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**NAVAL
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MONTEREY, CALIFORNIA

THESIS

**ASSESSING THE ACCURACY OF MARINE CORPS
RESERVE ACTIVE DUTY DATES WITHIN THE DEFENSE
ENROLLMENT ELIGIBILITY REPORTING SYSTEM**

by

Christina A. Schmunk

June 2011

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**ASSESSING THE ACCURACY OF MARINE CORPS RESERVE ACTIVE DUTY
DATES WITHIN THE DEFENSE ENROLLMENT ELIGIBILITY REPORTING
SYSTEM**

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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN OPERATIONS RESEARCH

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ABSTRACT

The Defense Manpower Data Center (DMDC) is charged with collecting, maintaining, and reporting information on over 42 million people who are currently or previously connected to Department of Defense. Personnel information is provided by each of the United States Uniformed Services to be passed to the Personnel Data Repository (PDR) to update members' records in the Defense Enrollment Eligibility Reporting System (DEERS). Records are used to support benefits provided to the members and their families including medical, dental, educational, and life insurance while they are fulfilling their service and after retirement.

This research identifies issues with overlaying active duty periods in the PDR; uses statistical data analysis techniques to determine the accuracy of the data fields within the PDR; and provides guidelines for the application of active duty periods to a member's record. This research: (1) maps all active duty date source submissions that modify PDR records for Marine Reservists; (2) determines the business rules for applying changes to active duty date fields and recommends changes; (3) assesses and quantifies data quality of Marine Reservist active duty dates; and (4) makes recommendations for a continuous improvement methodology that the DMDC can implement for the other guard and reserve component data.

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LIST OF ACRONYMS AND ABBREVIATIONS

AD	Active Duty
ADOS	Active Duty Operational Support
ADOT	Active Duty Other than Training
ADT	Active Duty Training
AEF	Air Expeditionary Force
AF	Air Force
AGR	Active Guard/Reserve
ARNG	Army National Guard
AT	Annual Training
CHAMPUS	Civilian Health and Medical Program of the Uniformed Services
CMC/MI	Commandant of the Marine Corps/Manpower Management Information Systems Division
CofG	Convenience of the Government
DAP	Data, Analysis and Programs Division
DEERS	Defense Enrollment Eligibility Reporting System
DEP	Delayed Entry Program
DFAS	Defense Finance and Accounting Service
DMADV	Define-Measure-Analyze-Design-Verify
DMAIC	Define-Measure-Analyze-Improve-Control
DMDC	Defense Manpower Data Center
DoD	Department of Defense
DoDI	Department of Defense Instruction
DQT	Data Quality Team
DQTF	Data Quality Task Force
DVA	Department of Veterans Affairs
FTNGD	Full-Time National Guard Duty
GAO	United States Government Accountability Office
GWOT	Global War on Terror

IADT	Initial Active Duty Training
IDT	Inactive Duty Training
IMA	Individual Mobilization Augmentee
IRB	Institutional Review Board
IRR	Individual Ready Reserve
KB	Knowledge Based
MCTFS	Marine Corps Total Force System
MSO	Military Service Obligation
NPS	Naval Postgraduate School
OCO	Overseas Contingency Operations
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
OND	Operation New Dawn
ONE	Operation Noble Eagle
OS	Operational Support
OTD	Other Training Duty
OUR	Operation Unified Response
PDR	Personnel Data Repository
PFT	Personnel/Finance Transfer
PITE	Point In Time Extract
PNLEC	Personnel Entitlement Condition
RAPIDS	Real-time Automated Personnel Identification System
RC	Reserve Components
RCCPDS	Reserve Components Common Personnel Data System
ROTC	Reserve Officers Training Corps
ROWS	Reserve Order Writing System
SELRES	Selected Reserve
SPA	Secure Personnel Accountability
SPC	Statistical Process Control
SSN	Social Security Number

TAMP	Transition Assistance Management Program
TFDW	Total Force Data Warehouse
USMC	United States Marine Corps
USMCR	United States Marine Corps Reserve
V2	Grey Area Retired Reserve Member
VA	Veterans Affairs
VADIR	Veterans Affairs Department of Defense Identity Repository
VO	Verifying Official

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EXECUTIVE SUMMARY

The Defense Manpower Data Center (DMDC) collects, maintains, and reports on personnel and pay information provided by each of the seven Uniformed Services. This information is then passed to the Personnel Data Repository (PDR) in order to update members' records in the Defense Enrollment Eligibility Reporting System (DEERS). As part of the many functions of DEERS, records are used to support benefits provided to Service members and their families, including medical and dental benefits while in the military and once retired, and educational benefits while they are members of the Uniformed Services and after any type of separation.

In order to derive these benefits for members of the reserve and guard, the PDR must track and maintain information on a member's active duty periods. For Marine Corps Reservists, these active duty dates are processed from the Marine Corps Total Force System (MCTFS) to the DMDC. The records come in through the Reserve Components Common Personnel Data System (RCCPDS) Master Files, RCCPDS Transaction Files, and the Activation File where validation checks are performed prior to being sent to the PDR for use in determining eligibility through DEERS. Discrepancies with the active duty dates on the PDR can result in situations where the member may not have benefits during their time of service or they are receiving benefits when they have not met the eligibility criteria.

This research identifies issues with overlaying active duty periods, both contingency and non-contingency, in the PDR; uses statistical data analysis techniques to determine the accuracy of the data fields within the PDR; and provides guidelines for the application of active duty periods to a member's record. In so doing, it: (1) maps all active duty date source submissions that modify PDR records for Marine Reservists; (2) determines the business rules for applying changes to active duty date fields and recommends changes; (3) assesses and quantifies data quality of Marine Reservist active duty dates; and (4) makes recommendations for a continuous improvement methodology that the DMDC can implement for the other guard and reserve component data.

As a result of this research, it was determined that while RCCPDS edit procedures handled data flow as expected there are areas of concern within the procedures. Comparisons of the MCTFS data to the PDR in addition to the RCCPDS and activation data compared to the PDR showed match rates in the 60% range based on matches by SSN, active duty start date, and active duty stop date. An analysis of the discrepant data suggests that the Department of Defense may be spending as much as \$1.3 million per year for health care benefits for personnel incorrectly listed as being on active duty.

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Finally, I would like to recognize my colleagues in the Operations Research Department. As Admiral Mullen explained to us, there are certain people that help us get through the program, I consider you to be my support system. Thank you for taking me under your wings and making sure I got all the way through the program. Safe travels to all of you.

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I. INTRODUCTION

A. BACKGROUND

The Defense Manpower Data Center (DMDC) is charged with collecting, maintaining, and reporting information “on over 42 million people now and previously connected to [the] Department of Defense (DoD)” (DMDC, 2010a). Each of the seven Uniformed Services (Army, Navy, Marine Corps, Air Force, Coast Guard, Public Health Service Commissioned Corps, and National Oceanic and Atmospheric Administration Commissioned Corps) provides personnel information in accordance with several Department of Defense Instructions (DoDI). These feeds are in turn used to update members’ records in the Defense Enrollment Eligibility Reporting System (DEERS). DEERS serves as the “central DoD repository of personnel and medical eligibility data” (DMDC, 2010a). As part of the many functions of DEERS, records from the Personnel Data Repository (PDR) are used to support benefits provided to Service members and their families, including medical and dental benefits while in the military and once retired, and educational benefits while they are members of the Uniformed Services and after any type of separation.

When the Services first began supplying data feeds to the DMDC, transmissions were sent on a quarterly basis, later moving to monthly. This made real-time updating of DEERS difficult. The Real-time Automated Personnel Identification System (RAPIDS) program was fielded in 1985 with the Navy, and in 1992, moved to the DMDC. RAPIDS is the DoD’s enterprise solution for issuing the Uniformed Services identification and privilege cards to all active and reserve Service members, civilian employees, retired members, eligible family members, and selected contractors. This system is in use around the world, including at fixed sites, as well as in mobilized guard and reserve activities and aboard Navy ships. This provides a number of operators the ability to modify a member’s active duty (AD) period record when shown documentation of a member’s orders, without providing information through the personnel files.

Part of the information contained in the personnel files and captured through RAPIDS is the reserve and guard member deployment history and active duty periods greater than 30 days. This information is captured as active duty dates on the flat files submitted under the Reserve Components Common Personnel Data System (RCCPDS) DoDI 7730.54 in Enclosures 3 and 5, Activation and/or Support Dates in Enclosure 11, and the update of non-contingency dates through RAPIDS stations (USD [P&R], 2009).

1. The Impact of Incorrect Active Duty Dates for Service Members

The following stories were taken directly from the DMDC Support Office. These are Service members who contacted DMDC due to discrepancies in their DEERS record that resulted in them not getting the proper benefits to which they were entitled. Please note, these cases are not Marine Corps specific, rather are representative cases across multiple Service components.

a. Suspension of Disability Payments

A member contacted their senator stating that they could not apply for Veterans Affairs (VA) benefits due to an incorrect period of active duty. The senator forwarded this inquiry to the Officer of the Assistant Secretary of Defense for Legislative Affairs who facsimiled the inquiry to DMDC. The member stated they left active duty in 2002 and had not returned to active duty since that time. The PDR reflected that he was on active duty after 2002 and this caused the suspension of the member's disability payments and benefits by VA. Specifically, the PDR reflected a separation from active duty on January 2002. There was also a subsequent period of active duty from October 2008 to December 2008 in support of a contingency operation based on data received by the Service component.

After speaking with the Service liaison located at DMDC, it was determined that active duty orders were issued to the member on September 2008, to be effective October 2008 through November 2009. On October 2008, the member's orders were amended to be effective January 2009. However, on March 2009, these orders were revoked.

b. New Active Duty Period

In January 2009, a sponsor went back on AD. The PDR did not show the new orders and so the member was referred to a RAPIDS facility to show the new AD orders and get the record updated. In October 2009, the member's dependent was denied a claim. The member was still on AD so the DMDC Support Office advised the family to take the AD order to a RAPIDS facility to update the record. The family then had three additional periods in a seven month time period where they called the DMDC Support Office to state they were denied benefits and had to produce orders to confirm they were entitled to benefits.

B. LITERATURE REVIEW

1. Data Quality Task Force (DQTF)

Since DMDC customers range from the general public to decision makers in Washington, DC, the reliability and integrity of the information stored by the DMDC must stand up to close scrutiny. In 2006 and 2007, the Government Accountability Office (GAO) published two reports that questioned the reliability of the DMDC's data. To address these matters, the DMDC Data Quality Task Force (DQTF) was established on March 5, 2009. According to DMDC's "DQTF: Final Report and Recommendations" (DMDC, 2009b), this concern has also been echoed by current and former Office of the Secretary of Defense officials, other senior customers, and DMDC staff.

Subsequently, the DMDC established a permanent data quality facilitation group known as the Data Quality Team (DQT). In the initial report of the DQTF, a proposal of target areas for further investigation included the need for analysis of active duty start and stop dates. These dates are "High Impact Data Elements" based on the estimated time to address the concern, the number of groups impacted by the concern, and the complexity of the concern (DMDC, 2009a). This method of prioritization is outlined in the Data Quality Task Force: Initial Report, Issues for Investigation (DMDC, 2009a).

Based on the need to track active duty start and stop dates, the recommendation of the DQTF was to “establish a working group to examine all business rules and processes related to active duty start and stop dates, including transactional logic” (DMDC, 2009b).

This research is in direct support of the recommendations from the DMDC working group.

2. Continual Process Improvement

Six Sigma is a strategy that uses principles and techniques of quality improvement with the goal of “virtually error free business performance” (Pyzdek, 2003). The name Six Sigma comes from the idea of reducing the number of defects in a process to as low as 3.4 parts per million opportunities. Essentially, Six Sigma uses process improvement methods to achieve a highly defect-free process by reducing the variation of a process around its desired target state; thus, the process operates well within the closest specification limit set by the customer.

A vast number of publications describe the methodology and implementation of the Six Sigma process across a wide range of companies. There are also several departments within the federal government trying to improve the efficiencies of their organizations using Six Sigma principles.

The most common types of Six Sigma improvement models are the Define-Measure-Analyze-Improve-Control (DMAIC) and the Define-Measure-Analyze-Design-Verify (DMADV) methods (see Figure 1). Since DMAIC is utilized for existing business processes, it will be the method used in this paper.

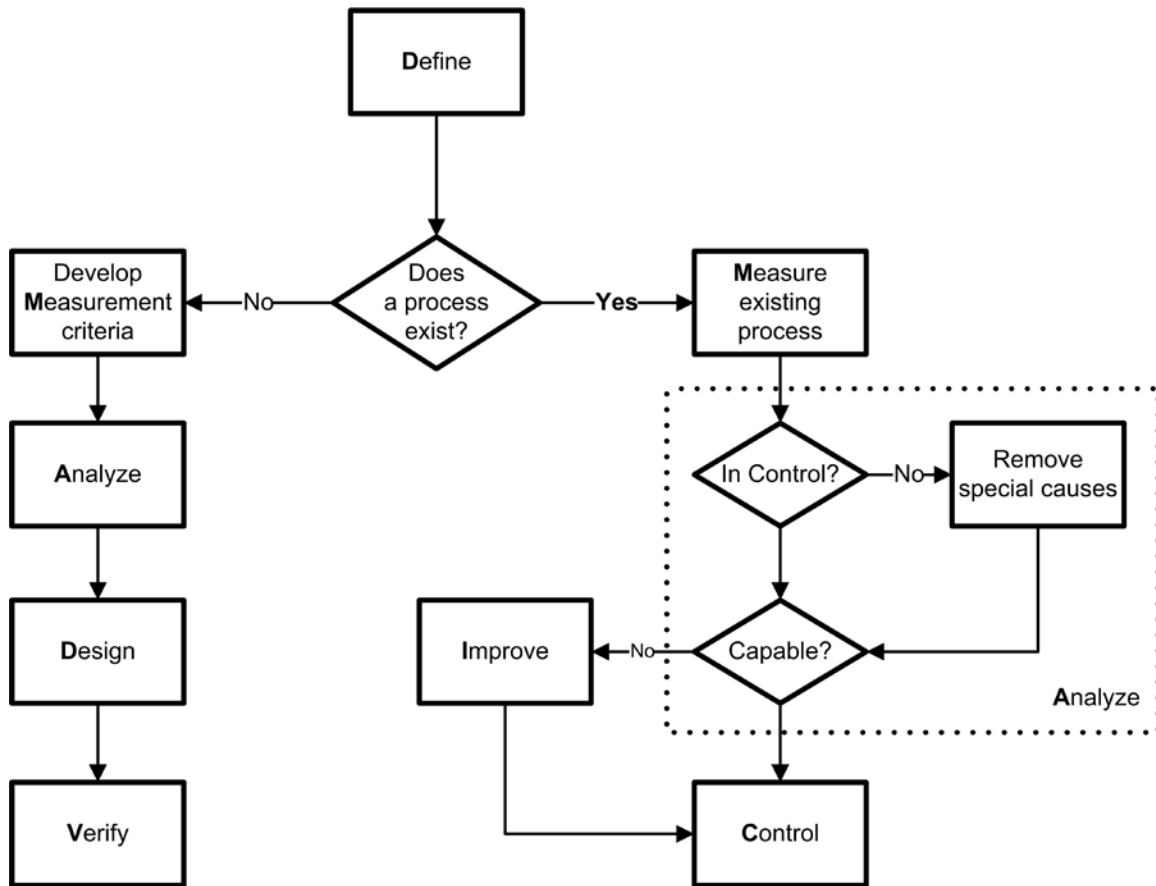


Figure 1. The Process of Determining DMAIC vs. DMADV (From Pyzdek, 2003)

“DMAIC is used when a project’s goal can be accomplished by improving an existing product, process, or service” (Pyzdek, 2003). This is done according to a specific set of steps, as shown in Table 1. This process is considered a closed-loop process; once the control step is completed, the next project begins with the define step.

Table 1. Overview of DMAIC (From Pyzdek, 2003)

Define	Determine goals Determine customer requirements Map process flow
Measure	Develop data collection process Collect data Compile and display data
Analyze	Verify data Draw conclusions from data Test conclusions Determine improvement opportunities Determine root causes
Improve	Create improvement ideas Set goals Implement improvement methods
Control	Monitor improvement progress Measure improvement statistically Assess effectiveness Make needed adjustments

Note: See Appendix A for sources of additional information about Six Sigma.

C. OBJECTIVES

Active duty dates within DEERS define which members are eligible for medical, dental, and educational benefits and when they are entitled to these benefits. Improving the quality of active duty dates will help ensure timely access to medical benefits for guard and reserve Service members and their families, and will help determine eligibility for educational benefits. Active duty dates have been reported in the RCCPDS file submissions since 1991 per DoDI 7730.54 (USD [P&R], 2009). Post September 11, 2001, the increase in the number of activations of reserve and guard members has brought about volatility in these fields, and consequently, benefits have been expanded based on this information, which increases the ability to exacerbate data quality issues.

This research will help identify issues with tracking active duty periods, both activations and training periods, across multiple systems. This thesis uses statistical data

analysis techniques in an attempt to determine the accuracy of the data fields within the PDR and provides guidelines for the application of active duty periods to a member's record.

Following are the major objectives of this thesis:

- Map all active duty date source submissions that modify PDR records for Marine Reservists.
- Determine the business rules for applying changes to active duty start and stop date fields and recommend changes.
- Assess and quantify data quality of Marine Reservist active duty dates in DEERS, as well as changes that can occur from the multiple data sources.
- Make recommendations for a continuous improvement methodology that the DMDC can implement for other guard and reserve data.

D. THESIS OUTLINE

The subsequent chapters are organized as follows. Chapter II discusses high-level explanations of the data sources and files that are used in the analysis. Chapter III highlights known active duty date concerns and resolutions that have been applied during the course of the study period. Chapter IV provides the results of the analysis, and presents generalized interpretation of those results. Chapter V presents the analysis conclusions, recommendations, and suggestions for future study of active duty dates.

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II. DATA SOURCES AND PROCESSING METHODS

This chapter discusses background information regarding the files discussed in this research. The Human Subject Protection Institutional Review Board (IRB) application was approved on September 3, 2010, by the Naval Postgraduate School IRB, to use human subjects in the project titled Assessing the Accuracy of Marine Corps Reserve Active Duty Dates Within the Defense Enrollment Eligibility Reporting System (NPS IRB# NPS.2010.0102-IR-EP5-A). See Appendix B for the documentation.

A. THE MARINE CORPS SYSTEMS

For a Marine Corps reservist preparing to activate in support of a contingency or perform another active service, duty orders are first generated in the Reserve Order Writing System (ROWS). A member will take these orders to the duty station, where consolidated administrators or unit administrators will enter the orders into the Marine Corps Total Force System (MCTFS) (see Figure 2). The MCTFS is an integrated pay and personnel system that houses data on all Marines in the regular and reserve components. As such, it is managed jointly with the USMC responsible for the personnel functionality, and the Defense Finance and Accounting Service (DFAS), responsible for the pay functionality (DIMHRS, 2007).

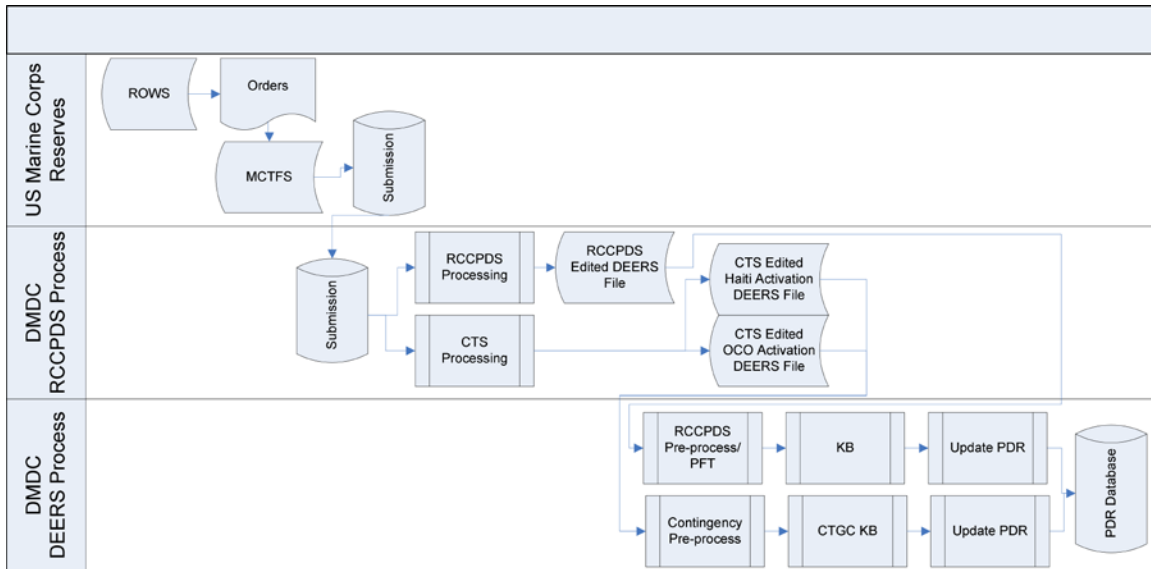


Figure 2. Processing Flow of Marine Corps Data From ROWS to DEERS

1. Marine Reserve Order Writing System (ROWS)

When the United States Marine Corps Reserve (USMCR) determines that a member needs orders, whether for activation or training, the member’s deployment eligibility needs to be confirmed. Based on selection criteria, date of last deployment, and other qualifications, members will be selected to either be activated or be required to perform another type of AD period. Once the selections are made, the ROWS creates the orders that are sent to the unit and to the member. These orders will contain information for the Marine, including the length of the AD period and reporting information. ROWS is considered the system of record for orders.

For this thesis, an extract of the ROWS data could not be obtained.

2. Marine Corps Total Force System (MCTFS)/Total Force Data Warehouse (TFDW)

After reporting to the location specified in the orders, the Marine will go through an in-processing procedure, during which the Marine’s AD information will be entered into the MCTFS. The Marine’s record and orders will receive an initial hand check to make sure all the documentation is in order prior to sending the package to the clerk to be

entered into the MCTFS. The clerk will enter the orders into the MCTFS using a series of codes that document the type of AD period. Before the update is submitted (usually on a daily basis), the clerk has the personnel officer certify the entries. Once the entries are certified, the transactions pertaining to the AD period will be sent to the DMDC. The Diary Feedback Report is a computer audit of the entries for that day that shows the errors of that day's diary. Errors are then corrected by the diary clerk through a new diary during the next day's processing. Through this process, any errors pertaining to the AD period are fixed in a subsequent transaction.

At the end of every month, a "snapshot" of MCTFS is taken and stored in the TFDW. These archives were used in this research to determine discrepancies that may have occurred between the Marine Corps system and receipt by DMDC.

As part of this thesis, extracts from the TFDW were obtained.

B. DMDC SYSTEMS AND DATA

Files received from the USMCR are sent to the DMDC via flat files from the MCTFS. These files are first processed through the DMDC's edit processing. There are separate edit processes for RCCPDS files and activation files. Records that are not rejected in either edit process are then passed through to the PDR.

Generally, submission files sent to the DMDC are run through an edit process to validate the data being sent and to ensure the data follows edit procedures as defined in DoDI 7730.54 (USD [P&R], 2009). Edited files are then sent to the PDR, to the DMDC's Data Warehouse, to web applications, and are used as well for reporting purposes. The edited files that are sent to the DEERS Division are then pre-processed before being passed through the Knowledge Based (KB) software and into the Personnel Data Repository (PDR). The PDR then feeds additional web applications, other databases, and real-time satellite systems such as the one that shares data with the Department of Veterans Affairs (DVA).

Figure 2 shows the basic flow of the files from the submission source through the RCCPDS processing and DEERS processing. See Figure 9 in Appendix C for a more

detailed view of the flow of data from the Service's submission, through the Data, Analysis and Programs (DAP) Division, and onto the DEERS Division. These processes will be highlighted in the following sections.

1. RCCPDS File Processing

The RCCPDS is a database maintained by the DMDC. The RCCPDS stores historical data feeds dating back to 1971 for the USMCR as well as for the other Uniformed Services mentioned in Chapter I. All the RCCPDS files are submitted under the guidance of DoDI 7730.54 (USD [P&R], 2009). Per this instruction, the USMCR provides two types of files to the DMDC: transactional files (see DoDI 7730.54, Enclosure 5) and strength files (see DoDI 7730.54, Enclosure 3).

The transactional files are submitted daily, Sunday through Thursday, unless system modifications are being implemented or a holiday is being observed. These records provide updates to specific data elements affecting member eligibility for medical, dental, and educational benefits. Specifically, transactional changes include the following: gains and losses to the Service component; transfers within the Service component; and changes to the member's unit, active duty dates, educational benefits, and mailing address.

The RCCPDS master strength file provides an end-of-month snapshot of the personnel information of every Service member in the reserve and guard components of the military and is considered the official strength of the component. The USMCR submits both these data files from the MCTFS.

The RCCPDS submission processing is triggered immediately after receipt of the MCTFS USMCR transaction file at the DMDC and is processed in the order they are received. The processing of the transaction and strength files is automated through the DAP Division. If invalid data is transmitted, the DMDC has a process for rejecting the transactions. The elements listed in Table 2 will cause a record to be rejected, and to not process with the rest of the file. In order to process the rejected record, the Service component must resubmit the record with valid information.

Table 2. Elements on the RCCPDS Submission That Will Reject a Master or Transaction Record. Created From USD[P&R] 2009 Data and RCCPDS Processing Programs.

Data Element	Valid Data	Invalid Data
Reserve Component	See Table 11 in Appendix D for acceptable values.	
Reserve Component Category	These fields are verified together. See Table 12 in Appendix D for acceptable values.	
Training and Retirement Category		
Social Security Number (SSN)		If the SSN is found to be non-numeric
Transaction Code (applicable to transaction file only)	See Table 13 in Appendix D for acceptable values.	
Transaction Effective Date (applicable to transaction file only)		If the Transaction Effective Date is greater than 10 years in the past and (as of November 2010) less than seven days in the future (prior to November 2010, transactions could be submitted up to one year in the future)

Active duty dates have quality control checks on them to prevent erroneous dates from being applied to the PDR. Prior to August 17, 2010, the active duty start date was allowed to be submitted up to 30 years prior to the submission date, and no days in the future (see Chapter III Section B). The active duty end date was allowed to be up to 10 years in the past, and 30 years in the future.

The complete RCCPDS edit processing is illustrated in Appendix E, including reports and extracts that are created during processing. Once the RCCPDS edit processing is completed, edited files are sent to the DMDC DEERS Division for further processing.

2. Activation File Processing

Activation files provide yet another data feed of AD periods per DoDI 7730.54, Enclosure 11 (USD [P&R], 2009). The activation files were

completed and entered production in August 2004, and are the successors to other systems used to track personnel involved in contingency operations since Gulf War I. (DMDC, 2010b)

These files contain personnel who have been activated in support of the Global War on Terror (GWOT) since September 11, 2001, and Operation Unified Response (OUR) since January 2010.

An activation period is defined as “a member of the Reserve Component who is or has been ‘called-up’ to active duty in support of Operation Noble Eagle (ONE), OEF, OIF, or OUR” (DMDC, 2010b). An activation will also include AD training periods and operational support. An activated member is not necessarily deployed in support of combat operations.

The activation files are updated on a daily basis, and Services can provide more than one submission in a day. These daily files are rolled-up into a monthly snapshot. Analysts complete reporting using this monthly snapshot. Monthly snapshots are only updated on a monthly basis. The USMCR updates for the activation file are from the MCTFS Crisis File under the Commandant of the Marine Corps/Manpower Management Information Systems Division (CMC/MI). Due to the deployment data not creating an active duty period in the personnel segment in DEERS, only the activation file will be discussed. However, continuing research on this subject may be examining the deployment data that is available for the VA’s use in the VA Department of Defense Identity Repository (VADIR) application.

Activation submissions begin processing immediately after receipt at the DMDC and are thus processed in the order they are received. The processing of the files is automated through the DAP Division. If invalid data is transmitted, the DMDC has a process for rejecting transactions. Certain elements will cause a record to be rejected and

not processed forward with the rest of the file (see Table 3). Service liaisons receive information regarding rejected transactions and in order to process the rejected record, the Service component must resubmit the record with valid information.

Table 3. Elements on Activation Submissions That Will Reject a Record. Created From USD[P&R] 2009 Data and Activation Processing Programs.

Data Element	Valid Data	Fatal Errors
Service Component Code	See Table 11 in Appendix D for acceptable values.	Invalid values, or the Service Component Code doesn't equal the submitting Service Component Code
Statute Code	See Table 14 in Appendix F for acceptable values.	Invalid values
Executive Order	See Table 15 in Appendix F for acceptable values.	Invalid values
Project Plan ID	See Table 16 in Appendix F for acceptable values.	Invalid values
Executive Order/Project Plan ID	See Table 17 in Appendix F for acceptable values.	Invalid values, or the Statue Code is not J: unknown values or invalid values
Transaction Type Code	See Table 18 in Appendix F for acceptable values.	Unknown or invalid values
Begin Date		Unknown or invalid dates Begin date greater than the file date
Projected End Date		For transactions that are sent at the beginning of an activation period (GA) and cancellations of end transactions (LX) records: projected end date less than the begin date, or unknown date

Data Element	Valid Data	Fatal Errors
End Date		<p>For historical event transactions (BA), transactions sent to end an activation period (LA), and LX records: end date greater than the file date or unknown date</p> <p>For GA records: end date less than or equal to the file date, or there is an end date (future periods)</p>

See Appendix G for the complete activation edit processing, including reports and extracts that are created during processing. Active duty dates are also compared to a table of contingency periods. Events prior to September 11, 2001, are not currently accepted. Once the activation processing is completed, edited files are sent to the DMDC DEERS Division for further processing.

3. DEERS Processing

DEERS was developed after Congress directed the DoD to develop a program to collect and provide for the management of demographic and sociographic data and to minimize the fraudulent receipt of health benefits. DoD health care is provided directly, through military hospitals and clinics, and indirectly, through the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS). The DEERS Program Office was established and began implementing DEERS policy in 1979 under the direction of the Assistant Secretary of Defense for Health Affairs and the Assistant Secretary of Defense for Manpower, Reserve Affairs, and Logistics. The DEERS Sponsor Enrollment database was built at the DMDC in 1982 using Active Duty Master Files and the Finance Center Retired Files.

Reserve and guard sponsors were not added to DEERS until 1986. During this time, select reserve and guard units began enrolling family members as pre-eligible. This was the first addition of a population that did not have active medical benefits. The

enrollment of all reserve and guard members was not opened until 1989. In 1995, the DEERS program office was moved to the DMDC.

Before applying the data to the PDR, the RCCPDS files are pre-processed through the Personnel/Finance Transfer (PFT) application. This application has its own validation process for the data and generates data elements that are specific to DEERS. When an AD end date is determined to be indefinite, the '20991231' date provided by the RCCPDS files is blanked out during the PFT process. The activation file goes through a similar SAS program to create the transactions needed to update the PDR.

The PFT process creates the records needed to update the PDR. The incoming personnel data is matched against the existing records on the database. The information that is being passed is checked against the PDR to make sure the record is providing the most recent data. The RCCPDS AD periods will only update the PDR if the personnel entitlement condition (PNLEC) does not have a special operation code (this is derived based on the project code from activations). This special operation code determines additional benefits for members with "on active duty" conditions including allowing the member to receive medical and dental benefits and, for certain periods, may allow the member to receive educational benefits. The special operation code automatically creates a Transition Assistance Management Program (TAMP) period after the AD period. This TAMP period allows for some additional benefits that TRICARE has authorized, including waiving the medical deductible amount and introducing other benefits that reduce the beneficiary's out-of-pocket costs. When a member's AD periods are placed in the PDR, the member is automatically given the aforementioned benefits. If the AD period is subsequently taken away, the benefits may be subject to recoupment action.

To examine the records, the DEERS Point In Time Extracts (PITE) were used. Each DEERS PITE represents a snapshot of the DEERS database at the end of the month. Each record in the PITE represents a relationship in DEERS and contains the AD periods that are in the PDR.

C. RAPIDS SYSTEM

Historically, files were not received on a daily basis, and so there was a necessity for individuals in the field to update information and issue an identification card for a member and their family. To fulfill this need, RAPIDS was developed. Today, if data is reported in a timely manner by the Service personnel feeds, an immediate update is not required. However, there are a number of reasons that updates may not be received through the personnel feeds: systems reject records, paperwork piles up, etc. Therefore, RAPIDS provides 2,000 workstations at 900 sites in 23 countries, with 818 locations throughout the United States, for VOs to update limited amounts of PDR data for Service members (see Figure 3).

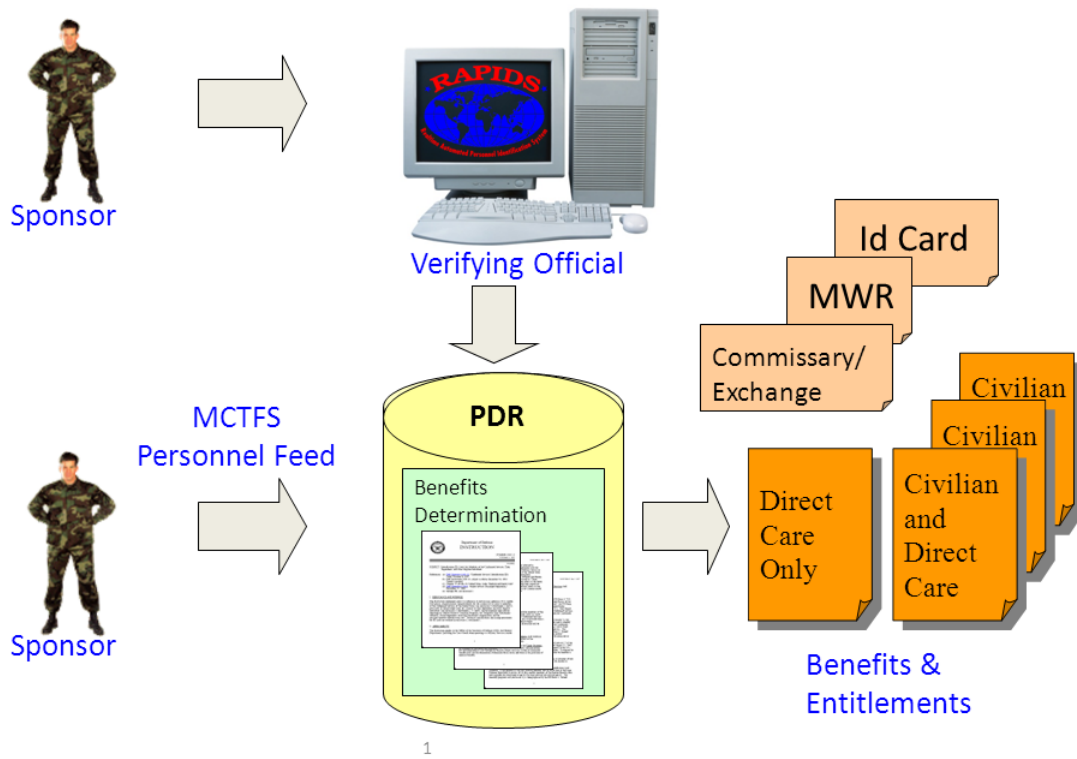


Figure 3. RAPIDS and Personnel Updates to the PDR (After DMDC, n.d.)

In order for a member to update an active duty period through a RAPIDS station, the member would visit a verifying official (VO). The VO cannot just add an active duty personnel category to the PDR; however, if there is an active duty period already in the PDR, the VO can modify the dates. This includes extending, terminating, and un-terminating the dates already listed in the PDR. For reserve and guard members, VOs can add “on active duty” personnel conditions to the member’s record using RAPIDS (for example, if a Selected Reserve (SELRES) member starts a training period); however, they do not have the ability to add a special operation code to the segment. When a VO is updating the member’s record, proper documentation must be presented to the VO (e.g., a DD Form 214: Certificate of Release or Discharge From Active Duty, extension orders, reenlistment contract).

RAPIDS stations are not Service unique. To mitigate the issues this may cause, VOs are provided with guidance for updates to DEERS through Air Force Instruction 36-3026_IP of June 17, 2009. Although it is a Joint Service instruction, it contains Service-specific guidelines where applicable. The rate of VO turnover at identification card issuance sites varies and the experience level of the VOs can vary dramatically; thus, the VO’s understanding of Service-specific procedures can vary as well. In general, however, members most frequently visit the facility where they are attached, so the VOs are relatively familiar with their Service-specific procedures.

Edits have been built into RAPIDS to ensure that the dates of the “on active duty” condition align with the dates during which the member is affiliated with the Service component. Also, the begin date of the active duty period cannot be more than 10 days in the past. When this data reaches the PDR, it will be reflected as *unverified* if the VO is adding the active duty period to the record, and as *discrepant* if the Service previously reported different days, and the VO is modifying the dates. The data that the RAPIDS operator is entering is considered suspended data in the PDR until it is verified from a Service submission, in this case the personnel file or activation file. The suspended data is still used to determine benefits and this information can remain on a member’s record.

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III. KNOWN CONCERNS PRIOR TO THE START OF THIS THESIS

Due to the importance of these fields, especially post-September 11, 2001, the scrutiny of the active duty start and stop dates have been continually monitored. As previously stated, the GAO, as well as the DMDC, has examined ways to improve the reliability of these data elements. As such, some improvements to these fields have occurred over time. Here a few examples of improvements to the data quality of these fields will be explained.

A. AD START AND STOP DATE DEPENDENCY

In June 2009, data from the RCCPDS Edit File was found to have active duty start dates that were made invalid through the edit procedure, because the date was outside the acceptable range value. This means that in the RCCPDS Edit File, the active duty start date was a zero filled field. The active duty stop dates, however, were valid according to the date edit procedure, so the submitted AD stop date was passed through to the RCCPDS Edit File.

As a result of these findings, on January 6, 2010, the RCCPDS team updated the edit logic to include a dependency check between the active duty start date and the active duty stop date. This means that if the active duty start date is deemed invalid, both dates will be considered invalid. The RCCPDS Edit Files dating back to January 2000 were updated with this logic.

B. ALLOWING FOR AD START DATES UP TO SEVEN DAYS IN THE FUTURE

Due to Service-specific issues requiring the Services to send AD period transactional data prior to the start of the AD period, on September 8, 2010, logic was included to allow the submission of AD start dates up to seven days in the future. To do this, the new logic checks for cases where the AD start date is in the future and then runs a second range test to determine if the date is less than seven days in the future.

C. AD PERIODS LESS THAN 31 DAYS

DoDI 7730.54 Enclosure 3 and 5 state that the Services should not report AD periods less than 31 days, and the RCCPDS procedure does not perform a check on the dates to make sure this is being followed. Originally, the PDR was not equipped to handle periods less than 31 days due to medical and dental benefits that were applied to a member on a monthly basis. Due to recent legislation, however, the DEERS Division is working to update processing and allow the entry of activation periods less than 31 days due to new educational benefits that allow all contingency periods to be counted towards time served, regardless of length.

This requires a rewrite of the current activation processing to examine periods less than 31 days. This also requires the DEERS Division to change their practices so that organizations such as the VA are allowed to see the less-than-31-day periods without affecting medical benefits, which are required on monthly periods.

IV. ANALYSIS

This chapter summarizes the comparison of the RCCPDS master, RCCPDS transaction, activation, PDR, and MCTFS data.

A. THE SAMPLE COHORT

The initial population of the study was 18,852 unique Marine Corps Reservists and 19,397 unique AD start periods. These individuals were selected from the RCCPDS Submission Master Files from January 2010 through June 2010. The population was selected because they were USMCR members with valid active duty dates on the Master Files. The cohort included members from the SELRES, Individual Ready Reserve (IRR), and Retired Reserve populations.

B. PROCEDURES

After selecting the sample cohort, the RCCPDS Edit Master File records, the RCCPDS Submission and Edit Transaction File, activation edit, and DEERS PITE File records were collected for the sample based on a social security number (SSN) match. Then the RCCPDS and activation records were compared to the DEERS PITE records using SSN and active duty period comparisons. A separate comparison between the DEERS PITE and the TFDW extracts were also compared.

C. RESULTS

1. RCCPDS Master Submission and RCCPDS Master Edit Comparison

The RCCPDS Master Submission is the precursor file to the RCCPDS Master Edit. The files were sorted by SSN and file date prior to merging. Figure 4 displays the merge between these two files. There was a perfect match between these two files.

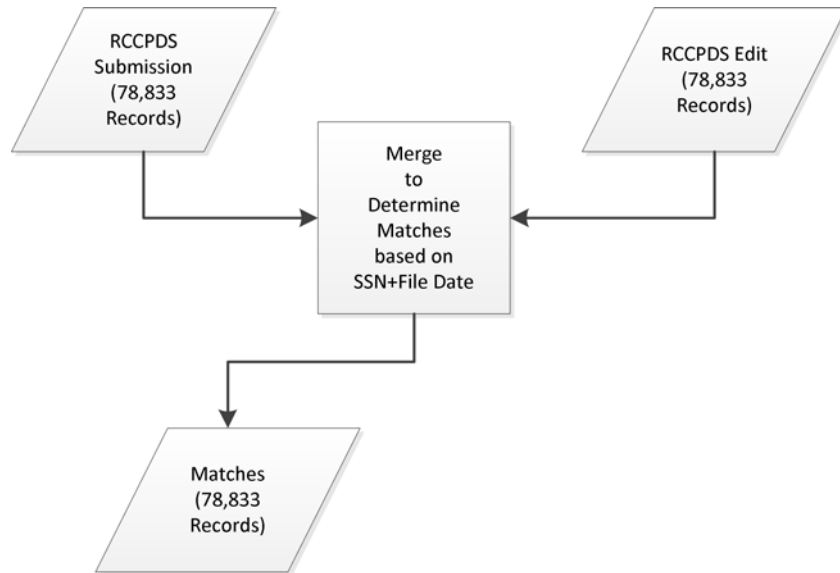


Figure 4. Comparison of RCCPDS Submission Master File and RCCPDS Edit Master File

Then a comparison on the AD dates was done. As Table 4 shows, the majority of the records contained dates that matched exactly. This signifies the dates passed the validation procedures in the edit processing. However, approximately 2.8 percent of the file had some indication that the AD start date or stop date changed. The indefinite stop date submission row in Table 4 is an expected outcome. For indefinite stop date submission members, the Services will submit a stop date of ‘55555555’. As per DoDI 7730.54, this is the correct submission, however for database purposes; this is not a valid date. The RCCPDS edit process modifies the ‘55555555’ date to ‘20991231’. That leaves 12 records to examine. The invalid AD stop date submission records have ‘99999999’ as the stop date. This situation is not recognized as valid by the RCCPDS edit process because a member should have an appropriate end date for the AD period as described by the orders.

Table 4. RCCPDS Submission and RCCPDS Edit AD Date Comparison

	Frequency	Percent
Indefinite Stop Date Submission	2,113	2.7
Invalid AD Stop Date Submission	69	0.1
Submission and Edit Dates Match Exactly	76,651	97.2

The interesting part of the indefinite stop date submission comes when the RCC/TRC values are examined (Table 5). Normally active guard/reserve (AGR) members are the members with indefinite stop dates, as these members will serve periods similar to an active component or regular Service member. However, a non-AGR member would have an indefinite stop date if they were extended for the convenience of the government (CofG). The reasons for a member to be on CofG include the need of medical attention due to an injury received while on an AD period, legal reasons including appellate leave, and finally as a temporary measure to update a record. The last reason is considered a rare occurrence for a Marine Reservist. These records should be checked to make sure these are the reasons for the indefinite AD period and not a reporting error. AGR members are listed in the below table as ‘SG’. The definitions of the other values can be found in Table 13 of Appendix D.

Table 5. AGR Submission Records by RCC/TRC

RCC/TRC	Frequency
RE	38
SA	134
SG	1885
TB	29
UF	27
<i>Total</i>	<i>2,113</i>

2. RCCPDS Transaction Submission and RCCPDS Transaction Edit Comparison

The RCCPDS Transaction Submission is the precursor file to the RCCPDS Transaction Edit. The files were sorted by SSN, transaction type code, and transaction

effective date prior to merging. Figure 5 displays the merge between these two files. Almost thirty-four thousand records matched between these two files.

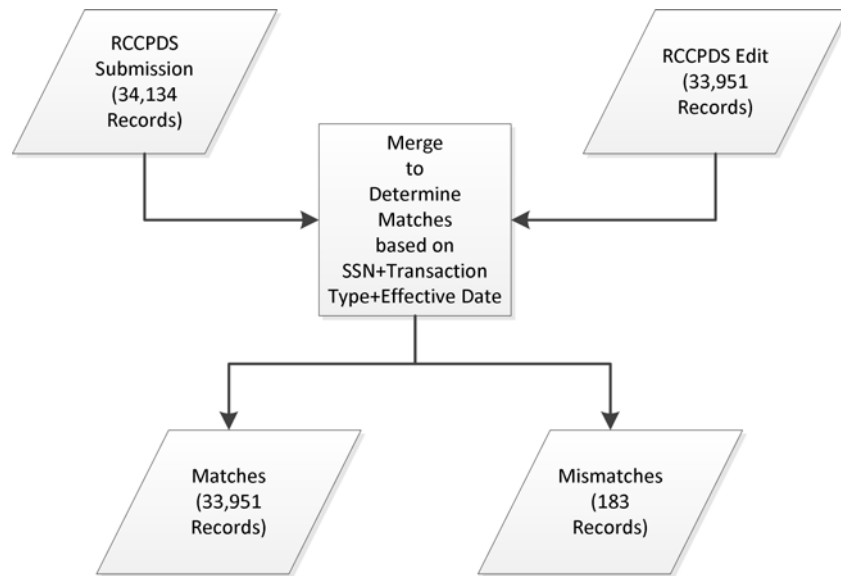


Figure 5. Comparison of RCCPDS Submission Transaction File and RCCPDS Edit Transaction File

At the end of every month, a comparison is conducted between the previous month's master file, the current month's transactions, and the current month's master file. This process is called reconciliation. During this process, gain transactions are rejected if the member was on the previous month's master and the current month's master. A loss transaction will be rejected if the member was not on the previous month's master and is not on the current month's master. Of the 34,134 transaction records, 183 did not match. The rejected submission records were due rejected gain and loss information, which was sent back to the Marine Corps Liaison. These rejections are only identifiable at the end of the month.

The comparison of AD dates in the rest of the records is shown in Table 6. Over 99% of the records matched AD periods.

Table 6. RCCPDS Submission and RCCPDS Edit AD Date Comparison

	Frequency	Percent
Indefinite AD Stop Date Submission	201	0.6
Submission and Edit Dates Match Exactly	33,750	99.4

3. RCCPDS and Activations Comparison to DEERS PITE

The comparison of the RCCPDS Master Edit, RCCPDS Transaction Edit, and the activations to the DEERS PITE proved to be difficult due to the fact that if a member’s record was updated to change the AD period, there is no clear identifier to determine these situations. Activations may receive a cancel transaction or an update transaction, but RCCPDS would just see a change in dates. The match steps are highlighted in Figure 6.

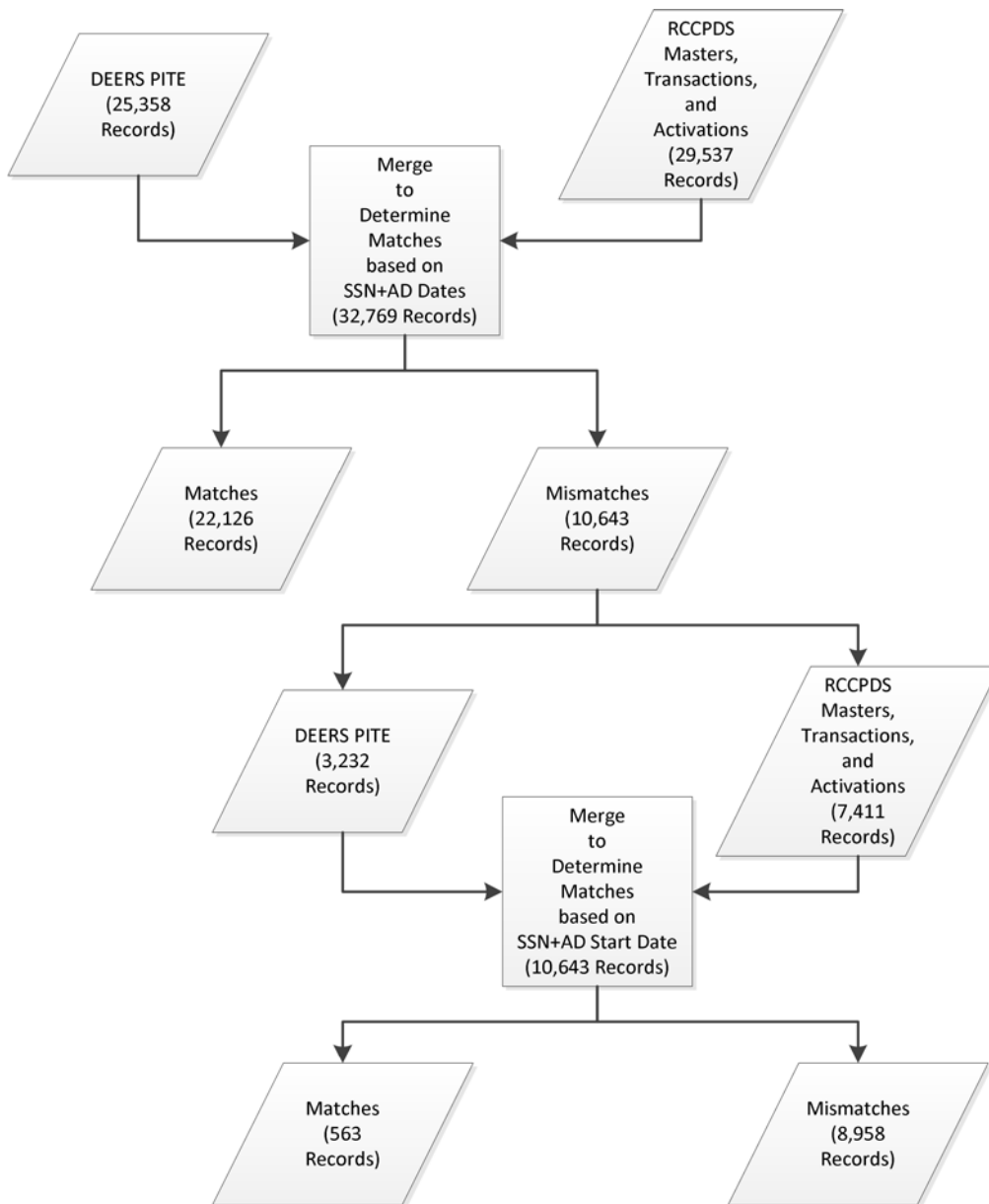


Figure 6. Comparison of RCCPDS and Activations to DEERS PITE Files

The first step compared the two files based on SSN, AD start date, and AD stop date. This match resulted in a 67.5% match rate. The next step took the mismatched PDR and edit records and matched based on SSN and AD start date. The theory behind this match was that the AD stop dates could have been different for some reason, but the AD start date should not have changed. This only accounted for 563 additional records. The differences between the stop dates of the 492 records are shown in Table 7. This

results in a total match rate of 69.2%. This signifies differences between the RCCPDS and activation edits and PITE files, which could be the result of changes to members' PDR records.

Table 7. Difference Between PDR and Edit AD Stop Date

	Frequency	Percent
Records with indefinite end dates	70	14.2
<i>PDR Records in the Future of the Edit Records</i>		
Less than 1 week	10	2.0
1 to 2 weeks	13	2.6
2 to 3 weeks	10	2.0
3 weeks to 1 month	15	3.1
1 to 6 months	91	18.5
6 to 12 months	72	14.6
1 to 2 years	58	11.8
More than 2 years	90	18.3
<i>PDR Records in the Past of the Edit Records</i>		
Less than 1 week	6	1.2
1 to 2 weeks	4	0.8
2 to 3 weeks	9	1.8
3 weeks to 1 month	5	1.0
1 to 6 months	18	3.7
6 to 12 months	16	3.3
1 to 2 years	1	0.2
More than 2 years	4	0.8

Table 8 shows the distribution of the special operations code that is applied to the record as the record is applied to DEERS. Using this on the 492 records with mismatched end dates, gives us an idea of the percentage of records may have been modified. Due to the update procedures the PDR utilizes, newer records may not always overlay if the effective dates submitted by the Service component are not correct.

Table 8. Special Operations Code of the Records With Different Stop Dates

	Frequency	Percent
RAPIDS Entered Period	47	9.6
RCCPDS Entered Period	288	58.5
Activation Entered Period	148	84.0
Other Period	9	1.8

4. MCTFS Comparison to DEERS PITE

To determine the validity of DEERS, a comparison between the MCFTS TFDW files and the PITE files was completed. There are 6,877 unique SSNs present in the initial sample pulled from the PDR, which was a pull of all Marine Corps Reservists from the time period of January to June of 2010. There are 5,073 unique SSNs present in the TFDW dataset. Due to the complexity of the match process, the comparison was done in multiple steps. These steps are highlighted in Figure 7.

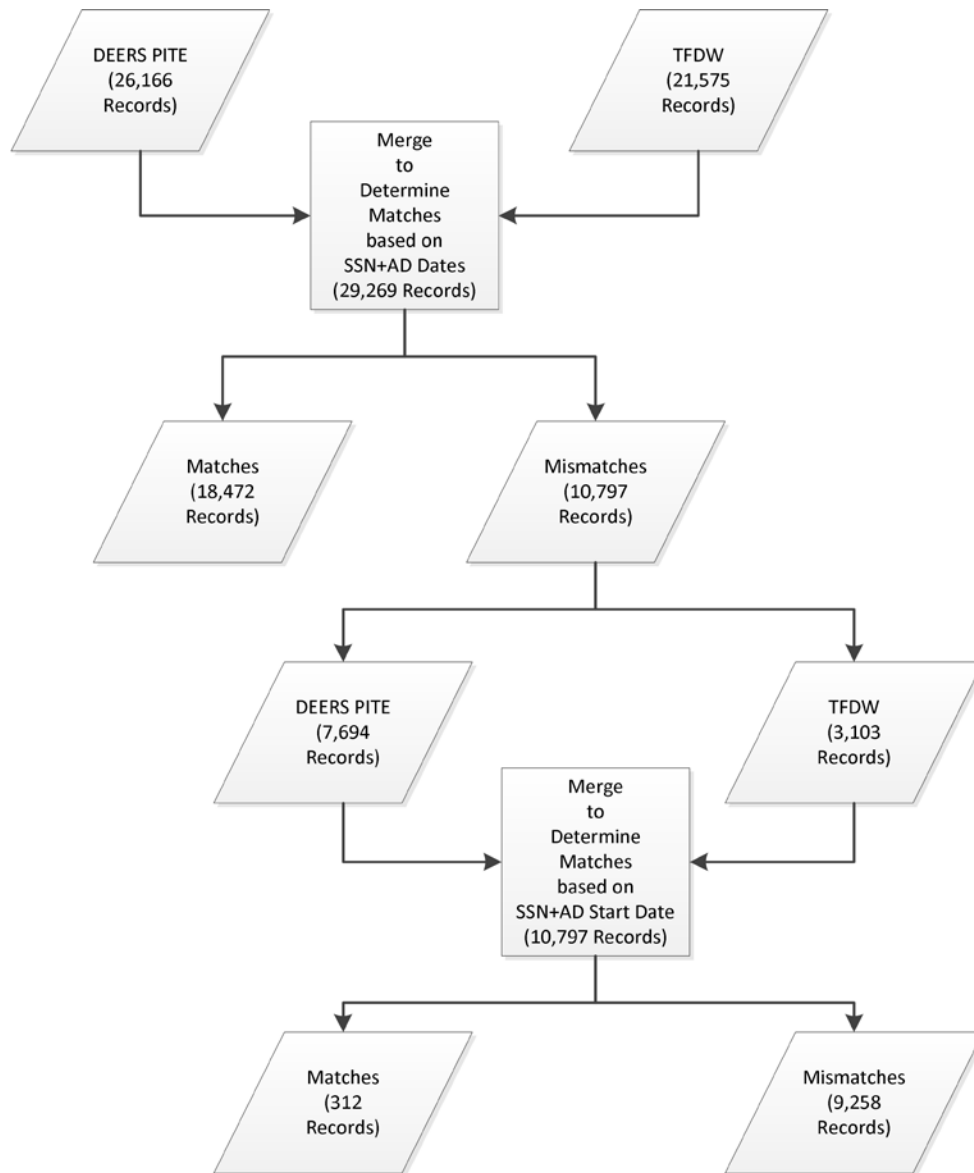


Figure 7. Comparison of TFDW Files and DEERS PITE Files

The first step compared the two files based on SSN, AD start date, and AD stop date. This match resulted in a 63.1% match rate. The next step took the mismatched PDR and MCTFS records and matched based on SSN and AD start date. This only accounted for 312 additional records. The differences between the stop dates of the 312 records are shown in Table 9. This results in a total match rate of 64.5%. This signifies differences between TFDW and PITE files, which could be the result of changes to members' PDR records.

Table 9. Difference Between PDR and MCTFS AD Stop Date

	Frequency	Percent
Records with indefinite end dates	3	1.0
<i>PDR Records in the Future of the MCTFS Records</i>		
Less than 1 week	9	2.9
1 to 2 weeks	9	2.9
2 to 3 weeks	10	3.2
3 weeks to 1 month	13	4.2
1 to 6 months	77	24.7
6 to 12 months	70	22.4
1 to 2 years	56	18.0
More than 2 years	22	7.1
<i>PDR Records in the Past of the MCTFS Records</i>		
Less than 1 week	11	3.5
1 to 2 weeks	1	0.3
2 to 3 weeks	3	1.0
3 weeks to 1 month	2	0.6
1 to 6 months	18	5.8
6 to 12 months	3	1.0
1 to 2 years	1	0.3
More than 2 years	4	1.3

Table 10 shows the distribution of the special operations code that is applied to the record as the record is applied to DEERS.

Table 10. Special Operations Code of the Records With Different Stop Dates

	Frequency	Percent
RAPIDS Entered Period	20	6.4
RCCPDS Entered Period	244	78.2
Activation Entered Period	46	14.8
Other Period	2	0.6

V. CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the results of this research and makes recommendations for future research and study with a focus on improving active duty period reporting specifically and DMDC data quality more generally.

A. CONCLUSIONS

As shown in Chapter IV, while the RCCPDS edit procedures generally handled the data as desired, there were notable discrepancies between the data being fed to the PDR and DEERS itself. The match rate between these files was 67.5% based on SSN, AD start date, and AD stop date. The majority of these discrepancies showed PDR records being greater than one month in the past of the dates on the records that were trying to update the PDR. Research was not done comparing the transaction effective dates of the systems. This would be important to understand whether the records are being updated prior to the RCCPDS or activation feed.

Also of note is the 63.1% match rate between the PDR and the MCTFS TFDW feeds from the Marine Corps. This research tried to take all known periods of AD from the MCTFS system in order to do the comparison. It was determined that the best source for this information would be the TFDW feeds. However, in order to understand the discrepancy rate, further understanding about when the TFDW back-ups are created, and working with the Marine Corps to make sure the AD periods between the PDR and the TFDW are the same would assist in determining whether the match rate could be increased. The majority of the AD period discrepancies were PDR records with future dates compared to the TFDW records, which brings questions as to the updating of the records outside of the source system.

1. Potential Cost Savings

Recently, *The Economist* (2011) wrote an article stating that the DoD's "real budget-buster is health care" and cited Defense Secretary Robert Gates as saying it is

“eating the Defen[s]e Department alive.” To help mitigate this problem, the DoD is considering increasing the amount Service members and retirees must contribute for their health insurance. Unmentioned in *The Economist* article, however, is the idea that eliminating insurance costs for ineligible personnel could also help reign in the cost of health care.

For example, this research has shown is that there are likely individuals currently listed in DEERS as eligible for health benefits, because of incorrect AD dates, who are actually not eligible for these (and other) benefits. Now consider the potential cost of paying for health care coverage for these individuals. In FY 10 TRICARE stated that the annual per capita cost of a guard or reservist and the family members, including health care, pharmacy costs, “administrative costs associated with Managed Care Support Contracts (such as claims processing rates and fees)”, and dental costs, is \$6,375 (Sarshar, June 3, 2011, personal communication). Returning to Table 10 and multiplying the weekly cost of \$122.60 times the number of weeks where a PDR record contains a date in the future of the MCTFS’ TFDW record, suggests that the government could have paid as much as \$92,930.80 in additional health care costs for ineligible Marine Corps Reservists. Further assuming that this discrepancy rate is constant across all seven Reserve and Guard Service components suggests that the total overpayment could be as large as \$1.3 million per year.

Of course, these costs are a combination of both the fixed costs of insuring a member and his or her family and the variable costs of their utilization of health care services. Presumably, those who are incorrectly listed in DEERS incur little to none of the variable costs, but it is still likely that more data that are accurate could result in fixed cost savings on the order of hundreds of thousands of dollars.

B. RECOMMENDATIONS

Regular monitoring of data quality is critical. Often the easiest way to assess whether the system is working properly is to look at the end game, in this case when the dates are applied to the PDR. Unfortunately, for DMDC and MCTFS, waiting this long

is often waiting too long. That is, once the information is on the PDR the member could be trying to access a benefit and this could result in a member being denied benefits to which he or she is entitled.

Thus, interim data checks are also important for timely assessment of proper system operation. For example, RCCPDS has a monthly check of the number of changes every month to active duty periods, where the number of changes to data elements is monitored and a simple color-coding scheme is applied in an attempt to identify potential problems. This “stop lighting spreadsheet,” shown in Figure 8, allow the file managers to monitor the amount of changes on these data elements. However, AD dates are highly variable and the stop lighting thresholds do not take population size or other factors into account. The result is that file managers have to use best judgment to determine if the changes between two months are reasonable.

FIELD_NAME	N 1103	% 1103	N 1102	% 1102	N 1101	% 1101	N 1012	% 1012
1. 878 3-4 RSY CATEGORY/TRC	7452	2.30%	7077	2.30%	7409	2.30%	5688	1.70%
2. 879 18-87 NAME	354	0.00%	302	0.00%	365	0.00%	261	0.00%
3. 880 88-95 PERSON BIRTH DATE	46	0.00%	30	0.00%	34	0.00%	25	0.00%
4. 881 103 SEX	9	0.00%	4	0.00%	2	0.00%	2	0.00%
5. 882 104 MARITAL STATUS CODE	1478	0.50%	1160	0.40%	1387	0.40%	840	0.30%
6. 883 505-507 RACE	10	0.00%	6	0.00%	7	0.00%	9	0.00%
7. 884 106-107 ETHNIC GROUP	12	0.00%	11	0.00%	15	0.00%	12	0.00%
8. 885 114-115 EDUCATION	1632	0.50%	1495	0.50%	1633	0.60%	1604	0.50%
9. 886 151-152 DEPENDENT'S QUANTITY	2168	0.70%	1961	0.60%	1723	0.50%	1183	0.40%
10. 887 153-161 SPOUSE SSN	0	0.00%	0	0.00%	0	0.00%	0	0.00%
11. 888 186-193 PEBB	184	0.10%	189	0.10%	202	0.10%	307	0.10%
12. 889 208-209 LENGTH OF SR SVC AGRMT	3463	1.00%	3829	1.20%	2825	0.90%	2395	0.70%
13. 890 210-217 ACT.DTY START DATE	8471	2.60%	5782	1.80%	6871	2.00%	6375	2.00%
14. 891 218-225 ACT.DTY STOP DATE	11821	3.60%	8991	2.80%	12778	3.90%	11010	3.40%
15. 892 226-233 EXPIR OF EML. IN FR	815	0.00%	5032	1.50%	5208	1.60%	4174	1.30%
16. 893 250-257 DATE OF RANK	11688	3.60%	10883	3.30%	11315	3.50%	8554	2.60%
17. 894 258-261 PAY GRADE	9542	2.90%	8324	2.60%	8667	2.70%	7852	2.40%
18. 895 282-289,306-311 SOC.DODDCC-PRIMARY	12066	3.70%	10051	3.10%	11731	3.60%	12445	3.80%
19. 896 290-297,312-317 SOC.DODDCC-DUTY	11495	3.50%	15213	4.70%	12210	3.70%	13637	4.20%
20. 897 298-305,318-323 SOC.DODDCC-SECONDARY	6161	1.90%	4853	1.50%	5759	1.80%	5595	1.70%
21. 898 373-381 OFF. MAND. REMOVAL	0	0.00%	0	0.00%	0	0.00%	0	0.00%
22. 899 392-399 ASGN MILITARY UIC	11608	3.60%	11680	3.60%	13655	4.20%	8756	2.70%
23. 900 404-412 ASGN UNIT ZIP CODE	8952	2.80%	8367	2.60%	10063	3.10%	7258	2.20%
24. 901 432-439 DUTY UIC	11608	3.60%	11680	3.60%	13655	4.20%	8756	2.70%
25. 902 482-489 DATE AWARD SECURITY CLEAR.	4881	1.50%	3329	1.00%	4753	1.50%	3638	1.10%
26. 903 490 AUTHORIZED SECURITY ACCESS	4109	1.30%	2827	0.90%	3691	1.10%	2671	0.80%
27. 904 537 TRANS.INDICATOR, INVOLSEP	0	0.00%	0	0.00%	0	0.00%	0	0.00%
28. 905 598 RTAF PAY INDICATOR	0	0.00%	0	0.00%	0	0.00%	0	0.00%
29. 906 704-721 LANGUAGE 1, ETC.	58	0.00%	93	0.00%	54	0.00%	52	0.00%
30. 907 722-739 LANGUAGE 2, ETC.	14	0.00%	20	0.00%	7	0.00%	5	0.00%
31. 908 740-757 LANGUAGE 3, ETC.	4	0.00%	3	0.00%	3	0.00%	3	0.00%
32. 909 758-775 LANGUAGE 4, ETC.	0	0.00%	0	0.00%	0	0.00%	0	0.00%
33. 910 776-793 LANGUAGE 5, ETC.	0	0.00%	0	0.00%	0	0.00%	0	0.00%
34. 911 790 MGB ENROLLMENT BASIS	256	0.10%	4051	1.20%	362	0.10%	209	0.10%
35. 912 799-806 MGB ENROLLMT ACT.DTE	121	0.00%	97	0.00%	34	0.00%	23	0.00%
36. 913 807 MGB ENROLLMT ACT.CODE	104	0.00%	96	0.00%	35	0.00%	24	0.00%
37. 914 808-809 MGB KICKER RATE	155	0.00%	3963	1.20%	328	0.10%	185	0.10%
38. 915 810 MGB INIT OBLIG. YRS	147	0.00%	148	0.00%	47	0.00%	38	0.00%
39. 916 811 MGB YEAP	133	0.00%	113	0.00%	39	0.00%	30	0.00%
40. 917 812-819 MGB BAS. SVC BEGIN DTE	2684	0.80%	4685	1.40%	1151	0.40%	1520	0.50%
41. 918 RESERVED FOR FUTURE USE	0	0.00%	0	0.00%	0	0.00%	0	0.00%
42. 919 822-823 MGB ELIG. STATUS	3735	1.10%	8910	2.70%	1030	0.30%	3378	1.00%
43. 920 824-831 MGB BAS. EFF.DATE	39873	12.30%	43079	13.20%	39109	12.00%	38410	11.80%
44. 921 833-840 MGB KICK SVC BEGIN DTE	252	0.10%	516	0.20%	151	0.00%	185	0.10%
45. 922 841 MGB KICK INCENT. BASIS	269	0.10%	554	0.20%	149	0.00%	143	0.00%
46. 923 842-843 MGB KICK INCENT. RATE	262	0.10%	506	0.20%	125	0.00%	112	0.00%
47. 924 844-845 MGB KICK INCENT. RATE	1013	0.30%	1707	0.50%	303	0.10%	310	0.10%

Figure 8. RCCPDS Stop Lighting Spreadsheet

DMDC could improve on these data management techniques by implementing formal statistical process control (often referred to as a “control chart”) methods. As with the stop lighting spreadsheet, the idea of behind statistical process control (SPC) methods

is to provide managers with tools that help them separate (and identify) events that have degraded the quality of the data (known as “special causes” in SPC parlance) from the routine random variation inherent in the data (known in SPC as “common causes”). The difference is that the color coding in the spreadsheets would be based on statistically-derived thresholds that would allow DMDC to appropriately specify how and when the colors change in the spreadsheet while accounting for the underlying variation in the data, sample sizes, etc.

Similarly, the application of Six Sigma tools and methods would be useful for improving various DMDC data handling and management processes so that the quality of resulting data provided to DEERS and other systems is of the highest possible caliber. For example, regular reports are sent to the DMDC Liaisons with information about changes being performed by RAPIDS operators on active duty periods. Control charts could be used to monitor these reports to identify when operators are modifying an unusual amount of information that is coming from the source system. When such a condition is identified, then DMDC and/or Service Liaison personnel could instigate an investigation to understand why.

In addition, other Six Sigma methods could be used to focus on the phone calls received by the DMDC Support Office. For example, when a member calls in one month to state they are being denied benefits, a system that allows file managers, liaisons, and DMDC Support Office Representatives access to the same information and a way to be able to track an individual record’s changes may improve the quality of customer service. By being able to track the changes to an individual’s PDR record, DMDC should be able to identify what is happening to the member sooner and be able to identify a root cause more efficiently.

Essentially, the idea is that by applying statistical specifications to these types of reports, thresholds can be set to trigger a response by DMDC or Service liaison personnel to look into whatever issue that has arisen. Future research efforts should look at issues identified through this research to determine an appropriate statistical model or threshold that would identify problems that are occurring in the PDR and decrease emphasis on anomalies.

The USMCR could also employ similar techniques after conducting their own analysis of the data being fed to the PDR. Ultimately, data quality improvements of submissions to DMDC are the responsibility of the Service component. Currently, Service components receive feedback reports regarding submission files and submission errors. USMCR can use these reports in conjunction with results of their analysis to determine a continuous process improvement that is complimentary to DMDC's continuous process improvement plan.

1. The Future of AD Dates in DoDI 7730.54

Active duty period reporting in DoDI 7730.54 existed prior to 9/11 in Enclosure 3 while the transactional (Enclosure 5) requirements and the Named Contingency (Enclosure 11) reporting requirement were developed post 9/11. As the reporting requirement in the Named Contingency Enclosure of DoDI 7730.54 becomes more robust, the requirement will entail more reporting than the active duty period reporting in Enclosure 3. Since Enclosure 3 only requires the reporting of active duty periods greater than 30 days, the Named Contingency reporting already includes these periods where they are in response to named contingencies. As of the May 25, 2011 signature of DoDI 7730.54, the reporting of named contingency information has been relocated into Enclosure 8, along with the new requirement of the reporting of all active service periods.

As the Service components have already begun preparations, and some have already submitted these historical periods of active service, DMDC is working to adapt the PDR to not require non-overlapping periods of benefits and allow the system to store periods that are less than 30 days. Continued research into when transitions from reporting in DoDI 7730.54 Enclosure 3 should occur and making sure the appropriate reporting is being done through DoDI 7730.54 Enclosure 8.

C. SUGGESTIONS FOR FUTURE STUDY

1. Examination of Orders

In order to authoritatively determine if the data being entered into the PDR is what the member is entitled to, an extract of the Order Writing System should be compared to the MCTFS feeds to DMDC. Unfortunately, for this thesis, the Order Writing System data could not be obtained from the Marine Corps.

In the future, the Marine Corps and DMDC should establish a baseline for what benefits and entitlements the member should be receiving as well as determining what orders may have been canceled and may not have been updated. Currently, DMDC has no way of auditing the RAPIDS updates to the PDR in order to determine if the operator is actually checking written orders without a manual intervention.

Regular checks against the order writing system could also provide an additional system check. However, implementers of consistent order writing checks would need to determine what information would be overlaid, how often checks should be performed, and what would happen to members who may end up having benefit money recouped.

2. Individual Record Examination

During the examination of the TFDW dataset, a comparison of all records with AD periods between January and June of 2010 by SSN revealed 108 records on the TFDW dataset that were not appearing on the PDR during the same time. As a result of this finding, a few of the individual records were examined and found that the AD periods submitted by MCTFS were submitted after the June PDR pull. This suggests that there is latency in reporting and that some members who are entitled to benefits are not being recorded in the PDR (such as with the Congressional case study example presented in Chapter I). An examination of the MCTFS reporting latency should thus be conducted to determine whether such problem exists and, if so, the appropriate corrective action.

APPENDIX A. ADDITIONAL RESOURCES FOR SIX SIGMA

Below are sources of additional information about Six Sigma as described in Chapter I Section B2.

- Breyfogle, F. W., III. (1999). *Implementing Six Sigma: Smarter solutions using statistical methods*. New York, NY: John Wiley & Sons.
- Breyfogle, F. W., Cupello, J. M., Meadows, B. (2001). *Managing Six Sigma: A practical guide to understanding, assessing, and implementing the strategy that yields bottom-line success*. New York, NY: John Wiley & Sons.
- Deming, W. E. (1982). *Out of the crisis*. Cambridge, MA: Massachusetts Institute of Technology Press.
- Eckes, G. (2001). *The Six Sigma revolution: How General Electric and others turned process into profits*. New York, NY: John Wiley & Sons.
- Gitlow, H., Oppenheim, A., & Oppenheim, R. (1995). *Quality management: Tools and methods for improvement* (2nd ed.). Burr Ridge, IL: Irwin.
- Harrington, H. J. (1991). *Business process improvement: The breakthrough strategy for total quality, productivity, and competitiveness*. San Francisco, CA: McGraw-Hill.
- Kazmierski, T. J. (1995). *Statistical problem solving in quality engineering*. San Francisco, CA: McGraw-Hill.
- Shewhart, W. A. (1986). *Statistical method from the viewpoint of quality control*. New York, NY: Dover Publications.
- Zink, K. J. (Ed.). (1997). *Successful TQM: Inside stories from European Quality Award winners*. New York, NY: John Wiley & Sons.

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APPENDIX B. IRB LETTER OF APPROVAL



Naval Postgraduate School
Institutional Review Board (IRB)


SEP 03 2010

From: President, Naval Postgraduate School
Via: Chairman, Institutional Review Board
To: Ronald Fricker, Jr., Operations Research Department
Christina Schmunk

SUBJ: ASSESSING THE ACCURACY OF MARINE CORPS RESERVE ACTIVE
DUTY DATES WITHIN THE DEFENSE ENROLLMENT ELIGIBILITY
REPORTING SYSTEM

Encl: (1) Approved IRB Protocol

1. The NPS IRB is pleased to inform you that the NPS President has approved your project (NPS IRB# NPS.2010.0102-IR-EP5-A). The approved IRB Protocol is found in enclosure (1). Completion of the CITI Research Ethics Training has been confirmed.
2. This approval expires on 30 June 11. If additional time is required to complete the research, a continuing review report must be approved by the IRB and NPS President prior to the expiration of approval. At expiration all research (subject recruitment, data collection, analysis of data containing PII) must cease.
3. You are required to report to the IRB any unanticipated problems or serious adverse events to the NPS IRB within 24 hours of the occurrence.
4. Any proposed changes in IRB approved research must be reviewed and approved by the NPS IRB and NPS President prior to implementation except where necessary to eliminate apparent immediate hazards to research participants and subjects.
5. As the Principal Investigator it is your responsibility to ensure that the research and the actions of all project personnel involved in conducting this study will conform with the IRB approved protocol and IRB requirements/policies.
6. After the experiment is completed the Principal Investigator will submit to the Human Subjects Protection Office, all signed informed consent documents, unanticipated problem reports, adverse event reports and a End of Experiment Report. The Human Subjects Research Office will secure these documents for 10 years and then forward to the nearest FRC.


Lawrence Shattuck, Ph.D.
Chair
Institutional Review Board

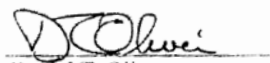

Daniel T. Oliver
President
Naval Postgraduate School

Figure 9. NPS IRB Approval Letter

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APPENDIX C. PROCESSING OF FILES THROUGH DMDC

Figure 10 is a detailed processing flow diagram of submission files processing through DAP and into DEERS for updating the PDR. Files are received and moved to the DMDC's mainframe environment at the Naval Postgraduate School (NPS). From there, edited files are created (as described in RCCPDS File Processing) and continue on to the PDR.

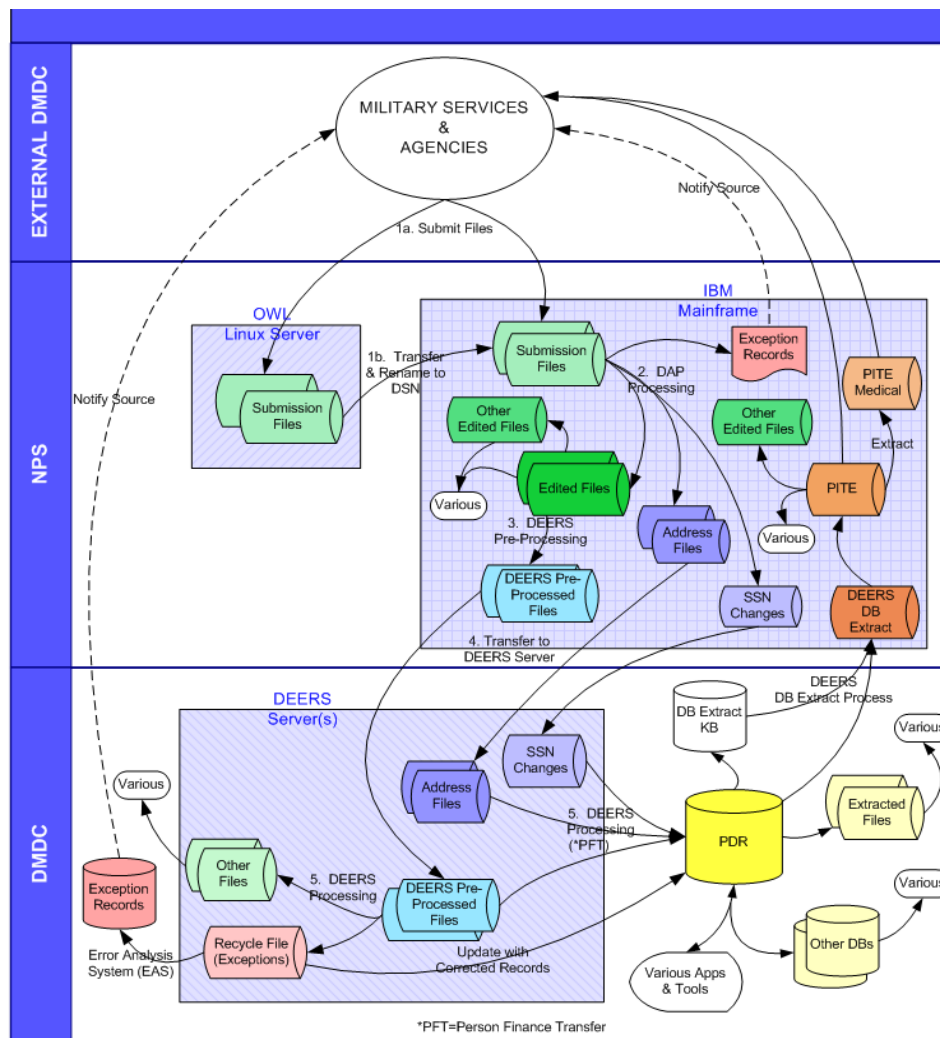


Figure 10. High-Level Processing Flow of the DMDC Files From the Mainframe to the PDR (From DMDC, n.d.)

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APPENDIX D. RCCPDS VALID SUBMISSION VALUES

The following tables are reproduced to provide DMDC analysts with concise reference of the documentation at the time this thesis was completed. The tables highlight the accepted inputs from the Service for valid record submission per DoDI 7730.54 (USD[P&R], 2009) as outlined in Table 2 in RCCPDS File Processing.

Table 11. Reserve Component Valid Values (From USD[P&R], 2009)

Service Component Code	Value Definition
AG	Army National Guard
AV	Army Reserve
CV	Coast Guard Reserve
FG	Air National Guard
FV	Air Force Reserve
MV	Marine Corps Reserve
NV	Navy Reserve

Table 12. Reserve Component Category/Training and Retirement Category Valid Values (From USD[P&R], 2009)

Reserve Component Category/Training and Retirement Category Code	Value Definition
Ready Reserve – Selected Reserve (SELRES) – Trained in Units	
SA	Individuals required to perform at least 48 Inactive Duty Training (IDT) periods annually who are trained and assigned to a unit
SG	Full-Time Support Personnel or AGR
SV	Full-Time Members (Special Category). SELRES members who

Reserve Component Category/Training and Retirement Category Code	Value Definition
	are performing AD or Full-Time National Guard Duty (FTNGD) for more than 180 days in a fiscal year but who are exempted from counting against the active duty strengths or FTNGD (AGR strength)
Ready Reserve – SELRES – Trained Individuals (Non-Unit)	
TB	Individual Mobilization Augmentees (IMAs) – Trained IMAs who drill from 0 to 48 times per year and are assigned to active component, Selective Service System, or Federal Emergency Management Agency organizations on mobilization
Ready Reserve – SELRES – Training Pipeline	
UF	Personnel currently on Initial Active Duty Training (IADT). Enlisted personnel on the second part of split training and those in Army One Station Unit Training
UP	Personnel awaiting IADT and authorized to perform IDT and Army National Guard (ARNG) members not authorized to perform IDT. Includes Service members performing IDT with or without pay.
UQ	Personnel awaiting the second part of IADT.
US	AGR currently on or awaiting IADT. These are non-prior service AGR personnel
UT	SMP – Senior Reserve Officers Training Corps (ROTC) cadets or Marine Corps platoon leader course members who are also permitted to be members of a SELRES unit. (Does not include basic ROTC enrollees.)
UX	SELRES members in other training programs including chaplain, medical, health professional stipend, and early commissioning programs
Ready Reserve – Individual Ready Reserve (IRR)	
RE	Trained individual members of the ready reserve not in the SELRES (not applicable to involuntary program)
RH	Untrained members of the IRR in the delayed entry program (DEP)
RM	Service members are subject to involuntary activation

Reserve Component Category/Training and Retirement Category Code	Value Definition
RU	Personnel awaiting IADT and not authorized to perform IDT or receiving pay
Ready Reserve Training	
PJ	Ready reserve members not in the SELRES who are participating in officer training programs (excludes ROTC)
PK	Ready reserve members not in the SELRES participating in the Health Professionals Scholarship Program (HPSP)
PO	Ready reserve members who are contracted ROTC and not in the SELRES
Inactive National Guard (ING) – Ready Reserve	
II	Ready reserve members who are members of the ING
Standby Reserve	
YC	Members designated as key employees and transferred from the ready reserve to the standby reserve active status list for the period they remain designated as key employees
YD	Personnel not having fulfilled their statutory military service obligation (MSO), who are temporarily assigned for a hardship reason but intend to return to the ready reserve, or who are retained by a RC in an active status
YL	Members with at least 20 years of service who have a less-than-30-percent service disability and who have been transferred to the inactive status list instead of being separated
YN	Other members of the standby reserve on the inactive status list
Retired Reserve	
V1	Service members who have completed at least 20 qualifying years of service creditable for retired pay for non-regular service, who have reached the designated age to receive non-regular retirement pay, and who are now drawing retired pay for non-regular service
V2	Service members who have completed 20 qualifying years of service creditable for retired pay but are not yet receiving retired pay
V3	Service members retired for physical disability. Service members

Reserve Component Category/Training and Retirement Category Code	Value Definition
	who have 20 years of service creditable for retired pay or who are more than 30-percent disabled (includes Reservists serving with the active component or RC)
V4	Reserve members who have completed 20 or more years of active duty service and retired
V5	Reserve personnel drawing retired pay based on retirement for reasons other than age, service requirements, or physical disability

Table 13. Reserve Component Valid Values (From USD[P&R], 2009)

Transaction Type Code	Value Definition
E1	Change to Montgomery G.I. Bill data
E3	Change to DEERS active duty data (obsolete)
E4	Change to home mailing address
E5	Change to active duty start date and/or stop date
E6	Change to assigned UIC, duty UIC
E7	Change to pay grade
G0	Reenlistment gain: Service members with a break in service of more than 24 hours but less than 91 days who have reenlisted
G1	Non-prior service: An individual from civilian status who has served previously in an Active Component or Reserve Component, and has not received credit toward fulfillment of his or her MSO
G3	From civil life (prior service)
G4	Direct from active component to RC
G5	Gain from another RC
G7	Other gain
G8	Gain from enlisted to officer status or vice versa
GX	Generated gain

Transaction Type Code	Value Definition
L0	Other losses that cannot be classified into another loss code
L1	Discharged to civil life (a final or complete discharge that severs all contractual service or statutory obligations)
L2	Extended active duty whereby a member changes from a RC appropriation to an active component appropriation
L3	Loss to another RC
L7	Death
L8	Loss from enlisted to officer status or vice versa
LX	Generated Loss
M1	Immediate reenlistment
M2	Extension of current enlistment contract or agreement
N1	Inter-component transfer within the same Service: Guard to SELRES
N2	Inter-component transfer within the same Service: Guard (other than AGR) to Reserve IRR
N3	Inter-component transfer within the same Service: Guard (other than AGR) to Standby Reserve for reason other than retirement
N4	Inter-component transfer within the same Service: Guard (other than AGR) to Reserve Component for the purpose of retirement
N5	Inter-component transfer within the same Service: Guard AGR to Reserve IRR
N6	Inter-component transfer within the same Service: Guard AGR to Standby Reserve for reason other than retirement
N7	Inter-component transfer within the same Service: Guard AGR to Reserve Component for the purpose of retirement
P0	Retired (V2) transferred to retired status other than Retired Reserve (V2)
P1	Selected Reserve transferred to retired status other than Retired Reserve (V2)
P2	AGR transferred to retired status other than Retired Reserve (V2)
P3	IRR transferred to retired status other than Retired Reserve (V2)
P4	Standby transferred to retired status other than Retired Reserve (V2)

Transaction Type Code	Value Definition
S1	Change to Service member's SSN
S2	Change to Service member's name
T1	Intra-component transfer between Reserve categories: Retired Reserve (V2) to SELRES (other than AGR)
T2	Intra-component transfer between Reserve categories: Retired Reserve (V2) to IRR
T3	Intra-component transfer between Reserve categories: Retired Reserve (V2) to Standby
TA	Intra-component transfer between Reserve categories: SELRES (other than AGR) to AGR
TB	Intra-component transfer between Reserve categories: SELRES (other than AGR) to IRR
TC	Intra-component transfer between Reserve categories: SELRES (other than AGR) to ING
TD	Intra-component transfer between Reserve categories: SELRES (other than AGR) to Standby
TE	Intra-component transfer between Reserve categories: SELRES (other than AGR) to Retired Reserve (V2)
TF	Intra-component transfer between Reserve categories: AGR to SELRES (other than AGR)
TG	Intra-component transfer between Reserve categories: AGR to IRR
TH	Intra-component transfer between Reserve categories: AGR to ING
TJ	Intra-component transfer between Reserve categories: AGR to Standby
TK	Intra-component transfer between Reserve categories: AGR to Retired Reserve (V2)
TL	Intra-component transfer between Reserve categories: IRR to AGR
TM	Intra-component transfer between Reserve categories: IRR to SELRES (other than AGR)
TN	Intra-component transfer between Reserve categories: IRR to Standby
TP	Intra-component transfer between Reserve categories: IRR to Retired Reserve (V2)

Transaction Type Code	Value Definition
TQ	Intra-component transfer between Reserve categories: ING to AGR
TR	Intra-component transfer between Reserve categories: ING to SELRES (other than AGR)
TU	Intra-component transfer between Reserve categories: Standby to AGR
TV	Intra-component transfer between Reserve categories: Standby to SELRES (other than AGR)
TW	Intra-component transfer between Reserve categories: Standby to IRR
TY	Intra-component transfer between Reserve categories: Standby to Retired Reserve (V2)
TZ	Intra-component transfer between Reserve categories: Retired Reserve (V2) to AGR

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APPENDIX E. RCCPDS PROCESSING FLOW OF SUBMISSIONS

Figure 11 displays the RCCPDS edit processing flowchart at the time of this thesis documentation and through the summer of 2010. This process was modified at the end of fiscal year 2010 to prepare for a new DoDI. The new process was implemented in May 2011 upon the signature of DoDI 7730.54 (USD [P&R], 2011). This is provided to give DMDC analysts with a concise reference of the documentation at the time this thesis was completed. This diagram is outlined in RCCPDS File Processing.

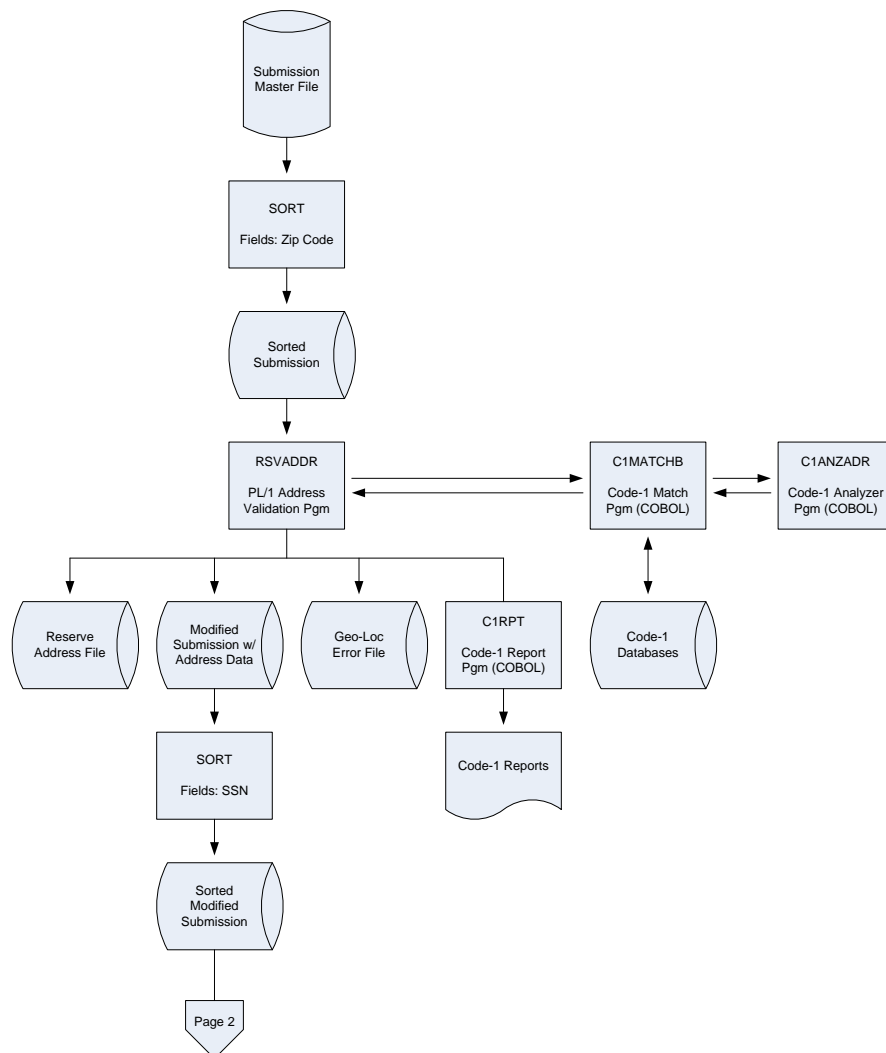


Figure 11. Page 1 of RCCPDS Processing Flow From Submission to Edit (From DMDC, n.d.)

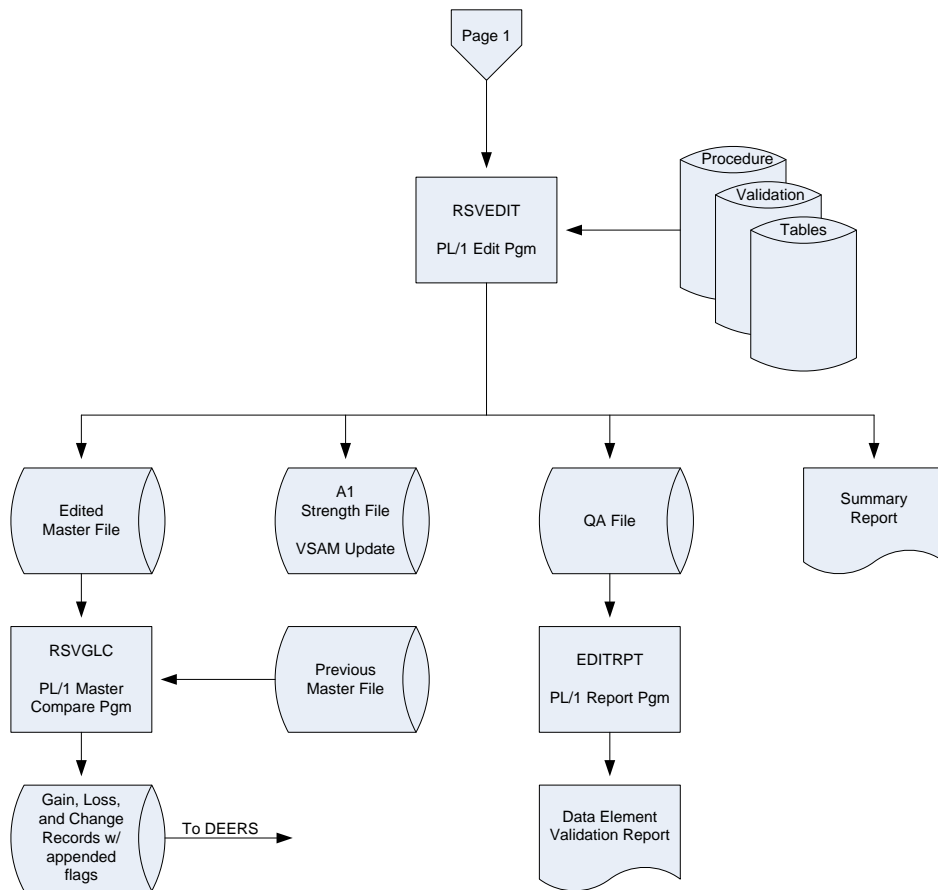


Figure 12. Page 2 of RCCPDS Processing Flow From Submission to Edit (From DMDC, n.d.)

APPENDIX F. ACTIVATION VALID SUBMISSION VALUES

The following tables are reproduced to provide DMDC analysts with concise reference of the documentation at the time this thesis was completed. The tables highlight the accepted inputs from the Service for valid record submission per DoDI 7730.54 (USD [P&R], 2009) as outlined in Table 3 in activation file processing.

Table 14. Statute Code Valid Values (From USD[P&R], 2009)

Statute Code	Value Definition
A	Section 688 of 10 U.S.C.
B	Section 12301(a) of 10 U.S.C.
C	Section 12301(d) of 10 U.S.C.
D	Section 12302 of 10 U.S.C.
E	Section 12304 of 10 U.S.C.
F	Section 331 of 14 U.S.C.
G	Section 359 of 14 U.S.C.
H	Section 367 of 14 U.S.C.
I	Section 12406 of 10 U.S.C.
J	Section 502(f) of 32 U.S.C.
K	Section 12301(h) of 10 U.S.C.
L	Section 712 of 14 U.S.C.
M	Chapter 9 of 32 U.S.C.
Z	Unknown (for use with Project Codes A99 or B99)

Table 15. Executive Order Valid Values (From USD[P&R], 2009)

Executive Order Code	Value Definition
12927	Haiti
12982	Bosnia
12982A	Air Force (AF) Bosnia
13076	Southern Watch
13076A	AF Southern Watch
13120	Kosovo
13120A	AF Kosovo
13223	Overseas Contingency Operation (OCO)
13223A	OCO World Trade Center (WTC)
13223B	OCO ONE
13223C	OCO ONE
13223D	OCO OEF
13223E	OCO Air Expeditionary Force (AEF)
13223F	OCO OIF
13223G	Pre-OCO
13223H	OCO Operation New Dawn (OND)
13529	Haiti Operation Unified Response (OUR)
13529A	Haiti OUR

Table 16. Project Plan ID Valid Values (From USD[P&R], 2009)

Project Plan ID Code	Value Definition
3JT	Operation Unified Response (OUR) (Haiti)
9BU	Southern Watch/Desert Thunder
9EC	Uphold Democracy
9EV	Joint Endeavor/Guard
9FF	Joint Forge
9FS	Allied Forge
9FV	Joint Guardian
9GF	OCO
A20	AD-Active Duty Training (ADT)- IADT
A22	AD-ADT-Other Training Duty (OTD)
A25	AD-Active Duty Other Than Training (ADOT)-Active Duty Operational Support (ADOS)
A26	AD-ADOT-AGR
A28	AD-Other
A99	AD-Unknown (derived period)
B22	FTNGD-OTD
B25	FTNGD-Operational Support (OS)
B26	FTNGD-AGR
B99	FTNGD-Unknown (derived period)

Table 17. Executive Order and Project Plan ID Combination Valid Values, Using Data From DMDC Activation Processing Programs

Project Plan ID	Executive Order	Operation Name
AEF	13223E	OCO AEF
A20		AD-ADT-IADT
A21		AD-ADT-Annual Training (AT)
A22		AD-ADT-OTD
A25		AD-ADOT-ADOS
A26		AD-ADOT-AGR
A27		AD-ADOT-Involuntary
A99		AD-Unknown
B11		IADT Tech Training
B21		FTNGD-OTD
B25		FTNGD-OS
B26		FTNGD-AGR
B27		FTNGD-Involuntary
B99		FTNGD-Unknown
OEF	13223D	OCO OEF
OIF	13223F	OCO OIF
OJE	12982A	Joint Forge
OND	13223H	OCO OND
OUR	13529	OUR
PRE	13223G	Pre-OCO
3JT	13529	OUR
9BU	13076	Southern Watch/Desert Thunder
9EC	12927	Uphold Democracy
9EV	12982	Joint Endeavor/Guard
9FF	12982	Joint Forge
9FS	13120	Allied Forge
9FV	13120	Joint Guardian
9GF	13223	OCO

Table 18. Transaction Type Code Valid Values (From USD[P&R], 2009)

Transaction Type Code	Value Definition
GA	Begin Transaction
LA	End Transaction
GX	Cancellation of Begin Transaction
LX	Cancellation of End Transaction
BA	Historical Event: Submit when member has completed active duty or FTNGD and the member's information has not been previously submitted.
NB	Change to Statute Code: Submit if the statute code was incorrectly reported on a previous submission; submit this transaction with the original event activation and/or support begin date and the new statute code.

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APPENDIX G. ACTIVATIONS PROCESSING FLOW OF DAILY SUBMISSIONS

Figure 13 displays the activation edit processing flowchart at the time of this thesis documentation. This is provided to give DMDC analysts with a concise reference of the documentation at the time this thesis was completed. This diagram is outlined in activation file processing and further explanation can be found in this document.

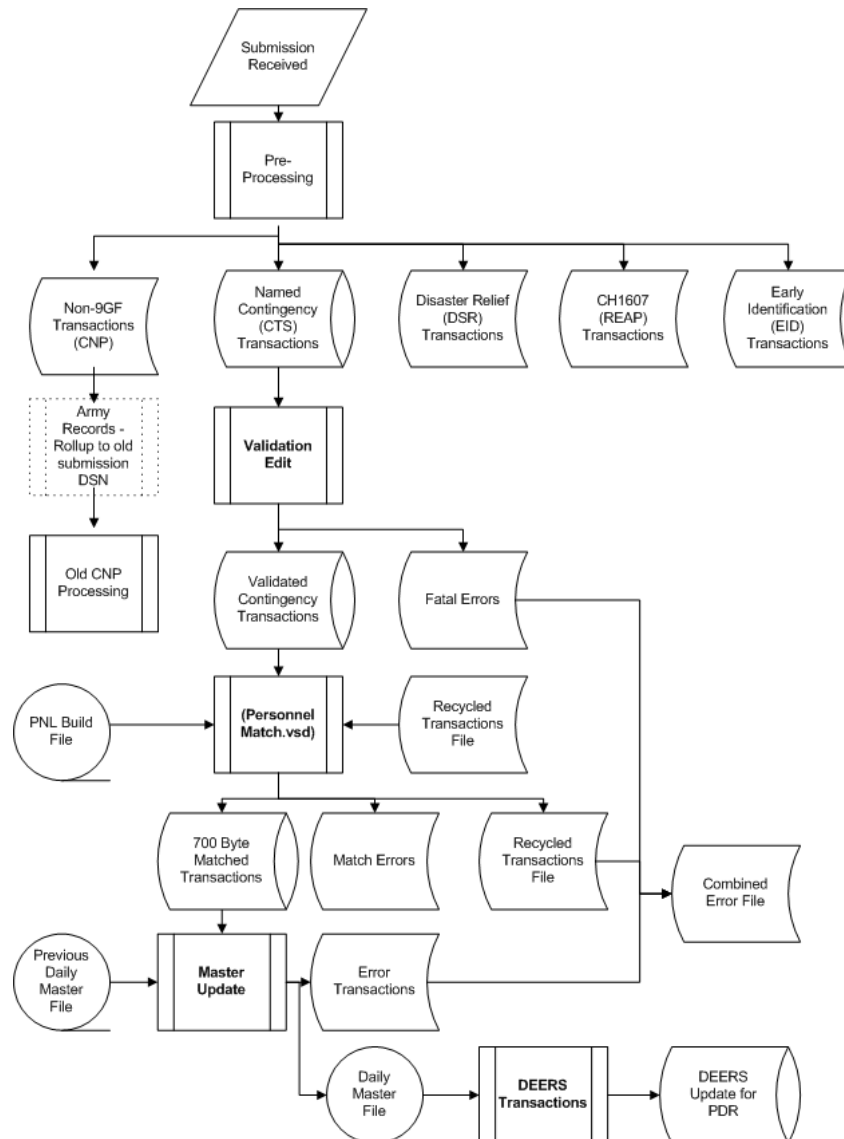


Figure 13. Daily and Weekly Activation Processing, as of 9 April 2008 (From DMDC, n.d.)



Figure 14. DEERS Transaction Creation Program, as of 1 June 2006 (From DMDC, n.d.)

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