NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

JOINT APPLIED PROJECT

Reducing the Logistics Footprint in Naval Ships Through the Optimization of Allowance Equipage Lists (AELs)

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June 2010

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REPORT DOCUMENTATION PAGE	Form Approved OMB No. TBD

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	June 2010	Joint Applied Project

4. TITLE AND SUBTITLE: Reducing the Logistics Footprint of Naval Ships Through the Optimization of Weapon System Allowance Equipage Lists (AELs)	5. FUNDING NUMBERS N/A
6. AUTHOR(S): Ricardo T. Alvarez	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A	10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES: The views expressed in this report are those of the author(s) and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol number _____.

12a. DISTRIBUTION / AVAILABILITY STATEMENT	12b. DISTRIBUTION CODE
Approved for public release; distribution is unlimited	A

13. ABSTRACT (maximum 200 words)

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14. SUBJECT TERMS Allowance Equipage List, AEL, optimize, effectiveness, logistics footprint, Integrated Logistics Support, ILS, HAZMAT, cost reduction, cost savings, Total Ownership Cost, TOC, outfitting documents.	15. NUMBER OF PAGES 101
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UU

NSN 7540-01-280-5500 Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

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REDUCING THE LOGISTICS FOOTPRINT IN NAVAL SHIPS THROUGH THE OPTIMIZATION OF ALLOWANCE EQUIPAGE LISTs (AELs)

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MASTER OF SCIENCE IN PROGRAM MANAGEMENT (MSPM)

From the

NAVAL POSTGRADUATE SCHOOL
June 2010

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ABSTRACT

It is critical that the Department of Navy (DON) acquisition personnel and Department of Defense (DoD) support contractors understand the impact to naval ships' weapons systems Total Ownership Cost (TOC) when procuring outfitting equipage and test equipment supporting the maintenance concept. This project focuses on reducing the logistics footprint of U.S. Naval ships through the optimization of weapon system Allowance Equipage Lists (AELs).

After reviewing Integrated Logistics Support (ILS) data utilized to support and certify logistically the new construction ships' outfitting, it became apparent that there were many redundancies and other problems associated with the ILS data. The problems within the weapon system AELs include numerous redundancies, Hazardous Materials (HAZMAT) and items that should be on separate outfitting documents. Correcting these problems would circumvent unnecessary costs and would reduce the logistics footprint in the ships' outfitting. The intent of this project is to provide guidance and recommendations for the optimization in the outfitting of equipage, tools, consumables, and test equipment for ships' weapon systems, which will lead to a reduced logistics footprint and reduce TOC during ships' outfitting.

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LIST OF ACRONYMS AND ABBREVIATIONS

AEL	Allowance Equipage List
APL	Allowance Parts List
AWS	AEGIS Weapon System
CNO	Chief of Naval Operations
COSAL	Coordinated Shipboard Allowance List
COTS	Commercial Off-the-Shelf
DoD	Department of Defense
DON	Department of the Navy
EMS	Environmental Management Systems
FMS	Foreign Military Sales
GPETE	General Purpose Electronic Test Equipment
GUCL	General Used Consumables List
HAZMAT	Hazardous Materials
ILS	Integrated Logistics Support
ISEA	In-Service Engineering Agent
MIP	Maintenance Index Page
MRC	Maintenance Requirement Card
MSPM	Masters of Science in Program Management
NPS	Naval Post-Graduate School
NSN	National Stock Number
OBRP	On-Board Repair Part
OSI	Operating Space Item
PEETE	Portable Electrical/Electronic Test Equipment
PHD NSWC	Port Hueneme Division, Naval Surface Warfare Center
PMS	Planned Maintenance System
PN	Part Number
POC	Point of Contact
S&TE	Support and Test Equipment

SCIT	Standardization and Control of Industrial Tools
SM&R	Source, Maintenance and Recoverability
SPCC	Ships Parts Control Center
SPETE	Special Purpose Electronic Test Equipment
SPETERL	Special Portable Electrical/Electronic Test Equipment Requirements List
SPMIG	Standard PMS Material Identification Guide
TE	Test Equipment
TEI	Test Equipment Index
TM	Technical Manual
TMDE	Test Maintenance and Diagnostic Equipment
TOC	Total Ownership Cost
TPMTE	Tools, Parts, Material, Test Equipment
UI	Unit of Issue
USD AT&L	Under Secretary of Defense, Acquisition, Technology and Logistics
USN	United States Navy
VLS	Vertical Launching System
WPNSTA	Weapons Station
WS	Weapons System

ACKNOWLEDGEMENTS

The author would like to acknowledge and thank those who served as advisors for this project and provided superb support: David F. Matthews, CDR Rich Nalwasky, Kimberly Alvarez and Brad R. Naegle. Also, I would like to thank my command, Port Hueneme Division Naval Surface Warfare Center, A00 management, for their continuous support provided in completing the MSPM program. Finally, special thanks go to my wife and kids who supported me during this MSPM program and during the times of need.

Thank you all!

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EXECUTIVE SUMMARY

It is critical that the Department of Navy (DON) acquisition personnel and Department of Defense (DoD) support contractors understand the impact to naval ships' weapons systems Total Ownership Cost (TOC) when procuring outfitting equipage, Hazardous Materials (HAZMAT), General Used Consumables List (GUCL) items and Test Equipment (TE) supporting the maintenance concept. This project focuses on reducing the logistics footprint of U.S. Naval (USN) ships through the optimization of Weapon System (WS) Allowance Equipage Lists (AELs).

After reviewing Integrated Logistics Support (ILS) data utilized to support and certify logistically the new construction ships' outfitting, it became apparent that there were many redundancies and other problems associated with the ILS data. The problems within the weapon system AELs include numerous redundant entries, which consist of equipage, HAZMAT, and others. Correcting these problems would avoid unnecessary costs and would reduce the logistics footprint in the ships' outfitting. The intent of this project is to provide guidance and recommendations for the optimization in the ships' outfitting of equipage, tools, consumables, and test equipment for ships' weapon systems, which will lead to a reduced logistics footprint.

Sentinel (2010, April) reports that Admiral Gary Roughead, Chief of Naval Operations (CNO), said, "to sustain this force for the future, we are addressing the growing cost of owning our fleet by Integrating Total Ownership Cost and manpower costs into all of our program

decisions and by pursuing cost reduction strategies for major acquisition programs.”

Key Messages from CNO:

1. It is everyone’s job in the Navy to reduce the cost to own and operate the fleet.

2. Reducing TOC is imperative for building and sustaining a capable and affordable fleet.

3. Navy personnel must create and exploit every opportunity to reduce TOC.

4. The Navy’s focus and culture must be changed to make TOC a key component in the decision making. (p.9)

I. INTRODUCTION

A. SCOPE

The scope of this effort is to reduce the logistics footprint of Naval Ships through the optimization of Weapon System Allowance Equipage Lists. There will be focus upon the Vertical Launching System (VLS) support equipment AEL, because this document is a good example of what an AEL should not look like. This paper has been developed to provide guidance in the optimization and effectiveness in the development and updating of AELs and the implementation of Environmental Management System (EMS) policies.

This paper is organized into five chapters; Chapter I contains the introduction, the scope, and the methodology used and the importance of the research. Chapter II includes the background and provides the reader with a basic understanding of the concepts, organizations, and systems addressed in the paper. Chapter III presents the data to be analyzed. Chapter IV provides the data elements supporting the analysis and the forming of conclusions and recommendations. Finally, Chapter V provides the conclusions and recommendations.

B. PURPOSE

The purpose of this paper is to identify the current AEL outfitting strengths and weaknesses and provide recommendations for the optimal development of naval weapon system AELs in an effort to reduce its logistics footprint during ships' outfitting.

As dollars are shrinking for ship operational and direct support, we need to look at ways to reduce costs in all areas. An area we should not overlook is the ships' initial outfitting and follow-on costs. The WS AELs drive the outfitting of the ship with tools, consumables, and other items, which are required to perform maintenance on the weapon systems. Redundancies in the outfitting documents drive up the cost of the TOC. This paper will provide recommendations concerning how to achieve Total Ownership Cost reduction by optimizing outfitting documentation.

This paper follows the directive from the Office of the Under Secretary of Defense, Acquisition, Technology, and Logistics (USD AT&L), dated 8 Oct 2003, that enclosed the guide entitled, "*Designing and Assessing Supportability* by *DOD Weapon Systems: A Guide to Increased Reliability and Reduced Logistics Footprint"* USD AT&L (2003) and the CNO's TOC directive, Sentinel (2010).

C. RESEARCH OBJECTIVES

The objective of this research is to provide guidance and recommendations that can be used to optimize future and current WS AEL development, which will in turn reduce the logistics footprint and TOC in outfitting documentation. The focus of this paper is on the WS AELs. The goal of this analysis is to answer the following questions:

1. What are the key factors that contribute to an optimized AEL?
2. How do WS AELs affect the ships' Total Ownership Cost?
3. How can the Logistics footprint of AELs be reduced?

D. METHODOLOGY

The methodology utilized in this research was to collect data, analyze and document processes used in the development of current WS AELs. Data was collected and analyzed, problems identified were documented, and a recommendation and conclusion were included. This information will serve as a guide to future developers of AELs in support of reducing the logistics footprint and reducing the TOC during ships' initial outfitting and follow-on.

1. Data Collection

Data from the VLS and AEGIS Naval weapon system AELs was collected. DoD standards and procedures, cognizant personnel, and online information from legitimate sources were used to obtain the appropriate data.

2. Data Analysis

The information collected was analyzed to meet project objectives, draw conclusions, and provide recommendations.

3. Problem Identification

Several naval weapon system AELs were obtained and reviewed for identification of problems and to provide an opportunity to optimize logistics outfitting documentation. Findings and recommendations are provided to identify how to optimize the development of these allowance outfitting documents.

E. LIMITATIONS OF RESEARCH

This research identifies the key aspects that will contribute to an optimized weapon system AEL. It does not apply to other types of AELs, such as electronic equipment AELs. This report focuses specifically on the VLS Support Equipment AEL, because it is a good example of what not to do. This research also analyzes other outfitting documentation that is relevant and related to the maintenance concept and is included in the Coordinated Shipboard Allowance List (COSAL) load out. In the context of this project and from this point on, all references to an AEL refer to a Weapon System (WS) AEL.

II. BACKGROUND

A. OVERVIEW

Over the past several years, I had the opportunity to review ILS data utilized to logistically support and certify new construction ship outfitting. During the reviews, it became apparent that there were many redundancies and other associated problems with the ILS data. There is currently no documentation providing detailed guidance for the development and maintenance of Naval Weapon Systems AELs. This paper will attempt to bridge that gap, and provide a comprehensive guide to the optimization of AELs, current or future.

Next, a basic understanding of the concepts, cognizant organizations for each outfitting document, and systems addressed in the paper will be provided.

1. Maintenance Concept

Although there are three levels of maintenance within the concept, this paper will only focus on Organizational or “O-level” maintenance. The O-level of weapon system maintenance is supported by the Maintenance Requirement Cards (MRCs) and Technical Manuals (TMs). The MRCs from the Planned Maintenance System (PMS) and TM’s maintenance requirements are performed by the ships’ crew (O-level maintenance).

Weapon System AELs, Special Purpose Electrical and Electronic Test Equipment Requirements Lists (SPEETRL), Allowance Parts Lists (APLs), HAZMAT AELs, and General Used

Consumables Lists (GUCL) are developed and maintained to support the performance of the maintenance concept, and directly support the performance of the MRCs and TMs.

2. Tools, Parts, Material, Test Equipment (TPMTE) Block

All items called out in the TPMTE Block of the MRCs and TMs have to be supported and outfitted onboard the ship, in order to support the particular maintenance action. What items are included on the TPMTE? Where do they belong? What outfitting document drives these items into the Ship? We will address these questions first by dissecting the TPMTE block. Figure 1 provides a pictorial block diagram of the relationship between MRC/TMs TPMTE items and the different outfitting documents that drive them into the ship. Appendices A and B offer a quick look at the TPMTE block in MRCs and TMs.

The Support and Test Equipment (S&TE) Manager is the person responsible for developing the AEL in support of his/her weapon system MRCs/TMs. Additional responsibilities are to distribute all other items that do not belong in the AEL to the appropriate outfitting document and to ascertain that no redundancies will be created during the distribution of items contained in the TPMTE.

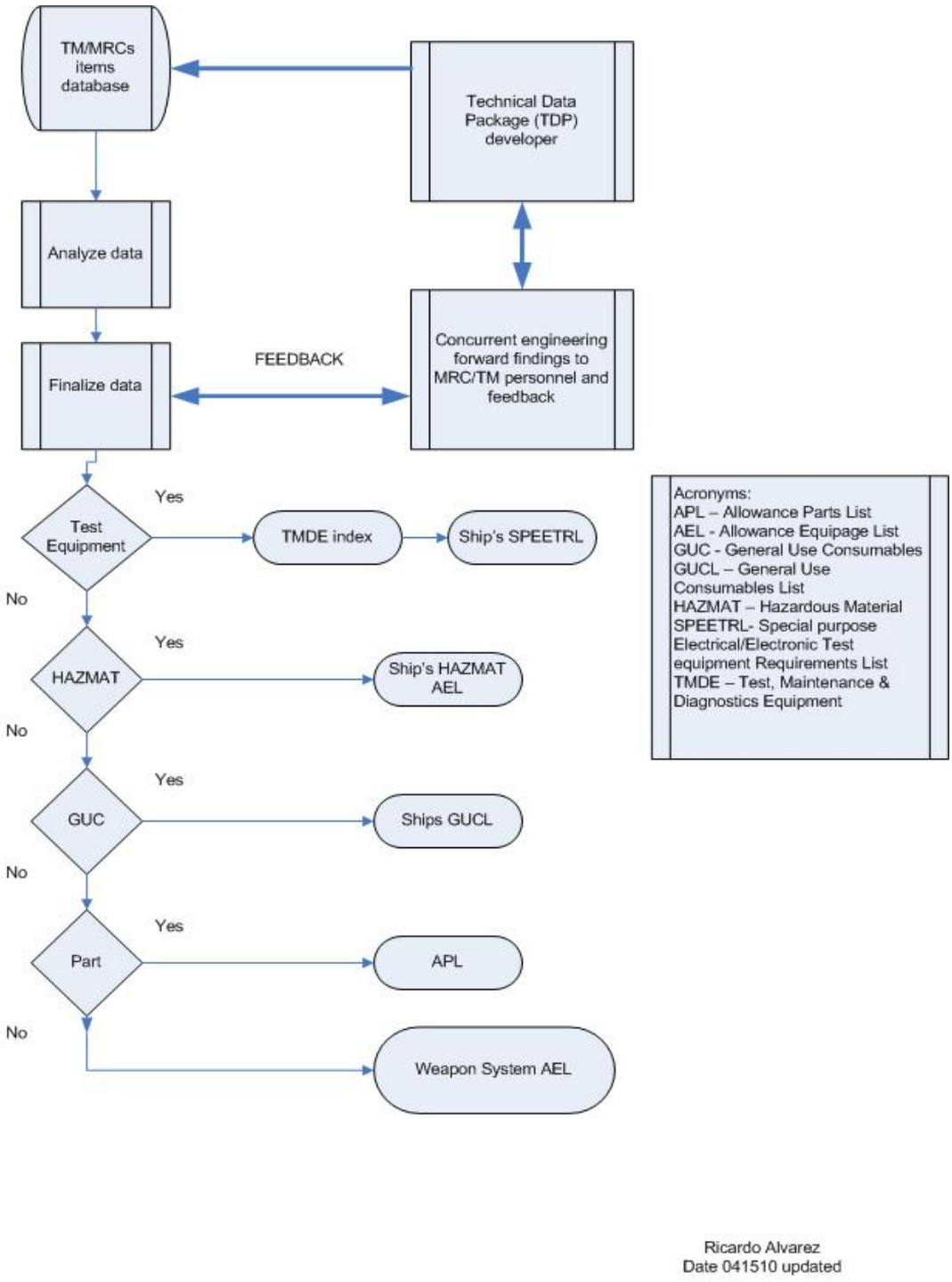

Figure 1. MRC/TMs and the outfitting documentation relationship

a. Test Equipment

TE belongs and should be contained in the Test, Maintenance, and Diagnostic Equipment (TMDE) index and outfitted through the SPEETRL, NSWC Corona (2010). The TMDE supersedes the old Test Equipment Index (TEI) and the old Portable Electrical/Electronic Test Equipment (PEETE) index.

Cognizant activity:
NSWC Corona Seal Beach Detachment
Attn: Greg Hogan
TMDE Program Lead Engineer
(562) 626-7192.

b. Piece Parts

Piece parts found in the TPMTE block of the MRCs/TMs should not be included in the AEL. These items should be included in an APL; in the VLS case, it would be in the On-Board Repair Parts (OBRPs) APL.

Cognizant activity:

WS In-Service Engineering Agent (ISEA).

c. HAZMAT

HAZMAT items found in the TPMTE block in the MRCs/TMs belong in the ships' HAZMAT AEL. It should not be included in the WS AEL.

Cognizant activity:

Naval Surface Warfare Center-Carderock Division
Ship Service Engineering Station
Philadelphia, Pennsylvania, Code 945.

d. General Used Consumables (GUC)

General used consumables, such as pencils, pens, pads, erasers, paper cups, rags, and others found in the TPMTE block in the MRCs/TMs should be included in the GUCL.

Cognizant activity:

SUPSHIPS, Ship class ILS supervisor.

e. Tools and Consumables

All tools and exclusive consumables should be listed in the WS AEL, with the exceptions listed above. The AELs are managed by the S&TE manager.

Cognizant activity:

WS ISEA.

3. What Is an AEL?

The AEL is one of the ships' initial outfitting documents contained within the COSAL. It also contains all tools and consumables required for a particular system's maintenance. During the development and maintenance of AELs, the TPMTE block of MRCs and system TMs are dissected, and only tools and consumables are included on the AEL. An AEL is an outfitting document that allows the ship to be equipped with tools and consumables. Consumables included in the AEL should be all others that do not belong in the GUCL. Refer to SPCC (1995) for a detailed description of each field on the AEL.

4. What Is EMS?

PHD NSWC (2010) provided the following description of what an Environmental Management System (EMS) is and what it includes.

> Environmental Management System (EMS) is part of an organization's management system used to develop and implement its environmental policy and manage its environmental aspects. The EMS includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources. EMS applies to all HAZMAT found in the TMPTE of the MRCs and TMs. (p. 1)

a. Benefits of an EMS

Some of the benefits of an EMS are captured in the quote below, from PHD NSWC (2010).

> Organizations/Ships with a functional/applied EMS will benefit from an improved quality of work life, improved relations with regulators and stakeholders, emphasis in pollution prevention, and the integration of environmental considerations into day-to-day activities. In addition, reduced liability costs and reduced accidents have been realized by organizations with an EMS in place. (p.1)

b. Environmental Management System (EMS) Compliance

EMS is mandated by federal, state, and local laws and regulations. Table 1 provides a quick look of some of these laws and regulations, from presentation provided by Boudreau, M. W. (2009).

Table 1. Applicable laws, regulations and policies requiring EMS implementation. After Boudreau, 2009

Title	Description
Executive order 13423	Strengthening Federal Environmental, Energy, and Transportation Management, President Bush (2007). http://www.presidency.ucsb.edu/ws/index.php?pid=24469
Executive Order 13148	Greening the Government Through Leadership in Environmental Management, President Clinton (2000). http://www.presidency.ucsb.edu/ws/index.php?pid=61641&st=12969&st1=
ISO 14001	Environmental Management Systems Specification with guidance for use http://www.nssn.org
DoDI 5000.2	E7.1.6. Environment, Safety and Occupational Health (ESOH) http://akss.dau.mil/darc/darc.html
Defense Acquisition Guidebook	Para. 2.3 Systems Acquisition: Acquisition Strategy 4.4.10. Human Systems Integration (HSI) 4.4.11. Environment, Safety and Occupational Health (ESOH) 4.4.11.2. Environment, Safety, and Occupational Health (ESOH) Risk Management 6.2.5. Safety and Occupational Health 6.2.5. Safety and Occupational Health http://akss.dau.mil/dag
DFARS Part 223	Environment, Conservation, Occupational Safety, and Drug-Free Workplace: • SUBPART 223.3--Hazardous Material Identification and Material Safety Data • SUBPART 223.8-Ozone-depleting Substances • SUBPART 223.71-Storage And Disposal Of Toxic And Hazardous Materials • SUBPART 223.72-Safeguarding Sensitive Conventional Arms, Ammunition, And Explosives

5. Systems Addressed

This paper will primarily address the VLS support equipment AEL. For comparison purposes only, the paper compares the support equipment VLS AEL with the AEGIS Weapon System (AWS) AELs to provide some perspective. However, this does not mean the analysis does not apply to all other weapon system AELs. To one degree or another, the findings of this thesis should apply to all WS AELs in all organizations in the Navy and DoD and, if we apply the lessons learned, we will be able to reduce the TOC and logistics footprint for other weapon systems, as well.

III. DATA ELEMENTS

A. DATA

1. MRC Data

a. Description

This paper will look into MRC TPMTE data for the VLS system. Table 2 lists the scheduled and unscheduled maintenance MRC deck applicable for the DDG 110, reference DON (2009). Items listed in the MRC TPMTE are referenced with a Standard PMS Material Identification Guide (SPMIG) for easy cross reference to their Part Number (PN) and National Stock Number (NSN). It is impractical to list and enclose all MRCs contained on each deck in this paper.

Table 2. VLS PMS MRC decks reviewed

Number	Nomenclature
7211/094	MK41 MOD15, Vertical Launching System
7211/U94	MK 41 MOD15, Vertical Launching System

b. Elements

The elements included in the MRC TPMTE block are tools, parts, material, test equipment, and miscellaneous items required. Appendix A provides a snapshot of a randomly selected MRC to show the TPMTE block contents and it provides the items required to perform the maintenance action described in the MRC procedure.

2. TM Data

a. Description

This paper will look into TM TPMTE data for the VLS system. Table 3 lists the applicable TM suite for the DDG 110, which is the SW394-AF-MMO-000/VLS MK41 Vertical Launching System TM, reference DON (2007). It is impractical to enclose all of the applicable TMs in this paper.

Table 3. VLS TMs reviewed

Number	Nomenclature
SW394-AF-MMO-010/VLS	Front Matter
SW394-AF-MMO-020/VLS	Introduction & Description
SW394-AF-MMO-030/VLS	Missiles, Canister, and Launcher SUPPORT EQUIPMENT
SW394-AF-MMO-040/VLS	Operation and Maintenance VLS MK41 mod 15
SW394-AF-MMO-050/VLS	Fault Isolation (VLS MK 41 MODS 0, 2 AND 0 WITH ORDALT 16817)
SW394-AF-MMO-060/VLS	FAULT ISOLATION (VLS MK 41 MODS 7, 15, AND 0 WITH ORDALT 16817)
SW394-AF-MMO-070/VLS	REFERENCE DIAGRAMS, (VLS MK 41 MODS 0, 2, AND 0 WITH ORDALT 16817)
SW394-AF-MMO-080/VLS	REFERENCE DIAGRAMS (VLS MK 41 MODS 7, 15, AND 0 WITH ORDALT 16817)
SW394-AF-MMO-090/VLS	STRIKEDOWN EQUIPMENT AND OPERATIONS, (VLS MK 41 MODS 0 AND 2)
SW394-AF-MMO-100/VLS	STRIKEDOWN EQUIPMENT AND OPERATIONS, (VLS MK 41 MODS 7, 15, AND 0 WITH ORDALT 16817)
SW394-AF-MMO-110/VLS	ILLUSTRATED PARTS BREAKDOWN

b. Elements

The elements included in the TM TPMTE block are tools, parts, material, test equipment and miscellaneous items required. Appendix B provides a snapshot of a randomly selected Technical Manual to show the TPMTE block contents and it provides the items required to perform the maintenance action described in the TM procedure.

3. WS AEL Data

a. Description

During this research, many WS AELs were collected and analyzed for basic structuring, as explained in Chapter II. Table 4 lists some of the current AELs analyzed from the MK 41 Vertical Launching System and the Aegis Weapon System (AWS) that were available and provided by the cognizant personnel. Table 4 also contains other outfitting documents that will be analyzed, reference SPCC (2010). All data in Table 4 can be obtained through:

Navy Ships Parts Control Center (SPCC)
P.O Box 2020
5450 Carlisle Pike
Mechanicsburg, PA 17055-0788

Table 4. AELs and other outfitting documents reviewed

Vertical Launching System MK 41	
AEL#	**Nomenclature**
0-00423A105	Support Equipment AEL, MK41 Mod 15 VLS Baseline VII
AJA423A499	Support Equipment AEL, Vertical Launching System MK 41 MOD 22, DDH 2319 Class
0-JA423A230	Support Equipment AEL, Vertical Launching System MK 41 MOD 18, DD 2242 Class
0-JA423A230	Support Equipment AEL, Vertical Launching System MK 41 MOD 20, DDG 2317 Class
TW394-A3-ECI-020VLS-J	Integrated Logistics Support for the MK 41 Mod 22, DDH 2319 ship
APL 00423A759	VLS ON BOARD REPAIR PARTS (OBRP)
AEGIS Weapon System AELs	
AEL#	**Nomenclature**
A004230048	ANTENNA GROUP,AEGIS
A004230049	TRANSMITTER GROUP,AEGIS
A004230050	SIGNAL PROCESSOR GROUP,AEGIS
A004230051	FIRE CONTROL SYSTEM,AEGIS
A004230052	COMMAND AND DECISION SYSTEM,AEGIS
A004230053	WEAPONS CONTROL SYSTEM,AEGIS
A004230054	FREQUENCY CONVERTERS,AEGIS
A004230055	WATER COOLERS,AEGIS
A004230056	LINE PRINTERS AND PLOTTERS,AEGIS
A004230057	OPERATIONAL READINESS TEST SYSTEM,AEGIS
A004230058	DISPLAY SYSTEM,AEGIS
A004230059	AUXILIARY EQUIPMENT,AEGIS
A004230060	WEAPON SYSTEM,TRACKING ACCY,AEGIS
A004230095	AN/UYQ-70(V),APE/ACEG,SSE,AEGIS
A00423A068	AN/UYQ-70(V),SUPPORT EQUIPMENT,LAN,AEGIS
HAZMAT for DDG-110	
AEL#	**Nomenclature**
3-HZ5568605	HAZMAT, GENERAL PURPOSE FOR DDG-110 ONLY
General Used Consumables List (GUCL) for the DDG 110	
AEL#	**Nomenclature**
N/A	General Used Consumables List for DDG 110

b. Elements

Appendix C contains the support equipment AEL data for the MK 41 mod 15 from the VLS logistics checklist. The mod 15 data applies to the DDG 110 and is the latest data available as of July 2009, obtained from cognizant personnel.

4. GUCL Data

a. Description

During the research, a GUCL list was obtained from cognizant personnel to investigate and analyze the contents. In this particular case, the DDG 110 GUCL was obtained.

b. Elements

The elements contained in a GUCL include, but are not limited to consumable items such as pens, pencils, markers, pads, sheets, paper, erasers, paper cups and plates, plastic bags, rulers, gloves, plastic bottles, forms, brushes, padlocks, brooms and goggles.

5. TMDE Data

a. Description

The TMDE index data is a listing of all test equipment required combat system wide. The TMDE index database version 4.8.000, dated 16 Mar 2010, was obtained for this review.

b. Elements

The elements contained in the TMDE are special test equipment and general purpose test equipment listed by system supported and by SCAT code. All equipment contained in the TMDE index must have a SCAT code and be assigned and incorporated into the TMDE index by cognizant TMDE personnel.

6. APL Data

a. Description

The APLs provide support and outfitting for items that are piece parts required for the particular maintenance action, which are listed in the TMPTE of MRCs and TMs. The APL reviewed for this effort was the OBRP APL 00423A759.

b. Elements

The elements are items such as gaskets, shims, filters, and anything else that is part of equipment that will need to be replaced during maintenance.

7. HAZMAT AEL Data

a. Description

The HAZMAT AEL provides one of the most important services in terms of environmental concerns and compliance with the EMS laws and regulations (reference to Table 1). The HAZMAT AEL contains material required for particular maintenance actions listed in the TMPTE of MRCs and TMs, it also provides support and outfitting for all HAZMAT items on the ship.

b. Elements

HAZMAT includes, but is not limited to, batteries (AA, AAA, C, D, cell phone batteries, UPS, etc.), dry cleaning solvents, oil, grease, acetone, toluene, MEK, paints, polysulfide, trichloroethane, mercury thermometers, and florescent lights (although the florescent lights are energy efficient, they contain mercury and have to be disposed of properly) PHD NSWC (2007).

B. TOTAL OWNERSHIP COST (TOC) CONSIDERATIONS

Considerations in TOC reduction should be implemented in all requirements documents and outfitting documentations. At a quick glance into the data, it is apparent that there are many redundancies within and between each outfitting document. It is imperative to reduce these redundancies in order to reduce the TOC. Reduction of TOC is a mandate. Chapters IV and V will provide a detailed analysis, conclusion, and recommendations in determining how to reduce the TOC by reducing the logistics footprint through the outfitting documentation.

C. SUMMARY

This chapter provided an overview of the data elements that are contained within each of the outfitting documents that support the maintenance concept, in direct support of the MRCs and TMs. In the next chapter, we will analyze the data of each item.

IV. ANALYSIS OF DATA COLLECTED

A. ANALYSIS

1. MRC Data Analysis

a. Description

After reviewing and analyzing the data from the VLS PMS MRC decks referenced in Table 2, it was determined that tools, parts, materials, test equipment, and miscellaneous items were being outfitted through several documents in an inefficient manner. The VLS AEL contained most of the items listed in the MRC decks, creating a redundancy within the different outfitting documents. Also, the non-standardized utilization of substitutes creates redundancies within the MRC deck. The following were the issues found:

b. Redundancies Within the MRC deck

In the same MRC deck, redundancies were found from MRC to MRC. Identical items with different SPMIG numbers and different NSNs, with different unit of issue (UI), were found. As an example, polysulfide was listed in MRCs. One MRC SPMIG number translated to NSN 8030-00-762-8807 for a quart of polysulfide. In another MRC, a pint was listed and a third MRC listed a tube of polysulfide. A similar situation exists for paints: five gallons, one gallon, and one quart of the same type of paint are called out on different MRCs. Regarding tools in the MRCs, there were inconsistencies in the unit of issue specified. For example, one MRC will list an individual socket, while

another MRC will list the socket set (which includes all of the individual sockets). This lack of standardization within the MRC deck creates a redundancy in the AELs.

c. Redundancies Between Supporting Outfitting Documents

It was found that the VLS support equipment AEL contained most of the elements on the TPMTE. However, some of these items should have been more appropriately included in other outfitting documents, such as the TEI, APLs, HAZMAT, or the GUCL. This has created a redundancy between supporting documentation, driving onboard the ship twice as many items as required and increasing the logistics footprint.

2. TM Data Analysis

a. Description

Data from the VLS TMs, when analyzed, revealed that tools, parts, material, test equipment, and miscellaneous were going into several outfitting documents (reference Table 3). The TM analysis found the same problems listed for the MRCs. Standardization, EMS and reduction of the logistics footprint should also apply.

3. WS AEL Data Analysis

a. Description

The AEL provides support and outfitting for all tools and consumables required for the particular maintenance actions, as required in the MRCs and TMs. Data from the VLS WS AEL (reference Appendix C), was analyzed and revealed that all the items listed in the VLS MRC/TM

TMPTE block were also contained in the VLS WS support equipment AEL—literally all items! The AEL included test equipment, parts, HAZMAT and GUCL items, which do not belong in the AEL.

Data from the AEGIS WS AELs listed in Appendix H, were analyzed and it appears that only tools were listed, for the most part. The AWS AEL, although not perfect, provides a good example of what an AEL should include. Notice that the AWS AELs did not include test equipment, parts, HAZMAT, or GUCL items, with one or two exceptions.

The following segments discuss issues found on the VLS AELs.

b. Redundancies Within the AEL

Redundancies where found throughout the AELs. Items may have different National Stock Numbers (NSN), but are the same items in a different quantity or unit of issue.

(1) HAZMAT in the AELs. First, HAZMAT items do not belong on the AEL. Second, there are many redundant HAZMAT items listed in the AELs. One such item, listed multiple times, is the polysulfide sealing compound. It is listed as NSN 8030-00-762-8807 (for a quart) and as NSN 8030-00-009-5023 (for a pint) and also listed for a tube. The polysulfide sealing compound is the same item, but in different specified amounts. The VLS AEL included all of the HAZMAT items listed in the MRC TPMTE. HAZMAT material does not belong in the AEL.

(2) GUCL items in the AEL. First, the GUCL items do not belong on the AEL. Second, there are many redundant GUCL items listed in the AELs. There are some

items listed multiple times. For example, a pail is listed under NSN 7240-00-274-3875 (2 dozen) and also as NSN 7240-00-246-1097 (one). These NSNs will create a purchase order of a total quantity of 25 pails, when only 2 are required. Another example is the listing of paper and disposable cups on the AEL. There is a paper cup listed as NSN 7350-00-290-0588 and a disposable cup listed as NSN 7350-00-082-5741, either of which can perform the operation of holding liquid. These are just two of many items listed multiple times, resulting in excess material purchased, which in turn increases the TOC. This AEL also incorrectly includes all of the GUCL items listed in the MRC TPMTE.

(3) Test equipment. TE does not belong on the WS AELs. Test equipment listed in WS AELs must be deleted and added to the TMDE index.

(4) Tools redundancy. Tools shall be called out by the set only, when available in a set. When the AELs list a set and the piece parts of a set, we run into redundancies. Someone may question the following, "What happens if a socket belonging to a socket set is lost?" The answer is simple; the ship has money assigned for incidentals, the ship should replace the lost socket by purchasing one at a local hardware store. It is a commercial-off-the-shelf (COTS) item and readily available. It is also the crew's responsibility to maintain the tools and protect them from pilferage.

c. Redundancies Between Supporting Outfitting Documents

It was found that the VLS support equipment AEL contained all or most of the elements on the TPMTE.

However, some of these items should have been more appropriately included in other outfitting documents, such as the TMDE index, HAZMAT AEL, GUCL, or APLs. Having all items from the MRC/TM in the AELs has created a redundancy within supporting documentation. Gross examples of redundancies between outfitting documents can be seen just by comparing the GUCL and HAZMAT items with the VLS support equipment AEL. Listing TE, GUCL items, and HAZMAT in the AEL increases the TOC.

4. GUCL Data Analysis

The following issues were found with the GUCL and are described below:

a. Description

The GUCL provides support and outfitting for all generally used consumables required for the particular maintenance action and that are listed in the TMPTE of MRCs and TMs. Data from the GUCL, referenced in Appendix D, was analyzed and it was found that while it contains most of the items used in the VLS MRC TMPTE, there were some items not found.

b. Redundancies Within the GUCL

Redundancies were found within the GUCL, such as listing the same item with the same NSN numerous times. This creates redundancy in purchase orders, which adds to the overall cost. This problem was found throughout the document.

c. Redundancies Between Supporting Outfitting Documents

The GUCL contained most consumables found also in the VLS support equipment AEL. The GUCL drives consumable items to be outfitted in the ship. Having items duplicated in the WS AEL drive twice as many items as needed onboard the ship.

During the analysis of the GUCL, there were some items found in the GUCL that may be better supported in a different outfitting document. While these items found are in a very small quantity, they do create redundancy.

There where some items such as the adapter connectors, removal tool and power stripper, that were listed in the GUCL. These items may or may not be listed in another outfitting document.

5. TMDE Index Data Analysis

a. Description

During the analysis of the TMDE index V 4.8.000, it was found that the MK 41 mod 15 index has not been created. What does this mean? It means the EP-10 Salinity conductivity meter, multi-meters, CO meter, etc., required by the VLS mod 15 are not outfitted through the SPEETRL. These items should be incorporated in the TMDE and deleted from the VLS WS AEL, where they currently reside.

b. Duplication Within the TMDE Index

Appendix G shows the TMDE index for the VLS Mk 41 mod 7. During review, it was observed that, while there are five items listed, only two multi-meters are outfitted,

since they have an allowance quantity of one each. The same scenario was observed in the segment supporting the VLS mod 0 and mod 2. These multi-meters are redundant as they are substitutes of each other and digital is preferred over the analog multi-meter. Also, it was observed that the SCAT coded item 4212 should be preferred over the 4237 since it has a better accuracy (4-1/2 digits of accuracy versus a 3-1/2).

c. Not All VLS MK 41 MODs Are Supported

Although there are several different applicable configurations for the MK 41, only MODs 0, 2 and 7 were found in the TMDE index. The MK 41 Mod 15 for the USN was not found. Refer to Appendix G for a snapshot of the TMDE index. What about Foreign Military Sales (FMS) VLS MODs? Currently there are 24 different FMS VLS configurations with no support in the TMDE. There are some gaps in the VLS TE world that need to be corrected by cognizant S&TE personnel.

d. Missing or Not Required Items

Research uncovered both missing and items that may or may not be required listed in the TMDE index. For example, the salinity conductivity meter is not found in the TMDE index but it is a requirement in the MRC TPMTE. Other items, such as the frequency counter and the oscilloscope are currently listed but may not be required. These two items may have been needed in the past, but are no longer required.

6. APL Data Analysis

The APLs provide support and outfitting for items that are piece parts of the system and are required for the particular maintenance action and that are listed in the TMPTE of MRCs and TMs. While items such as, O-RING NSN 5331-01-123-3302 is required and listed in the VLS support equipment AEL, it was not found in the OBRP APL 00423A759. Parts should be removed from the VLS WS AEL, items such as this one should be place in the APL.

7. HAZMAT AEL Data Analysis

a. Description

The HAZMAT AEL provides support and outfitting for all HAZMAT material required for the particular maintenance actions and are listed in the TMPTE of MRCs and TMs. Data from the HAZMAT AEL, referenced in Appendix F, was analyzed and it was found that while it contains most of the items used in the VLS MRC TMPTE, there were some items not found. However, it is the ISEA responsible for a particular system to provide the data to cover this gap.

b. Redundancies Within the HAZMAT AEL

After analyzing the HAZMAT AEL, it was found that it contains redundancies within itself. The following are tangible examples:

(1) Cleaning compound. Table 5 shows 13 entries for different brands of cleaning compounds in different quantities. These compounds appear to be substitutes for each other.

Table 5. HAZMAT AEL cleaning compound extract. From SPCC, 2010

Part Number	Nomenclature	National Stock Number
S237-6973-160Z	CLEANING COMPOUND	6850-00-105-3084
MIL-C-11090	CLEANING COMPOUND	6850-00-224-6665
TT-N-95	CLEANING COMPOUND	6810-00-238-8119
MIL-C-85704	CLEANING COMPOUND,E	6850-00-181-7594
7930-01-418-1104	CLEANING COMPOUND,H	7930-01-418-1104
MILC43454 2OZBTL	CLEANING COMPOUND,O	6850-00-392-9751
1323	CLEANING COMPOUND,O	7930-00-459-2247
IMPACT	CLEANING COMPOUND,S	6850-01-380-4369
OASIS 136	CLEANING COMPOUND,S	7930-01-398-0955
GREASETRIP PLUS	CLEANING COMPOUND,S	7930-01-418-1229
15461	CLEANING COMPOUND,S	7930-01-418-1240
15905	CLEANING COMPOUND,S	7930-01-521-6604
62380925	CLEANING SOLUTION,P	7930-01-418-1401

(2) Dishwashing compound. Table 6 listed six entries for different brands of dishwashing compounds in different quantities. These compounds appear to be substitutes for each other.

Table 6. HAZMAT AEL dishwashing compound extract. From SPCC, 2010

Part Number	Nomenclature	National Stock Number
10371	DISHWASHING COMPOUND	7930-01-152-7072
SOLITAIRE	DISHWASHING COMPOUND	7930-01-177-5119
MAG FUSION 6-3LBS	DISHWASHING COMPOUND	7930-01-494-0067
SILVER FUSION 3-4.0LBS	DISHWASHING COMPOUND	7930-01-494-0068
17060	DISHWASHING COMPOUND	7930-01-494-0906
CRYSTAL FUSION 2-2.5LBS	DISHWASHING COMPOUND	7930-01-494-0913

(3) Other. Other examples were found that appear to be substitutes, such as alcohol, oil, laundry detergent, etc.

c. Redundancies Among Supporting Outfitting Documents

The VLS support equipment AEL contains all of the HAZMAT contained in the MRCs and TMs TPMTE block, creating redundancy. It is the ISEA S&TE responsibility to delete

this HAZMAT from their support equipment AEL and forward any discrepancies to the HAZMAT AEL manager.

B. TOTAL OWNERSHIP COST (TOC) CONSIDERATIONS

During the analysis of the different outfitting documents, it was found that there were redundancies within each document and between outfitting documents. These redundancies are augmenting the TOC of the ship. Simple standardization and elimination of redundancies can reduce the logistics footprint and reduce the TOC. The cost of one consumable or HAZMAT may seem insignificant, however, added together from all of the ships, the extra spending could reach hundreds of thousands of dollars during the life cycle of our ships.

C. SUMMARY

This chapter provided the data analysis of each outfitting document that supports the maintenance concept, in direct support of the MRCs and TMs. It was found that redundancies exist within and among each supporting document, as well as in the requirement documents (MRCs/TMs). These redundancies drain the outfitting and ships' OPTAR money, augmenting the TOC. The fix is easy, but to reach it, all cognizant personnel will have to do their part. The conclusions and recommendations will be provided in the next chapter.

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V. RECOMMENDATIONS AND CONCLUSIONS

A. RECOMMENDATIONS

This chapter provides recommendations to mitigate the problems that were found during the data analysis in Chapter IV, which will impact outfitting documents and contribute to the augmentation of the Total Ownership Cost of our fleet, followed by the conclusions.

1. MRC Recommendations

a. Description

Data in the MRC Deck are the requirements to be satisfied through and driven by the outfitting documents, therefore, it is important to standardize the items found in the MRC and work concurrently with the S&TE manager to avoid redundancies and minimize impact in the TOC.

b. Redundancies Within the MRC Deck

Avoid redundancies by standardizing items used, making sure the different SPMIG numbers in the TPMTE of the MRC deck are not the same item. Also, make sure to use the SPMIG with the smallest amount needed to perform the maintenance task in the required timeframe. Remember, some of the items have limited shelf life.

Standardize within the MRC deck minimizing the total number of SPMIG used throughout the deck. Look for one type of grease/oil that may be acceptable to perform the task opposed to having several types of grease/oils.

For tools, call out the set in lieu of the piece parts of the asset, when possible. Build a database and share it with other cognizant personnel.

Comply with EMS laws and regulations, look for environmentally friendly substitutes. As an example P-D-680 dry cleaning solvent was found in the USN VLS PMS in 54 MRCs (reference Appendix E). This item is hazardous and can easily be substituted with simple green which is biodegradable. Work concurrently with the S&TE manager to minimize number of items supported.

c. Redundancies Between Supporting Outfitting Documents

Work with the S&TE manager to make sure the items in the TPMTE of the MRC deck are located in the right outfitting document.

2. TM Recommendations

a. Description

The recommendations for the TMs are the same as for the MRCs, as described in the previous paragraph.

3. AEL Recommendations

a. Description

After analyzing the VLS support Equipment AELs, it is apparent that a revamp and re-distribution of items into the appropriate outfitting document is urgently required.

When comparing the VLS AELs (reference Appendix C) to the AWS AELs (reference Appendix H) you will notice that they are different in content. Standardization needs to be reached between AELS.

From the AEGIS WS AELs (reference Appendix H), while it did not include items that do not belong in an AEL, such as test equipment, parts, HAZMAT, and GUCL items, there is still room for improvement. Recommend minimizing the listing of items that are included in a set, whenever possible (e.g., sockets that belong on a wrench set or screw divers that belong on a set).

The following paragraphs provide recommendation for the VLS support equipment AEL.

b. Redundancies Within the AEL

Many redundancies were found throughout the AEL. It is recommended to work concurrently with the PMS/TM data manager to develop a condensed list of all items and update the MRCs/ TMs and outfitting documents.

(1) HAZMAT in the AELs. Recommend that all HAZMAT items be deleted from the AEL. HAZMAT items do not belong on the AEL. If required by your command to be listed in the WS AEL for referencing purposes, then, it should have the following constraints:

i. Quantity field should be “blank.”
ii. Operating Space Item (OSI) field should be blank.
iii. Special disposition code in the SM&R code should be added. A Source, Maintenance and Recoverability (SM&R) code such as, “PHOZA” should be considered. Reference Appendix I for SM&R details, NAVSUP (n.d.).

iv. Add a note to explain why the quantity field has been left blank. Sample verbiage for the remarks field in the AEL: “HAZMAT material found in this AEL has a quantity of blank and is for reference only. Hazardous materials outfitting allowances are found in the ship’s HAZMAT AEL.”

(2) GUCL items in the AEL. Recommend deletion of all GUCL items from the AEL. GUCL items do not belong on the AEL. Make sure that they are supported by the ship’s GUCL; if not supported, then forward item information to be added to the GUCL. Make sure that the items forwarded are not redundancies and provide the minimum required quantity to perform the maintenance action.

(3) Test equipment in the AEL. Recommend deleting all TE items from the AEL. TE items do not belong on the AEL.

(4) Tools redundancy. Recommend deleting all piece parts from the set. As an example, if a socket wrench set is listed in the AEL, do not also list all the sockets in the set individually, as it is redundant. Make sure that you do not have redundancies by analyzing each item that appears to be the same or perhaps used to do the same work. For example, a 6-inch screwdriver versus a 5-inch screwdriver—either/or will do the job. A 50 in-lb torque wrench versus a 75 in-lb, probabilities are that the 75 in-lb will do the job for both requirements. Work closely and concurrently with your PMS and S&TE manager.

Recommend that the Standardization and Control of Industrial Tools (SCIT) program be incorporated into your AEL. It provides a good source for quality tools

from Snap-on, Craftsman, etc., that are cross-referenced with your common tools in SCIT to provide quality tools to your ship’s crew and place SCIT NSN/SPMIG in your AEL/MRCs.

Recommend taking a closer look at the SM&R code. A SM&R code, such as PD5ZZ, should be considered as common COTS tools that are readily available. Reference Appendix I for SM&R details, NAVSUP (n.d.).

c. Redundancies Between Supporting Outfitting Documents

Recommend deleting from VLS support equipment AEL all TE, HAZMAT, GUCL items, and piece parts, and place them in the appropriate outfitting documents (TMDE index, HAZMAT AEL, GUCL or APLs). Make sure that you do not create redundancies by distributing these items in more than one outfitting document.

4. GUCL Recommendations

a. Description

During the analysis of the GUCL, some areas of opportunity for improvement were found and are shared in this section.

b. Redundancies Within the GUCL

As found during the analysis of this document, there are many items listed numerous times with the same NSN. Recommend condensing the listing by avoiding repeated items of the same NSN and totalized the quantity. This will provide at a glance how many items we are buying. It may get a better price from the vendor and there will be

fewer purchase orders to track and manage. This problem was found throughout the document.

c. Redundancies Between Supporting Outfitting Documents

During the analysis of the GUCL, there were some items found in the GUCL that may be better supported in a different outfitting document. While the items found are in a very small quantity, they do create redundancy and it is an opportunity for cost savings. Recommend working concurrently with the system cognizant personnel, for the items, and deleting them from the GUCL. The adapter connector, removal tool and power stripper are just a few of the items in question.

5. TMDE Index Recommendations

a. Description

During the analysis of the TMDE index database, some areas of opportunity for improvement were found and are shared in this section.

b. Duplication Within the TMDE Index

While the VLS Mod 15 is not supported, the MODs 0, 2 and 7 are supported in the current version of the TMDE. All current MODs in the TMDE have the same data. Recommend working concurrently with the VLS S&TE manager to delete the duplication in the two multi-meters listed (one analog and one digital). A digital multi-meter would be the best choice because it can out perform the analog meter. Additionally a multi-meter with more accuracy, 4-1/2 digits instead of 3-1/2 digits, would be better.

c. Not All VLS MK 41 MODs Supported

The VLS Mk 41 mod configurations supported in the TMDE were MK 41 MODs 0, 2 and 7. It is recommended to create and add the USN VLS mod 15 equipment segment. Also, it is recommended to create a segment for the different FMS VLS mod configurations. The S&TE manager should be able to provide the requirements for all MK 41 MODs.

d. Missing and Not Required Items

Recommend working concurrently with the S&TE cognizant personnel to update the TMDE VLS segment to incorporate and assign SCAT codes for the following VLS test equipment: EP-10 Salinity conductivity meter, 4212-digital multi-meters, Hand held CO meter, Hand held Fault Isolation Panel (FIP) diagnostics equipment, etc. as well as, deleting unnecessary listings in the TMDE of equipment that is no longer used in the VLS system (oscilloscope and frequency counter). Further recommendations are:

(1) Delete the items mentioned above from the VLS Support Equipment AEL.

(2) Delete from all MRCs/TMs SCAT code 4245 and replace with SCAT code 4212 or better.

6. APL Recommendations

Recommend working concurrently with the S&TE and MRC/TM Managers to add all spare parts required in MRCs/TMs TMPTE. As an example, item O-RING 5331-01-123-3302 needs to be added into the VLS OBRP and deleted from VLS support equipment AEL. Other items may or may not be supported by the APL.

7. HAZMAT AEL Recommendations

a. Description

During the analysis of the HAZMAT AEL, some areas of opportunity for improvement were found and are shared in this section. Recommend taking a closer look at the SM&R coding in the HAZMAT AEL. A SM&R code such as PHOZA should be considered as the “H” in the second position will denote the item as HAZMAT (reference Appendix I for SM&R details).

b. Redundancies Within the HAZMAT AEL

After analyzing the HAZMAT AEL, it was found that it contains redundancies within itself. Tables 5 and 6, show only two examples of redundancies, but redundancies were found throughout the document.

It is recommended to revamp and delete all redundancies or substitutes. This listing then can become a standardized list of authorized HAZMAT to support the maintenance concept and reduce the logistics footprint, while complying with EMS laws and regulations.

Condensing the HAZMAT AEL will contribute to fewer purchase orders which, in turn, can cut time and effort, thus reducing the TOC.

c. Redundancies Between Supporting Outfitting Documents

While the VLS support equipment AEL contains many HAZMAT, it is the ISEA S&TE responsibility to delete this HAZMAT from their support equipment AEL and forward any gaps to the HAZMAT AEL manager for support.

8. Total Ownership Cost (TOC) Considerations

It is recommended to eliminate some of the general areas of concern that were found and that contribute to the augmentation of TOC are listed below:

a. Redundancies within outfitting documents
b. Redundancies between outfitting documents
c. Non-compliance with EMS laws and regulations
d. Human factors. Loss of body of knowledge and non-concurrent engineering
e. Non-standardization on substitutes in the requirements documents (MRCs/TM) that drives the outfitting documentation

These redundancies are contributors to the high cost in outfitting, maintaining and operating our fleet. By eliminating redundancies in logistics outfitting documents, and eliminating or mitigating the HAZMAT, we will help reduce the Logistics Footprint, reduce the Total Ownership Cost of our fleet, and comply with the applicable EMS laws and regulations.

9. Summary

This section of Chapter V provides recommendations for each outfitting documents that support the maintenance concept, in direct support of the MRCs and TMs, with special emphasis in the VLS support equipment AEL. The main responsibility falls in the MRC/TM and S&TE managers to oversee that the outfitting documents that are supporting the system without incurring redundancies and inefficiencies. Furthermore, it is the responsibility of

all cognizant personnel and management to do their part in achieving optimization and effectiveness in the outfitting documentation.

B. CONCLUSIONS

In conclusion, the research indicated that the root cause of redundancies is the improper development of AELs and the duplication of items in other outfitting documents. In particular for the VLS AEL, the issues that cause redundancies are:

1. The roll-over of existing AELs into the new AEL.
2. AEL additions of items listed in the MRCs and TM, without analyzing the data. Item(s) may already be in the AEL with a different NSN.
3. Not reviewing the current MRC/TM for deleted items and leaving them in the AEL.
4. No concurrent engineering.
5. Not placing the right item, in the right outfitting document, as depicted in Figure 1.

Unfortunately, there are many other external factors that contribute to inefficiencies in the outfitting documentation, such as: re-organizations, re-groupings of people, moving sea tasks to contractors, plain ignorance of the process and the existence of different supporting documents, and disregard for the importance of AELs and the functions of a dedicated S&TE manager. All of these factors, and others, contribute to the loss of the existing body of knowledge and, in general, all tasks get done in a poor and limited fashion.

Management plays a principal role to assure the reduction of TOC is achieved, but it is the responsibility of the cognizant personnel for each outfitting and requirement document to make sure that items are in the right place, with the right quantity, and to eliminate redundancies. When in doubt, follow the basic pictorial outlays that Figure 1 provides.

The areas of opportunity that will help reduce the TOC within the context of this paper are: Redundancies within outfitting documents, redundancies between outfitting documents, Non-compliance with EMS laws and regulations, Human factors, such as, Loss of body of knowledge, non-concurrent engineering and non-standardization on substitutes in the requirements documents (MRCs/TM) that drive the outfitting documentation. By eliminating these contributors to redundancies, we will reduce the Logistics Footprint, thus, reducing the Total Ownership Cost of our fleet. While this paper was focused in the VLS weapon system support documentation, it may also apply to all other weapon system AELs to some degree. Figure 1 is the fundamental outlays for optimizing the AELs and provides the relationship between the maintenance requirements and the different outfitting documents.

This paper was developed to provide the Navy with a basic guide in reducing the logistics footprint and Total Ownership Cost through the optimization of weapon system AELs and other outfitting documentation. It is everyone’s responsibility to contribute to reducing the TOC.

On Watch (2010) interviewed Rear Admiral Thomas Eccles regarding, how NAVSEA will address TOC in 2010.

> NAVSEA is aggressively tackling TOC issues in 2010 and beyond. Most noticeably, NAVSEA is implementing a TOC objective for each employee. This is a first step in bringing culture change to the organization. NAVSEA also established a TOC Program Manager position to develop a continuous process for how we will manage TOC, focusing on culture change. The goal of the TOC program is to collect, consolidate and track all TOC initiatives in support of our directive to deliver savings to the Fleet. (p.17)

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APPENDIX A. MRC EXAMPLE OF THE TPMTE BLOCK. FROM DON, 2009

protection is necessary.

TOOLS, PARTS, MATERIALS, TEST EQUIPMENT

MATERIALS

1. [00030] Adhesive, MIL-A-46146 GRAY SILICONE Suffix A, NSN 8040-00-144-9774
   Hazardous Material User's Guide (HMUG) Group 2 , Disposal Method 1
2. [00059] Antiseize compound, MIL-A-907
   Hazardous Material User's Guide (HMUG) Group 11 , Disposal Method 1
3. [00961] Paper, abrasive (80 grit)
4. [01102] Rag, wiping
5. [01118] Primer coating, TT-P-645B
   Hazardous Material User's Guide (HMUG) Group 12 , Disposal Method 1

6. [01144] Tag, safety (as required)
7. [01356] Tape, pressure sensitive adhesive
8. [01608] Brush, paint
9. [02283] Dry cleaning solvent, P-D-680 type III, A-A-59601
   Hazardous Material User's Guide (HMUG) Group 15 , Disposal Method 1
10. Cardboard (7 1/2" x 16")

PARTS

1. [07151] Adapter, hatch motor
2. [07152] Nut, self-locking, extended washer

TOOLS

1. [00102] Bar, pry, Type 4, style 15" x 1/2"
2. [00715] Key set, socket head screw, 20 short series wrenches, 0.028" - 3/4"
3. [00863] Mallet, rubber, Type 3, class 3, 24 OZ
4. [01009] Pliers, 6", long nose, side cutter
5. [01025] Pliers, slip joint, Elec conn, mult jt, conduit nose
6. [01269] Wrench set, socket, 1/2" sq drive, 7/16" to 1-1/4", 20 PC
7. [01454] Wrench set, socket, 3/8" sq drive, 23-PC set
8. [01512] Wrench, torque, 3/8" sq drive, 0 to 150 IN-LB
9. [01752] Wrench, torque, 1/2" sq drive, 0 to 150 FT-LB
10. [02938] Wrench, torque, 3/8" sq drive, 0 to 50 FT-LB
11. [03845] Sling, multiple leg
12. [03852] Socket, socket wrench, 3/4" sq drive x 1 1/2"
13. [03853] Socket, socket wrench, 3/4" sq drive x 2 1/4"
14. [13141] Wedge, wood (8x2x4 (3) (See NOTE 3)

MISCELLANEOUS

1. [00637] Headset-chest set, electrical, Type H-200/U, sound powered (3)
2. [01365] Technical manuals/drawings/forms (CPCM)
3. [01623] Strap, lifting and handling, No NSN -- W/C provide
4. [02000] Mandatory Related Maintenance MRC (7211/094: Q-1 (PUJP))
5. [03034] Gloves, men's and women's, Heavy duty
6. [03400] Partial Mandatory Related Maintenance MRC (7211/094: D-1 (PJLR))
7. [03575] Glove set, chemical protective
8. [03707] Goggles, industrial, Not vented
9. [03857] Tray, box
10. [09741] Nitrile gloves, special, Premium sol-vex
11. [11922] Hazardous Material Users Guide (HMUG), OPNAVINST 5100.28

NOTE: Numbers in brackets can be referenced to Standard PMS Materials Identification Guide (SPMIG) for identification.

HAZARDOUS MATERIALS CONTROL STATEMENT(U)

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APPENDIX B. TM EXAMPLE OF THE TPMTE BLOCK. FROM DON, 2007

Table 6-30. Lighting Distribution Fault Isolation Procedure

Preliminary:

Purpose:

This table provides fault isolation for VLS lighting. Fault isolation is limited to circuit breakers inside the System Lighting, Power Receptacle, and Telephone Junction Box (SLJB) and wiring for both the SLJB and the Module Lighting, Power Receptacle, and Telephone Junction Box (MLJB). It is important to provide external power (outside launcher) for lighting. Launcher lighting and receptacle power is lost when ship power to the SLJB is secured. No maintenance shall be performed with power applied to the SLJB.

Reference data:

Table 6-9. Launcher Entry Procedure

Table 6-10. Launcher Exit Procedure

Table 6-42. Next Higher Level of Maintenance Required Situation Analysis Procedure

Figure 7-16. Lighting Power Distribution

Applicable UMRCs:

Refer to applicable MIP for the proper UMRC.

Tools, parts, materials, and test equipment required:

Screwdriver, torque, 0-75 in.-lb, 1/4-in. drive
Socket wrench attachment, socket-head screw, 3/16-in. x 1/4-in. drive
Wrench set, socket, 1/4-in. drive
Allen wrench, 5/32-in.
Flashlight, explosion-proof
Multimeter, Simpson 260/6XLP (SCAT-4245) or equivalent
Grating extension system ladder

General troubleshooting considerations:

A. Secure power before performing any troubleshooting on the SLJB or MLJB. When removing/replacing fuses, disconnecting/connecting cables or connectors, opening/closing equipment, or performing resistance measurements, always secure all input power to the equipment and attach safety tags. Remove safety tags and restore power after fuse replacement, measurement or work completion.

B. When an LRU is replaced, restart procedure from beginning to verify all faults are corrected and equipment is working correctly.

Preliminary requirement:

Perform Table 6-9, Launcher Entry Procedure, and removal of deluge hoses from canisters is not required for the affected module.

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APPENDIX C. MK41 MOD 15 VLS BASELINE VII, SUPPORT EQUIPMENT AEL 0-00423A105. FROM SPCC, 2010

AEL 0-00423A105					
PART NUMBER	NATIONAL STOCK NUMBER		NOMENCLATURE	QUANTITY	
				REQD	ONBD
A-A-1048 TY1	9Q 5350	00-192-5047	ABRASIVE CLOTH	2-EA	2-EA
A-A-1048	9Q 5350	00-192-5049	ABRASIVE CLOTH	2-EA	2-EA
O-A-51	9G 6810	00-223-2739	ACETONE, TECHNICAL	2-EA	2-EA
6692848-1	9B 6695	01-416-9528	ADAPTER, CALIBRATION	2-EA	2-EA
TM-1	9Q 5120	00-227-8095	ADAPTER, SOCKET WRENCH	2-EA	2-EA
B107,10M TY2CL3ST1	9Q 5120	00-240-8702	ADAPTER, SOCKET WRENCH	2-EA	2-EA
A2	9Q 5120	01-335-0696	ADAPTER, 3/8FX1/2M	2-EA	2-EA
15567-002	9Q 8040	00-144-9774	ADHESIVE	2-EA	2-EA
800125-210	9Q 8040	00-753-4800	ADHESIVE	2-EA	2-EA
MIS-22657	9Q 8040	00-061-8303	ADHESIVE EPOXY PATCH	2-EA	2-EA
MIL-A-907	9Q 8030	00-059-2761	ANTISEIZE COMPOUND	2-EA	2-EA
MIL-A-41829	9D 8415	00-082-6108	APRON, UTILITY	2-EA	2-EA
A-A-1668	9Q 8105	00-837-7757	BAG, PLASTIC 12X12IN	2-EA	2-EA
84428-231	9G 6840	01-437-4786	MICROBIOCIDE	2-EA	2-EA
SDM222	9Q 5120	00-595-8197	BIT-SCRDVR	2-EA	2-EA
TMC-105A	9Q 5120	01-367-3500	BIT-SCRDVR 1/4 FLT TIP	2-EA	2-EA
SW105-753	9Q 5120	00-044-1718	BIT,SCRDVR 9/64X1/4DR	2-EA	2-EA
02-883CC	9L 6640	01-125-0056	BOTTLE, SCREW CAP	2-EA	2-EA
H-B-0051	9Q 7920	00-291-8305	BROOM-CORN	2-EA	2-EA

AEL 0-00423A105					
PART NUMBER	NATIONAL STOCK NUMBER		NOMENCLATURE	QUANTITY	
				REQD	ONBD
15SS	9Q 7920	00-900-3577	BRUSH	6-EA	6-EA
H-B-491 TY2CL1SZ7	9Q 8020	00-559-0439	BRUSH SASH TOOL	6-EA	6-EA
H-B-178	9Q 7920	00-267-1213	BRUSH WIRE	6-EA	6-EA
H-B-491 TY2CL1SZ6	9Q 8020	00-597-5301	BRUSH-SASH TOOL OVAL	2-EA	2-EA
H-B-643 TY2CL1SZ1	9Q 7120	00-514-2417	BRUSH, ACID SWABBING	2-EA	2-EA
H-B-491 TY2CL1SZ9	9Q 8020	00-559-0389	BRUSH, PAINT	2-EA	2-EA
H-B-491	9Q 8020	00-559-0438	BRUSH, PAINT	6-EA	6-EA
308T	9Q 7920	00-244-7431	BRUSH,PLATER'S,13" HAND	2-EA	2-EA
MILB22784	9Q 7920	00-061-0037	BRUSH, SCRUB	2-EA	2-EA
HB178/1	9Q 7920	00-291-5815	BRUSH, WIRE, SCRATCH	2-EA	2-EA
AA-C-45TY2STADES3	9Q 5140	00-030-6617	CABINET, TOOL, MOBILE	2-EA	2-EA
81-0230-50PPM or 81-0230-01	9G 6695	01-423-4620	CALIBRATION KIT 50 PPM	2-EA	2-EA
GGG-C-105 TY1CL1STA	9Q 5210	00-554-7134	CALIPER SET, MICROMETER	2-EA	2-EA
GGG-C-105TYPE1CLASS3	9Q 5210	00-540-2973	CALIPER, MICROMETER	2-EA	2-EA
RTV 732	9Q 8030	00-180-6339	CALKING COMPOUND	2-EA	2-EA
13005 SIMPLE GREEN	9Q 7930	01-306-8369	CLEANING COMPOUND,S	2-EA	2-EA
P-D-680	9G 6850	01-331-3349	CLEANING COMPOUND,S	2-EA	2-EA
LLLA650TY2CLB9X17IN	9Q 7520	00-240-5503	CLIPBOARD 9 IN X 17 IN	2-EA	2-EA
A-A-1206	9Q 5350	00-221-0872	CLOTH, ABRASIVE	2-EA	2-EA
MIRACLEWIPE001	9Q 7920	00-044-9281	CLOTH, CLEANING	2-EA	2-EA
A-A-162	9Q 7920	00-401-8034	CLOTH, CLEANING	2-EA	2-EA

AEL 0-00423A105					
PART NUMBER	NATIONAL STOCK NUMBER		NOMENCLATURE	QUANTITY	
				REQD	ONBD
C1851	9Q 7920	00-292-9204	CLOTH, LINT FREE	2-EA	2-EA
N700A	9Q 8030	00-145-0111	COATING COMPOUND-NPRN	2-EA	2-EA
MIL-C-81706 CL3	9Q 8030	01-018-2838	CORROSION RESISTANT	2-EA	2-EA
MIL-C-29133 LARGE	9D 8415	00-601-0797	COVERALLS, DISPOSABLE	10-EA	10-EA
A-A-50358 or MIL-C-29133 XLARGE	9D 8415	00-601-0801	COVERALLS, DISPOSABLE	10-EA	10-EA
TF-26	9Q 5120	00-189-7895	CROWFOOT ATTACHMENT	2-EA	2-EA
TF-32	9Q 5120	00-229-2772	CROWFOOT ATTACHMENT	2-EA	2-EA
AN8508-10B	9Q 5120	01-348-9464	CROWFOOT ATTACHMENT	2-EA	2-EA
AN8508-12B	9Q 5120	01-348-9466	CROWFOOT ATTACHMENT	2-EA	2-EA
A-A-2577 TY1STACL3	9Q 7350	00-290-0588	CUP-PAPER	2-EA	2-EA
A-A-2595 TY1SZ80Z	9Q 7350	00-082-5741	CUP, DISPOSABLE	2-EA	2-EA
GGD226	9L 6515	00-324-5500	DEPRESSOR, TONGUE	2-EA	2-EA
P-D-1747CL1	9Q 7930	00-068-1669	DETERGENT, GENERAL P	2-EA	2-EA
DS017	9G 3439	00-132-1331	DESOLDERING TOOL	2-EA	2-EA
MIL-D-16791	9Q 7930	00-985-6911	DETERGENT, GENERAL P	2-EA	2-EA
A-A-1016	9Q 5345	00-196-1698	DISK, ABRASIVE 80GRIT	2-EA	2-EA
O-C-265	9G 6810	00-107-1510	DISTILLED WATER, ACS	2-EA	2-EA
DDD-D-00690 TY2	9Q 8340	00-205-1911	DROPCLOTH, PAINTER	2-EA	2-EA
MIL-D-43703	9Q 8110	01-150-0677	DRUM, SHIPPING & S	2-EA	2-EA
AGA4185	9Q 8010	01-441-6147	ENAMEL	2-EA	2-EA
MIL-E-15090 TYPE3	9Q 8010	01-441-5909	ENAMEL-LGT GY	2-EA	2-EA

AEL 0-00423A105					
PART NUMBER	NATIONAL STOCK NUMBER		NOMENCLATURE	QUANTITY	
				REQD	ONBD
CLASS2GR					
MIL-P-24441 /22 TY3 FA152	9Q 8010	01-302-3606	EPOXY COATING KIT	2-EA	2-EA
MIL-P- 24441 /21 TY3 FA151	9Q 8010	01-302-6838	EPOXY COATING KIT	2-EA	2-EA
MIL-P-24441 /20 TY3 FA150	9Q 8010	01-347-0916	EPOXY COATING KIT	2-EA	2-EA
MIL-P-24441/2 TY2	9Q 8010	01-350-4741	EPOXY COATING KIT	2-EA	2-EA
MIL-P-24441/1 TY1	9Q 8010	01-350-4742	EPOXY COATING KIT	2-EA	2-EA
MIL-P-24441	9Q 8010	01-350-4743	EPOXY COATING KIT	2-EA	2-EA
A-A-132	9Q 7510	00-223-7046	ERASER-RUBBER	2-EA	2-DZ
TTE781	9G 6810	00-285-4309	ETHYLENE GLYCOL MON	2-EA	2-EA
A-A-2170	9Q 5120	00-227-8105	EXTENSION, SOCKET WR	2-EA	2-EA
41B305-500	9Q 5120	00-227-8107	EXTENSION, SOCKET WR	2-EA	2-EA
54938 OR 78-8063-1506-1	9Q 7910	01-541-9341	FILTER, VACUUM CLEAN	1-EA	1-DZ
GA-265A	9Q 5120	01-355-2072	FINGER, MECHANICAL	2-EA	2-EA
MIL-F-3747	9Q 6230	00-299-3035	FLASHLIGHT	2-EA	2-EA
MIL-F-12224	9D 8430	00-262-5295	FOOTWEAR COVERS, TOX	2-EA	2-EA
MIL-F-12224 LARGE	9D 8430	00-262-5296	FOOTWEAR COVERS, TOX	2-EA	2-EA
GGG-G-17	9Q 5120	00-221-2047	GAGE-TPR WI THKNS E	2-EA	2-EA
MS22520-6-005	9Z 5220	01-023-6517	GAGE, CRIMPING TOOL	2-EA	2-EA
F71371	9Q 5210	00-221-1999	GAGE, THICKNESS	2-EA	2-EA
M16377/26-002	9Z 6210	00-635-8819	GLOBE WHITE	2-EA	2-EA
MIL-G-12223	9D 8415	00-753-6552	GLOVES-TOXILOGICAL SZ M	2-EA	2-EA

AEL 0-00423A105					
PART NUMBER	NATIONAL STOCK NUMBER		NOMENCLATURE	QUANTITY	
				REQD	ONBD
ZZ-G-381	9D 8415	00-266-8677	GLOVES,CHEMICAL PROTEC	2-EA	2-EA
MIL-G-2366	9D 8415	00-268-7870	GLOVES, LTHR, H V DY	2-EA	2-EA
MIL-G-44013	9D 8415	01-092-3910	GLOVES, HEAT PROTECT	2-EA	2-EA
37G2940	9Q 8415	00-634-4658	GLOVES, MEN'S	2-EA	2-EA
9400 CHEMI-CLR-4C	9Z 4240	01-364-2994	GOGGLES, INDUSTRIAL	6-EA	6-EA
MIL-G-23827	9G 9150	00-985-7246	GREASE	2-EA	2-EA
MIL-L-15719	9G 9150	01-080-9652	GREASE, SILICON	2-EA	2-EA
2691216-1	9G 9150	00-145-0268	GREASE, AIRCRAFT	2-EA	2-EA
DOD-G-24508	9G 9150	00-149-1592	GREASE, BALL AND ROL	2-EA	2-EA
SA8277092	9G 9150	00-530-6814	GREASE, WIRE ROPE-EX	2-EA	2-EA
GGG-H-86 TY2CLISTB	9Q 5120	00-061-8541	HAMMER, HAND	2-EA	2-EA
1940708	9Q 5120	00-249-1076	HANDLE, SOCKET WRENCH	2-EA	2-EA
A475	9N 5965	00-900-6401	HEAD-CHEST-ST H200/U	6-EA	6-EA
HG501	9C 4940	01-028-7493	HEAT GUN	2-EA	2-EA
497AJK OR 78-9236-5077-0	9Q 7910	01-534-4522	HEPA VACUUM	2-EA	2-EA
657A	9Q 5210	01-367-7656	HOLDER, DIAL INDICAT	2-EA	2-EA
L-H-520	9C 4720	00-729-5338	HOSE ASSEMBLY, NONME	2-EA	2-EA
SK510192PC11	9Q 5210	00-243-9649	INDICATOR-DL	2-EA	2-EA
M81969/14-10	9Q 5120	01-330-3822	INSERTER AND REMOVE	4-EA	4-EA
801-6161851ITEM67	9G 5970	00-877-8591	INSUL TAPE, 3/4" WD	2-EA	2-EA

AEL 0-00423A105					
PART NUMBER	NATIONAL STOCK NUMBER		NOMENCLATURE	QUANTITY	
				REQD	ONBD
120-8	9G 5970	00-241-5406	INSULATING COMPOUND	2-EA	2-EA
TT-I-735	9G 6810	00-983-8551	ISOPROPYL ALCOHOL	2-EA	2-EA
56011	9Q 5120	00-935-4641	KEY SET, SOCKET HEAD	2-EA	2-EA
28569	9Q 5120	00-826-6007	KEY-HEX 3/16	2-EA	2-EA
0181-5	9Q 5120	00-198-5398	KEY, SOCKET HEAD SCR	2-EA	2-EA
1090989	9Q 5120	00-224-4659	KEY, SOCKET HEAD SCR	2-EA	2-EA
GGG-K-00275	9Q 5120	00-889-2163	KEY, SOCKET HEAD SCR	2-EA	2-EA
GGG-K-481 TY1CLIST1	9Q 5110	00-240-7070	KNIFE, CRAFTSMAN'S	2-EA	2-EA
GGG-K-484	9Q 5110	00-240-5943	KNIFE, POCKET	2-EA	2-EA
GGG-K-481	9Q 5110	00-223-8827	KNIFE, SCRAPING	2-EA	2-EA
M16377-49-306-2	9Z 6230	00-244-3996	LIGHT, EXTENSION	2-EA	2-EA
BRAY0300	9G 9150	00-231-6689	LUBE OIL, GENERAL PURP	3-EA	3-EA
MIL-L-23398	9G 9150	01-260-2534	LUBRICANT, SOLID FILM	2-EA	2-EA
5597830-1	9G 9150	00-482-6884	LUBRICATING COMPOUND	2-EA	2-EA
99-30-171	9Z 4930	00-965-0288	LUBRICATING GUN, HAN	2-EA	2-EA
GGG-H-33	9Q 5120	00-293-3399	MALLET, RUBBER	2-EA	2-EA
EP-10	9L 6630	01-188-5368	METER, CONDUCTIVITY	2-EA	2-EA
12640	9Q 5120	00-618-6901	MIRROR, INSPECTION	2-EA	2-EA
24	9Q 5120	01-313-4097	MIRROR, INSPECTION	2-EA	2-EA
77/BN	IHM6625	01-336-3372TE	MULTI-METER	2-EA	2-EA
A195195	9Z 4240	01-436-8838	NITRILE GLOVES	2-EA	2-EA

AEL 0-00423A105					
PART NUMBER	NATIONAL STOCK NUMBER		NOMENCLATURE	QUANTITY	
				REQD	ONBD
2069-US-0-1-56-002	9Z 4210	00-392-2943	NOZZLE, FIRE HOSE	2-EA	2-EA
MIL-P-83461/1	9Z 5331	01-123-3302	O-RING, SEAT	2-EA	2-EA
F-TE036	9B 4240	01-516-2005	PADS, KNEE	2-EA	2-EA
A-A-1273TY1	9Q 7240	00-274-3875	PAIL-3-GALLON	2-EA	2-EA
L-P-65	9Q 7240	00-246-1097	PAIL, RUBBER 3-GAL	2-EA	2-EA
A-A-300 TY2	9Q 7290	00-224-8308	PAN-DUST STL	2 EA	2-EA
MIL-P-43940	9Z 7310	00-238-5163	PAN, STEAM TABLE	2-EA	2-EA
220GRIT9X11IN	9Q 5350	00-224-7209	PAPER, ABRASIVE	2-EA	2-EA
L-P-378	9Q 8135	00-579-6487	PLASTIC SHEET	2-EA	2-EA
G243085-1	9Q 5120	00-247-5177	PLIERS	2-EA	2-EA
7150736	9Q 5120	00-256-2150	PLIERS	2-EA	2-EA
GGG-W-340	9Q 5120	00-305-2306	PLIERS, TWISTER	2-EA	2-EA
7638739	9Q 5110	00-224-1532	PLIERS, DIAGONAL CUT	2-EA	2-EA
0200	9Q 5120	00-288-9717	PLIERS, RETAINING RI	2-EA	2-EA
276	9Q 5120	00-223-7396	PLIERS, SLI P JOINT	2-EA	2-EA
529	9Q 5120	00-624-8065	PLIERS, SLIP JOINT	2-EA	2-EA
A-A-2786	9Q 8010	01-368-2633	PRIMER COATING	2-EA	2-EA
TT-P-645	9Q 8010	01-285-1329	PRIMER COATING-YEL	2-EA	2-EA
76455	9Q 8030	00-900-2373	PRIMER, SEALING COMP	2-EA	2-EA
2126	9Q 5120	00-224-1389	PRY BAR	2-EA	2-EA
7251044-9	1HM5340	01-509-1374	PULLER ASSY DELUGE	2-EA	0-EA

AEL 0-00423A105					
PART NUMBER	NATIONAL STOCK NUMBER		NOMENCLATURE	QUANTITY	
				REQD	ONBD
GGG-P-831 TY8CLST1	9Q 5120	00-883-3003	PUNCH SET, DRIVE PIN	2-EA	2-EA
96 5/16	9Q 5120	00-240-8898	PUNCH, DRIFT 1/8 IN	2-EA	2-EA
A-A-531	9Q 7920	00-205-1711	RAG, WIPING	2-EA	2-EA
6608952-9	9Q 5120	01-415-2154	REMOVAL TOOL, DUST C	2-EA	2-EA
8210 N-95	9Z 4240	01-429-2685	RESPIRATOR, PARTICUL	2-EA	2-EA
T-R-571	9Q 4020	00-068-7907	ROPE, FIBROUS	2-EA	2-EA
CF616	9Q 5210	00-971-8827	RULE, MACHINIST'S	2-EA	2-EA
A-A-563	9Q 7510	00-935-1005	RULER, PLASTIC	2-EA	2-EA
00-S-101	9Q 5130	00-596-1176	SANDER, DISK PNEUMATIC 7	2-EA	2-EA
46X16	9Q 5110	00-255-0420	SCISSORS, ELECTRICIA	2-EA	2-EA
41S1056-10	9Q 5120	00-278-1270	SCREWDRIVER	2-EA	2-EA
AM-606	9Q 5120	00-596-0938	SCREWDRIVER ATTACHM	2-EA	2-EA
TMA5	9Q 5120	00-596-0940	SCREWDRIVER ATTACHM	2-EA	2-EA
HTS56	9Q 5120	00-863-4942	SCREWDRIVER ATTACHM	2-EA	2-EA
HTS-3	9Q 5120	00-863-4944	SCREWDRIVER ATTACHM	2-EA	2-EA
208FA	9Q 5120	01-195-0640	SCREWDRIVER ATTACHM	2-EA	2-EA
GGG121	9Q 5120	00-580-0334	SCREWDRIVER SET-CRS TIP	2-EA	2-EA
250	9Q 5120	00-288-8739	SCREWDRIVER SET, JEW	2-EA	2-EA
SSDEP-30	9Q 5120	00-060-2004	SCREWDRIVER, CROSS T	2-EA	2-EA
SSDP64	9Q 5120	00-224-7375	SCREWDRIVER, CROSS T	2-EA	2-EA
SSDP22	9Q 5120	00-227-7293	SCREWDRIVER, CROSS T	2-EA	2-EA

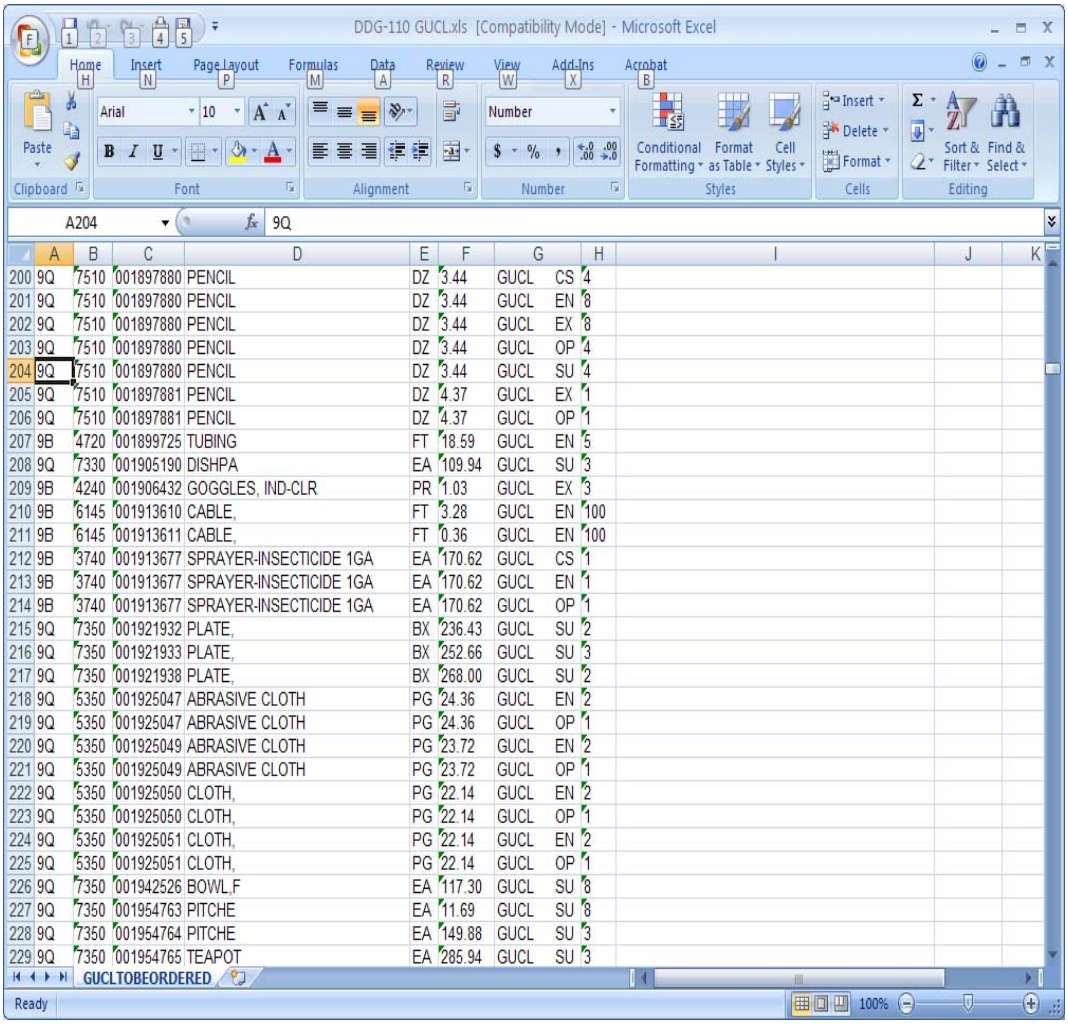
AEL 0-00423A105					
PART NUMBER	NATIONAL STOCK NUMBER		NOMENCLATURE	QUANTITY	
				REQD	ONBD
SSDP63	9Q 5120	00-234-8912	SCREWDRIVER, CROSS T	2-EA	2-EA
SSDP42	9Q 5120	00-234-8913	SCREWDRIVER, CROSS T	2-EA	2-EA
11655777-7	9Q 5120	00-240-8716	SCREWDRIVER, CROSS T	2-EA	2-EA
GGG-S-121 TY6CL1	9Q 5120	00-596-0861	SCREWDRIVER, CROSS T	2-EA	2-EA
SDD4	9Q 5120	00-222-8852	SCREWDRIVER, FLAT TI	2-EA	2-EA
GGG-S-121	9Q 5120	00-227-7334	SCREWDRIVER, FLAT TI	2-EA	2-EA
8178-27	9Q 5120	00-236-2127	SCREWDRIVER, FLAT TI	2-EA	2-EA
A130-2	9Q 5120	00-236-2140	SCREWDRIVER, FLAT TI	2-EA	2-EA
B107.15 TY1CL1DEA	9Q 5120	00-905-6730	SCREWDRIVER, FLAT TI	2-EA	2-EA
41S1634-100	9Q 5120	00-241-3170	SCREWDRIVER, OFFSET	2-EA	2-EA
020	9Q 5120	00-287-2130	SCREWDRIVER, OFFSET	2-EA	2-EA
TQS-6-FU	9Q 5120	00-890-7816	SCREWDRIVER, TORQUE	2-EA	2-EA
GGG-S-121 8INCH	9Q 5120	00-905-6729	SCREWDRIVER, 3/8X8"	2-EA	2-EA
9176642	9Q 5120	00-221-7063	SCRIBER, MACHINIST'S	2-EA	2-EA
30LS5-2	9Z 5340	00-559-8718	SEAL, ANTIPILFERAGE	2-EA	2-EA
083-21	9Q 8030	00-081-2331	SEALANT	2-EA	2-EA
PR-1436-G CLASS B	9Q 8030	00-009-5023	SEALING COMPOUND	2-EA	2-EA
084-21	9Q 8030	00-081-2333	SEALING COMPOUND	2-EA	2-EA
MIL-S-81733	9Q 8030	00-762-8807	SEALING COMPOUND	2-EA	2-EA
MILS8660	9G 6850	00-880-7616	SILICONE COMPOUND	2-EA	2-EA
MIL-C-47009	9G 6850	01-046-3643	SILICONE COMPOUND	2-EA	2-EA

AEL 0-00423A105					
PART NUMBER	NATIONAL STOCK NUMBER		NOMENCLATURE	QUANTITY	
				REQD	ONBD
8710A64-0097	9Q 5120	00-243-7328	SOCKET EXTENSION	2-EA	2-EA
1940722	9Q 5120	00-198-5390	SOCKET HEAD KEY	2-EA	2-EA
A-A-1401	9Q 5120	00-935-7309	SOCKET SET, SOCKET W	2-EA	2-EA
4080-10	9Q 5120	00-555-2353	SOCKET-SKTH SCR 3-16	2-EA	2-EA
TMD-10	9Q 5120	00-935-7487	SOCKET, SKT WR 5-16IN	2-EA	2-EA
ST-818	9Q 5120	00-180-1019	SOCKET, SKT WR, 9-16 SQ	2-EA	2-EA
B107.L CLISTA	9Q 5120	00-189-7917	SOCKET, SOCKET WRENCH	2-EA	2-EA
12Z731-8	9Q 5120	00-293-0094	SOCKET, SOCKET WRENCH	2-EA	2-EA
A-A-1427	9Q 6810	00-598-7316	SODIUM HYPOCHLORITE	2-EA	2-EA
804606	9G 3439	00-269-9610	SOLDER	2-EA	2-EA
W-S-570	9G 3439	00-204-3855	SOLDERING PENCIL,EL	2-EA	2-EA
NAS1387-3	9B 5940	00-168-3316	SPLICE, CONDUCTOR	2-EA	2-EA
8767156	9Q 7920	00-240-2559	SPONGE	2-EA	2-EA
LEMANIA-28260	9G 6645	00-126-0286	STOPWATCH	2-EA	2-EA
03208	9G 5975	00-074-2072	STRAP, TIEDOWN, ELECT	2-EA	2-EA
W-0764	9Z 4240	01-063-4880	STRAP, WRIST, ELECTRO	2-EA	2-EA
45-202	9QD 5110	00-268-4224	STRIPPER, WIRE, HAND	2-EA	2-EA
2697756 PIECE 3	3ND 5930	01-291-1724	SWITCH, SAFETY OBSER	2-EA	2-EA
A-A-900	9Q 8135	00-178-9151	TAG, SHIPPING	2-EA	2-EA
L-T-100	9Q 7510	00-987-6661	TAPE-PRESSURE SENSITIVE	2-EA	2-EA
17 3/4" BLACK	9G 5970	00-419-4291	TAPE, BLACK	2-EA	2-EA

AEL 0-00423A105					
PART NUMBER	NATIONAL STOCK NUMBER		NOMENCLATURE	QUANTITY	
				REQD	ONBD
130C 1INX30FT	9G 5970	01-290-1623	TAPE, INSULATION, ELE	2-EA	2-EA
A-A-1586	9Q 71510	00-074-4969	TAPE, PRESSURE SENSI	2-EA	2-EA
P-705-1IN	9Q 7510	00-283-0612	TAPE, PRESSURE SENSI	2-EA	2-EA
MILT23397	9Q 7510	00-473-9513	TAPE, PRESSURE SENSI	2-EA	2-EA
MIL-T-22-85TY2	9Q 7510	00-852-8180	TAPE, PRESSURE SENSI	2-EA	2-EA
TT-T-291 TY1	9Q 8010	00-242-2089	THINNER-PAINT	2-EA	2-EA
GGG-T-558/7TYBCL1	9Q 5140	00-319-5079	TOOL BOX, PORTABLE	2-EA	2-EA
6695884-1	9Q 5120	01-367-4646	TOOL,DELUGE HOSE VALVE	2-EA	2-EA
A-A-123	9Q 8530	01-293-1387	TOOTHBRUSH	2-EA	2-EA
GGG-W-00686 TY3CL1	9Q 5120	01-396-6070	TORQUE WRENCH	2-EA	2-EA
S8800-461043	9Z 5510	00-268-3480	WEDGE, WOOD	2-EA	2-EA
900010-32C	9Z 9505	00-293-4208	WIRE, NONELECTRICAL	2-EA	2-EA
600X800	9N 5920	01-168-2044	WORK STATION KIT, EL	2-EA	2-EA
51200017510	9Q 5120	00-322-6231	WRENCH SET SKT 3/8DR	2-EA	2-EA
GGG-W-636 TY3	9Q 5120	00-148-7917	WRENCH SET, COMBINAT	2-EA	2-EA
GGG-W-641	9Q 5120	00-081-2305	WRENCH SET, SOCKET	2-EA	2-EA
A-A-1399	9Q 5120	00-081-2307	WRENCH SET, SOCKET	2-EA	2-EA
A-A-2490	9Q 5120	00-277-5781	WRENCH-BX 7-16X1-2IN	2-EA	2-EA
W74	9Q 5120	00-293-0008	WRENCH-OE ADJ 15IN NMAG	2-EA	2-EA
1248	9Q 5120	00-203-4804	WRENCH-OE FXD 1 1-2IN	2-EA	2-EA
1244	9Q 5120	00-203-4806	WRENCH-OE FXD 1 3-8IN	2-EA	2-EA

AEL 0-00423A105					
PART NUMBER	NATIONAL STOCK NUMBER		NOMENCLATURE	QUANTITY	
				REQD	ONBD
9B1496	9Q 5120	00-203-4802	WRENCH-OE FXD 1 5/8IN	2-EA	2-EA
1232	9Q 5120	00-203-4812	WRENCH-OE FXD 1IN	2-EA	2-EA
10394794-1	9Q 5120	00-239-0017	WRENCH-SKT 9/16	2-EA	2-EA
9002M63G01	9Q 5120	00-293-2224	WRENCH-SKTH SCR	2-EA	2-EA
J-1313-B	9Q 5120	00-247-2540	WRENCH-TORQ	2-EA	2-EA
2163993	9Q 5120	00-776-1841	WRENCH-TORQ	2-EA	2-EA
A-A-1274	9Q 5120	00-900-1283	WRENCH, TORQUE	2-EA	2-EA
41W490	9Q 5120	00-240-1414	WRENCH, ADJUSTABLE	2-EA	2-EA
10510986	9Q 5120	00-264-3796	WRENCH, ADJUSTABLE	2-EA	2-EA
AD10	9Q 5120	01-367-3393	WRENCH, ADJUSTABLE	2-EA	2-EA
A-A-1342	9Q 5120	00-184-8678	WRENCH, BOX	2-EA	2-EA
OEX48	9Q 5120	00-277-8834	WRENCH, BOX AND OPEN	2-EA	2-EA
A-A-1358	9Q 5120	00-288-9997	WRENCH,BOX AND OPEN	2-EA	2-EA
2421010-21	9Q 5120	00-228-9527	WRENCH, OPEN END	2-EA	2-EA
A-A-1356	9Q 5120	00-277-7025	WRENCH,OPEN END	2-EA	2-EA
GGG-W-651 TY2CLA	9Q 5120	00-277-1462	WRENCH, PIPE	2-EA	2-EA
TQ12B	9Q 5120	00-230-6380	WRENCH, TORQUE	2-EA	2-EA
A-A-2411	9Q 5120	00-242-3264	WRENCH, TORQUE	2-EA	2-EA
F2001	9Q 5120	00-853-4538	WRENCH, TORQUE	2-EA	2-EA
5102-450	9Q 5120	00-729-6427	80 IN-OZ TRQ WRENCH	2-EA	2-EA

APPENDIX D. GUCL LIST SAMPLE SNAPSHOT CONTENTS. FROM SPCC, 2010



	A	B	C	D	E	F	G	H	I	J	K
200	9Q	7510	001897880	PENCIL	DZ	3.44	GUCL	CS	4		
201	9Q	7510	001897880	PENCIL	DZ	3.44	GUCL	EN	8		
202	9Q	7510	001897880	PENCIL	DZ	3.44	GUCL	EX	8		
203	9Q	7510	001897880	PENCIL	DZ	3.44	GUCL	OP	4		
204	9Q	7510	001897880	PENCIL	DZ	3.44	GUCL	SU	4		
205	9Q	7510	001897881	PENCIL	DZ	4.37	GUCL	EX	1		
206	9Q	7510	001897881	PENCIL	DZ	4.37	GUCL	OP	1		
207	9B	4720	001899725	TUBING	FT	18.59	GUCL	EN	5		
208	9Q	7330	001905190	DISHPA	EA	109.94	GUCL	SU	3		
209	9B	4240	001906432	GOGGLES, IND-CLR	PR	1.03	GUCL	EX	3		
210	9B	6145	001913610	CABLE,	FT	3.28	GUCL	EN	100		
211	9B	6145	001913611	CABLE,	FT	0.36	GUCL	EN	100		
212	9B	3740	001913677	SPRAYER-INSECTICIDE 1GA	EA	170.62	GUCL	CS	1		
213	9B	3740	001913677	SPRAYER-INSECTICIDE 1GA	EA	170.62	GUCL	EN	1		
214	9B	3740	001913677	SPRAYER-INSECTICIDE 1GA	EA	170.62	GUCL	OP	1		
215	9Q	7350	001921932	PLATE,	BX	236.43	GUCL	SU	2		
216	9Q	7350	001921933	PLATE,	BX	252.66	GUCL	SU	3		
217	9Q	7350	001921938	PLATE,	BX	268.00	GUCL	SU	2		
218	9Q	5350	001925047	ABRASIVE CLOTH	PG	24.36	GUCL	EN	2		
219	9Q	5350	001925047	ABRASIVE CLOTH	PG	24.36	GUCL	OP	1		
220	9Q	5350	001925049	ABRASIVE CLOTH	PG	23.72	GUCL	EN	2		
221	9Q	5350	001925049	ABRASIVE CLOTH	PG	23.72	GUCL	OP	1		
222	9Q	5350	001925050	CLOTH,	PG	22.14	GUCL	EN	2		
223	9Q	5350	001925050	CLOTH,	PG	22.14	GUCL	OP	1		
224	9Q	5350	001925051	CLOTH,	PG	22.14	GUCL	EN	2		
225	9Q	5350	001925051	CLOTH,	PG	22.14	GUCL	OP	1		
226	9Q	7350	001942526	BOWL,F	EA	117.30	GUCL	SU	8		
227	9Q	7350	001954763	PITCHE	EA	11.69	GUCL	SU	8		
228	9Q	7350	001954764	PITCHE	EA	149.88	GUCL	SU	3		
229	9Q	7350	001954765	TEAPOT	EA	285.94	GUCL	SU	3		

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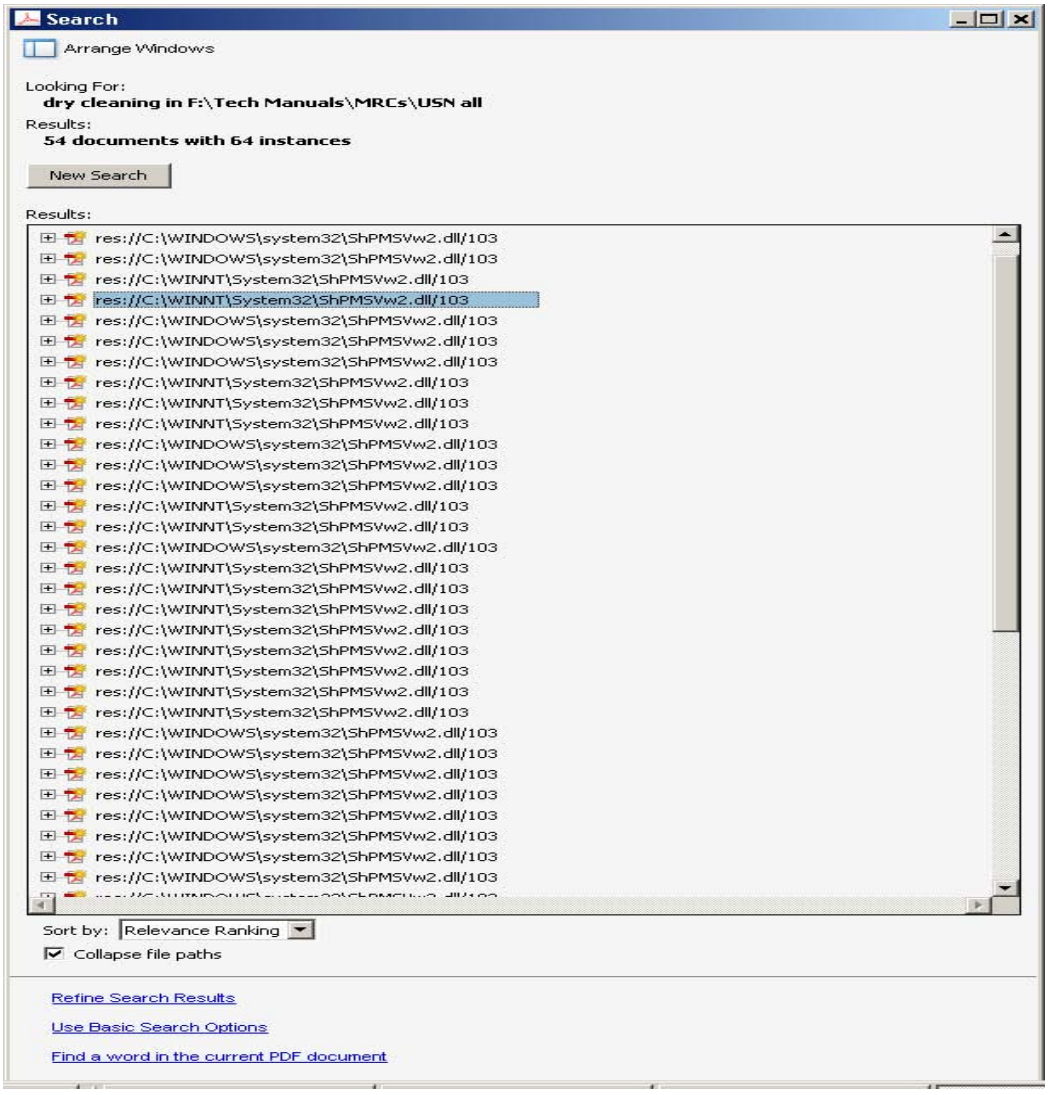
APPENDIX E. HAZMAT SAMPLE IN MRCS. FROM DON, 2009

Sample data of the USN VLS PMS deck for item P-D-680 Dry cleaning solvent, as of 5/1/09. The MRCs called this item in 54 MRCs. This is to exemplify and show the urgency of implementation of this paper.



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APPENDIX F. HAZMAT AEL SAMPLE PAGE. FROM SPCC, 2010

ALLOWANCE EQUIPAGE LIST (AEL)

EQUIPAGE NOMENCLATURE/CHARACTERISTICS	TECHNICAL DOCUMENT NUMBER	MANUAL / PLAN	IDENTIFICATION NO.	DATE	PAGE
HAZMAT, GENERAL PURPOSE, DDG-110 ONLY			3-HZ5568605	03-11-10	2

CHARACTERISTICS			SCLC	SCRC	MAINT	SUBSTITUTE ALLOWANCE	NOTES	CUM	QTY	ON BOARD ALLOWANCE TABLE COL. 1	COL. 2	COL. 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8
MILC43454 20ZBTL	CLEANING COMPOUND,O	9B 6850-00-392-9751				UPA2ZZ		1EBT	1								1
1323	CLEANING COMPOUND,O	9Q 7930-00-459-2247				UPA2ZZ		1CBX	1								2
IMPACT	CLEANING COMPOUND,S	9B 6850-01-380-4369				UPA2ZZ		1ECN									1
OASIS 136	CLEANING COMPOUND,S	9Q 7930-01-398-0955				UPC2ZZ		1CBX									6
GREASETRIP PLUS	CLEANING COMPOUND,S	9Q 7930-01-418-1229				UPC2ZZ		1CBX									12
15461	CLEANING COMPOUND,S	9Q 7930-01-418-1240				UPC2ZZ		1CBX									4
15905	CLEANING COMPOUND,S	9Q 7930-01-521-6604				UPA2ZZ		1CBX									4
62380925	CLEANING SOLUTION,P	9Q 7930-01-418-1401				UPC2ZZ		1CBX									5
945011	COMPOUND-CRSN PVNTV	9Q 8030-00-231-2345				UPA2ZZ		1EGL									1
A202	CORROSION PREVENTIV	9Q 8030-01-008-3058				UPA2ZZ		1ECN									2
FLUID FILM NAS	CORROSION PREVENTIV	9Q 8030-01-381-6357				UPA2ZZ		1CBT									1
WD-40-9 OZ AEROSOL	CORROSION PREVENTIV	9Q 8030-01-418-9006				UPA2ZZ		1CBX									1
ELISHA DYNAMIC COAT	CORROSION PREVENTIV	9Q 8030-01-484-6227				UPA2ZZ		1RCN									1
IRIDITE 14-2 BRUSHKIT	CORROSION RESISTANT	9Q 8030-00-623-3180				UPA2ZZ		1EKT									1
22806-000-00	COVERING, DECK	9Q 7220-00-205-0389				UPA2ZZ		1REA									1000
L312	CUTTING COMPOUND,PA	9B 9150-01-510-0944				UPA2ZZ		1CEA									1
VV-C-846-IC	CUTTING OIL-SOLUBLE	9B 9150-00-252-6380				UPA2ZZ		1CCN									1
DC 200-100SCTK,5GL	DAMPING FLD,SILICON	9B 9150-00-269-8246				UPC2ZZ		1ELB									1
O-E-760,ALCOHOL,DENATURED	DENATURED ALCOHOL	9B 6810-00-543-7415				UPA2ZZ		1EGL									3
PROTEK-SORB 121	DESICCANT,ACTIVATED	9B 6850-00-263-8640				UPA2ZZ		1ECN									1
MIL-D-3716	DESICCANT,ACTIVATED	9B 6850-00-663-9415				UPA2ZZ		1CCN									6
16016	DESTAINER,LAUNDRY	9Q 7930-01-418-1439				UPA2ZZ		1CBX									6
P-D-220B,TYPE II,LIQUID C	DETERGENT-GENP	9Q 7930-00-530-8067				UPA2ZZ		1CGL									15
DETERGENT, GENERAL PURPOS	DETERGENT-GENP LIQ OIL	9Q 7930-00-531-9715				UPA2ZZ		1CGL									1
P-D-1747 CL1	DETERGENT,GENERAL P	9Q 7930-00-177-5243				UPC2ZZ		1CBX									10
110	DETERGENT,GENERAL P	9Q 7930-01-367-2909				UPC2ZZ		1CBX									18
14191	DETERGENT,GENERAL P	9Q 7930-01-379-5182				UPC2ZZ		1CBX									2
16013	DETERGENT,LAUNDRY	9Q 7930-01-392-7560				UPC2ZZ		1CBX									6
16005	DETERGENT,LAUNDRY	9Q 7930-01-436-7911				UPC2ZZ		1CBX									6
13102	DETERGENT,LAUNDRY	9Q 7930-01-436-8050				UPC2ZZ		1CBX									6
10371	DISHWASHING COMPOUN	9Q 7930-01-152-7072				UPA2ZZ		1RBX									1
SOLITAIRE	DISHWASHING COMPOUN	9Q 7930-01-177-5119				UPA2ZZ		1RBX									1
MAG FUSION 6-3LBS	DISHWASHING COMPOUN	9Q 7930-01-494-0067				UPA2ZZ		1CBX									12
SILVER FUSION 3-4.0LBS	DISHWASHING COMPOUN	9Q 7930-01-494-0068				UPA2ZZ		1CBX									6
17060	DISHWASHING COMPOUN	9Q 7930-01-494-0906				UPA2ZZ		1CBX									25
CRYSTAL FUSION 2-2.5LBS	DISHWASHING COMPOUN	9Q 7930-01-494-0913				UPA2ZZ		1CBX									6
WESCODYNE	DISINFECTANT-DETERG	9B 6840-00-526-1129				UPA2ZZ		1CBT									1

REFERENCE NO./DESCRIPTIVE DATA		ITEM NAME	STOCK NO.	SCLC	SCRC	MAINT	SUBSTITUTE ALLOWANCE	NOTES	CUM	QTY	1	2	3	4	5	6	7	8
		ALLOWANCE EQUIPAGE LIST (AEL)									3-HZ5568605				03-11-10			2
SHIP TYPE & HULL NO.																		

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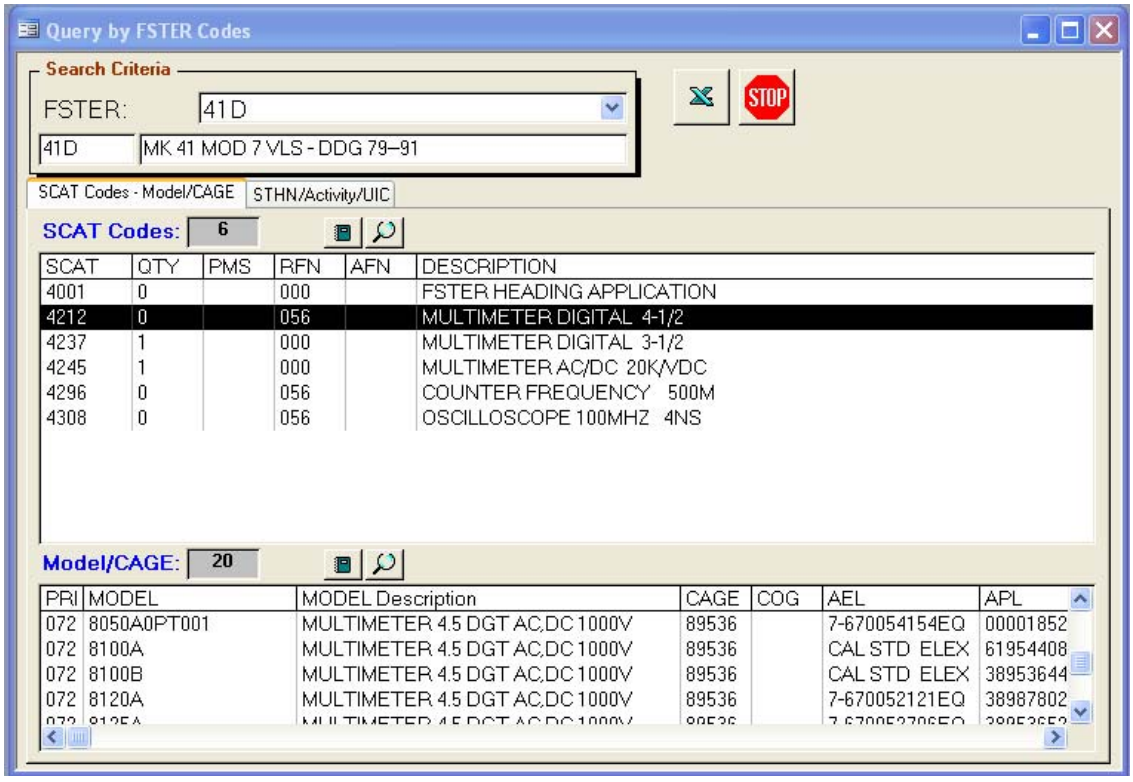
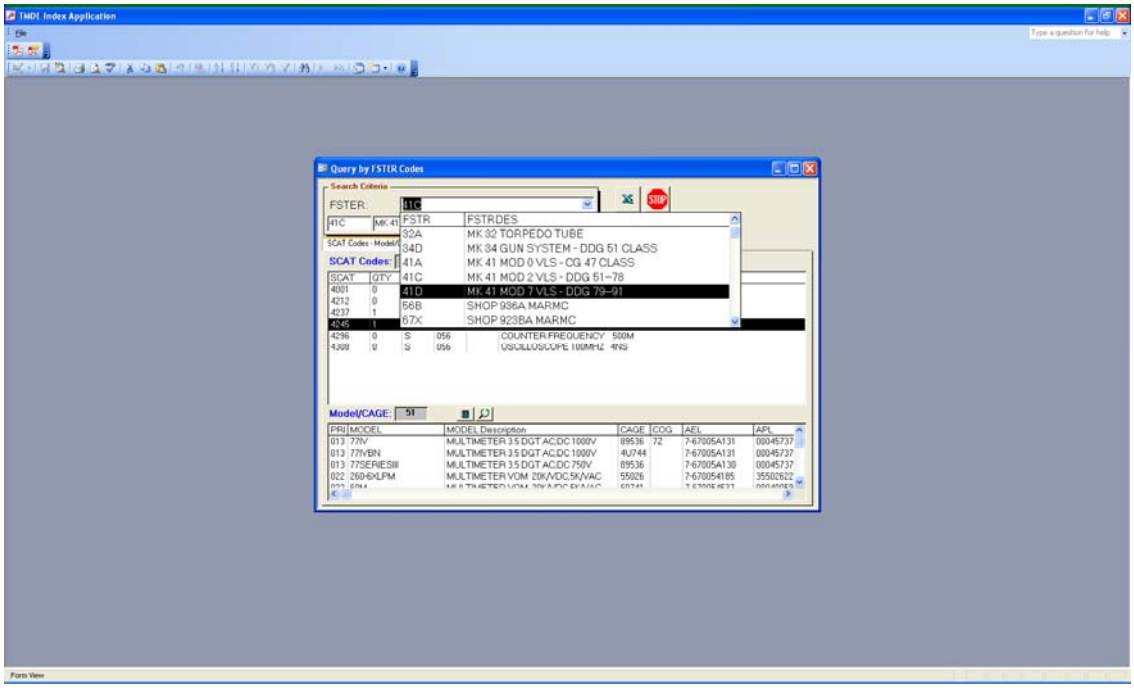
APPENDIX G. TMDE CONTENTS FOR VLS. FROM NSWC CORONA, 2010





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APPENDIX H. AEGIS WEAPON SYSTEM AEL, PAGE SAMPLES. FROM SPCC, 2010

ALLOWANCE EQUIPAGE LIST (AEL)

EQUIPAGE NOMENCLATURE/CHARACTERISTICS	TECHNICAL DOCUMENT NUMBER	MANUAL / PLAN	IDENTIFICATION NO.	DATE	PAGE
ANTENNA GROUP,AEGIS			0-004230048	04-01-08	1

CHARACTERISTICS
NAVICP-M 058131
COLUMN 1 = CG52 THRU CG58
COLUMN 2 = CG59 THRU CG73
COLUMN 3 = DDG51 THRU DDG90
COLUMN 4 = DDG91 THRU DDG102
COLUMN 5 = DDG103 THRU DDG112
CCF DATE -03 96

REFERENCE NO./DESCRIPTIVE DATA	ITEM NAME	STOCK NO.	SEC CL	SOURCE	MAINT	RSUPPCD RECOVC	NOTES	CUSTODY	UI	QTY	ON BOARD ALLOWANCE TABLE COL. 1	COL. 2	COL. 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8
57	ADAPTER-CBL RF	9B 5935-01-243-4052		UPA5ZZ			1REA								1			
0P142	ADAPTER, TORQUE WRE	1RW5120-01-152-8274		UPA5ZZ			1CEA								1			
3080-2240-00	ADAPTER,CONNECTOR	9B 5935-00-824-7588		UPA5ZZ			1EEA					1	1	1				
GA800BN5	ADAPTER,CONNECTOR	9B 5935-00-847-9683		UPA5ZZ			1EEA								1			
M55339/07-00029	ADAPTER,CONNECTOR	9B 5935-01-035-5650		UPA5ZZ			1EEA					1	1	1				
705976	ADAPTER,CONNECTOR	9B 5935-01-106-1709		UPA5ZZ			1CEA								1			
LB142	ADAPTER,TORQUE WREN	9B 5120-01-017-8947		UPA5ZZ			1EEA							1				
0P142	ADAPTER,TORQUE WREN	9Q 5120-01-069-3005		UPE5ZZ			1REA							1				
94646	ALIGNMENT TOOL	9Q 5120-00-293-2081		UPA5ZZ			1EEA					1	1	1				
5860880	ALIGNMENT TOOL,ELEC	9B 5120-01-297-6102		UPA5ZZ			1REA				1							
6320	BIT SET,SCREWDRIVER	9Q 5120-00-465-3858		UPA5ZZ			1RSE					1	1	1				
11501A	CABLE ASSEMBLY,RADI	9B 5995-00-121-6334		UPA5ZZ			1EEA					1	1	1				
6815451	CABLE ASSEMBLY,SPEC	9B 5995-01-439-6821		UPA5ZZ			1REA				1	1	1	1				
3258345	COMB,PIN LOCATOR	9B 5120-01-297-6103		UPA5ZZ			1REA				30							
45098	CRIMPING TOOL,TERMI	9Q 5120-00-020-5927		UPA5ZZ			1REA							1				
6710557	EXTENDER ARRAY	9B 5998-01-441-7227		7PA5ZZ			1REA					2	2	2				
786294	EXTENDER CABLE ASSE	9B 6625-01-130-5732		UPA5ZZ			1REA				1							
5616324	EXTRACTOR MODULE	9B 5998-01-440-9855		UPA5ZZ			1REA							1				
2899370	EXTRACTOR,ELECTRICA	9B 5998-01-264-7770		UPA5ZZ			1REA								1			
2899452	EXTRACTOR,ELECTRICA	9B 5998-01-299-6772		UPA5ZZ			1REA				1							
5860099	EXTRACTOR,ELECTRICA	9B 5998-01-304-2083		UPA5ZZ			1REA								1			
6519608	EXTRACTOR,ELECTRICA	9B 5998-01-324-5281		7PA5ZZ			1REA					2	2	2				
GL650	FORCEPS,GAUZE PAD HOLD	9B 6515-00-337-3900		UPA5ZZ			1EEA				1	1	1	1				
43H	FORCEPS,SOLDERING	9Q 5120-01-369-9999		UPA5ZZ			1REA				1	1	1	1	1			
GGG-F-331	HAND FILE SET	9Q 5110-00-204-2685		UPA5ZZ			1ESE				1	1	1	1				
8691286-501	HANDLE,ADAPTER ASSY	9B 5895-01-334-8330		7PA5ZZ			1REA				2							
TM70C	HANDLE,SOCKET WRENC	9Q 5120-00-221-7957		UPA5ZZ			1EEA				1	1	1	1				
438ST160	HOLDER,PRINTED CIRC	9B 5998-01-440-6898		UPA5ZZ			1REA				1							
M81969/17-03	INSERTER,ELECTRICAL	9Q 5120-00-079-4598		UPA5ZZ			1EEA				1							
M81969/39-01	INSERTER,ELECTRICAL	9Q 5120-00-132-0396		UPA5ZZ			1EEA					1	1	1				
200893-2	INSERTER,ELECTRICAL	9Q 5120-00-427-2795		UPA5ZZ			1EEA					1	1	1				
HX-122	KEY	9B 5315-01-156-5045		UPA5ZZ			1EEA							1				

REFERENCE NO./DESCRIPTIVE DATA	ITEM NAME	STOCK NO.	SEC CL	SOURCE	MAINT	RSUPPCD RECOVC	NOTES	CUSTODY	UI	QTY	1	2	3	4	5	6	7	8
	ALLOWANCE EQUIPAGE LIST (AEL)										0-004230048				04-01-08			1
SHIP TYPE & HULL NO.																		

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APPENDIX H. AEGIS WEAPON SYSTEM AEL, PAGE SAMPLES. (CONT.)

ALLOWANCE EQUIPAGE LIST (AEL)

EQUIPAGE NOMENCLATURE/CHARACTERISTICS	TECHNICAL DOCUMENT NUMBER	MANUAL / PLAN	IDENTIFICATION NO.	DATE	PAGE
ANTENNA GROUP,AEGIS			0-004230048	04-01-08	2

CHARACTERISTICS			SEC CL	SOURCE	MAINT	RECOV	SUPPORTS	NOTES	CUSTODY	UI	QTY	ON BOARD ALLOWANCE TABLE COL 1	COL 2	COL 3	COL 4	COL 5	COL 6	COL 7	COL 8
56011	KEY SET,SOCKET HEAD	9Q 5120-00-935-4641		UPA5ZZ				1ESE				1	1	1	1				
LN-9BP	KEY SET,SOCKET HEAD	9Q 5120-01-063-4004		UPA5ZZ				1ESE				1							
10B08	L SHAPE HEX WRENCH	9Q 5120-00-240-5300		UPA5ZZ				1EEA				1							
Y8133	LEAD SET, TEST	9B 6625-01-013-5137		UPA5ZZ				1REA				1							
PDSANE7066252196	LEAD SET,TEST	9B 6625-01-121-0510		UPA5ZZ				1EEA				1							
P6106AOPT03	LEAD,TEST	9B 6625-00-155-5735		UPA5ZZ				1REA								1			
GGG-M-350	MIRROR,INSPECTION	9Q 5120-01-278-8257		UPA5ZZ				1EEA				1	1	1	1				
S700	NUTDRIVER SET	9Q 5120-00-540-6755		UPA5ZZ				1ESE				1	1	1	1				
8288495-1	PIN LOCATOR COMB	9B 5935-01-324-5301		UPA5ZZ				1REA					50	50	50				
M81969/14-11	PIN REMOVAL TOOL	9Q 5120-00-915-4587		UPA5ZZ				1EEA							1				
8146485-1	PIN,SHOULDER,HEADLE	9B 5315-01-312-4115		UPA5ZZ				1REA				2							
SN56	PLIERS	9Q 5120-00-247-5177		UPA5ZZ				1EEA				1	1	1	1				
7638739	PLIERS,DIAGONAL CUT	9Q 5110-00-224-1532		UPA5ZZ				1EEA				1	1	1	1				
P6108A	PROBE-LEAD ASSEMBLY	9B 6625-01-271-1517		UPA5ZZ				1REA				1							
P6137	PROBE-LEAD ASSEMBLY	9B 6625-01-313-2169		UPA5ZZ				1EEA								1			
80I-600	PROD,TEST	9B 6625-01-062-7051		UPA5ZZ				1EEA								1			
305183	REMOVER, ELECT CONT	9Q 5120-00-020-5926		UPA5ZZ				1EEA					1	1	1				
3010	SCRAPER,WOOD	9Q 5110-00-952-3380		UPA5ZZ				1EEA				1	1	1	1				
VA0938	SCREWDRIVER ATTACHM	9Q 5120-00-596-0938		UPA5ZZ				1EEA				1	1	1	1				
GGG-S-1808	SCREWDRIVER SET,JEW	9Q 5120-00-288-8739		UPA5ZZ				1ESE				1	1	1	1				
GGG-S-121 #1	SCREWDRIVER-CRS TIP 8IN	9Q 5120-00-529-3101		UPA5ZZ				1EEA				1	1	1	1				
9172450	SCREWDRIVER-FLT TIP 8IN	9Q 5120-00-287-2502		UPA5ZZ				1EEA				1	1	1	1				
65-342	SCREWDRIVER,CROSS T	9Q 5120-00-227-7293		UPA5ZZ				1EEA				1	1	1	1				
GGG-S-121 7"	SCREWDRIVER,CROSS T	9Q 5120-00-596-0861		UPA5ZZ				1EEA				1	1	1	1				
GGG-S-121TY6CL1 #0	SCREWDRIVER,CROSS T	9Q 5120-00-820-2995		UPA5ZZ				1EEA				1	1	1	1				
SDD6	SCREWDRIVER,FLAT TI	9Q 5120-00-234-8910		UPA5ZZ				1EEA				1	1	1	1				
66-110	SCREWDRIVER,FLAT TI	9Q 5120-00-293-3309		UPA5ZZ				1EEA				1	1	1	1				
TQS-6-FU	SCREWDRIVER,TORQUE	9Q 5120-00-890-7816		UPA5ZZ				1EEA					1	1	1				
TQSC4FUA	SCREWDRIVER,TORQUE	9Q 5120-01-131-4467		UPA5ZZ				1REA								1			
DUCKSEAL SEALANT	SEALING COMPOUND	9Q 8030-00-281-2337		UPA5ZZ				1CCO				0AR	0AR	0AR	0AR				
GGG-S-00278	SHEARS-STR TRM	9Q 5110-00-293-9199		UPA5ZZ				1EEA					1	1	1				
30113	STRAP,WRIST,ELECTRO	9B 4240-01-063-4880		UPA5ZZ				1EEA								1			
GGG-S-665 TY2CL2STASZ5	STRIPPER,WIRE,HAND	9Q 5110-00-542-4487		UPA5ZZ				1EEA								1			
8394947-501	SUPPORT WATERFALL H	9B 5975-01-324-5710		UPA5ZZ				1REA				2							
6127587	SUPPORT,TEE,WATERFALL	9B 5340-01-298-2866		UPA5ZZ				1REA				4	4	4	4				
6625482	SUPPORT,UPPER,PWR.SUP	9B 5930-01-324-5660		UPA5ZZ				1REA					2		2				
24-7205-2400-01	TAPE,ELECTRONIC DAT	9B 7045-01-086-2044		UPA5ZZ				1ERL				0AR	0AR	0AR	0AR	0AR			

REFERENCE NO./DESCRIPTIVE DATA	ITEM NAME	STOCK NO.	SEC CL	SOURCE	MAINT	RECOV	SUPPORTS	NOTES	CUSTODY	UI	QTY	1	2	3	4	5	6	7	8
	ALLOWANCE EQUIPAGE LIST (AEL)											0-004230048				04-01-08			2
SHIP TYPE & HULL NO.																			

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APPENDIX H. AEGIS WEAPON SYSTEM AEL, PAGE SAMPLES

(CONT.)

ALLOWANCE EQUIPAGE LIST (AEL)

EQUIPAGE NOMENCLATURE/CHARACTERISTICS	TECHNICAL DOCUMENT NUMBER	MANUAL / PLAN	IDENTIFICATION NO.	DATE	PAGE
ANTENNA GROUP,AEGIS			0-004230048	04-01-08	3

CHARACTERISTICS			SEC CODE	SOURCE CODE	MAINT CODE	SUPPORT RECOVERY CODE	NOTES	CUSTODY	U/I	QTY	ON BOARD ALLOWANCE TABLE COL. 1	COL. 2	COL. 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8
M83507/11-01	TOOL, CRIMPING	9Q 5180-00-921-5771		UPA5ZZ				1EKT			1							
M81969/19-07	TOOL, REMOVAL	9Q 5120-00-079-4601		UPA5ZZ				1EEA			1							
GGG-W-2843	TORQUE WRENCH	9Q 5120-01-396-6070		UPA5ZZ				1EEA							1			
GGG-T-870	TWEEZERS,CRAFTSMAN'	9Q 5120-00-247-0867		UPA5ZZ				1EEA			1	1	1	1				
3258281-3	WIRE,JUMPER,DAISY CHA	9B 5995-01-324-5368		UPA5ZZ				1REA			1							
AL102A	WRENCH SET	9Q 5120-00-752-9008		UPA5ZZ				1ESE			1							
51200017510	WRENCH SET SKT 3/8DR	9Q 5120-00-322-6231		UPA5ZZ				1ESE			1	1	1	1				
A-A-1358	WRENCH SET,COMBINAT	9Q 5120-00-148-7917		UPA5ZZ				1ESE			1							
T8438	WRENCH TORQUE	9Q 5120-00-169-5776		UPA5ZZ				1EEA			1							
928266-1	WRENCH,ELECTRICAL C	9Q 5120-01-166-7020		UPA5ZZ				1EEA			1							
4080-12	WRENCH,HEX,3-16 X 3-8 DR	9Q 5120-00-683-8597		UPA5ZZ				1EEA			1	1	1	1				
S8	WRENCH,SOCKET	9Q 5120-00-241-3188		UPA5ZZ				1EEA			1							
GGG-W-657	WRENCH,SOCKET	9Q 5120-00-293-0796		UPA5ZZ				1EEA			1							
6502D0087	WRENCH,SPANNER	9Q 5120-01-428-2943		UPA5ZZ				1REA				1	1	1				
TQ12B	WRENCH,TORQUE	9Q 5120-00-230-6380		UPA5ZZ				1EEA							1			
CH150	WRENCH,TORQUE	1RW5120-00-427-6021MF		UPA5ZZ				1REA							1			
2906915-1	WRENCH,TORQUE	9B 5120-01-255-9372		UPA5ZZ				1REA						1				
413-900-020	WRENCH,TORQUE	9Q 5120-01-374-1932		UPA5ZZ				1EEA				1	1	1				

MULTI-REFERENCE NUMBER	FSCM	CROSS REF-NIIN/ACN	MULTI-REFERENCE NUMBER	FSCM	CROSS REF-NIIN/ACN
CIET-20-HD	71468	00-132-0396	PDSANE706625219	98750	01-121-0510
W-T-0051C-08-16-24-RB	81348	01-086-2044	010-6108-13	80009	01-271-1517
0867	00247	00-247-0867	2293900-1	10001	00-921-5771
3841	05276	01-035-5650	6127587-1	53711	01-298-2866
7956858-00	90536	01-086-2044			

E N D

REFERENCE NO./DESCRIPTIVE DATA	ITEM NAME	STOCK NO.	SEC CODE	SOURCE CODE	MAINT CODE	SUPPORT RECOVERY CODE	NOTES	CUSTODY	U/I	QTY	1	2	3	4	5	6	7	8
	ALLOWANCE EQUIPAGE LIST (AEL)										0-004230048				04-01-08			3
SHIP TYPE & HULL NO.																		

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APPENDIX I. SOURCE, MAINTENANCE AND RECOVERABILITY CODES. FROM NAVSUP, n.d.

NAVY SM&R CODING REFERENCE CHART — **NAVSUP INSTR 4423.29** — **PUB719 (NSN 0530-LP-011-2960)**

SOURCE		MAINTENANCE		RECOVERABILITY	SERVICE OPTION CODE
1ST POS	2ND POSITION	3RD POSITION	4TH POSITION	5TH POSITION	6TH POSITION
MEANS OF ACQUIRING SUPPORT		USE: LOWEST LEVEL AUTHORIZED TO REMOVE/REPLACE THE ITEM.	REPAIR: LOWEST LEVEL WITH CAPABILITY AND RESOURCES TO PERFORM COMPLETE REPAIR ACTION.	DISPOSITION: WHEN UNSERVICABLE OR UNECONOMICALLY REPAIRABLE, CONDEMN OR DISPOSE.	ASSIGNED TO SUPPORT ITEMS TO CONVEY SPECIFIC INFORMATION TO THE SERVICE'S LOGISTICS COMMUNITY/OPERATING FORCES.
P	A ITEM: STOCKED	O ORG/UNIT	O ORG/UNIT	O ORG/UNIT	1 I-LEVEL 1ST DEGREE
	B ITEM: STOCKED, INSURANCE	2 MINESWEEPER 3 SUBMARINES 4 AUX/AMPHIB 5 DESTROYER, FFG 6 CRUISER/CARRIER	2 MINESWEEPER 3 SUBMARINES 4 AUX/AMPHIB 5 DESTROYER, FFG 6 CRUISER/CARRIER	F I/AFLOAT	2 I-LEVEL 2ND DEGREE
	C ITEM: STOCKED, DETERIORATIVE	F I/AFLOAT	F I/AFLOAT	G ASHORE AND AFLOAT	3 I-LEVEL 3RD DEGREE
	D ITEM: SUPPORT, INITIAL ISSUE OF OUTFITTING & STOCKED ONLY FOR ADDITIONAL INITIAL ISSUE	G ASHORE AND AFLOAT	G ASHORE AND AFLOAT	H I/ASHORE	6 COMMERCIAL ITEM, ORGANICALLY MFR'D
	E EQUIPMENT: SUPPORT, STOCKED FOR INITIAL ISSUE OR OUTFITTING OF SPECIFIED MAINTENANCE ACTIVITIES	H I/ASHORE	H I/ASHORE	K DLR; CONTRACTOR FACILITY	8 NON-CONSUMABLE; 2ND DEGREE ENGINE I-LEVEL
	F EQUIPMENT: SUPPORT, NONSTOCKED, CENTRALLY PROCURED ON DEMAND	K CONTRACTOR FACILITY	K CONTRACTOR FACILITY	L INTERMEDIATE SRA LEVEL	9 NON-CONSUMABLE; 3RD DEGREE ENGINE I-LEVEL
	G ITEM: STOCKED FOR SUSTAINED SUPPORT. UNECONOMICAL TO PRODUCE AT A LATER TIME	L INTERMEDIATE SRA	L INTERMEDIATE SRA	D DLR; CONDEMN OR DISPOSE AT DEPOT	E END TO END TEST
	H ITEM: STOCKED, CONTAINS HAZMAT. HMIS/MSDS REPORTING REQUIRED	D DEPOT	D DEPOT	Z NON-REPAIRABLE	J INTER-SERVICE DLR REPAIRABLE BELOW D-LEVEL
	R TERMINAL OR OBSELETE, REPLACED	Z REF ONLY	Z NON-REPAIRABLE	R GOLD DISC REPAIR	P PROGRESSIVE MAINTENANCE
	Z TERMINAL OR OBSELETE, NOT REPLACED		B RECONDITION	A NON-REPAIRABLE BUT REQUIRES SPECIAL HANDLING	T TRAINING DEVICES
K	D ITEM: DEPOT O/H & MAINTENANCE KITS				
	F ITEM: MAINTENANCE KIT, PLACE AT O,F,H,L				
	B ITEM: IN BOTH DEPOT REPAIR & MAINT. KITS				
M	O MFR OR FAB AT UNIT LEVEL				
	F MFR OR FAB AT INTERMEDIATE/DS LEVEL				
	H MFR OR FAB AT INTERMEDIATE/GS LEVEL				
	L MFR OR FAB AT SPECIALIZED REPAIR ACTIVITY (SRA)				
	G MFR OR FAB AT BOTH AFLOAT AND ASHORE				
	D MFR OR FAB AT DEPOT MAINTENANCE LEVEL				
A	O ITEM: ASSEMBLED AT ORG/UNIT				
	F ITEM: ASSEMBLED AT INTERMEDIATE LEVEL - AFLOAT				
	H ITEM: ASSEMBLED AT INTERMEDIATE LEVEL - ASHORE				
	L ITEM: ASSEMBLED AT SRA				
	G ITEM: ASSEMBLED AFLOAT OR ASHORE				
	D ITEM: ASSEMBLED AT DEPOT MAINTENANCE LEVEL				
X	A ITEM: REQUISITION NEXT HIGHER ASSEMBLY				
	B ITEM: NOT PROCURED OR STOCKED. AVAILABLE THRU SALVAGE. REQ. BY CAGE/PART NUMBER				
	C INSTALLATION DRAWING, DIAGRAM, INSTRUCTION SHEET. IDENTIFY BY CAGE/PART NUMER				
	D NON-STOCKED. OBTAIN VIA LOCAL PURCHASE				

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