO, 1999)

3. Impetus and Counter-Impetus for Outsourcing

One of the most important considerations for a commercial type government activity is competitive outsourcing; the potential savings make competitive outsourcing attractive. A Congressional Budget Office review of commercial type government activities concluded that outsourcing could save about 35 percent of what it costs to perform the activities “in-house” (Mussel, 1987). The OMB reported an average savings of: 30 percent from original government costs; 20 percent savings for in-house government “wins” in cost-comparison competitions; and 35 percent for private-sector “wins” (GAO, 1990).

The counter-argument to that is, although greater savings were realized when activities were contracted out, savings were still realized when the activities remained in-house. Several audit reports have cautioned that A-76 studies rely on projected rather than actual costs and that subsequent cost adjustments tend to reduce actual savings significantly (Robbert, Gates, & Elliott, 1997).

The private sector has cost competitive advantages over government entities that can be attributed to two phenomena: (1) more efficient use of labor; and (2) economies of scale (Donahue, 1989). To elaborate this further:

- “...labor efficiencies arise because private-sector managers tend to have greater flexibility in managing their labor forces, a richer array of incentives and penalties, tighter accountability, and a greater propensity to substitute capital for labor” (Robbert, Gates, & Elliott, 1997).
- “...economies (of scale) arise when a single large contractor performs the same function at multiple sites” (Robbert, Gates, & Elliott, 1997).

4. Challenges in Proceeding with the A-76 at NWCF

The A-76 process at any organizations, particularly the NWCF, can last over an 18 to 36 months timeframe and often does not take into consideration the quality of work or timeliness of work completion (Moreau, 2002). The A-76 is a cost comparison study tool only, which takes a snapshot of all products and services performed by the chosen activities or functional areas, often over five years, and translates them into the performance work statement (PWS) as a benchmark.

I. SUMMARY

This chapter introduced the fundamental framework and legislative foundation unique to the Navy Working Capital Fund and FEC Washington organizational, financial management, and business models. It also discussed the various factors affecting net operating results, which leads into the variance and sensitivity analysis portion of the next chapter.

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III. DATA ANALYSIS

A. INTRODUCTION

The purpose of this chapter is to apply both quantitative and qualitative techniques to analyze the collected data. The quantitative portion of the analysis focuses on performing data analysis using statistical tools to examine labor hours. The results after conducting the analysis underpin the essential factors affecting NOR and report these variances based on budgeted and actual performance. The remainder of the chapter focuses on the qualitative aspects of the analysis to determine the impact on costs of purchased utilities (e.g., fuel, electricity and natural gas).

B. DATA GATHERING PROCESS

Data gathering and interviews with FEC Washington employees were conducted to gain insight on the command's overall financial performance. The intent was to understand the factors generating differences between actual and budgeted NOR, and how the budgeting process worked. Detailed information regarding budgeted and actual performance, labor hours, and utility costs were collected for fiscal years 2006 through 2008.

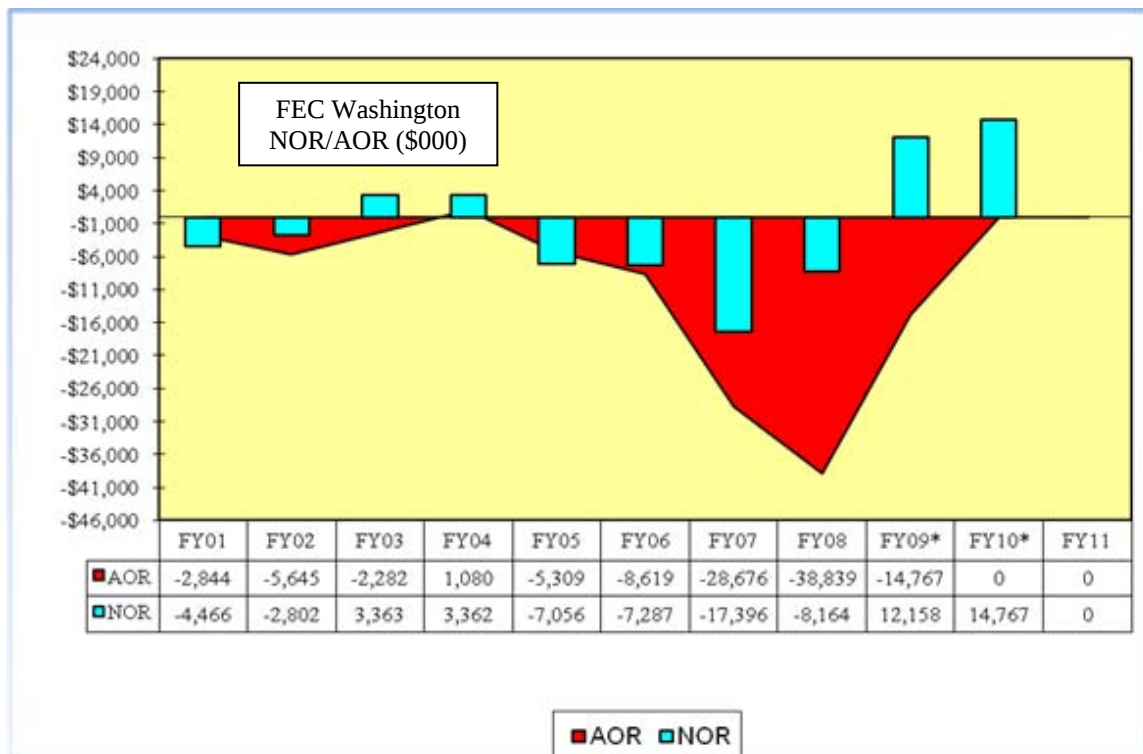
C. CURRENT FUNDING PROFILE

NOR and AOR are important measurement tools used by working capital fund activities. NOR is defined as revenues minus expenses for each fiscal year; AOR is a cumulative measure of NOR that traces back to the first year of that same activity. AOR is a historical running total (since the inception of the activity) of NOR and can be defined as beginning of the year AOR plus the end of year NOR.

The idea for any working capital fund activity is to charge users for their products and services to cover the activity's expenses. Thus, all working capital fund activities have a common goal in trying to achieve an AOR of zero. The use of NOR and AOR enables financial managers to gauge the financial health of their activity and allows them the opportunity to increase or decrease rates charged to the customers.

The first step in understanding NOR and AOR and their use at FEC Washington is to understand the context of budgeted versus actual NOR and AOR. FEC Washington goes through a meticulous budgeting process that examines and calculates all of the revenues and expenses for each activity under its purview. All of the forecasted revenues and expenses are then consolidated and articulated in the fiscal year operating budget. The budgeted NOR and AOR are located at the end of the statement of revenue and expenses—budget (FEC Washington Operating Budget).

Actual revenues and expenses are transmitted separately through a financial reporting system called Industrial Budget Information System (IBIS). The revenue streams come from the following services: maintenance and repair, transportation services, utility services, sanitation services, and other products and services. Expenses are broken down in the following categories: labor, military labor, material, contractual services, depreciation, and other. Figure 6 illustrates the current AOR and NOR trend.



Note: FY09 and FY10 are forecasted figures

Figure 6. NOR and AOR Submitted for Fiscal Year 2008 (From: FEC Washington Comptroller Office, 2009).

D. VARIANCE ANALYSIS

To determine the most influential factors on FEC Washington's NOR and AOR, a variance analysis was conducted on the revenues and expenses for fiscal years 2006, 2007 and 2008. This method evaluates the results of the executed budget against the forecasted budget.

1. Definition

An organization's budget is its plan of forecasted revenues and expenses for a given period of time. Any deviation from this plan can be defined as a variance. A variance can be the result of many factors differences between planned and actual number of direct labor hours, fluctuating prices of inputs or operating efficiencies. There are two types of variances—favorable and unfavorable. A favorable variance is one that, taken alone, results in additional operating gain, while an unfavorable variance is one that, taken alone, results in decreased operating gain, holding all other things constant (Maher & Deakin, 1994).

2. Process

A variance analysis was conducted comparing the total budgeted and actual revenues received for fiscal years 2008, 2007 and 2006, as well as for the budgeted and actual expenses.

a. Revenue Center

Maintenance and repair. This is the recurring, day-to-day, periodic, or scheduled work required to preserve or return a real property facility to such a condition that it may be used for its designated purpose. Repair is the return of a real property facility to such condition that it may be effectively utilized for its designated purpose, by overhaul, reconstruction, or replacement of constituent parts or materials that are damaged or deteriorated to the point where they cannot be economically maintained.

Transportation Services. There are three types of transportation services provided by FEC Washington.

- Passenger carrying vehicles, which include sedans, station wagons, ambulances, buses, sport utility vehicles (SUVs), and carry-all passenger vans.
- Non-passenger carrying vehicles, which include conventional type trucks and trailers that in general are not primarily intended for transportation of personnel but for cargo. Although scooters, motorcycles, multiple-drive weapons carriers, jeeps, and prime movers can be used to transport personnel, all are classed as non-passenger carrying vehicles.
- Other vehicles, which include railway, weight handling, material handling, fire fighting, construction, and specialized equipment.

Utility Services. The Utilities Department maintains and operates electrical and mechanical distribution systems, steam production facilities, and provides temporary utility services to ships in port. The Utility Department also supplies electricity, potable and non-potable water, steam, natural gas, saltwater, boiler feedwater, compressed air, and wastewater collection systems maintenance.

Sanitation Services. Sanitation services provides for refuse collection and disposal; pest control; hazardous waste handling and disposal; industrial waste disposal; and environmental engineering services and laboratory testing.

Other Products and Services. Other products and services profit center is comprised of revenue from miscellaneous products and services provided they are not directly associated or attributable to any other profit center.

b. Expense/Cost Center

Labor. Expenses incurred for labor pay for the salaries and benefits of the employees. There are five categories of labor. Each category has its own labor rate depending on the type of labor used: Emergency work, Recurring work, Service work, Minor work, Specific work.

Military Labor. Expenses incurred for military labor pay for the salaries and benefits of the uniformed service members.

Material. Materials and supplies used in support of maintenance and repair services.

Other. Other expenses are expenses incurred not directly associated or attributable to any other expense category. An example of this type of expense is costs incurred to provide port terminal services.

Contractual Services. The contractual services fall under the category assigned to expense/cost center, which encompasses all cost elements associated with contracting for services in support of the customers. It may include costs associated with contracts for purchased utility commodities, facilities support services, transportation equipment leases and purchases, and others as needed to provide best value requirements to the customers.

Depreciation. Depreciation is the reduction in the value of FEC Washington's assets due to usage, passage of time, wear and tear, technological outdating or obsolescence, depletion, inadequacy, rot, rust, decay or other such factors (NAVFAC PWD Management Guide, 2008).

3. Variance Analysis Results

The following tables and figures summarize the variance analysis results of the actual budget in comparison to the forecasted budget for fiscal years 2008, 2007, and 2006.

In fiscal year 2008, Table 1 illustrates that actual revenues exceeded the budgeted revenues by 8 percent, creating a favorable variance. Similarly, actual expenses exceeded the budgeted expenses by 15 percent, creating an unfavorable variance. The net effect between revenues and expenses created a net unfavorable variance of 905 percent and \$16.35 million short of the budgeted amount. The 905 percent unfavorable variance is significant. To understand its impact fully, it is important to examine the relationship between budgeted and actual NOR, as well as the contributing factors, such as contractual services, utility services and labor. FEC Washington budgeted for a negative NOR of \$1.81M; whereas, in actuality, they executed a negative NOR of \$18.16M. The

major contributors to this significant percentage stemmed largely from the expenses associated with contractual services and labor. The shortfall of revenues received from utility services added to the disparity between budgeted and actual even further for fiscal year 2008.

An unfavorable variance can be viewed as a shortfall of the budgeted amount; whereas, a favorable variance, can be viewed as excess of the budgeted amount. Figure 7 illustrates the various categories of revenues and expenses. It is noteworthy to mention that revenues received from utilities services comprise the largest revenue stream; whereas, expenses incurred from contractual services, encompass the largest source of expenditures.

Table 1. Analysis of Budget Variance for Fiscal Year 2008

FY2008						
	<u>Revenue</u>	(B) Budget	(A) Actual	(A-B=BV) Budget Variance	(BV / B = PB) Percent Budget	Favorable or Unfavorable Variance
3030	Maintenance & Repair	\$ 70,306,000	\$ 66,116,226	\$ (4,189,774)	-6%	U
3070	Transportation Services	\$ 13,663,000	\$ 21,709,466	\$ 8,046,466	59%	F
3090	Utility Services	\$ 140,277,000	\$ 134,223,920	\$ (6,053,080)	-4%	U
3091	Sanitation Services	\$ -	\$ 7,977,920	\$ 7,977,920		F
3140	Other Products & Services	\$ 1,105,000	\$ 12,612,265	\$ 11,507,265	1041%	F
	Total	\$ 225,351,000	\$ 242,639,796	\$ 17,288,796	8%	F
	<u>Expenses</u>					
10	Labor	\$ 53,963,000	\$ 61,104,538	\$ 7,141,538	13%	U
19	Military Labor	\$ 1,095,000	\$ 2,047,353	\$ 952,353	87%	U
20	Material	\$ 30,857,000	\$ 22,777,958	\$ (8,079,042)	-26%	F
30	Other	\$ 350,000	\$ (754,539)	\$ (1,104,539)	-316%	F
40	Contractual Services	\$ 140,464,000	\$ 175,307,221	\$ 34,843,221	25%	U
50	Depreciation	\$ 429,000	\$ 315,585	\$ (113,415)	-26%	F
	Total	\$ 227,158,000	\$ 260,798,116	\$ 33,640,116	15%	U
	FY08 NOR	\$ (1,807,000)	\$ (18,158,320)	\$ (16,351,320)	-905%	U

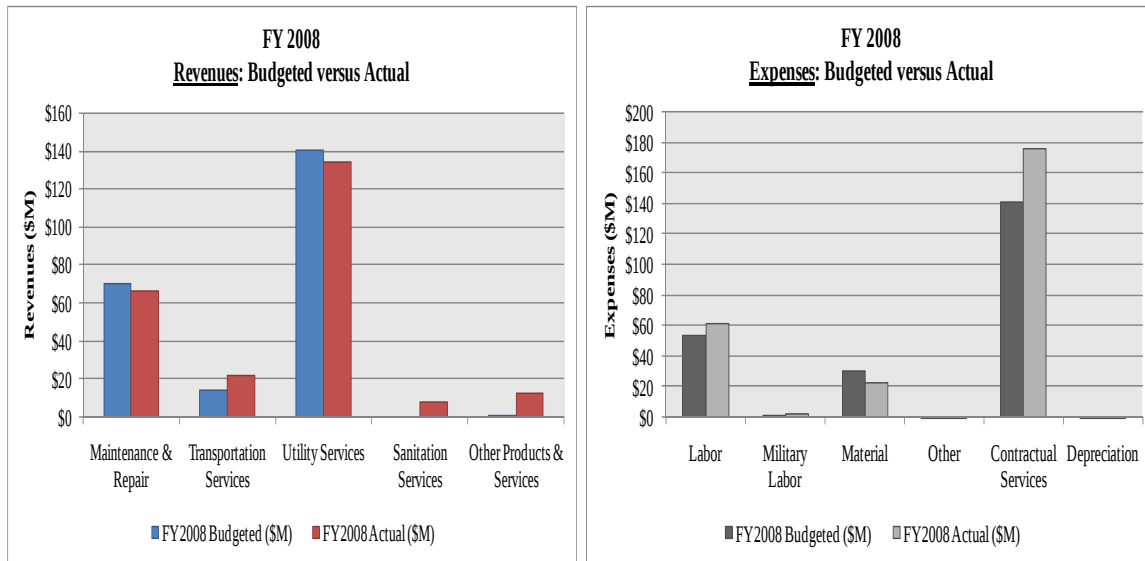


Figure 7. Comparison of Revenues and Expenses Fiscal Year 2008

Fiscal year 2007 presented a situation similar to the one presented in 2008 where the budgeted NOR was significantly different from the executed NOR. Table 2 illustrates that actual revenues fell short of the budgeted revenues by 3 percent, creating an unfavorable variance. On the contrary, actual expenses exceeded the budgeted expenses by 6 percent, also creating an unfavorable variance. The net effect between revenues and expenses created an overall unfavorable variance of 870 percent and \$19.65 million short of the budgeted amount. As was the case in 2008, the primary contributors to the significant disparity between budgeted and actual NOR again stem largely from expenses associated with contractual services and labor.

Figure 8 illustrates the various categories of revenues and expenses. It is noteworthy to mention that revenues received from utilities services comprise the largest revenue stream; whereas, expenses incurred from contractual services, encompass the largest source of expenditures.

Table 2. Analysis of Budget Variance for Fiscal Year 2007

FY2007						
	<u>Revenue</u>	(B) Budget	(A) Actual	(A-B=BV) Budget Variance	(BV / B = PB) Percent Budget	Favorable or Unfavorable Variance
3030	Maintenance & Repair	\$ 63,703,915	\$ 63,256,245	\$ (447,670)	-1%	U
3070	Transportation Services	\$ 12,675,500	\$ 17,834,120	\$ 5,158,620	41%	F
3090	Utility Services	\$ 125,777,540	\$ 125,165,123	\$ (612,417)	0%	U
3091	Sanitation Services	\$ -	\$ 455,914	\$ 455,914		F
3140	Other Products & Services	\$ 17,905,045	\$ 7,159,399	\$ (10,745,646)	-60%	U
	Total	\$ 220,062,000	\$ 213,870,801	\$ (6,191,199)	-3%	U
	<u>Expenses</u>					
10	Labor	\$ 48,046,000	\$ 58,568,330	\$ 10,522,330	22%	U
19	Military Labor	\$ 1,057,000	\$ 1,057,000	\$ -	0%	-
20	Material	\$ 29,850,000	\$ 19,923,360	\$ (9,926,640)	-33%	F
30	Other	\$ 414,000	\$ (2,266,694)	\$ (2,680,694)	-648%	F
40	Contractual Services	\$ 138,094,000	\$ 153,667,751	\$ 15,573,751	11%	U
50	Depreciation	\$ 343,000	\$ 314,834	\$ (28,166)	-8%	F
	Total	\$ 217,804,000	\$ 231,264,581	\$ 13,460,581	6%	U
	FY07 NOR	\$ 2,258,000	\$ (17,393,780)	\$ (19,651,780)	-870%	U

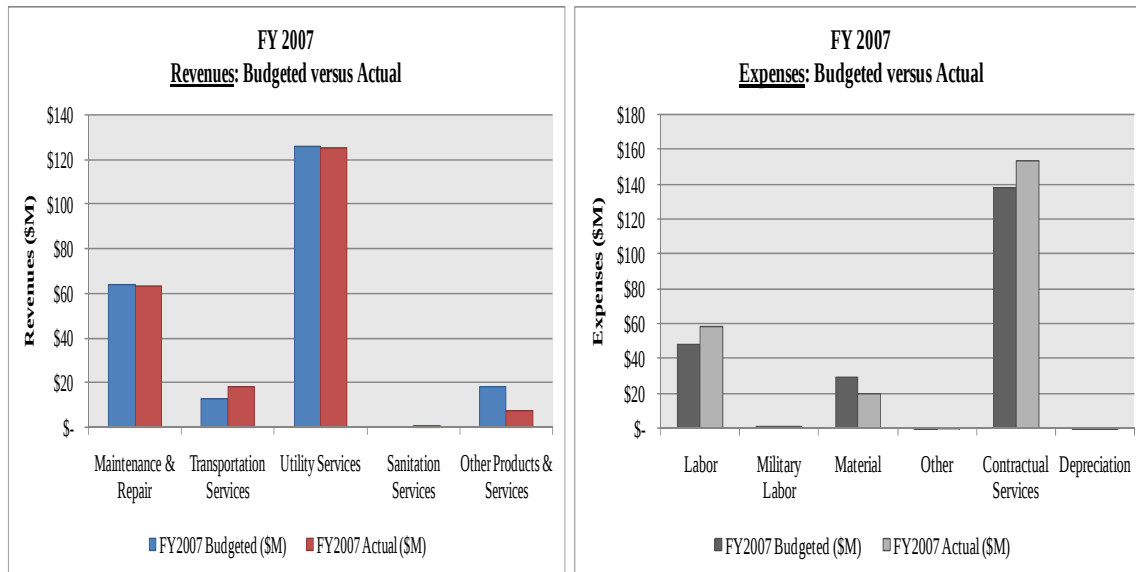


Figure 8. Comparison of Revenues and Expenses Fiscal Year 2007

In fiscal year 2006, Table 3 illustrates that actual revenues exceeded the budgeted revenues by 8 percent, creating a favorable variance. Similarly, actual expenses also

exceeded the budgeted expenses by 8 percent, creating an unfavorable variance. The net effect between revenues and expenses created an overall unfavorable variance of 29 percent and \$1.63 million. Figure 9 illustrates the various categories of revenues and expenses. It is noteworthy to mention that revenues received from utilities services comprise the largest revenue stream followed closely by maintenance and repairs, which is unique to fiscal year 2006. Expenses incurred from contractual services encompass the largest source of expenditures.

Table 3. Analysis of Budget Variance for Fiscal Year 2006

FY2006						
		(B) Budget	(A) Actual	(A-B=BV) Budget Variance	(BV / B = PB) Percent Budget	Favorable or Unfavorable Variance
	<u>Revenue</u>					
3030	Maintenance & Repair	\$ 76,730,000	\$ 77,650,087	\$ 920,087	1%	F
3070	Transportation Services	\$ 8,491,000	\$ 14,492,218	\$ 6,001,218	71%	F
3090	Utility Services	\$ 95,387,000	\$ 102,454,230	\$ 7,067,230	7%	F
3091	Sanitation Services	\$ 482,000	\$ 116,610	\$ (365,390)	-76%	U
3140	Other Products & Services	\$ 1,785,000	\$ 2,476,749	\$ 691,749	39%	F
	Total	\$ 182,875,000	\$ 197,189,895	\$ 14,314,895	8%	F
	<u>Expenses</u>					
10	Labor	\$ 54,781,000	\$ 52,286,127	\$ (2,494,873)	-5%	F
19	Military Labor	\$ 937,000	\$ 862,754	\$ (74,246)	-8%	F
20	Material	\$ 24,487,000	\$ 17,948,912	\$ (6,538,088)	-27%	F
30	Other	\$ 927,000	\$ (508,092)	\$ (1,435,092)	-155%	F
40	Contractual Services	\$ 107,055,000	\$ 133,149,698	\$ 26,094,698	24%	U
50	Depreciation	\$ 343,000	\$ 737,095	\$ 394,095	115%	U
	Total	\$ 188,530,000	\$ 204,476,494	\$ 15,946,494	8%	U
	FY06 NOR	\$ (5,655,000)	\$ (7,286,599)	\$ (1,631,599)	-29%	U

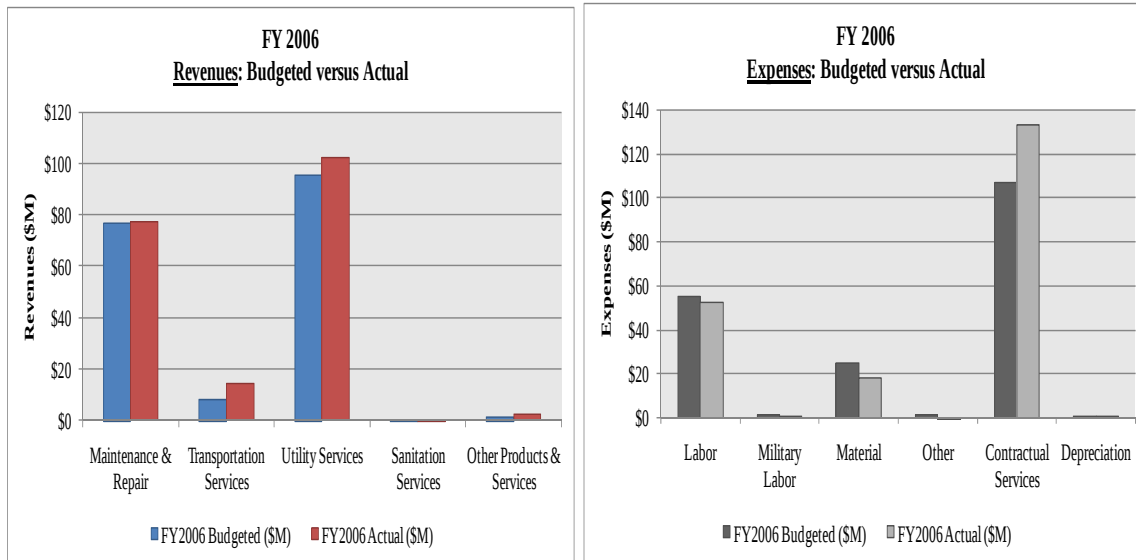


Figure 9. Comparison of Revenues and Expenses Fiscal Year 2006

E. LABOR HOURS ANALYSIS

1. Description of Labor Hours

The analysis of labor hours addresses both direct and indirect labor hours associated with all personnel assigned to revenue and expense/cost centers at five different activities, namely, Naval Support Activities Washington, Naval Academy of Annapolis, South Potomac, North Potomac, and Patuxent River. In general, these labor hours are broken down into the following categories of work with separate stabilized labor rates: (1) emergency work; (2) recurring work; (3) service work; (4) minor work; and (5) specific work.

- Emergency work occurs when situations arise, which require immediate action to prevent loss or damage to government property, to restore essential services that have been disrupted, to eliminate hazard to personnel, to restore essential mission operational capability. Facility emergency work hours stop when the emergency is arrested. If further work is required, the appropriate follow-on work category is to be established. The initial metric requires that approximately 90 percent of emergency work trouble calls must be responded to within two hours and all work must be arrested and or completed within 48 hours. Otherwise, the remaining work must be assigned to another category (NAVFAC PWD Management Guide, 2008).

- Recurring work is a type of work that may be repetitive in nature, or may be estimated (e.g., preventive maintenance of facilities, power plant operations and watch standing). The initial metric requires that approximately 80 percent of preventive maintenance completed by scheduled date and no more than 10 percent of preventive maintenance are missed (NAVFAC PWD Management Guide, 2008).
- Service work is the type of work, which is relatively minor in scope and requires minimal amount of planning or processing. Service work is often referred to as a trouble call or service call. The initial metric requires that approximately 90 percent of the service work be accomplished in 10 calendar days with no more than 32 hours of labor (NAVFAC PWD Management Guide, 2008).
- Minor work is the type of work that is planned, estimated, and scheduled, of a smaller scope than specific work, and requires more extensive planning or processing than Service work. The initial metric requires that approximately 90 percent of Minor work projects must be completed by the established timeframe and no more than 80 hours of labor (NAVFAC PWD Management Guide, 2008)
- Specific work is work projects that are planned, estimated, and scheduled, and are individually cost accounted, and requires more extensive planning and processing. The initial metric requires that approximately 90 percent of Specific work projects must be completed by the established timeframe and greater than 80 hours of labor (NAVFAC PWD Management Guide, 2008).

2. Descriptive Statistical Analysis of Labor Hours

The statistical analysis of labor hours examines the descriptive statistics of the hours worked per individual for fiscal years 2006, 2007, and 2008. Results indicated that the average number of hours (straight and overtime) worked per individual for fiscal years 2006, 2007 and 2008 are 1462, 1588 and 1565 hours with standard deviations of 672, 599, and 665 hours, respectively. It is noteworthy to recognize the mode (most recurring number) of zero hours worked for all three fiscal years.

In examining the personnel count of 649, 686, and 743 for fiscal years 2006, 2007, and 2008, there existed an increasing trend of the number of personnel employed by FEC Washington. The range of straight time (ST) and overtime (OT) hours worked per employee varies from zero to 3047, 3526, and 3262 hours in fiscal years 2006, 2007,

and 2008, respectively. Table 4 represents the detailed results of the descriptive statistical significant of labor hours analyzed. The terms used in Table 4 are defined as follows.

- Mean is the average, which is calculated by summing the observations and dividing by the number of observations. In this case, the observation corresponds to the average number of hours worked.
- Standard error estimates the standard deviation of the sample.
- Median is calculated by placing all of the observations in sequential order; the observation that falls in the middle is the median.
- Mode is the observation that occurs with the greatest frequency. In all three years observed, zero labor hours worked was found to be the mode.
- Standard deviation is the positive square root of the sample variance. Approximately 68 percent of the population falls within one standard deviation, 95 percent within two standard deviations and 99.7 percent within three standard deviations.
- Sample variance is the measure of the amount of variation of all the scores for a variable. This is computed by (1) calculating the sample mean, (2) compute the difference or deviation between each observation and the mean, (3) square and sum the deviations, and (4) divide the sum of squared deviations by the number of observations minus one.
- Range is the largest observation minus the smallest observation.
- Minimum is the smallest observation, which corresponds to the number of straight and overtime labor hours worked. In all three years observed, zero was found to be the smallest labor hours as part of the data set.
- Maximum is the largest observation. In all three years observed, these values were consistently above 3000 labor hours worked.
- Sum is the total of all observations, which corresponds to the total number of straight and overtime labor hours worked. The total number of straight and overtime hours worked had an upward trend as the number of employees had increased from fiscal years 2006 through 2008.
- Count is the number of employees in the FEC Washington's NWCF workforce (Keller, 2008).

Table 4. Statistical Significance of Labor Hours of Straight Time and Overtime
(From: FEC Washington Comptroller Office, 2009)

	<i>FY06</i>	<i>FY07</i>	<i>FY08</i>
Mean (Average)	1,462	1,588	1,565
Standard Error	26.37	22.89	24.41
Median	1,655	1,711	1,739
Mode	0	0	0
Standard Deviation	672	599	665
Sample Variance	451,149	359,339	442,799
Range	3070	3533	3262
Minimum	0	0	0
Maximum	3,047	3,526	3,262
Sum	949,122	1,089,121	1,162,535
Count (NWCF Personnel)	649	686	743

Under the Full Time Equivalent (FTE) system used by federal agencies, one work year is equivalent to 2080 hours of work. This means that one employee on a full time schedule of 40 hours per week for 52 weeks works 2080 hours in the period of one year (Office of Personnel Management, 2009). At FEC Washington, the 2080 total hours may include straight time, overtime, leave (e.g., sick, annual, and holiday leave), and other command discretionary or allowable hours. FEC Washington uses 1710 labor hours for formulating its fiscal year budget. This number is derived from subtracting sick, annual, and holiday leave from 2080 hours. It is important to recognize that 1710 of 2080 labor hours equates to approximately 82 percent productivity.

3. Control Chart Analysis of Labor Hours

The control charts are used to establish possible upper and lower control limits for overall distribution of labor hours worked by employee. A control chart can assist to identify the potential areas of interest that may exist in the labor hours expense category. The criteria used in the Figures 10, 11, and 12 are based on the descriptive statistical analysis conducted above. The control charts consist of a center line (CL), which is 1710 labor hours in the case of FEC Washington; an upper control limit (UCL) and a lower control limit (LCL), which are one standard deviation from the center line.

Figures 10, 11, and 12 illustrate the relationship between the number of hours worked and the deviation from the budgeted ST/OT labor hours, which is the center line of 1710 labor hours. While the majority of the employees (approximately 68 percent) fall within the control limits, a significant number of personnel are outside the control limits. The personnel above the UCL and below the LCL exceeded one standard deviation from the center line. Standard deviation is a statistical tool used to measure variance from an established benchmark (e.g., 1710 used as the budgeted ST/OT labor hour).

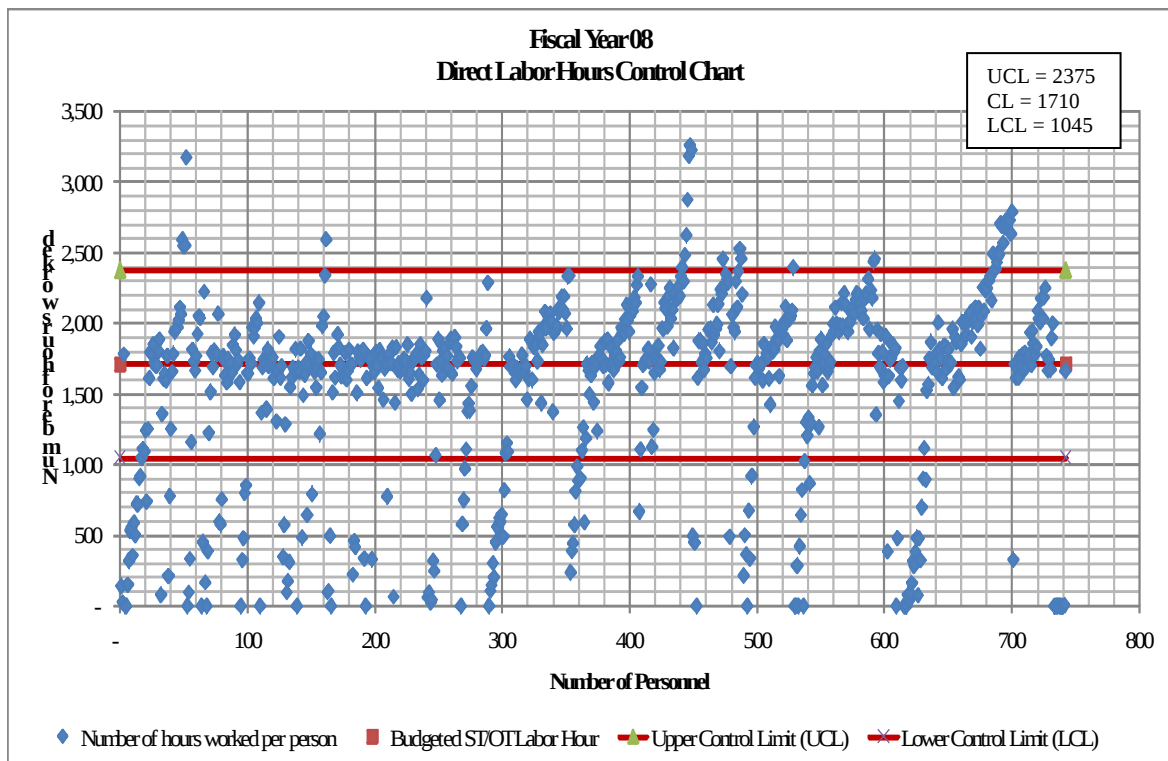


Figure 10. Direct Labor Hours Control Chart for Fiscal Year 2008

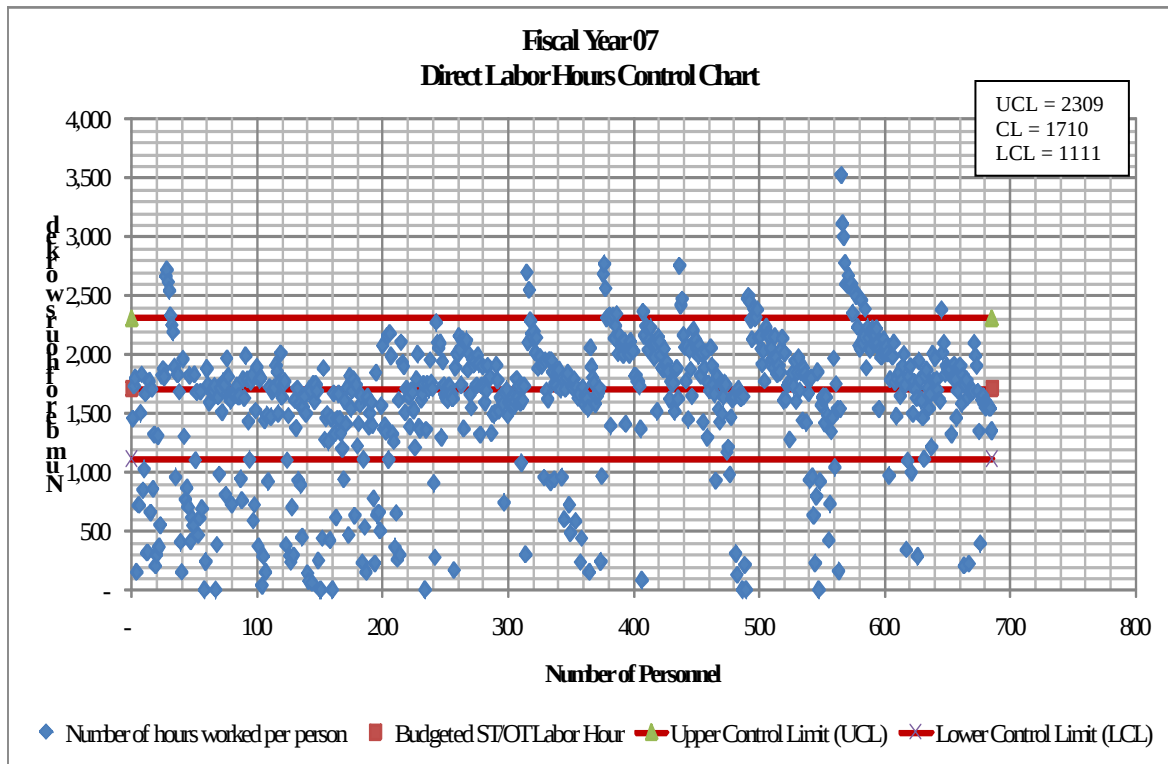


Figure 11. Direct Labor Hours Control Chart for Fiscal Year 2007

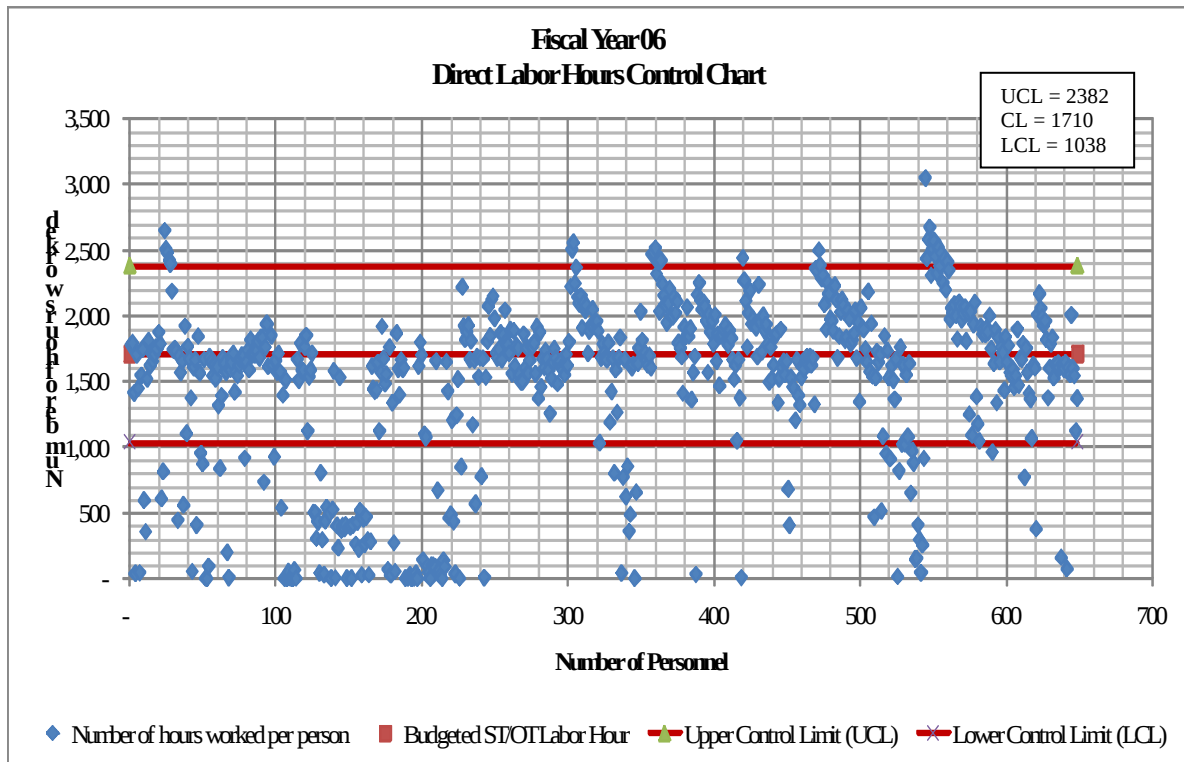


Figure 12. Direct Labor Hours Control Chart for Fiscal Year 2006

4. Distribution of Direct Labor Hours

Figure 13 is a summary of Figures 10, 11, and 12. The distributions of labor hours for each fiscal year are shown in a range from zero to 3500 hours divided into 500-hour increments. The graph is a side-by-side comparison of the labor hours worked from year to year. The graph illustrates a significant number of personnel, approximately one-third of the NWCF workforce at FEC Washington, working outside the standard work year of 1710 hours.

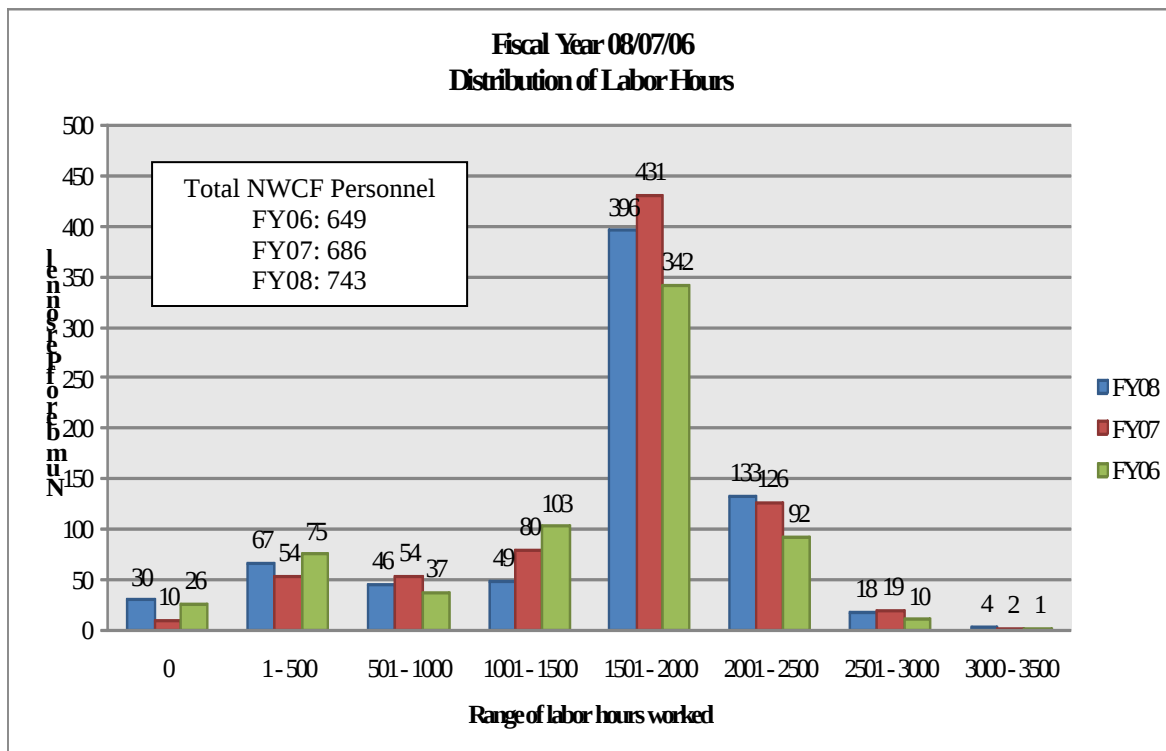


Figure 13. Distribution of Labor Hours in Fiscal Years 2008, 2007, and 2006

As the workforce continued to increase from fiscal years 2006 through 2008 (approximately 94 personnel), there existed an increased number of personnel who worked overtime. It is important to recognize the relative trends in the categories of personnel worked in the range of 1001–1500 and 2001–2500. The total percentage of personnel that worked in the 2001–2500 hours category proportionally increased from 14 to 18 percent of the total workforce from fiscal years 2006 to 2008, even though the overall workforce increased. As the overall workforce increased, the requirement to work

overtime would be expected to decrease given the proper number and mix of skilled employees with respect to the projected workload demands. The total percentage of personnel that worked in the 1001–1500 hours category proportionally decreased from 16 to 7 percent of the total workforce from fiscal years 2006 to 2008.

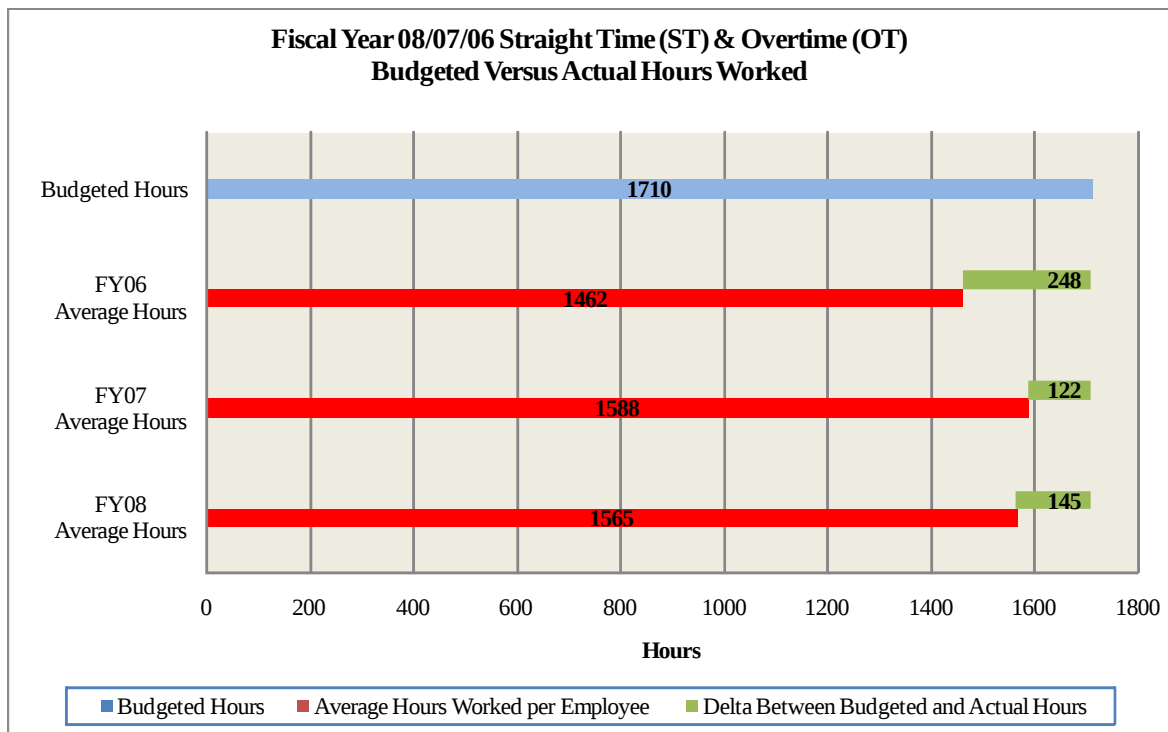


Figure 14. Budgeted versus Actual Labor Hours Worked for Fiscal Years 2006, 2007, and 2008

Figure 14 illustrates the disparity between budgeted labor hours and the average of actual hours worked for fiscal years 2006 through 2008. The budgeted labor hours are established at 1710 per fiscal year; actual labor hours for each fiscal year fell short of the budgeted amount by 248, 122, and 145 for fiscal years 2006, 2007, and 2008, respectively.

F. ANALYSIS OF UTILITIES

1. FEC Washington Utilities and Energy Management (UEM)

According to the EUM product line plan in 2006, FEC Washington provides UEM services to Naval District Washington (NDW) installations. They operate 16 electric, water and wastewater systems, eight steam systems, two gas systems, four wastewater treatment plants, one water treatment plant, and one co-generation plant. Installations include the following.

- Washington Navy Yard Bethesda, MD
- Arlington Service Center
- National Naval Medical Hospital, Bethesda Indian Head, MD
- NSWC Dahlgren
- NAS Patuxent River
- Anacostia Naval Station
- Naval Observatory
- NSWC Indian Head
- NSWC Carderock
- U.S. Naval Academy

UEM services for the above activities are charged under NWCF localized utility commodity rates centrally managed by FEC Washington. Electricity is purchased locally while the majority of natural gas is purchased through DESC contracts (except for natural gas purchased from Baltimore Gas & Electric for NAS PAX River). Asset management is a high priority to the UEM group. They are employing a project management approach to maintenance projects. The idea is to capture the true costs accurately associated with maintenance and formulate accurate rates to charge customers (NAVFAC, 2006).

2. Utilities Impact On NOR

In 2006, FEC reported that 44% of its total costs were attributed to the purchase of utilities and fuel across all of the FEC enterprise (Department of the Navy [DoN], 2007). This statistic raised questions regarding the negative impact that unanticipated utilities price increases could have on NOR and AOR. FEC anticipated these problems and developed a strategy to counteract the negative effects. In 2006, they implemented a strategy that deferred Sustainment, Restoration and Modernization (SRM), Civil

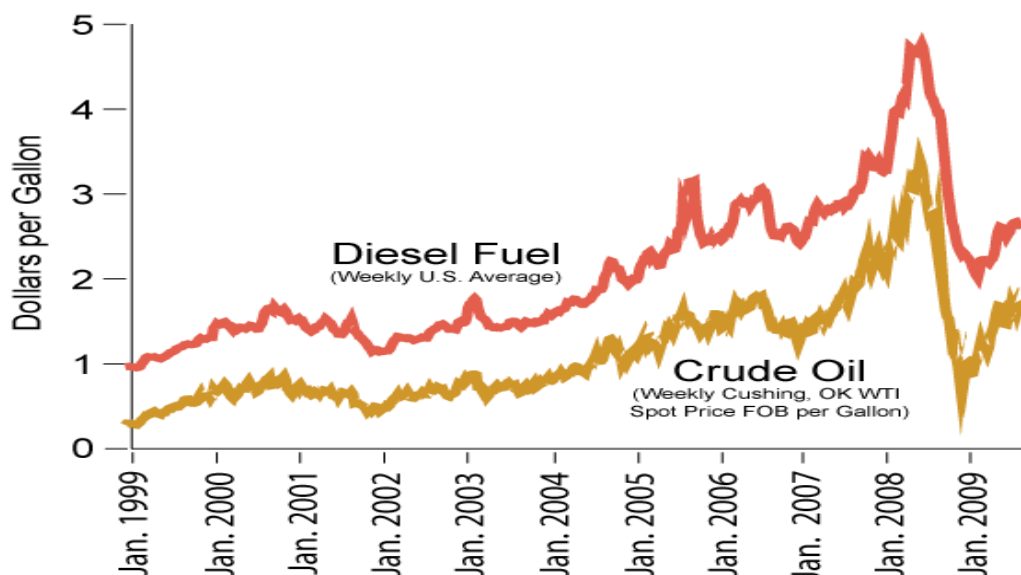
Engineering Support Equipment (CESE) procurement and hiring to act as a counter to the increase of the fuel and electricity costs. The strategy remains in place and FEC has implemented conservation measures to reduce the consumption of electricity and natural gas (Department of the Navy [DoN], 2009).

Purchased utilities (fuel, natural gas, and electricity) comprise the largest sources of revenues and expenses for FEC Washington. Figures 7 through 9 highlight the effects of utilities in terms of revenues and expenses. The trend from fiscal years 2006 to 2008 suggests that FEC Washington was successful in predicting future (budgeted) revenues. In 2008, the difference between the budgeted and actual utilities revenue streams was approximately four percent of the budgeted amount. The difference was less than one percent in 2007 and seven percent in 2006.

This was not the case in terms of accurately predicting expenses. The purchase of fuel and utilities fall under the expense category labeled contractual services. Figures 7 through 9 illustrate the disparity between the contractual services costs that FEC Washington was expecting to pay (budgeted) and what they ended up paying (actual). In fiscal years 2008, 2007, and 2006, they paid (25 percent, 11 percent and 24 percent, respectively) more than what was budgeted for during those same years. This had a negative impact on their NOR and AOR and highlighted the problem with assigning rates every two years as opposed to being able to adjust rates annually.

Utilities department labor hours associated with the services is rolled up and accounted for in the labor expense category (see Figures 7 through 9). It is important to point this out because an accurate prediction of fuel, natural gas and electricity costs may assist FEC Washington in formulating a budget that is more precise. Figures 15 through 17 are from the Department of Energy (DoE), which shows the increasing cost of utility commodities over time.

Diesel Fuel Prices Generally Follow Crude Oil



Source: Energy Information Administration.

Figure 15. Diesel Fuel Prices Generally Follow Crude Oil (From: http://tonto.eia.doe.gov/energyexplained/index.cfm?page=diesel_factors_affecting_prices)

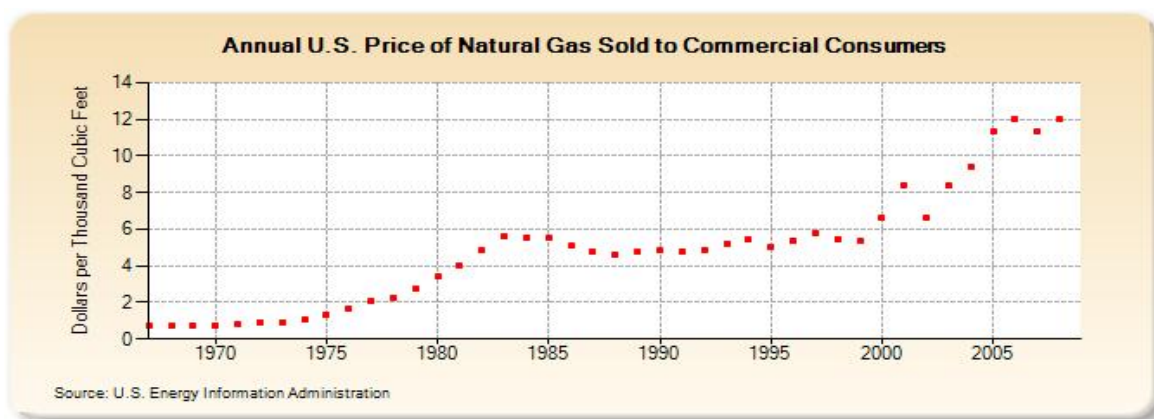


Figure 16. Annual U.S. Price of Natural Gas Sold to Commercial Consumers (From: <http://tonto.eia.doe.gov/dnav/ng/hist/n3020us3a.htm>)

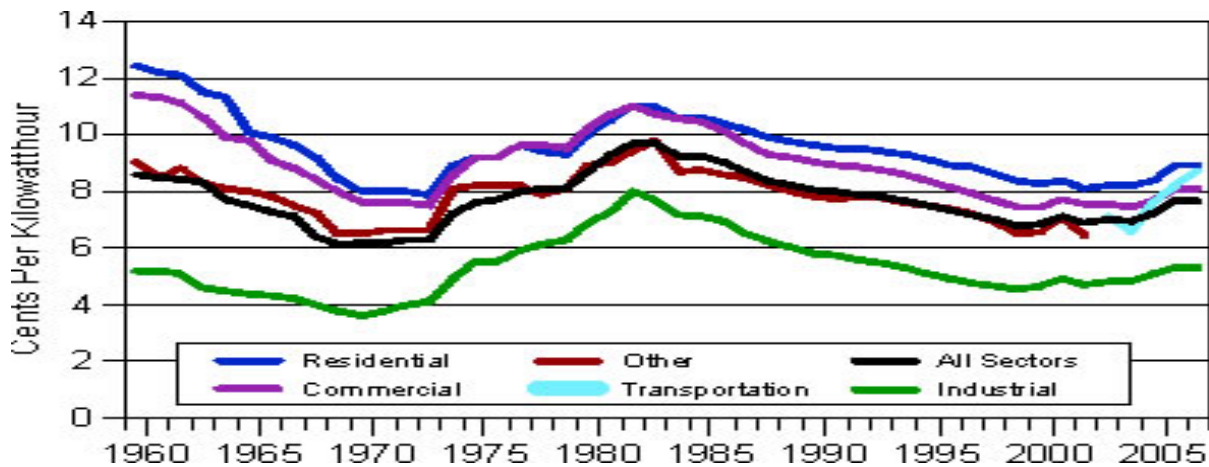


Figure 17. Average Retail Price of Electricity Sold by Sector, 1960–2007 (From: <http://www.eia.doe.gov/bookshelf/brochures/epa/epa.html>)

All three illustrations, with the exception of the sharp decrease of crude oil and diesel fuel as shown in Figure 15, indicate that fuel, gas and power follow a generally predictable trend over time. Numerous forecasting methods could be employed to predict future costs of these commodities. Utility cost data for these same commodities coming from each FEC Washington activity could provide an even more accurate and applicable data set that could be used in a forecasting model. It was stated earlier that 44 percent of all FEC activity total costs were attributed to the purchase of utilities and fuel in 2006. If these costs are still as significant as they were in 2006, then a more localized (activity level) assessment of utility costs may be needed for accurate budget formulation. If each FEC Washington activity assesses local utility costs, examines past trends and applies a forecasting method (such as a time series forecast), the end result (future anticipated costs) could play a crucial role in formulating a budget that better anticipates the impact of utilities on contractual service costs. The only data needed would be previous utilities bills paid. Figure 18 illustrates the relationship between revenues, expenses and NOR. The highlighted portions represent the areas affected by escalating utilities costs.

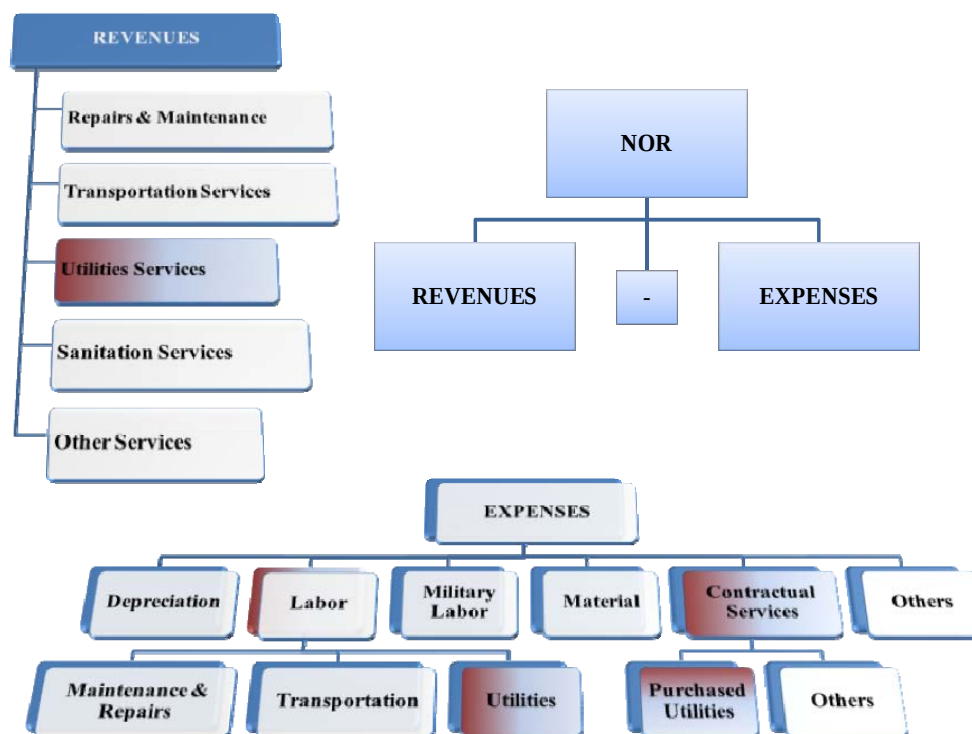


Figure 18. NOR Impact as a Result of Purchased Utilities Fluctuation

Any unanticipated increases in expenses has a negative effect on NOR/AOR. For example, if fuel costs exceed the rate being charged, the affected activity does not take in enough money to cover fuel expenses; thus, widening the gap of NOR and AOR. This problem is compounded the following year because the activity in question now has to charge enough money to cover losses from the previous year and charge enough to cover expenses for the current year. If the AOR continues further down a negative slope as is the current case (see Figure 6), the dollar amounts needed to enable a recovery to an AOR of zero grows at the same rate.

G. SUMMARY

This chapter provided a detailed presentation of the funding profile illustrating the current trend of NOR/AOR and the factors affecting the command NWCF financial performance for fiscal years 2006 through 2008. This was followed by a detailed variance analysis of revenues and expenses. A separate analysis was conducted and focused on

budgeted and actual labor hours, descriptive statistics of labor hours, control chart of labor hours, and a comparison of average hours worked per fiscal year. Finally, a qualitative analysis was conducted on the impact that purchased utilities had on FEC Washington expenses. Chapter IV summarizes the results and findings of the analysis conducted in this chapter.

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IV. FINDINGS AND RESULTS

A. INTRODUCTION

The purpose of this chapter is to interpret the data presented in Chapter III. This chapter discusses the results of the variance analysis resulting from the forecasted versus actual budget, NWCF workforce labor hours and the correlation between purchased utilities and contractual services. The findings discussed in this chapter offer an indication of factors affecting NOR.

B. RESULTS

1. Budget Variance Analysis

Table 5 summarizes the results conducted in Chapter III with respect to the budget variance analysis of forecasted versus actual budget from fiscal years 2006 to 2008. The overall results indicate that the actual NOR from fiscal years 2006 to 2008 was on a significant downward trend.

Table 5. Results from the Variance Analysis of Forecasted versus Actual Budget

Fiscal Year	Category	Budgeted	Actual	Variance	Percent Budget Variance
2006	Revenues	\$ 182,875,000	\$ 197,189,895	\$ 14,314,895	7.83%
	Expenses	\$ 188,530,000	\$ 204,476,494	\$ 15,946,494	8.46%
	NOR	\$ (5,655,000)	\$ (7,286,599)	\$ (1,631,599)	28.85%
2007	Revenues	\$ 220,062,000	\$ 213,870,801	\$ (6,191,199)	2.81%
	Expenses	\$ 217,804,000	\$ 231,264,581	\$ 13,460,581	6.18%
	NOR	\$ 2,258,000	\$ (17,393,780)	\$ (19,651,780)	870.32%
2008	Revenues	\$ 225,351,000	\$ 242,639,796	\$ 17,288,796	7.67%
	Expenses	\$ 227,158,000	\$ 260,798,116	\$ 33,640,116	14.81%
	NOR	\$ (1,807,000)	\$ (18,158,320)	\$ (16,351,320)	904.89%

Figure 19 illustrates the results of budget variance. The percent budget variance, which is the variance divided by the budgeted amount, rose significantly from 29 percent in fiscal year 2006 to 870 percent in fiscal year 2007 to 905 percent in fiscal year 2008.

In 2008, the largest contributor to the 905 percent budget variance is the contractual services expenses category of \$34.8M, followed by labor expenses of \$7.1M. In addition, the actual revenues for utilities services lagged behind the budgeted revenues by \$6.1M, followed by maintenance and repairs of \$4.2M. Similarly, in 2007, the largest contributor to the 870 percent budget variance was the contractual services expenses of \$15.6M, followed by labor expenses of \$10.5M. Furthermore, the actual revenues for other products and services lagged behind the budgeted revenues by \$10.7M. In 2006, the percent budget variance was only 29 percent, contractual services expenses was again the largest contributing factor, \$26.1M for that year.

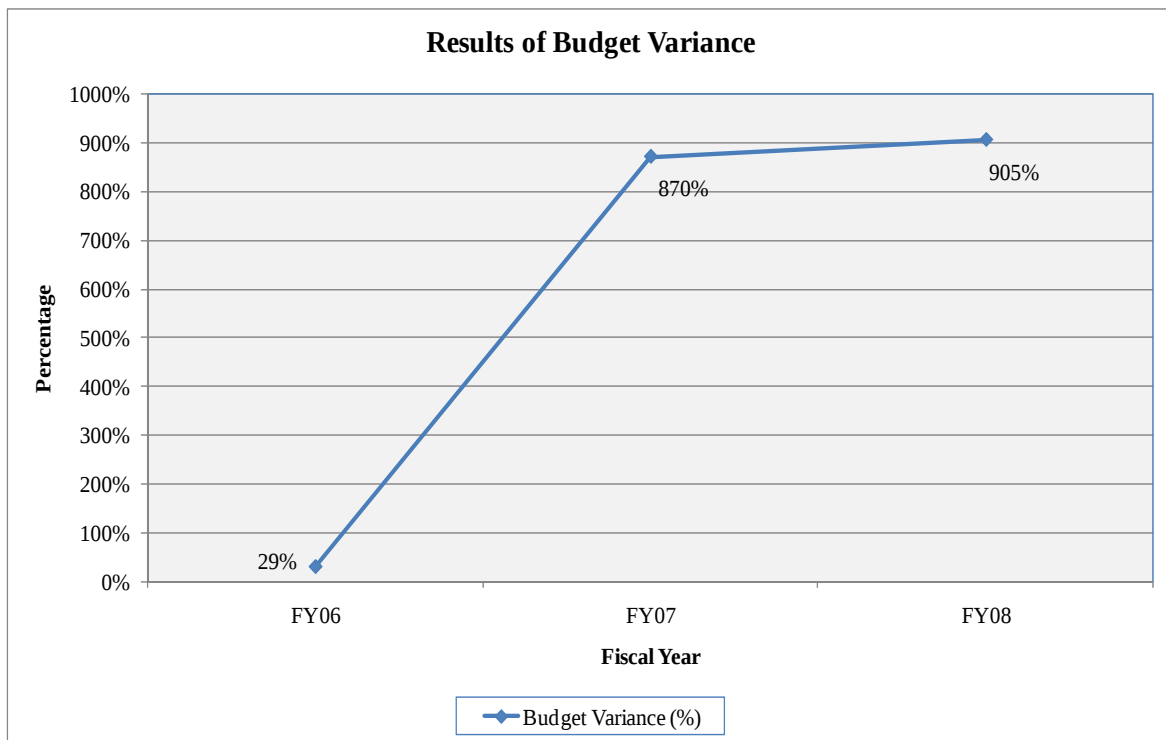


Figure 19. Results of Budget Variance

Figure 20 summarizes the trends of FEC Washington's actual expenses and revenues from fiscal years 2006 to 2008. As indicated on the figure, the rate of expenses outpaced the rate of revenues approximately by a factor of 1.24 or 24 percent. The gap between the actual expenses and revenues trendlines signals the importance of controlling expenses and/or increasing rates that yield higher revenues. The goal of any NWCF

activity is to converge these trendlines so that the difference between revenues and expenses equates to zero. In the case of FEC Washington, the gap between these trendlines was narrower in fiscal year 2006 but widened through the end of fiscal year 2008. Figure 20 also shows that the expenditure trendline continued on a predictable path but the revenues trendline traveled on a less predictable path. For instance, if the budgeted expenses were inaccurate, then the rates that affect budgeted revenues would also be inaccurate; thereby, widening the gap between expenses and revenues.

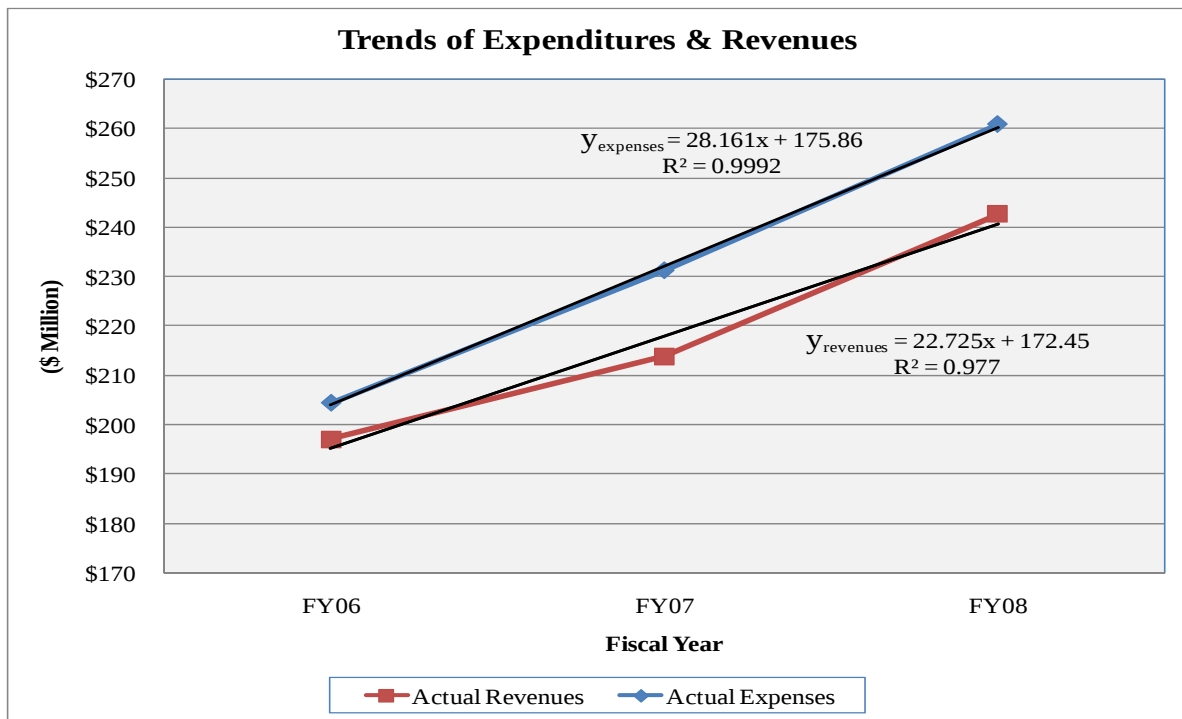


Figure 20. Trends of Expenditures and Revenues

2. Workforce Labor Hours

The result in Figure 21 illustrates the disparity between budgeted hours and averaged hours worked from fiscal years 2006 through 2008. It is important to recognize that the actual average hours worked per employee within the three-year period were significantly less than the budgeted hours despite the increase in the FEC Washington workforce. Figure 21 also shows the effects of personnel working below the 1710 budgeted hours benchmark creating possible revenue losses in those years. These revenue

losses stemmed from labor hours sales to the customers in the categories of maintenance and repairs, transportation services, utilities services, sanitation services and other products and services. In this case, the actual billable labor hours charged to customers were below the 1710 benchmark, which created the losses. To decrease the revenue losses due to labor hour sales, the overall averaged labor hours billed to the customers should meet or exceed the 1710 benchmark.

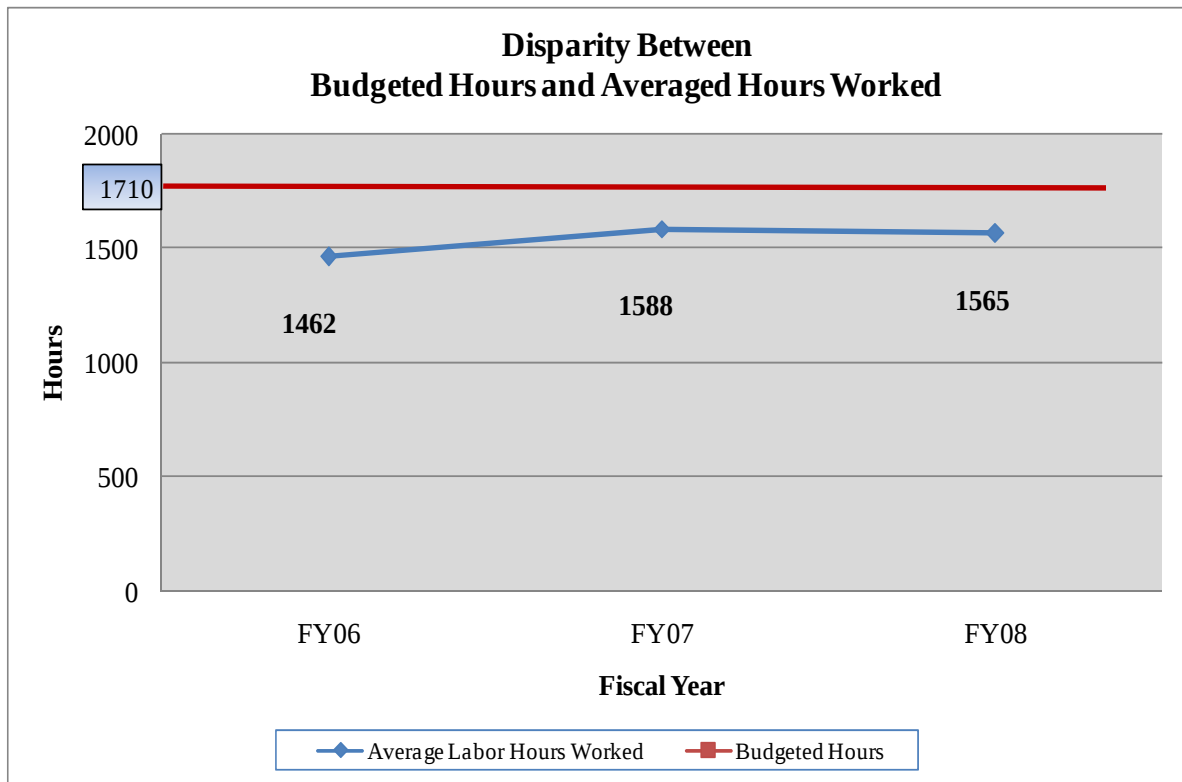


Figure 21. Disparity between Budgeted Hours and Average Hours Worked

Revenue losses can be determined by taking the difference between the actual average hours worked and the benchmark, multiplied by the billable labor rates in each category and the number of personnel in the NWCF workforce. For example, revenue losses in 2008 generated from the various abovementioned services can equate to \$9,696,150, using a billable rate of \$90 per hour and 743 employees. See the following detailed calculation.

$$\begin{aligned}\text{Revenues Losses} &= (1710-1565 \text{ hours per employee}) \times (\$90 \text{ per hour}) \\ &\times (743 \text{ employees}) = \$9,696,150\end{aligned}$$

It is recognized that there would be an increase in expenses due to personnel working more hours on average to bring in additional revenues. The actual expenses the command is expected to incur due to personnel working more hours would be less than the revenues generated from services charged to customers.

3. Correlation between Utility Services Revenues and Contractual Services Expenses

Figure 22 illustrates the result of contractual services expenses from fiscal years 2006 to 2008. The trend of contractual services expenses has been consistently increasing by approximately \$21 M from fiscal years 2006 to 2008. This predictable trend has not been reflected in the budgeted contractual services expense category. If calculation of utilities rates charged to customers were based on the budgeted contractual services expense, then FEC Washington would need to anticipate the contractual services expenses better.

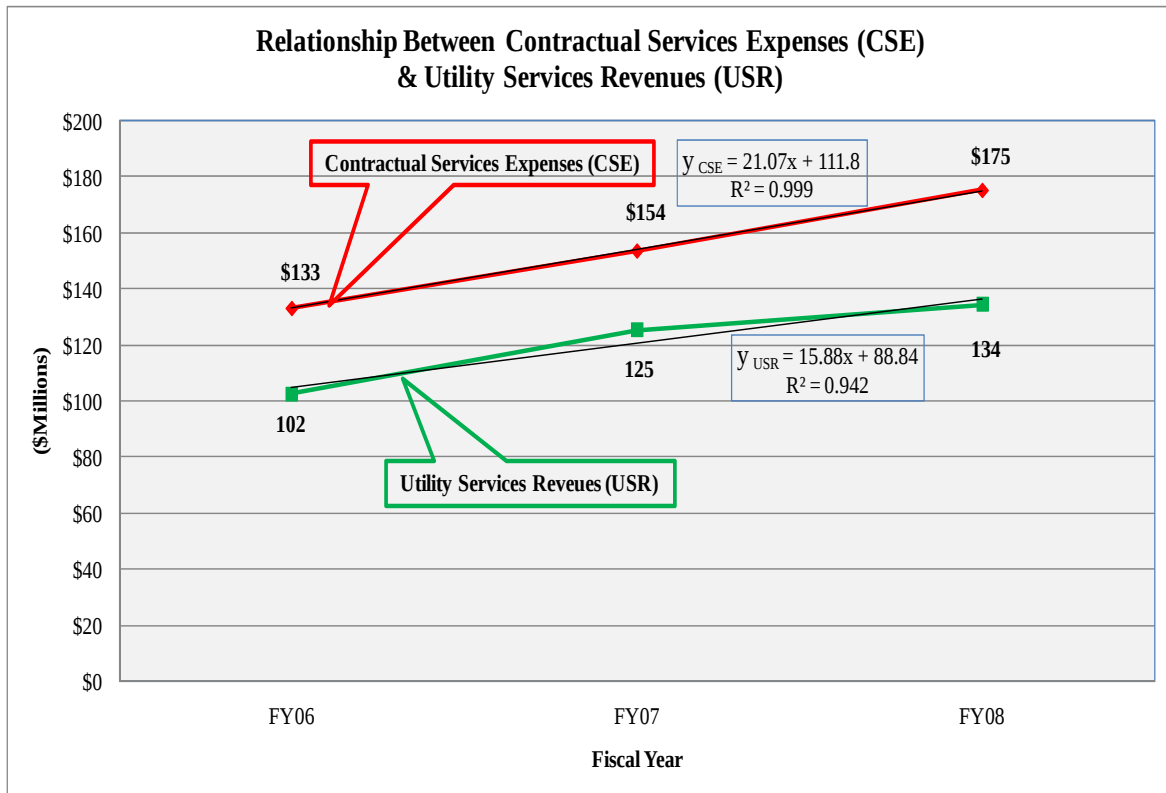


Figure 22. Relationship between Contractual Services Expenses (CSE) and Utility Services Revenues (USR)

The disparity between budgeted contractual services expenses and budgeted utilities services revenues negatively impacts NOR. The negative impact on NOR increases when the disparity gap between the two increases proportionally. Why? This occurred because FEC Washington appeared to have charged their customers at a lower rate than what was paid out for those respective contractual services from 2006 through 2008.

C. SUMMARY

This chapter summarized the results and findings resulting from the application of variance analysis of the command budget, workforce labor hours, as well as an analysis of revenues and expenses as they relate to utilities. The variance analysis of command budget showed that expenses consistently and dramatically outpaced revenues over the three-year period analyzed. The workforce labor hours (straight time and overtime)

analysis revealed that the average hours worked per employee fell below the budgeted annual labor hours benchmark of 1710 every year between 2006 and 2008. The analysis of revenues and expenses related to utilities underpinned the connection between utilities services revenues and contractual services expenses. All three of these factors were found to have a significant impact on NOR. Chapter V addresses the research questions, offers recommendations and suggests areas for additional research.

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V. CONCLUSION AND RECOMMENDATIONS

A. INTRODUCTION

The objective of this research project as outlined in Chapter I is to evaluate the factors affecting NOR and AOR in the NWCF setting of FEC Washington using data from fiscal years 2006 through 2008.

Chapter II provided a literature review that identified and examined the framework of the NWCF and how it is applied in the FEC Washington context. The literature review also examined several “best practices” that could be applied. Chapter III identified and analyzed the budget variance, labor hours, and revenues and expenses related to purchased utilities and contractual services. The analysis was done using various statistical methods. Chapter IV interpreted the results of the analysis from Chapter III and assessed the impact that these results had on the organization’s financial goals.

This chapter concludes with the answers to the primary and secondary research questions, presents recommendations, and suggests topics for further research.

B. RESEARCH QUESTIONS

1. Primary Research Question

- What are the factors affecting the command Net Operating Results (NOR) at FEC Washington in fiscal years 2006, 2007, and 2008?

The analysis revealed three primary factors that affected the NOR at FEC Washington during fiscal years 2006, 2007 and 2008. The first factor is the creation of stabilized rates that turned out to be insufficient. These rates tied directly to the revenues generated in the various categories of products and services (e.g., maintenance and repairs, transportation, utility services, sanitation services and other products and services) as shown in Chapter IV, Figure 20. In addition to the insufficient revenue generated, expenses in the contractual services category consistently exceeded the

budgeted amount over the three-year period. The results presented in Chapter IV, Figure 22 highlighted a steady annual increase of approximately \$21M over the budgeted amount in contractual services expenses from fiscal years 2006 through 2008.

The second factor was the disparity between the budgeted and actual average labor hours worked as shown in Chapter IV, Figure 21. This disparity created two negative effects: (1) insufficient revenues received from the total billable hours worked chargeable to the customers at a pre-determined rate fixed for a period of two years; and (2) unanticipated increase of expenses, such as overtime paid to employees in support of the mission.

The third factor was the continued rising cost of purchased utility commodities in support of the services rendered to the customers, coupled by the inadequate revenues generated from utilities services performed. The inaccurate anticipation of purchased utilities costs negatively affected NOR. The purchased utilities costs in the market increased at a consistent rate but the budgets developed did not reflect this increase. This resulted in the development of insufficient rates ultimately charged to customers. This, in turn, led to a revenue stream that was under-matched to the related streams of utilities expenses.

2. Secondary Research Questions

- What are the overall financial impacts of projecting inaccurate straight and overtime labor hour estimates?

The overall financial impact of projecting inaccurate straight and overtime labor hour estimates harmfully impact NOR as seen under the analysis of variance section of Chapter III. In this case, NOR followed a downward trend as a result of having more expenses incurred than revenues received in three consecutive years. More specifically, the rate of expenditure consistently outpaced the rate of revenues by a factor of 1.24 or 24 percent as analyzed in Figure 20, where inaccurate straight and overtime labor hours comprised a significant contribution. The results in Figure 21 indicated that potential revenue, which is the difference between the budgeted hours and actual hours worked multiplied by the billable rate and the total workforce, was not realized. As a result, the

actual revenue received from the labor hour category fell short of the projected revenues in the same category. One way to offset the disparity between the budgeted and actual straight and overtime is to regulate the overtime policy, as well as to ensure a sufficient amount of productive labor hours are worked. Another way to offset the disparity between the budgeted and actual straight and overtime is to determine the proper number and mix of skilled employees (e.g., plumbers, electricians, welders, etc.) needed to accomplish the anticipated workload and to compare that to the size of the current workforce. The ultimate goal is to determine if the workforce is well matched with the workload demands.

- How did escalating market utilities costs (e.g., fuel, electricity and natural gas) affect NOR and AOR?

Research on market utilities costs revealed that escalating utilities costs had an indirect effect on NOR and AOR. The effect was indirect because FEC Washington implemented a policy that diverted funds from sources such as Sustainment, Restoration and Modernization (SRM), Civil Engineering Support Equipment (CESE) procurement, and new hires to mitigate unplanned expenditures associated with volatile market utilities costs. The effects of SRM delays, CESE procurement cuts and limitations in new hires ultimately has a long-term negative impact on NOR. It is important to note that FEC Washington reduced the impact of these negative effects by the employment of certain cost saving measures. These measures may include employment of a utility acquisition strategy, use of refined utility ordering processes, as well as conservation measures for electricity and natural gas. These measures collectively offset the increasing costs of utilities expenses and reduce the need to divert funds from the other sources mentioned above.

- Based on the data provided from fiscal years 2006, 2007 and 2008, can forecasting models be used for estimating projected labor hours and utilities cost in the market?

Research indicated that various forecasting models could be used to reduce the variances between budgeted and actual labor and utilities costs. The time-series model is an effective method that predicts future values based on historical data. Another model that could be used is the Delphi method. This method involves presenting pertinent information to a group of subject matter experts to make accurate forecasts.

- What does FEC Washington know about the budget execution in fiscal year 2009 that could possibly be used to improve financial performance objectives in future years?

FEC Washington is aware of a large gap between the budgeted and actual NOR. In fiscal year 2009, FEC Washington projected approximately \$19.8M of positive NOR. Additionally, the command anticipated a redistribution of approximately \$9.9M from higher headquarters to offset the current negative AOR. This budget objective would bring the command's AOR to a breakeven point. However, FEC Washington experienced a positive NOR of \$4.3M. This amount is \$15.5M less than the forecasted amount of \$19.8M or 78 percent budget variance. The income statement from the IBIS report for fiscal year 2009 indicated that revenues generated were \$276M and expenses incurred were \$271.7M. Coincidentally, the percent budget in fiscal year 2009, budget variance divided by the budget, was 8 percent of the budgeted amount for revenue and 15 percent of the budgeted for expenses. These percentages are identical to the analyzed percent budgeted in fiscal year 2008 as shown in Chapter III, Table 1. Appendix D shows the detailed analysis.

This research recognized that the gap between the rate of revenues and expenses in fiscal year 2009 decreased but not as much as necessary to achieve the financial objectives. One way to improve the future financial performance is to continue narrowing the gap between the rate of revenues and expenses to mitigate the impact on NOR. To achieve this, it is important first to control costs associated with contractual services, in addition to improving workforce productivity. At the same, FEC Washington can re-examine the suggested forecasting models for revenue generation.

C. RECOMMENDATIONS FOR FURTHER RESEARCH

- Could secondary factors, such as the A-76 outsourcing study of public works production division personnel and the organizational transformation during July 2004, have affected NOR in the short or long term?
- Conduct a similar research study with other FECs in different geographical areas to identify trends.
- Were there any particular segments of the business more susceptible to lower productivity? If so, then why? Or, was there some anomaly that resulted in lower productivity? If so, was it related to seasonality, an aging workforce, or some other economic factors? (Courtesy of Potvin, 2009)
- Is there a private sector methodology that could be used to anticipate better and plan for the future procurement of market utilities commodities and contractual services?

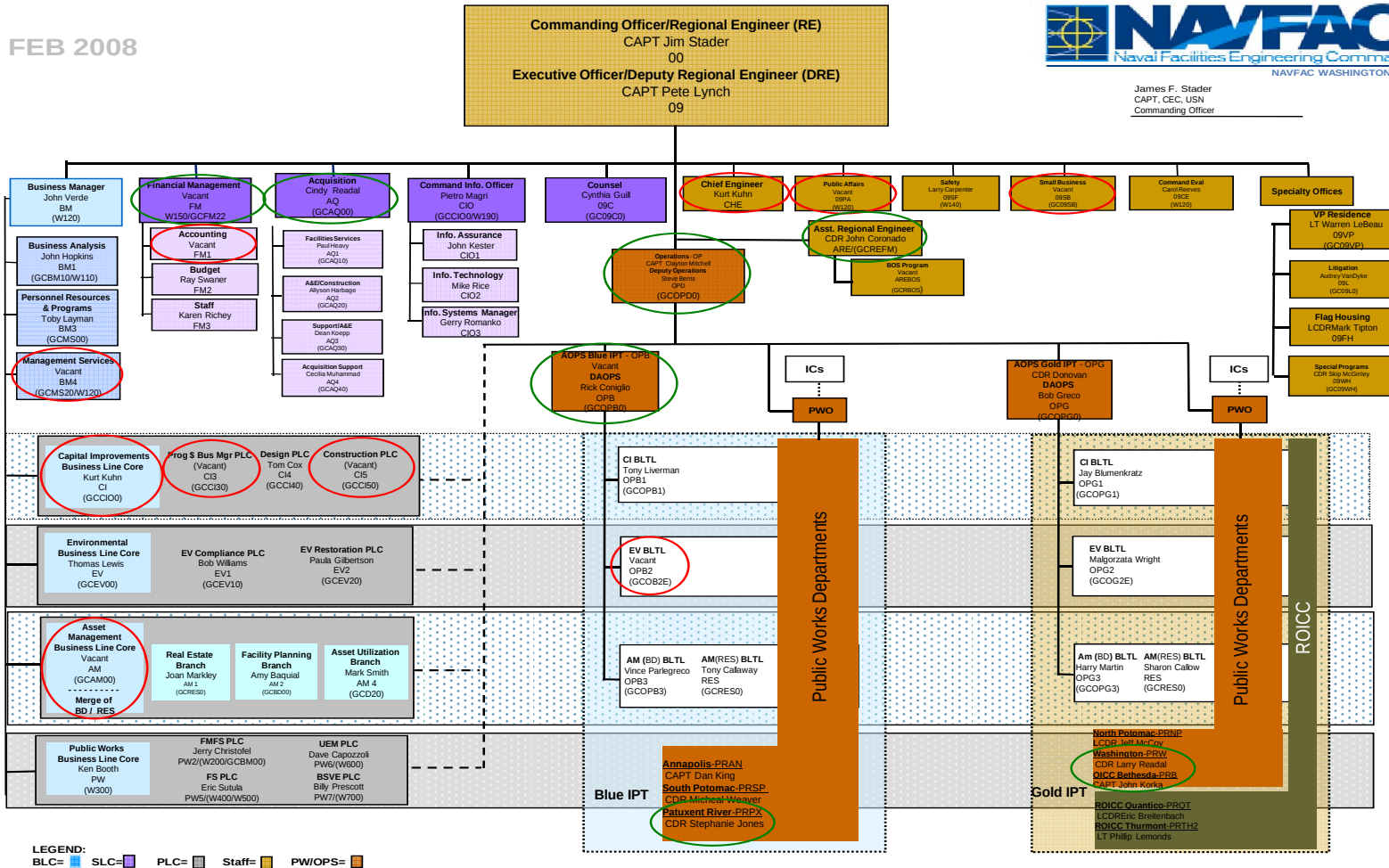
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APPENDIX A. FEC WASHINGTON ORGANIZATION CHART

FEB 2008



James F. Stader
CAPT, CEC, USN
Commanding Officer

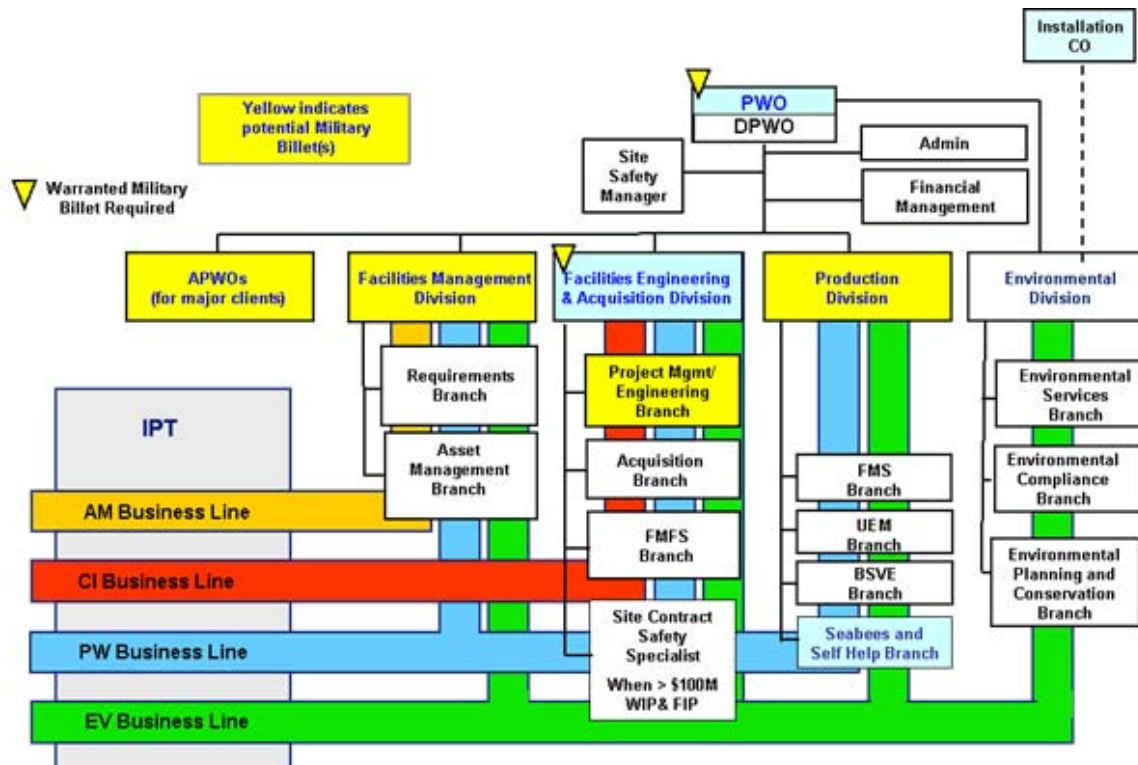


Source: Courtesy of NAVFAC. Retrieved June 15, 2009, from <https://portal.navy.mil/portal/page/portal/NAVFACWASH/>

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APPENDIX B. PWD TEMPLATE ORGANIZATION CHART

The PWD is a forward deployed organizational element of the Integrated Product Team (IPT) that provides the full range of NAVFAC facility and environmental products and services to Navy Installations. The PWD organization is comprised of personnel funded with both GF and NWCF, staffed as necessary to provide the NAVFAC product and service requirements of the installation.

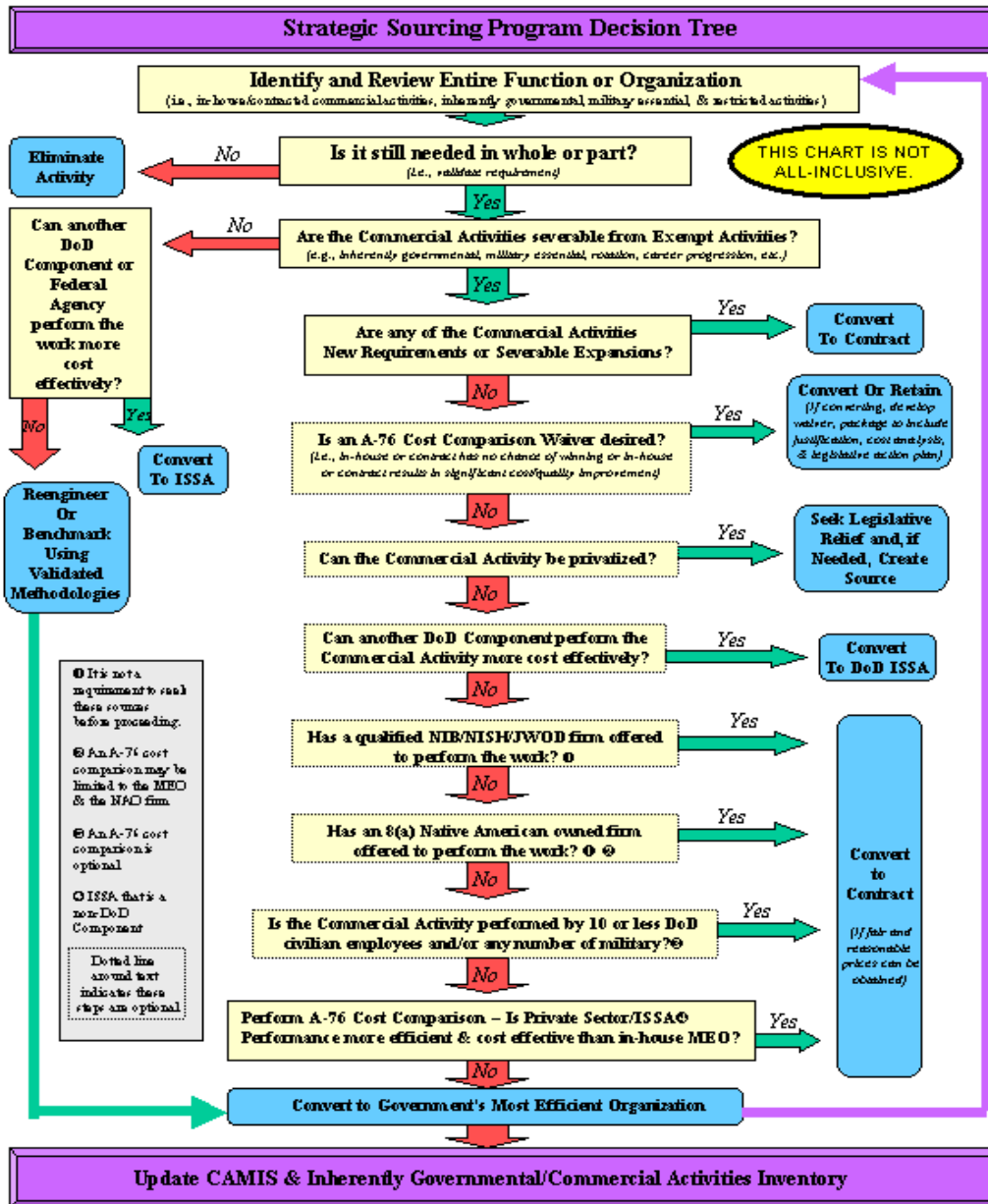


Note: Double-hatting and/or combining of functions may occur.

Source: Courtesy of NAVFAC. Retrieved June 15, 2009, from <https://portal.navfac.navy.mil/portal/page/portal/NAVFACWASH/>

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APPENDIX C. STRATEGIC SOURCING PROGRAM DECISION TREE



Source: Courtesy of Defense Logistics Agency (DLA). Retrieved June 15, 2009, from <http://www.dla.mil/a-76/images/osd/StrategicSourcing.gif>

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APPENDIX D. BUDGET INFORMATION ANALYZED FOR FY2009

FY2009					
	<u>Revenue</u>	<u>Budget</u>	<u>Actual</u>	<u>Budget Variance</u>	<u>Percent Budget</u>
3030	Maintenance & Repair	\$ 68,892,000	\$ 79,575,910	\$ 10,683,910	16%
3070	Transportation Services	\$ 14,381,000	\$ 23,893,506	\$ 9,512,506	66%
3090	Utility Services	\$ 170,506,000	\$ 152,943,547	\$ (17,562,453)	-10%
3091	Sanitation Services	\$ -	\$ 7,570,371	\$ 7,570,371	
3140	Other Products & Services	\$ 1,368,000	\$ 12,087,964	\$ 10,719,964	784%
	Total	\$ 255,147,000	\$ 276,071,298	\$ 20,924,298	8%
	<u>Expenses</u>				
4910	Labor	\$ 52,966,000	\$ 65,185,431	\$ 12,219,431	23%
4919	Military Labor	\$ 932,000	\$ 1,214,244	\$ 282,244	30%
4920	Material	\$ 36,477,000	\$ 22,520,415	\$ (13,956,585)	-38%
2930	Other	\$ 408,000	\$ (5,069,236)	\$ (5,477,236)	-1342%
4940	Contractual Services	\$ 144,080,000	\$ 187,639,674	\$ 43,559,674	30%
4950	Depreciation	\$ 453,000	\$ 285,906	\$ (167,094)	-37%
	Total	\$ 235,316,000	\$ 271,776,435	\$ 36,460,435	15%
	NOR	\$ 19,831,000	\$ 4,294,863	\$ (15,536,137)	-78%

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