

T9070-AL-DPC-020/077-2

NAVSEA TECHNICAL PUBLICATION

NAVSEA HAZARDOUS MATERIAL AVOIDANCE PROCESS



DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

PUBLISHED BY DIRECTION OF COMMANDER, NAVAL SEA SYSTEMS COMMAND

28 SEPTEMBER 2015

LIST OF EFFECTIVE PAGES

Dates of issue for original and subsequent revisions:

Original T9070-AL-DPC-020/077-2 28 September 2015

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 48, CONSISTING OF THE FOLLOWING:

Page No.

Title and A

i-viii

1-1 through 1-2

2-1 through 2-2

3-1 through 3-2

A-1 through A-17/(A-18 blank)

B-1 through B-4

C-1 through C-5/(C-6 blank)

D-1 through D-2

TMDER

CHENG'S INTENT

NAVSEA Design Practices and Criteria Manual T9070-AL-DPC-020/077-2, The NAVSEA Hazardous Material Avoidance Process, provides acquisition programs a standardized approach to complying with the requirements of hazardous material minimization as specifically stated in NAVSEA System Safety Engineering Policy, NAVSEAINST 5100.12B. This document provides a common process for acquisition, modernization and logistics life-cycle management efforts, leveraging the principles of commonality and standardization to achieve regulatory compliance; reduce environmental, safety, and occupational health risk, and improve sustainability. The use of a standardized process supports an effective implementation of hazardous material control and management within and across program boundaries. This manual is intended for broad use by program managers, technical authorities, engineers, shipbuilders and other users across the NAVSEA enterprise.

For information pertaining to this technical manual, please contact the Technical Warrant Holder for Ship Environmental Systems and Materials Engineering, Mr. Peter McGraw, SEA 05P5, (202) 781-2990, email: peter.mcgraw@navy.mil.



L.B. FULLER

Rear Admiral, USN

NAVSEA CHENG

TABLE OF CONTENTS

Chapter/Paragraph/Title	Page
CHENG's Intent	i
Foreword	vii
Chapter 1 Introduction	1-1
1.1 Purpose	1-1
1.2 Applicable Documents.....	1-1
1.3 Cancellation	1-1
1.4 Background.....	1-1
1.4.1 Exceptions	1-2
1.4.2 Formalizing the Approach for HM Elimination and Minimization	1-2
1.5 Scope and Applicability.....	1-2
1.6 Non-Applicability	1-2
Chapter 2 HM Management and Identification Process	2-1
2.1 Introduction	2-1
2.2 HM Management Plan.....	2-1
2.3 HM Categories.....	2-1
2.4 HM Approval and Assessment	2-1
2.5 NAVSEA List of Targeted Chemicals (N-LTC)	2-1
2.5.1 Purpose of the N-LTC	2-1
2.5.2 Determination of HM Severity Categories	2-2
2.5.3 NAVSEA 05 Involvement.....	2-2
Chapter 3 Responsibilities	3-1
3.1 NAVSEA Lead Activity Responsibilities.....	3-1
3.2 NAVSEA 05P5 TWH for Environmental Systems and Materials Engineering Responsibilities.....	3-1
3.3 NAVSEA TDM Responsibilities	3-2
3.4 NAVSEA CHIEF SYSTEMS ENGINEERS (CSE) Responsibilities	3-2
3.5 Point of Contact	3-2
Appendix A NAVSEA List of Targeted Chemicals (N-LTC).....	A-1
A.1 Introduction.....	A-1
A.2 NAVSEA List of Targeted Chemicals (N-LTC) Application Exception Notes.	A-7
A.2.1 Exception: Arsenic and Arsenic Compounds.	A-7
A.2.2 Exception: Beryllium and Beryllium Compounds.....	A-7
A.2.3 Exception: Cadmium and Cadmium Compounds.....	A-8
A.2.4 Exception: Nickel Compounds	A-8
A.2.5 Exception: Sulfuric Acid	A-8
A.2.6 Exception: Vinyl Chloride.....	A-8
A.2.7 Exception: Cyanide Containing Compounds (includes Nitrile and Cyano Compounds)	A-9
A.2.8 Exception: Lead and Lead Compounds	A-9
A.2.9 Exception: Lithium and Lithium Compounds.	A-10
A.2.10 Exception: Mercury and Mercury Compounds.....	A-10
A.2.11 Exception: Nickel	A-11

Chapter/Paragraph/Title	Page
A.2.12 Exception: Phenol	A-12
A.2.13 Exception: Styrene.....	A-12
A.2.14 Exception: Antimony and Antimony Compounds.....	A-13
A.2.15 Exception: Chromium and Non-Hexavalent Chromium Compounds	A-13
A.2.16 Exception: Cobalt and Cobalt Compounds.....	A-14
A.2.17 Exception: Copper and Copper Compounds.....	A-14
A.2.18 Exception: Selenium and Selenium Compounds	A-16
A.2.19 Exception: Silver and Silver Compounds	A-16
Appendix B NAVSEA 05 Hazardous Material Management Procedure.....	B-1
B.1 Introduction.....	B-1
B.2 Identification of HM.	B-1
B.3 HM Applicability.....	B-1
B.4 Hazardous Components.	B-1
B.5 Chemical Identification.....	B-1
B.6 Chemical Not Associated with Application Exception.....	B-2
B.7 Risk Assessment.	B-2
B.7.1 Severity Categories.	B-2
B.7.2 Probability Level of Exposure.	B-2
B.7.3 Quantitative Data.	B-2
B.7.4 Restricted Chemicals.....	B-2
B.8 Risk Acceptance.....	B-2
B.8.1 Prohibited Chemicals.	B-2
B.8.2 Non-Prohibited Chemicals.....	B-3
B.8.3 Application Exceptions.....	B-3
B.8.4 Levels of Risk.	B-3
B.9 Tracking.	B-3
Appendix C NAVSEA Hazardous Material Waiver Request Form Guidance	C-1
C.1 Introduction.....	C-1
C.2 Administrative Information.....	C-1
C.2.1 Requester Name*	C-1
C.2.2 Requester Organization*	C-1
C.2.3 Requester Phone Number*.....	C-1
C.2.4 Requester E-Mail*	C-1
C.2.5 Waiver Submission Date*.....	C-1
C.2.6 Government POC*.....	C-1
C.2.7 Government POC Phone Number*.....	C-1
C.2.8 Government POC E-Mail*.....	C-1
C.2.9 Program Executive Office.....	C-1
C.2.10 Program*	C-1
C.3 Product Information.	C-1
C.3.1 Chemical on the N-LTC*	C-1
C.3.2 Percent Composition (%).....	C-1

Chapter/Paragraph/Title	Page
C.3.3 National Stock Number.....	C-1
C.3.4 Attach SDS?*	C-1
C.3.5 Product Vendor*	C-1
C.3.6 Product Trademark Name*	C-1
C.3.7 Product Specification	C-2
C.3.8 Unit of Issue.....	C-2
C.3.9 Unit of Measure	C-2
C.4 Technical Information.....	C-2
C.4.1 Structural or Consumable*	C-2
C.4.2 Temperature(s) Where Product Will Be Used	C-2
C.4.3 Quantity of HM Within the System*	C-2
C.4.4 Special HM Control, Training, Handling Measures, and Personal Protection Equipment (PPE) Needed*	C-2
C.4.5 System*.....	C-2
C.4.6 Usage Information*	C-2
C.4.7 Maintenance Index Page(s).....	C-2
C.4.8 Maintenance Requirement Card Number(s)	C-2
C.4.9 Allowance Part or Equipage List(s)	C-2
C.4.10 Technical Manual(s)	C-2
C.5 Risk Assessment Information.	C-2
C.5.1 Mishap Severity Category*.....	C-2
C.5.2 Rationale for Mishap Severity Category*	C-2
C.5.3 Mishap Probability Level*	C-2
C.5.4 Rationale for Mishap Probability Level*	C-2
C.5.5 Risk Assessment Code	C-2
C.5.6 Discuss How Risk Will Be Mitigated and/or Managed Throughout Life-Cycle*	C-2
C.6 NAVSEA 05 Technical Community Recommendation(s) and PProgram Manager Decision.....	C-2
Appendix D List of Acronyms.....	D-1
D.1 List of Acronyms.	D-1

LIST OF ILLUSTRATIONS

Figure No. and Title	Page
Figure B-1. NAVSEA Hazardous Material Risk Identification, Assessment, Acceptance, and Tracking Process.	B-4
Figure C-1. NAVSEA Hazardous Material Waiver Request Form.	C-3

LIST OF TABLES

Table No. and Title	Page
Table A-1. Prohibited Chemicals on the N-LTC	A-1
Table A-2. Restricted Chemicals on the N-LTC.....	A-1
Table A-3. Tracked Chemicals on the N-LTC.....	A-6

FOREWORD

This document is intended to formalize Naval Sea System Command's (NAVSEA) process for the elimination or minimization of Hazardous Material (HM) used in delivered NAVSEA-sponsored systems, equipment, and processes by standardizing HM avoidance requirements. This document is organized as follows:

Chapter 1, Introduction

Chapter 2, HM Management and Identification Process

Chapter 3, Responsibilities

Appendix A, NAVSEA List of Targeted Chemicals (N-LTC)

Appendix B, NAVSEA 05 Hazardous Material Management Procedure

Appendix C, NAVSEA Hazardous Material Waiver Request Form Guidance

Appendix D, List of Acronyms

DISTANCE SUPPORT INFORMATION

Contact the Navy Distance Support (Anchor Desk) via the web (<http://www.anchordesk.navy.mil/>), e-mail (help@AnchorDesk.navy.mil), or via the toll free number (1-877-4-1-TOUCH [86824]).

TMDER INSTRUCTIONS

Ships, training activities, supply points, depots, Naval Shipyards and Supervisors of Shipbuilding are requested to arrange for the maximum practical use and evaluation of NAVSEA technical manuals (TMs). All errors, omissions, discrepancies, and suggestions for improvement to NAVSEA TMs shall be submitted as a Technical Manual Deficiency/Evaluation Report (TMDER). All feedback comments shall be thoroughly investigated and originators will be advised of action resulting there from.

The NAVSEA/SPAWAR Technical Manual Deficiency/Evaluation Report form, NAVSEA 4160/1, is included at the back of the TM.

Copies of form NAVSEA 4160/1 may also be downloaded from:

https://nsdsa.nmci.navy.mil/nsdsarepository/TMDER_BLANK_REV_9-2010-1.pdf

The following methods are available for generation and submission of TMDERs against unclassified TMs:

- For those with a Technical Data Management Information System (TDMIS) account, the most expedient and preferred method of TMDER generation and submission is via the TDMIS website at: <https://mercury.tdmis.navy.mil>.
- For those without a TDMIS account, generate and submit TMDER via the Naval Systems Data Support Activity (NSDSA) website at: https://mercury.tdmis.navy.mil/def_external/pubsearch.cfm. (TDMIS accounts may be requested at <https://nsdsa.nmci.navy.mil>.)
- When internet access is not available, submit TMDER via hardcopy to:
 COMMANDER
 CODE 310 TMDERs
 NAVSURFWARCENDIV NSDSA
 4363 MISSILE WAY, BLDG 1389
 PORT HUENEME, CA 93043-4307
- TMDERs against classified/restricted (includes all NOFORN) TMs must be submitted using the hardcopy method cited above.

- Urgent priority TM deficiencies shall be reported by Naval message with transmission to Port Hueneme Division, Naval Surface Warfare Center (Code 310), Port Hueneme, CA. Local message handling procedures shall be used. The message shall identify each TM deficiency by TM identification number and title. This method shall be used in those instances where a TM deficiency constitutes an urgent problem, (i.e., involves a condition, which if not corrected, could result in injury to personnel, damage to the equipment or, jeopardy to the safety or success of the mission).

Complete instructions for TMDER generation and submission are detailed on the NSDSA website at:

<https://nsdsa.nmci.navy.mil/tmder/tmder.asp?lvl=1>.

CHAPTER 1

INTRODUCTION

1.1 PURPOSE.

The purpose of this document is as follows:

- a. To formalize Naval Sea System Command's (NAVSEA) process for the elimination or minimization of Hazardous Material (HM) used in delivered NAVSEA-sponsored systems, equipment, and processes by standardizing HM avoidance requirements in support of NAVSEAINST 5100.12.
- b. To develop a comprehensive knowledge base of successful HM avoidance initiatives and to use this knowledge to share lessons learned regarding successful HM elimination/minimization initiatives, as well as provide a resource for HM risk assessment and mitigation efforts.
- c. To formalize the process of integrating HM used in NAVSEA systems, equipment, and processes with the appropriate Authorized Use List (AUL) for life-cycle management.
- d. To develop a comprehensive knowledge base of where and how NAVSEA continues to use HM to focus future Research, Development, Test, and Evaluation (RDT&E) activities related to HM avoidance.
- e. To require in ship specification section 077 and general specifications for ships overhaul.

1.2 APPLICABLE DOCUMENTS.

The following are references found in this document:

- a. NAVSEAINST 5100.12, System Safety Engineering Policy
- b. OPNAVINST 5090.1, Environmental Readiness Program Manual
- c. Executive Order (EO) 13693, Planning for Federal Sustainability in the Next Decade, of 19 Mar 15
- d. OPNAVINST 5100.19, Navy Safety and Occupational Health (SOH) Program Manual for Forces Afloat
- e. Environmental Readiness in Systems Acquisition, CNO(N4) Memorandum N4/8U156042, of 29 Jul 08
- f. NAVSEAINST 5000.8, Naval SYSCOM Risk Management Policy
- g. NAVSEA 5100.12-M, System Safety Engineering Manual
- h. NAVSEA S9510-AB-ATM-010, Technical Manual for Nuclear Powered Submarine Atmosphere Control Manual
- i. NSWCCD-63-TR-2012/140, Development of the Naval Sea Systems Command List of Targeted Chemicals, of 31 Oct 12 (N-LTC)(Formerly the NAVSEA Prohibited and Controlled Chemical List (PCCL), of 26 Nov 08)
- j. ASN (RD&A) Memorandum for Distribution, Department of the Navy Hexavalent Chromium Authorization Process, of 22 Dec 11
- k. ASN (RD&A) Memorandum for Distribution, Equipment/Systems Requiring the Unplanned Use of Class I Ozone-Depleting Substances (ODS), of 13 Nov 97

1.3 CANCELLATION.

NAVSEA letter Ser 05P/311 of 06 Aug 10 (NAVSEA Hazardous Material Avoidance Process) and NAVSEA letter Ser 04R/138 of 26 Nov 2008 (NAVSEA Prohibited and Controlled Chemical List) are hereby cancelled and superseded by this document.

1.4 BACKGROUND.

OPNAVINST 5090.1 defines HM as any material that, because of its quantity, concentration or physical, chemical, or infectious characteristics, may pose a substantial hazard to human health or the environment when incorrectly used, purposefully released, or accidentally spilled. This definition includes the following:

- a. Flammable/combustible materials
- b. Toxic materials
- c. Corrosive materials (including acids and bases)

- d. Oxidizing materials
- e. Aerosol containers
- f. Compressed gases

1.4.1 Exceptions. For purposes of this procedure, the definition of HM does not include materials that require special handling and disposal procedures including ammunition, weapons, explosives and explosive-actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical materials, medical waste and infectious materials, bulk fuels, and radioactive materials. These materials are hazardous, and exposure to personnel may occur during manufacture, storage, use, and demilitarization of these items. Risk assessment and approval/disapproval for the use of these materials is made by other Navy authorities.

1.4.2 Formalizing the Approach for HM Elimination and Minimization. Eliminating or minimizing the use of HM will reduce risks to human health and the environment; reduce weapon system life cycle costs associated with HM handling, storage, and disposal; help the Navy meet EO 13693 and OPNAVINST 5100.19 requirements to reduce the quantity of HM acquired, used, or disposed of; and support the Environmental Readiness in Systems Acquisition, CNO(N4) Memorandum N4/8U156042 requirement to minimize the use and quantity of HM used during manufacture and sustainment. Additionally, formalizing the approach for HM elimination or minimization supports the NAVSEAINST 5000.8 requirement for each acquisition and in-service program to have a defined risk management program. It also supports the NAVSEA 5100.12-M requirement for the Technical Warrant Holder (TWH) for Environmental Systems and Materials Engineering (NAVSEA 05P5) to provide cross-platform engineering and acquisition support for HM management and minimization efforts.

1.5 SCOPE AND APPLICABILITY.

This process applies to all of Corporate NAVSEA, encompassing NAVSEA Headquarters Directorates (NAVSEA HQ), NAVSEA Affiliated Program Executive Offices (PEOs) (including Program Managers Ships/Systems [PMS]), Supervisors of Shipbuilding (SUPSHIPS), Naval Surface Warfare Center (NSWC) Divisions, Naval Undersea Warfare Center (NUWC) Divisions, and other NAVSEA Field Activities (OFA), herein after referred to as “Lead Activities.” This process also applies to new ship and weapon system/equipment acquisition programs, modernization programs, logistics revisions, and system life-cycle management as of the date of this Technical Manual. Life-cycle management encompasses system/equipment manufacturing, installation, test and evaluation, operation, maintenance, modernization, repair, and disposal. This process does not apply to the laboratory use of analytical chemicals. This process will not be applied retroactively to existing acquisition programs and contracts unless directed by higher authority.

1.6 NON-APPLICABILITY.

This process does not apply to systems/equipment under the cognizance of Strategic Systems Program (SSP) or the Director, Naval Nuclear Propulsion (NAVSEA 08). This process also does not apply to maintenance executed at Naval Shipyards, Regional Maintenance Centers (RMCs), Depots, and Refit Facilities since compliance with this process will be completed by the lead activities developing the technical requirements.

CHAPTER 2

HM MANAGEMENT AND IDENTIFICATION PROCESS

2.1 INTRODUCTION.

The use of HM in NAVSEA-sponsored systems, equipment, and processes poses a hazard and risk that must be addressed and minimized through proper management strategies. This document utilizes and expands upon practices from NAVSEAINST 5000.8 to properly manage HM. System safety practices must be applied to HM identified in NAVSEA applications to allow for proper risk assessment and hazard mitigation measures. When properly applied, the system safety requirements of NAVSEAINST 5000.8 and NAVSEAINST 5100.12, and procedures in NAVSEA 5100.12-M should enable the identification and management of HM and their associated risks during system development and sustaining engineering activities. The hazard identification process shall consider the entire system life-cycle and potential impacts to personnel, infrastructure, defense systems, the public, and the environment.

2.2 HM MANAGEMENT PLAN.

The NAVSEA System Engineering Safety Manual (NAVSEA 5100.12-M) provides guidance on the development of a Hazardous Material Management Plan (HMMP), which is a critical component of integrating HM management into the systems engineering process. Through the HMMP, the Program can define contractor roles, responsibilities, and procedures to accomplish HM management and tracking.

2.3 HM CATEGORIES.

Following contract award, a list of HM within the delivered hardware and/or required for system construction/manufacture, installation, operation and support, categorized as prohibited, restricted, or tracked, will be mutually agreed upon by the Government and contractor. These categories have been defined as follows:

- a. Prohibited HM require the contractor to obtain Government approval before those materials can be included in the system, subsystems, and support equipment or planned for system construction/manufacture, installation, operation or support.
- b. Restricted HM are those materials that the contractor will target for elimination or minimization.
- c. Tracked HM are those materials that do not require specific contractor action other than tracking and reporting.

Additionally, the contractor will be required to track and report all prohibited, restricted, and tracked HM included in the delivered systems, subsystems, and support equipment or planned for system operation or support.

2.4 HM APPROVAL AND ASSESSMENT.

While only prohibited HM requires Government approval prior to use, all HM must be properly assessed through the system safety principles in NAVSEAINST 5100.12 and NAVSEA 5100.12-M. The identified risk and supporting analysis from this process must be accepted by the appropriate authorities as delineated in NAVSEAINST 5000.8.

2.5 NAVSEA LIST OF TARGETED CHEMICALS (N-LTC).

The NAVSEA List of Targeted Chemicals (N-LTC) was developed to support the HM management requirements of EO 13693, OPNAVINST 5100.19, and Environmental Readiness in Systems Acquisition, CNO(N4) Memorandum N4/8U156042.

2.5.1 Purpose of the N-LTC. The N-LTC identifies chemicals that may pose the greatest risk to Navy personnel, delivered hardware, and the environment. The chemicals in Appendix A have been categorized in accordance with the definitions of section 2.3. To assist in the system safety practices of NAVSEAINST 5100.12 and NAVSEA 5100.12-M, NAVSEA has assigned minimum severity categories to each of the chemicals based on the potential for death or injury, environmental impact, or monetary loss. If these chemicals are identified either as pure chemicals or as a constituent of a material for use in NAVSEA hardware and/or required for system operation and support, a proper risk assessment must be conducted by applying the provided severity category and determining the probability level of exposure based upon product application. Certain chemicals in Appendix A have identified application exceptions as discussed in section B.8. The risk assessment code (RAC) for these chemicals in the specific applications have already been determined and received the appropriate risk analysis approvals by SEA 05, per NAVSEAINST 5000.8.

2.5.2 Determination of HM Severity Categories. The NAVSEA-provided severity categories, based upon the definitions of NAVSEAINST 5000.8, are minimum assignments and can be elevated at the discretion of a program. The NAVSEA activity will be responsible for determining the probability level of exposure for the chemical application when conducting a risk assessment. Based upon the resultant RAC, use of the identified HM will require the appropriate level of risk acceptance per NAVSEAINST 5000.8, following the procedure discussed in Appendix B.

2.5.3 NAVSEA 05 Involvement. This procedure also formalizes the involvement of NAVSEA 05 in the Shipboard Hazardous Material List (SHML)/Submarine Material Control List Feedback Report (SFR) and Submarine Material Control List (SMCL) Certification Request processes in accordance with OPNAVINST 5100.19 and NAVSEA S9510-AB-ATM-010. These reports are used to request new material be added to the SHML and SMCL, which are the HM AULs for the respective communities. The N-LTC has been integrated into these processes to further manage HM across NAVSEA platforms.

CHAPTER 3 RESPONSIBILITIES

3.1 NAVSEA LEAD ACTIVITY RESPONSIBILITIES.

NAVSEA Lead Activities shall:

- a. Invoke the requirements of this manual (items (b) through (g) below) via Contracts, Contract Data Requirements Lists (CDRLs), Statements of Work (SOWs), specifications, and Memorandums of Agreement (MOAs) upon all contractors, subcontractors, vendors, suppliers and Participating Area Responsible Managers (PARMs).
- b. When applicable, include the requirements of the HM Avoidance Process and use of the N-LTC in the program's HMMP.
- c. Evaluate systems, subsystems, equipment, associated installation, maintenance and repair processes, specifications, and standards to identify components, materials, products, and consumables with HM per procedures discussed in Appendix B.
- d. Minimize the use of HM containing Prohibited and Restricted chemicals per Appendix A to the maximum extent possible based on evaluation of cost, performance, schedule, and programmatic risk analyses.
- e. Perform risk assessments for all HM containing chemicals listed in the N-LTC in accordance with the requirements of NAVSEAINST 5000.8 per Appendix B. Document the risk assessment for all N-LTC Tables [A-1](#) and [A-2](#) chemicals in addition to [Table A-3](#) chemicals that are assigned a serious or high residual risk.
- f. Per Section B.4 of Appendix B, submit a NAVSEA 05 HM Waiver Request Form (Appendix C) to NAVSEA 05P5 for procurement or use of any HM containing a Prohibited chemical or application with a risk assessment code of high or serious.
- g. Provide a copy of the approved/denied HM Waiver Request Form to NAVSEA 05P5.

3.2 NAVSEA 05P5 TWH FOR ENVIRONMENTAL SYSTEMS AND MATERIALS ENGINEERING RESPONSIBILITIES.

The NAVSEA 05P5 TWH for Environmental Systems and Materials Engineering shall:

- a. Coordinate with NAVSEA 04R and other appropriate organizations to review and update, if appropriate, the N-LTC whenever there is a significant change to regulations or Navy Policy, or when significant environmental or human health and safety impacts arise that require immediate action. Revisions to the N-LTC will not be retroactive to existing acquisition programs. New directives and revisions to the N-LTC will not be applied retroactively to existing acquisition programs and contracts unless directed by higher authority.
- b. Coordinate review of submitted NAVSEA 05 HM Waiver Request Forms with other NAVSEA 05 Technical Domain Managers (TDM) and provide the requesting Lead Activity and Program Office a consolidated recommendation for approval or denial per NAVSEAINST 5000.8. Coordination may be conducted electronically or via formal meetings chaired by NAVSEA 05P5.
- c. Develop and maintain NAVSEA approved application exceptions for chemicals listed in Appendix A per the risk acceptance requirements of NAVSEAINST 5000.8.
- d. Develop and maintain a database/repository for all HM Waiver Request Forms and associated documentation.
- e. Coordinate with Lead Activities to ensure HM is integrated into the appropriate AUL.
- f. Review all successful HM elimination/minimization initiatives for potential applicability to legacy systems and previously approved HM Waiver Review Forms.
- g. Coordinate with appropriate TWHs, Life-Cycle Managers (LCMs), In-Service Engineering Agents (ISEAs), Subject Matter Experts (SMEs), Fleet or end-users, Department of Defense (DoD) organizations, and other stakeholders.
- h. Maintain a series of TWH Chemical Position Papers that highlight the concerns associated specific chemicals of interest on the N-LTC. The position papers are hosted on Navy Knowledge Online (NKO) on the Environmental, Safety, and Occupational Health (ESOH) in Acquisition sub-community of the Shipboard Environmental Information Clearinghouse (SEIC) (<https://www.nko.navy.mil/group/esoh-in-acquisition/home>).

3.3 NAVSEA TDM RESPONSIBILITIES.

NAVSEA TDMs shall coordinate the review of submitted NAVSEA 05 HM Waiver Request Forms with NAVSEA 05P5 and provide the requesting Program Office a consolidated recommendation for approval or denial per NAVSEAINST 5000.8.

3.4 NAVSEA CHIEF SYSTEMS ENGINEERS (CSE) RESPONSIBILITIES.

NAVSEA CSEs shall coordinate the review of submitted NAVSEA 05 HM Waiver Request Forms with NAVSEA 05P5 and provide the requesting Program Office a consolidated recommendation for approval or denial per NAVSEAINST 5000.8.

3.5 POINT OF CONTACT.

The NAVSEA 05 point of contact for this Technical Manual is Mr. Peter McGraw (NAVSEA Technical Warrant Holder, Ship Environmental Systems and Materials Engineering) at (202) 781-2990 or Peter.McGraw@navy.mil.

APPENDIX A

NAVSEA LIST OF TARGETED CHEMICALS (N-LTC)

A.1 INTRODUCTION.

Tables A-1 through A-3 below comprise the N-LTC.

Table A-1. Prohibited Chemicals on the N-LTC.

Chemical	CAS	Severity Category
Asbestos (friable)	1332-21-4	Catastrophic
Asbestos variation - Actinolite	77536-66-4	Catastrophic
Asbestos variation - Amosite	12172-73-5	Catastrophic
Asbestos variation - Anthophyllite	77536-67-5	Catastrophic
Asbestos variation - Chrysotile	12001-29-5	Catastrophic
Asbestos variation - Crocidolite	12001-28-4	Catastrophic
Asbestos variation - Tremolite	77536-68-6	Catastrophic
Hexavalent Chromium Compounds	Multiple CAS	Catastrophic
Ozone Depleting Substances Class I	Multiple CAS	Catastrophic
Chlordane	57-74-9	Critical
Polychlorinated Biphenyls (PCB)	Multiple CAS	Critical

Table A-2. Restricted Chemicals on the N-LTC.

Chemical	CAS	Severity Category
1,3-Butadiene	106-99-0	Catastrophic
4,4'-Methylenebis (2-chloroaniline) (MBOCA)	101-14-4	Catastrophic
4-Aminobiphenyl	92-67-1	Catastrophic
Acetaldehyde	75-07-0	Catastrophic
Arsenic and Arsenic Compounds <i>Note: Except when used in batteries, solder, and electronic applications (see A.2.1).</i>	Multiple CAS	Catastrophic
Benzene	71-43-2	Catastrophic
Benzidine	92-87-5	Catastrophic
Benzo[a]pyrene	50-32-8	Catastrophic
Beryllium and Beryllium Compounds <i>Note: Except when used in electronic applications (see A.2.2).</i>	Multiple CAS	Catastrophic
beta-Naphthylamine	91-59-8	Catastrophic
Cadmium and Cadmium Compounds <i>Note: Except when used in batteries (see A.2.3).</i>	Multiple CAS	Catastrophic
Chlorambucil	305-03-3	Catastrophic
Chlornaphazine	494-03-1	Catastrophic
Chloromethyl Ether	542-88-1	Catastrophic

Table A-2. Restricted Chemicals on the N-LTC (Continued).

Chemical	CAS	Severity Category
Chloromethyl Methyl Ether	107-30-2	Catastrophic
Cyclophosphamide	50-18-0	Catastrophic
Diethylstilbestrol	56-53-1	Catastrophic
Ethylene Oxide	75-21-8	Catastrophic
Formaldehyde	50-00-0	Catastrophic
Melphalan	148-82-3	Catastrophic
Mustard Gas	505-60-2	Catastrophic
Nickel Compounds <i>Note: Except when used in batteries (see A.2.4).</i>	Multiple CAS	Catastrophic
N-Nitrosornicotine	16543-55-8	Catastrophic
o-Toluidine	95-53-4	Catastrophic
Phenacetin	62-44-2	Catastrophic
Sulfuric Acid <i>Note: Except when used in sealed maintenance-free batteries (see A.2.5).</i>	7664-93-9	Catastrophic
Thorium Dioxide	1314-20-1	Catastrophic
Vinyl Chloride <i>Note: Except when used in polyvinyl chloride (PVC) (see A.2.6).</i>	75-01-4	Catastrophic
1,1,2,2-Tetrachloroethane	79-34-5	Critical
1,1,2-Trichloroethane	79-00-5	Critical
1,2-Dichloropropane	78-87-5	Critical
1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	Critical
1,3-Dichloropropene	542-75-6	Critical
1,4-Dichlorobenzene	106-46-7	Critical
2,4,6-Trichlorophenol	88-06-2	Critical
2,4-Dinitrotoluene	121-14-2	Critical
2-Acetylaminofluorene	53-96-3	Critical
3,3'-Dichlorobenzidine	91-94-1	Critical
4,4'-Methylenedianiline	101-77-9	Critical
Acrolein	107-02-8	Critical
Acrylamide	79-06-1	Critical
Aldrin	309-00-2	Critical
Aziridine	151-56-4	Critical
Benz[a]anthracene	56-55-3	Critical
Benzo(a)phenanthrene	218-01-9	Critical
Benzo(k)fluoranthene	207-08-9	Critical
Benzo[b]fluoranthene	205-99-2	Critical
Benzyl Chloride	100-44-7	Critical
Bromoform	75-25-2	Critical

Table A-2. Restricted Chemicals on the N-LTC (Continued).

Chemical	CAS	Severity Category
Carbaryl	63-25-2	Critical
Carbon Disulfide	75-15-0	Critical
Carbonic dichloride	75-44-5	Critical
Chlorobenzene	108-90-7	Critical
Chloroform	67-66-3	Critical
Cyanide Containing Compounds (includes Nitrile and Cyano Compounds) <i>Note: Except when used in rubber (see A.2.7).</i>	Multiple CAS	Critical
Dibenz[a,h]anthracene	53-70-3	Critical
Dibromochloropropane (DBCP)	96-12-8	Critical
Dichlorodiphenyltrichloroethane (DDT)	50-29-3	Critical
Dichloroethyl Ether	111-44-4	Critical
Dichlorvos	62-73-7	Critical
Dieldrin	60-57-1	Critical
Dimethyl Sulfate	77-78-1	Critical
Dimethylhydrazine	57-14-7	Critical
Dinitroresol	534-52-1	Critical
Dioxin and Dioxin-Like Compounds	Multiple CAS	Critical
Endrin	72-20-8	Critical
Epichlorohydrin	106-89-8	Critical
Ethylene Dibromide	106-93-4	Critical
Ethylene Dichloride	107-06-2	Critical
Ethylene Thiourea	96-45-7	Critical
Ethylidene Dichloride	75-34-3	Critical
Fluoranthene	206-44-0	Critical
Heptachlor	76-44-8	Critical
Hexachlorobenzene	118-74-1	Critical
Hexachlorobutadiene	87-68-3	Critical
Hexachloroethane	67-72-1	Critical
Hydrazine	302-01-2	Critical
Indeno(1,2,3-cd)pyrene	193-39-5	Critical
Isocyanate Compounds	Multiple CAS	Critical
Lead and Lead Compounds <i>Note: Except when used in solder, sealed maintenance-free batteries, lead ballast for vessel stability, and industry standard metal alloys with lead $\leq 3\%$ (see A.2.8).</i>	Multiple CAS	Critical
Lindane	58-89-9	Critical
Lithium and Lithium Compounds <i>Note: Except when used in batteries (per S9310-AQ-SAF-010) and greases (see A.2.9).</i>	Multiple CAS	Critical

Table A-2. Restricted Chemicals on the N-LTC (Continued).

Chemical	CAS	Severity Category
Mercury and Mercury Compounds <i>Note: Except when used in batteries, LCD displays, and general purpose lighting (lamps and bulbs) (see A.2.10).</i>	Multiple CAS	Critical
Methoxychlor	72-43-5	Critical
Methyl Chloride	74-87-3	Critical
Methylene Chloride	75-09-2	Critical
Naphthalene	91-20-3	Critical
Nickel <i>Note: Except when used in piping, electrical connectors, electronic applications, plating, and industry standard metal alloys (see A.2.11).</i>	7440-02-0	Critical
Nitrobenzene	98-95-3	Critical
Nitrosodimethylamine	62-75-9	Critical
o-Anisidine	90-04-0	Critical
Parathion	56-38-2	Critical
Pentachlorophenol (PCP)	87-86-5	Critical
Perchloroethylene	127-18-4	Critical
Phenol <i>Note: Except when used in phenolic resins (see A.2.12).</i>	108-95-2	Critical
Phthalate Esters	Multiple CAS	Critical
Styrene <i>Note: Except when used in polymerized styrene (see A.2.13).</i>	100-42-5	Critical
Sulfur Hexafluoride	2551-62-4	Critical
Toluene	108-88-3	Critical
Toxaphene	8001-35-2	Critical
Trichloroethylene (TCE)	79-01-6	Critical
Vinylidene Chloride	75-35-4	Critical
1,2,4-Trichlorobenzene	120-82-1	Marginal
1,2-Dichlorobenzene	95-50-1	Marginal
2,4-Diaminotoluene	95-80-7	Marginal
2,4-Dichlorophenoxyacetic Acid (2,4-D)	94-75-7	Marginal
2,4-Dinitrophenol	51-28-5	Marginal
2,6-Dinitrotoluene	606-20-2	Marginal
2-Ethoxyethanol	110-80-5	Marginal
2-Nitropropane	79-46-9	Marginal
3-Methylcholanthrene	56-49-5	Marginal
4-Nitrophenol	100-02-7	Marginal
7,12-Dimethylbenz[a]anthracene	57-97-6	Marginal
7H-Dibenzo(c,g)carbazole	194-59-2	Marginal
Allyl Alcohol	107-18-6	Marginal

Table A-2. Restricted Chemicals on the N-LTC. (Continued)

Chemical	CAS	Severity Category
Allyl Chloride	107-05-1	Marginal
alpha-BHC	319-84-6	Marginal
Aniline	62-53-3	Marginal
Anthracene	120-12-7	Marginal
Antimony and Antimony Compounds <i>Note: Except when used in batteries and solder (see A.2.14).</i>	Multiple CAS	Marginal
Benomyl	17804-35-2	Marginal
Benzo(j)fluoranthene	205-82-3	Marginal
Benzotrichloride	98-07-7	Marginal
Beta-Propiolactone	57-57-8	Marginal
Carbofuran	1563-66-2	Marginal
Chlorine	7782-50-5	Marginal
Chloroprene	126-99-8	Marginal
Chromium and Non-Hexavalent Chromium Compounds <i>Note: Except when used in plating, industry standard metal alloys, and trivalent chromium coatings and surface treatments (see A.2.15).</i>	Multiple CAS	Marginal
Cobalt and Cobalt Compounds <i>Note: Except when used in industry standard metal alloys (see A.2.16).</i>	Multiple CAS	Marginal
Copper and Copper Compounds <i>Note: Except when used in batteries, solder, piping, electrical and electronic applications, plating, antifouling hull coatings and industry standard metal alloys (not including copper beryllium alloys) (see A.2.17).</i>	Multiple CAS	Marginal
Cresol (mixed isomers)	1319-77-3	Marginal
Dibenz(a,h)acridine	226-36-8	Marginal
Dibenz(a,j)acridine	224-42-0	Marginal
Dibenz[a,i]pyrene	189-55-9	Marginal
Dibenzo(a,e)pyrene	192-65-4	Marginal
Dibenzo(a,h)pyrene	189-64-0	Marginal
Dichlorodiphenyldichloroethane (DDD)	72-54-8	Marginal
Dimethylaminoazobenzene	60-11-7	Marginal
Dinitrobutyl Phenol	88-85-7	Marginal
Dinitrotoluene (mixed isomers)	25321-14-6	Marginal
Ethyl Chloride	75-00-3	Marginal
Ethylbenzene	100-41-4	Marginal
Furan	110-00-9	Marginal
Hexachlorocyclopentadiene	77-47-4	Marginal
Hexamethylphosphoramide	680-31-9	Marginal
Hydrazobenzene	122-66-7	Marginal
Hydrofluoric Acid	7664-39-3	Marginal

Table A-2. Restricted Chemicals on the N-LTC. (Continued)

Chemical	CAS	Severity Category
Kepone	143-50-0	Marginal
Maleic Anhydride	108-31-6	Marginal
m-Cresol	108-39-4	Marginal
Methanol	67-56-1	Marginal
Methyl Hydrazine	60-34-4	Marginal
Nicotine	54-11-5	Marginal
Nitrogen Mustard	51-75-2	Marginal
o-Cresol	95-48-7	Marginal
o-Tolidine	119-93-7	Marginal
Ozone Depleting Substances Class II	Multiple CAS	Marginal
p-Cresol	106-44-5	Marginal
Pentachlorobenzene	608-93-5	Marginal
Phosphine	7803-51-2	Marginal
Phosphorus	7723-14-0	Marginal
Propylene Oxide	75-56-9	Marginal
Propyleneimine	75-55-8	Marginal
Quinone	106-51-4	Marginal
Selenium and Selenium Compounds <i>Note: Except when used in electronic components (see A.2.18).</i>	Multiple CAS	Marginal
Silver and Silver Compounds <i>Note: Except when used in electrical and electronic applications, plating, and solder (see A.2.19).</i>	Multiple CAS	Marginal
Sodium Fluoroacetate	62-74-8	Marginal
Strychnine	57-24-9	Marginal
Thallium and Thallium Compounds	Multiple CAS	Marginal
Thiomethanol	74-93-1	Marginal
Tin Compounds	Multiple CAS	Marginal
Urethane	51-79-6	Marginal
Warfarin	81-81-2	Marginal
Xylene (Mixed Isomers)	1330-20-7	Marginal
Zinc Compounds	Multiple CAS	Marginal

Table A-3. Tracked Chemicals on the N-LTC

CHEMICAL	CAS	Severity Category
All hazardous materials containing chemicals not listed on the Prohibited and Restricted Tiers (Tables A-1 and A-2)		TBD by Lead Activity

A.2 NAVSEA LIST OF TARGETED CHEMICALS (N-LTC) APPLICATION EXCEPTION NOTES.

The following Notes provide rationale for the determination of N-LTC Application Exceptions. The Notes are referenced in Tables [A-1](#) and [A-2](#).

A.2.1 Exception: Arsenic and Arsenic Compounds.

A.2.1.1 Batteries.

- a. Severity Category: Catastrophic
- b. Probability Level: Improbable
- c. Rationale: During normal use, arsenic is fully contained in the battery. However, if the battery cell were to be opened or exposed to heat, exposure to arsenic could be harmful to personnel.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Some lead-acid batteries contain enclosed arsenic, which is added to strengthen leaded components. During normal operating conditions, arsenic is contained within the battery, which requires no maintenance and is eventually disposed of as an entire unit upon depletion. This application presents minimal Environmental, Safety, and Occupational Health (ESOH) risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.1.2 Solder.

- a. Severity Category: Catastrophic
- b. Probability Level: Improbable
- c. Rationale: Arsenic in solder poses a minimal risk (Probability Level: Improbable) for activities that only contact solder in place. Activities that perform soldering may have potential occupational exposure to arsenic metallic fume (Probability Level: Remote). These activities are generally well controlled with ventilation.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Arsenic is an impurity of the main constituents of various types of solder. The exposure to solder is low for most NAVSEA activities over its life-cycle because most activities are not engaged in operational maintenance. Activities that perform soldering, such as Naval Shipyards, perform this task using engineering controls (i.e., local exhaust ventilation) and certified personnel. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.1.3 Electronic Applications.

- a. Severity Category: Catastrophic
- b. Probability Level: Improbable
- c. Rationale: During normal operation, arsenic is contained within the component and is not disturbed.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: During normal operating conditions, electronic components are not abraded or machined and do not generate hazardous dust. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.2 Exception: Beryllium and Beryllium Compounds.

A.2.2.1 Electronic Applications.

- a. Severity Category: Catastrophic
- b. Probability Level: Improbable
- c. Rationale: During normal operation, beryllium is contained within the component and is not disturbed.
- d. Risk Assessment Code: Medium

- e. Rationale for Exception: During normal operating conditions, electronic components are enclosed and do not generate hazardous dust. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.3 Exception: Cadmium and Cadmium Compounds.

A.2.3.1 Batteries.

- a. Severity Category: Catastrophic
- b. Probability Level: Improbable
- c. Rationale: During normal use, cadmium is fully contained in the battery. However, if the battery cell were to be opened or exposed to heat, exposure to cadmium could be harmful to personnel.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Batteries contain enclosed cadmium. During normal operating conditions, cadmium is contained within the battery, which requires no maintenance and is eventually disposed of as an entire unit upon depletion. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.4 Exception: Nickel Compounds.

A.2.4.1 Batteries.

- a. Severity Category: Catastrophic
- b. Probability Level: Improbable
- c. Rationale: During normal use, nickel is fully contained in the battery. However, if the battery cell were to be opened or exposed to heat, exposure to nickel could be harmful to personnel.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Batteries contain enclosed nickel. During normal operating conditions, nickel is contained within the battery, which requires no maintenance and is eventually disposed of as an entire unit upon depletion. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.5 Exception: Sulfuric Acid.

A.1.5.1 Sealed Maintenance-Free Batteries.

- a. Severity Category: Catastrophic
- b. Probability Level: Improbable
- c. Rationale: During normal use, sulfuric acid is fully contained in the battery. However, if the battery cell were to be opened or exposed to heat, exposure to sulfuric acid could be harmful to personnel.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Batteries contain enclosed sulfuric acid. During normal operating conditions, sulfuric acid is contained within the battery, which requires no maintenance and is eventually disposed of as an entire unit upon depletion. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.6 Exception: Vinyl Chloride.

A.2.6.1 Polyvinyl Chloride.

- a. Severity Category: Catastrophic
- b. Probability Level: Improbable
- c. Rationale: Polyvinyl chloride is fully polymerized and contains no vinyl chloride monomer. However, vinyl chloride may be released if PVC materials are subjected to intense heat and burned, with potential personnel exposure. Since burning PVC plastic materials are not expected, the risk of exposure is deemed improbable.

- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Polymerized vinyl chloride is formed through the polymerization of vinyl chloride. This polymerized form presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.7 Exception: Cyanide Containing Compounds (includes Nitrile and Cyano Compounds).

A.2.7.1 Nitrile Rubber.

- a. Severity Category: Critical
- b. Probability Level: Improbable
- c. Rationale: Nitrile rubber contains no free cyanide compounds.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Under normal operating conditions, there is minimal potential for the formation of hydrogen cyanide gas from rubber. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.8 Exception: Lead and Lead Compounds.

A.2.8.1 Solder.

- a. Severity Category: Critical
- b. Probability Level: Remote
- c. Rationale: Lead in solder poses a minimal risk (Probability Level: Improbable) for activities that only contact solder in place. Activities that perform soldering may have potential occupational exposure to lead metallic fumes (Probability Level: Remote). However, these activities are generally well controlled with ventilation.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: The exposure to solder is low for most NAVSEA activities over its life-cycle because most activities are not engaged in operational maintenance. Activities that perform soldering, such as Naval Shipyards, perform this task using engineering controls (i.e., local exhaust ventilation) and certified personnel. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.8.2 Sealed Maintenance-Free Batteries.

- a. Severity Category: Critical
- b. Probability Level: Improbable
- c. Rationale: During normal use, lead is fully contained in the battery. However, if the battery cell were to be opened or exposed to heat, exposure to lead could be harmful to personnel.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Batteries contain enclosed lead. During normal operating conditions, lead is contained within the battery, which requires no maintenance and is eventually disposed of as an entire unit upon depletion. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.8.3 Lead Ballast for Vessel Stability.

- a. Severity Category: Critical
- b. Probability Level: Occasional
- c. Rationale: Naval Shipyards cut and move lead ballast on a frequent basis.
- d. Risk Assessment Code: Serious (PEO has approval authority)
- e. Rationale for Exception: Most NAVSEA activities have no contact with lead ballast. Those activities that install and remove lead ballast, such as Naval Shipyards, do so using strict exposure controls including ventilation and Personal Protective Equipment (PPE). ESOH risks are minimized by the use of proper controls.

A.2.8.4 Industry Standard Metal Alloys with Lead ≤3 Percent.

- a. Severity Category: Critical
- b. Probability Level: Occasional
- c. Rationale: Naval Shipyards perform metal working and hot work with metal alloys.
- d. Risk Assessment Code: Serious (PEO has approval authority)
- e. Rationale for Exception: Most NAVSEA activities do not regularly machine or abrade metal alloys during the life-cycle of the metal; therefore, lead should not be released to the environment. Some activities, such as Naval Shipyards, routinely machine and perform hot work on metal alloy substrates; however, these operations are performed under strict controls. ESOH risks are minimized by the use of proper controls.

A.2.9 Exception: Lithium and Lithium Compounds.

A.2.9.1 Batteries (per S9310-AQ-SAF-010).

- a. Severity Category: Critical
- b. Probability Level: Improbable
- c. Rationale: During normal use, lithium is fully contained in the battery. However, if the battery cell were to be opened or exposed to heat, exposure to lithium could be harmful to personnel.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Batteries contain enclosed lithium. During normal operating conditions, lithium is contained within the battery, which requires no maintenance and is eventually disposed of as an entire unit upon depletion. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption. Batteries require approval through S9310-AQ-SAF-010.

A.2.9.2 Greases.

- a. Severity Category: Critical
- b. Probability Level: Remote
- c. Rationale: During normal use personnel are protected from contact by gloves and other PPE.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Greases contain lithium stearate, which is a soap-like material. There is no free lithium in grease. Lithium greases are considered to have a very low human toxicity by all routes of exposure, and are considered to pose minimal risk to the environment upon release.

A.2.10 Exception: Mercury and Mercury Compounds.

A.2.10.1 Batteries.

- a. Severity Category: Critical
- b. Probability Level: Improbable
- c. Rationale: During normal use, mercury is fully contained in the battery. However, if the battery cell were to be opened or exposed to heat, exposure to mercury could be harmful to personnel.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Zinc air, silver oxide, and alkaline manganese oxide batteries contain small quantities of enclosed mercury. Mercuric oxide batteries may occasionally be required for specific military applications, which contain greater quantities of mercury than the above referenced types. During normal operating conditions, mercury is contained within the battery, which requires no maintenance and is eventually disposed of as an entire unit upon depletion. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.10.2 LCD Displays.

- a. Severity Category: Critical
- b. Probability Level: Improbable
- c. Rationale: During normal usage, mercury is fully contained within the assembly and does not pose a risk. However, if broken, shipboard personnel would be exposed to trace amounts of mercury released from the backlight assembly.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: The mercury content in LCD displays is low and under normal operating conditions will not be released to the environment. Mercury is contained within the LCD display which requires no maintenance and is eventually disposed of as an entire unit. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.10.3 General Purpose Lighting (Lamps and Bulbs).

- a. Severity Category: Critical
- b. Probability Level: Remote
- c. Rationale: General purpose lighting contains very low quantities of mercury but, if broken, may present a possible exposure.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: The mercury content in lighting materials is low and under normal operating conditions will not be released to the environment. This application presents minimal ESOH risk due to the improbable exposure by ingestion and absorption. However, the rupture of general purpose lighting may release low levels of mercury, which may present a possible route of inhalation exposure.

A.2.11 Exception: Nickel.A.2.11.1 Piping.

- a. Severity Category: Critical
- b. Probability Level: Occasional
- c. Rationale: Naval Shipyards and intermediate maintenance facilities (IMFs) machine and perform hot work on nickel alloy piping.
- d. Risk Assessment Code: Serious (PEO has approval authority)
- e. Rationale for Exception: During normal operating conditions, nickel is not released into the environment or manipulated to generate hazardous dust or fume. Some activities, such as Naval Shipyards and IMFs perform machining and/or hot work on nickel alloy piping. However, when performed, a variety of exposure controls, including ventilation and PPE, are used.

A.2.11.2 Electrical Connectors.

- a. Severity Category: Critical
- b. Probability Level: Improbable
- c. Rationale: Maintenance procedures do not require any grinding or sanding of the nickel.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Nickel in electrical connectors is present in its elemental state, which presents low toxicity. This form of nickel serves as a sub-layer of the connector coating that personnel will not come in contact with. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.11.2 Electronic Applications.

- a. Severity Category: Critical
- b. Probability Level: Improbable

- c. Rationale: During normal operation, nickel is contained within the component and is not disturbed.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Electronic applications utilize elemental nickel. This form of nickel is generally used as a conductive coating that is not abraded and does not generate hazardous dust. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.11.3 Nickel Plating.

- a. Severity Category: Critical
- b. Probability Level: Occasional
- c. Rationale: Nickel is necessary for corrosion protection of certain base metals or as a best practice to cap surfaces to engineering specifications, such as machinery and motor brush plating that are subject to sliding forces. During normal operation, nickel plating is contained within a controlled environment.
- d. Risk Assessment Code: Serious (PEO has approval authority)
- e. Rationale for Exception: Few activities, such as Naval Shipyards and IMFs, perform plating or subsequent machining of brushplated parts. However, when performed, a variety of exposure controls, including written industrial process instructions, ventilation, and PPE, are used. Operators are qualified to NAVSEA specification through rigorous training and examination.

A.2.11.4 Industry Standard Metal Alloys.

- a. Severity Category: Critical
- b. Probability Level: Occasional
- c. Rationale: Naval Shipyards and IMFs, machine and perform hot work on nickel alloy metals.
- d. Risk Assessment Code: Serious (PEO has approval authority)
- e. Rationale for Exception: Most activities do not regularly abrade or machine metal alloys during the life-cycle. Some activities, such as Naval Shipyards and IMFs, perform machining and/or hot work on nickel alloy piping. However, when performed, a variety of exposure controls, including ventilation and PPE, are used.

A.2.12 Exception: Phenol.

A.2.12.1 Phenolic Resins.

- a. Severity Category: Critical
- b. Probability Level: Improbable
- c. Rationale: Phenolic resins do not contain free phenol monomer. This form of polymer is highly stable and heat resistant; it is not likely to release free phenol unless burned.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Phenolic resin is formed through the polymerization of phenol. This polymerized form presents minimal ESOH risk of exposure to phenol due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.13 Exception: Styrene.

A.2.13.1 Polymerized Styrene.

- a. Severity Category: Critical
- b. Probability Level: Improbable
- c. Rationale: Polymerized styrene does not contain free styrene. However, if burned, this material may release free styrene which can pose an inhalation hazard. Since burning polystyrene materials are not expected, the risk of exposure is deemed improbable.
- d. Risk Assessment Code: Medium

- e. Rationale for Exception: Polymerized styrene is formed through the polymerization of styrene. Polystyrene contains no free styrene. This polymerized form presents minimal ESOH risk due to the improbable exposure to styrene by inhalation, ingestion, and absorption.

A.2.14 Exception: Antimony and Antimony Compounds.

A.2.14.1 Batteries.

- a. Severity Category: Marginal
- b. Probability Level: Improbable
- c. Rationale: During normal operating conditions, antimony is contained within the battery. However, if the battery cell were to be opened or exposed to heat, exposure to antimony could be harmful to personnel.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Batteries contain enclosed antimony, which exists as a residual impurity of other electrode materials. During normal operating conditions, antimony is contained within the battery, which requires no maintenance and is eventually disposed of as an entire unit upon depletion. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.14.2 Solder.

- a. Severity Category: Marginal
- b. Probability Level: Remote
- c. Rationale: Antimony in solder poses a minimal risk (improbable probability level) for activities that only contact solder in place. Activities that perform soldering may have potential occupation exposure to antimony metallic fume (remote probability level); however, these activities are generally very well controlled with ventilation.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: The exposure to solder is low for most NAVSEA activities over its life-cycle because most activities are not engaged in operational maintenance. Activities that perform soldering, such as Naval Shipyards, perform this task using exposure controls and certified personnel. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption. In addition, antimony-based solders are often used as alternatives to lead-based solders. Lead is far more toxic than antimony.

A.2.15 Exception: Chromium and Non-Hexavalent Chromium Compounds.

A.2.15.1 Chromium Plating.

- a. Severity Category: Marginal
- b. Probability Level: Occasional
- c. Rationale: Naval Shipyards and IMFs perform hard chromium electroplating to provide a finish that is resistant to wear, abrasion, heat, and corrosion such as for hydraulic cylinders and rods, engine components, and marine hardware.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: The exposure to metallic chromium from plated surfaces is low for most NAVSEA activities over its life-cycle because most activities are not engaged in operational maintenance. Activities that perform maintenance on metallic chromium plated items, such as Naval Shipyards, perform this task using exposure controls. In limited cases where hot work is performed on such coated parts, there is an increased risk of producing hexavalent chromium fume. However, where performed, this activity is conducted under strict exposure controls. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.15.2 Industry Standard Metal Alloys.

- a. Severity Category: Catastrophic
- b. Probability Level: Improbable
- c. Rationale: Alloys are not expected to pose a hazard to either shipboard personnel or the environment.
- d. Risk Assessment Code: Medium

- e. Rationale for Exception: Chromium is generally considered low toxicity when present in an alloy form. Additionally, metal alloys are not regularly abraded or machined during the life-cycle. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.15.3 Trivalent Chromium Coatings and Surface Treatments.

- a. Severity Category: Marginal
- b. Probability Level: Remote
- c. Rationale: Installed trivalent chromium coatings present little to no opportunity for exposure.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: The exposure to trivalent chromium from coatings is low for most NAVSEA activities over its life-cycle because most activities are not engaged in operational maintenance. Activities that may occasionally perform maintenance on trivalent chromium coated parts, such as Naval Shipyards, perform this task using exposure controls. In limited cases where hot work is performed on such coated parts, there is an increased risk of producing hexavalent chromium fume. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.16 Exception: Cobalt and Cobalt Compounds.

A.2.16.1 Industry Standard Metal Alloys.

- a. Severity Category: Marginal
- b. Probability Level: Occasional
- c. Rationale: Naval Shipyards and IMFs machine and perform hot work on nickel alloy piping.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Most NAVSEA Activities do not regularly abrade or machine metal alloys during the life-cycle. Activities that perform dust or fume generating activities on metal alloys, such as Naval Shipyards, do so using a variety of exposure controls, including ventilation and PPE.

A.2.17 Exception: Copper and Copper Compounds.

A.2.17.1 Batteries.

- a. Severity Category: Marginal
- b. Probability Level: Improbable
- c. Rationale: During normal operating conditions, copper is contained within the battery. However, if the battery cell were to be opened or exposed to heat, exposure to copper could be harmful to personnel.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Batteries contain enclosed copper. During normal operating conditions, copper is contained within the battery, which requires no maintenance and is eventually disposed of as an entire unit upon depletion. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.17.2 Solder.

- a. Severity Category: Marginal
- b. Probability Level: Remote
- c. Rationale: Copper in solder poses a minimal risk (improbable probability level) for activities that only contact solder in place. Activities that perform soldering may have potential occupation exposure to copper fume (remote probability level); however, these activities are generally very well controlled with ventilation.
- d. Risk Assessment Code: Medium

- e. Rationale for Exception: During normal operating conditions, solder installed in components is not contacted. Additionally, for most NAVSEA Activities there is minimal life-cycle exposure to solder because it is installed and discarded without operational maintenance. Activities that perform soldering, such as Naval Shipyards, perform this task using exposure controls and certified personnel. Additionally, few solders contain copper, and those that do rarely exceed 4 percent by weight. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.17.3 Piping.

- a. Severity Category: Marginal
- b. Probability Level: Occasional
- c. Rationale: Naval Shipyards and IMFs machine and perform hot work on copper piping.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: During normal operating conditions, copper is not released into the environment or manipulated to generate hazardous dust or fume. Some activities, such as Naval Shipyards and IMFs, perform machining and/or hot work on copper piping. However, when performed, a variety of exposure controls, including ventilation and PPE, are used.

A.2.17.4 Electrical and Electronic Components.

- a. Severity Category: Marginal
- b. Probability Level: Improbable
- c. Rationale: Hazardous effects would require deliberate ingestion by personnel and prolonged exposure is extremely unlikely.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Copper in electrical and electronic components is present in its elemental form, which presents low toxicity. This form of copper is generally used as a conductive coating in electronics and a base material is electrical components. During normal operating condition, both electrical and electronic applications are not abraded or machined and do not generate hazardous dust. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.17.5 Plating.

- a. Severity Category: Marginal
- b. Probability Level: Remote
- c. Rationale: Most NAVSEA activities only have contact with plated surfaces, which pose no risk. Those activities that perform plating use exposure controls.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Most NAVSEA Activities do not abrade or machine surfaces of plated items, and therefore do not generate hazardous dust. Activities that may perform copper plating, such as Naval Shipyards, may have occupational exposure to copper generated in the electroplating bath. However, these activities perform plating using a variety of exposure controls, including local exhaust, controlling operating parameters to minimize mist, bath additives, and/or use of brush plating techniques.

A.2.17.6 Antifouling Hull Coatings.

- a. Severity Category: Marginal
- b. Probability Level: Remote
- c. Rationale: Most NAVSEA activities only have contact with painted surfaces, which pose no risk. Those activities that apply coatings use appropriate exposure controls.
- d. Risk Assessment Code: Medium

- e. Rationale for Exception: Copper-based antifouling coatings are used on >98% of the Fleet. The few ships that are coated with other than Copper-based paints are either experimental demonstration platforms or are Aluminum hulled and Copper-based paints represent galvanic corrosion risk. Paints are applied in an industrial dry-dock setting where standards for worker and environmental safety apply.

A.2.17.7 Industry Standard Metal Alloys.

- a. Severity Category: Marginal
- b. Probability Level: Occasional
- c. Rationale: Naval Shipyards routinely perform operations that produce dusts and fumes of copper.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Most NAVSEA activities do not regularly machine or abrade metal alloys during the life-cycle of the metal. Some activities, such as Naval Shipyards, routinely machine and perform hot work on metal alloy substrates; however, these operations are performed using exposure controls. ESOH risks are minimized by the use of proper controls.

A.2.18 Exception: Selenium and Selenium Compounds.

A.2.18.1 Electronic Components.

- a. Severity Category: Marginal
- b. Probability Level: Improbable
- c. Rationale: During normal operating conditions, selenium is contained within the component and is not disturbed.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: During normal operating conditions, these components are sealed and are disposed of intact. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.19 Exception: Silver and Silver Compounds.

A.2.19.1 Electrical and Electronic Applications.

- a. Severity Category: Marginal
- b. Probability Level: Improbable
- c. Rationale: During normal operating conditions, silver is contained within the component and is not disturbed.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Elemental silver is generally used as a conductive coating in electronics and a base material is electrical components. During normal operating conditions, both electrical and electronic applications are not abraded or machined and do not generate hazardous dust. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.19.2 Plating.

- a. Severity Category: Marginal
- b. Probability Level: Remote
- c. Rationale: Most NAVSEA activities only have contact with plated surfaces, which poses no risk. Those activities that perform plating use exposure controls.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: Most NAVSEA Activities do not abrade or machine surfaces of plated items, and therefore do not generate hazardous dust. Activities that may perform silver plating, such as Naval Shipyards, may have occupational exposure to silver generated in the electroplating bath. However, these activities perform plating using a variety of exposure controls including local exhaust, controlling operating parameters to minimize mist, bath additives, and/or use of brush plating techniques. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

A.2.19.3 Solder.

- a. Severity Category: Marginal
- b. Probability Level: Remote
- c. Rationale: Silver in solder poses a minimal risk (improbable probability level) for activities that only contact solder in place. Activities that perform soldering may have potential occupation exposure to silver fume (remote probability level); however, these activities are generally very well controlled with ventilation.
- d. Risk Assessment Code: Medium
- e. Rationale for Exception: The exposure to solder is low for most NAVSEA activities over its life-cycle because most activities are not engaged in operational maintenance. Activities that perform soldering, such as Naval Shipyards, perform this task using exposure controls and certified personnel. This application presents minimal ESOH risk due to the improbable exposure by inhalation, ingestion, and absorption.

APPENDIX B

NAVSEA 05 HAZARDOUS MATERIAL MANAGEMENT PROCEDURE

B.1 INTRODUCTION.

The introduction of HM into NAVSEA-sponsored systems, equipment, or processes should be managed using the procedure delineated below. This procedure encompasses the following aspects of HM management:

- a. Identification
- b. Risk assessment
- c. Risk acceptance
- d. Tracking

B.2 IDENTIFICATION OF HM.

Upon identification of HM in NAVSEA sponsored systems, equipment, or processes, the Lead Activity must first identify the chemical(s) contained within the HM. The chemical(s) contained within the HM will be identified via available vendor furnished information. Examples of such information include safety data sheets (SDS) (formerly known as material safety data sheets [MSDS]), product data sheets (PDS), technical information, product specifications, commercial item descriptions, and drawings. The Lead Activity shall use best engineering judgment and practices in the identification of HM. There is no requirement to validate the absence of HM and destructive testing is not expected for identification.

B.3 HM APPLICABILITY.

This procedure applies to HM as defined in OPNAVINST 5090.1. This procedure does not apply to products with trace amounts of hazardous chemical components. The threshold for trace amount is less than 1.0 percent of product composition for non-carcinogenic components or less than 0.1 percent for carcinogenic components. This threshold applies to the hazardous component in a homogenous material, which is of uniform composition throughout and cannot be mechanically disjointed into components. Mechanically disjointed means that the material can be separated into components by mechanical actions, such as unscrewing, cutting, crushing, grinding, and abrasive processes. For example, the cadmium plating on an electrical connector can be mechanically disjointed from the connector itself; therefore, when determining the percent composition of cadmium, the total weight of just the plating should be considered and not the weight of the entire electrical connector.

B.4 HAZARDOUS COMPONENTS.

Furthermore, if there is evidence that a hazardous component is present at less than 1.0 percent (0.1 percent for carcinogens) and could be released into the workplace environment in concentrations that would exceed an OSHA permissible exposure limit (PEL) or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), or present a health risk in those concentrations, the product should be treated as HM. Even though this procedure applies to HM, the Lead Activity may identify articles with hazardous components based upon available information.

B.5 CHEMICAL IDENTIFICATION.

The chemical(s) identified by the Lead Activity within HM shall be compared to the N-LTC (Appendix A) and categorized as Prohibited, Restricted, or Tracked. While Prohibited and Restricted Chemicals are delineated in Appendix A, the Tracked tier is comprised of all chemicals not found in Tables [A-1](#) or [A-2](#) of Appendix A. The identified HM shall be assessed based upon the highest ranking chemical within the product. For example, if the HM contains one Prohibited tier chemical and two Restricted tier chemicals, the HM should be handled as "Prohibited" in accordance with section B.8 of this procedure. The assessment and tracking of the Tracked tier will be at the material level, not chemical. Additionally, if the identified chemical is associated with an Application Exception per Appendix A, the HM will be handled in accordance with section B.8 of this procedure.

B.6 CHEMICAL NOT ASSOCIATED WITH APPLICATION EXCEPTION.

If the identified chemical is not associated with an Application Exception, use of the HM will require a risk assessment in accordance with NAVSEAINST 5000.8. HM associated with systems planned for installation on a submarine need to comply with the procedures outlined within this document as well as the submarine atmosphere control requirements per NAVSEA S9510-AB-ATM-010. Per NAVSEA S9510-AB-ATM-010, all materials contemplated for use in submarines, including construction, carry-on, and materials in permanently sealed containers, require atmosphere control certification and the assignment of a usage category that defines the circumstances under which a material may be carried/used on board the submarine. Submarine Materials (SM) are all non-metallic materials or toxicologically significant metals (beryllium, cadmium, lead, and mercury).

B.7 RISK ASSESSMENT.

Risk assessments in accordance with NAVSEAINST 5000.8 are required for the use of all HM. Risk assessments are completed by identifying a hazard severity category and probability level of exposure associated with a specific product in a particular application. NAVSEA 05 has assigned hazard severity categories to Prohibited and Restricted chemicals on the N-LTC. Hazard severity category assignments were derived from findings in NSWCCD-63-TR-2012/140 and reviewed by subject matter experts.

B.7.1 Severity Categories. For this procedure, the Lead Activity shall apply the NAVSEA assigned minimum severity category associated with that chemical per Appendix A. The severity category can be elevated at the discretion of the Lead Activity but may not be downgraded. NAVSEA 05 has not assigned hazard severity categories to Tracked chemicals; therefore, the Lead Activity should utilize best engineering practices to determine the appropriate hazard severity category for the use of a Tracked chemical.

B.7.2 Probability Level of Exposure. The Lead Activity will be required to complete the risk assessment for the HM in a specific application by identifying and assigning a probability level of exposure, which considers inhalation, ingestion, and skin absorption routes of entry. Probability level of exposure may vary considerably for HM used in various applications. This discrepancy may depend on how the HM is contained or handled, the personal protective measures implemented, and other conditions that result in or limit exposure.

B.7.3 Quantitative Data. When available, the use of appropriate and representative quantitative data that defines frequency or rate of occurrence for the HM is generally preferable to qualitative analysis. Per NAVSEA 5100.12-M, no amount of doctrine, training, warning, caution, or Personal Protective Equipment can move a mishap probability to “Eliminated” (level F).

B.7.4 Restricted Chemicals. If the identified chemical is defined as Restricted per [Table A-2](#) of Appendix A, and not associated with an Application Exception, the resulting risk assessment will be used to further prioritize the Lead Activities’ efforts to eliminate or minimize the material. Each chemical on [Table A-2](#) of Appendix A is categorized as catastrophic, critical, or marginal severity as defined by NAVSEAINST 5000.8. When performing trade-off analyses, Lead Activities shall strive to utilize a chemical of the lowest severity, or a chemical not found on the N-LTC, if it results in the reduction of ESOH risk, and is technically and programmatically feasible. For example, Lead Activities shall strive to substitute a chemical of catastrophic severity with one of critical or marginal severity.

B.8 RISK ACCEPTANCE.

B.8.1 Prohibited Chemicals. The use of a Prohibited chemical (per Appendix A) must have Government approval before that material can be included in a system, subsystem, support equipment, or planned for system operation or support. The approval processes for two of the Prohibited chemicals, Hexavalent Chromium Compounds and Ozone Depleting Substances (ODS) Class I, are delineated in ASN (RD&A) Memorandum for Distribution, Department of the Navy Hexavalent Chromium Authorization Process, and ASN (RD&A) Memorandum for Distribution, Equipment/Systems Requiring the Unplanned Use of Class I Ozone-Depleting Substances (ODS). The use of the other prohibited materials shall be addressed based on the risk of the application and accepted as delineated in NAVSEAINST 5000.8. Prohibited chemicals have been designated by DoD for having the highest priority for elimination, and the use of Prohibited chemicals shall be limited to the maximum extent practicable based on the performance of risk assessments and cost analyses.

B.8.2 Non-Prohibited Chemicals. For HM containing non-Prohibited chemicals, the proper risk acceptance channel per NAVSEAINST 5000.8 must be pursued based on the determined RAC. Additionally, the Lead Activity shall submit a NAVSEA Hazardous Material Waiver Request Form (Appendix C) to the proper acceptance channel when a RAC is determined to be high or serious. The NAVSEA Hazardous Material Waiver Request Form shall be routed through the NAVSEA program Principal for Safety (PFS). Certification requirements for a program's PFS are defined in NAVSEAINST 5100.12. If a PFS does not exist, the NAVSEA Hazardous Material Waiver Request Form shall be submitted directly to the TWH for Environmental Systems and Materials Engineering (NAVSEA 05P5). The NAVSEA Hazardous Material Waiver Request Form will be used to document relevant information about the proposed HM and track the risk acceptance process. The risk acceptance channel for all HM based upon RAC is found in [Figure B-1](#).

B.8.3 Application Exceptions. Appendix A contains notes that identify application exceptions to this process. These exceptions are identified applications for specific chemicals that have been determined to pose an accepted risk to human health or the environment as determined by the TWH for Environmental Systems and Materials Engineering (NAVSEA 05P5). The submission of a NAVSEA Hazardous Material Waiver Request Form is not required for the use of Restricted Chemicals associated with an application exception. Additionally, the use of Restricted Chemicals associated with an application exception will not require efforts for elimination or minimization. The use of all HM (i.e., Prohibited, Restricted, and Tracked) and their associated risk assessments shall be included in the program hazard tracking system.

B.8.4 Levels of Risk. In accordance with NAVSEAINST 5000.8, and as delineated in [Figure B-1](#), high and serious risks must receive technical authority risk analysis approval by the NAVSEA Commander and Deputy Warrant Officer (DWO), respectively. Medium and low risks in the program tracking systems must receive technical authority risk analysis coordination with the TWH for Environmental Systems and Materials Engineering (NAVSEA 05P5) on a quarterly basis. However, low risks may also receive technical authority approval from the program certificate holder, also known as the PFS.

B.9 TRACKING.

The Lead Activity shall track all HM used in NAVSEA sponsored systems, subsystems, and support equipment or planned for system operation or support. To ensure uniformity and standardization, this document has established minimum data elements that must be captured for each record. These minimum data elements align with the required fields of the NAVSEA Hazardous Material Waiver Request Form (Appendix C):

- a. Chemical(s) on the N-LTC (Prohibited and Restricted only)
- b. Product Vendor
- c. Product Trademark Name
- d. Structural or Consumable
- e. Quantity of HM within the system
- f. Special HM control, training, handling measures, and PPE needed
- g. System
- h. Usage information
- i. Mishap Severity Category
- j. Rationale for Mishap Severity Category
- k. Mishap Probability Level
- l. Rationale for Mishap Probability Level
- m. Discussion of how risk will be mitigated and/or managed throughout life-cycle

Descriptions of these data elements can be found in the *NAVSEA Hazardous Material Waiver Request Form Guidance* in Appendix C. Furthermore, the guidance in Appendix C provides additional data elements that a Lead Activity may consider for inclusion in a hazard tracking system.

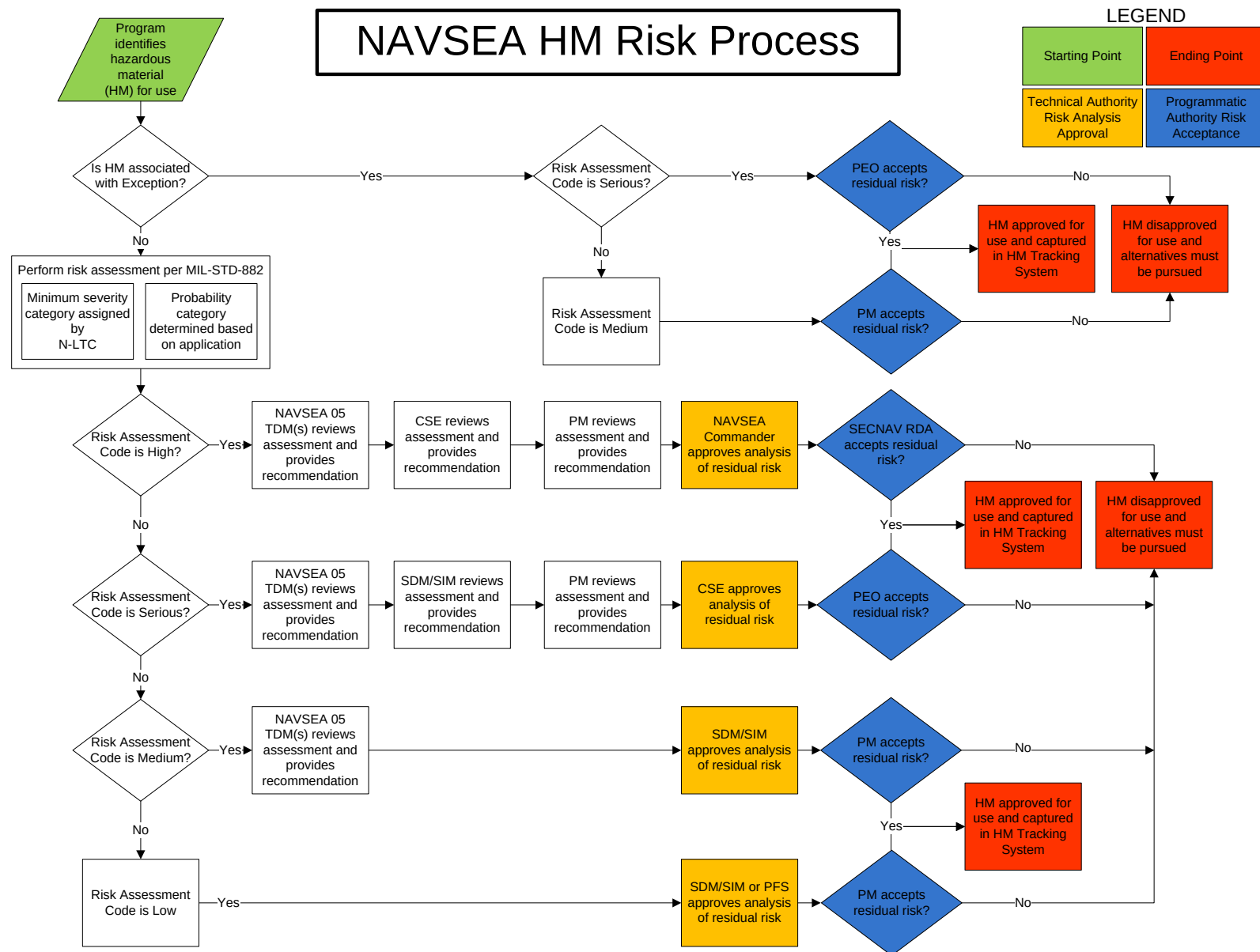


Figure B-1. NAVSEA Hazardous Material Risk Identification, Assessment, Acceptance, and Tracking Process.

APPENDIX C

NAVSEA HAZARDOUS MATERIAL WAIVER REQUEST FORM GUIDANCE

C.1 INTRODUCTION.

Complete the NAVSEA Hazardous Material Waiver Request Form in accordance with the guidance provided below. Items marked with a red asterisk (*) are required. Failure to complete a required field will generate an in-form error message to the user and will stop the request. You must select “Enable All Features” in the HM Waiver Request Form to populate all fields and apply an electronic signature.

C.2 ADMINISTRATIVE INFORMATION.

C.2.1 Requester Name*. Enter the complete name of the requester (First Last). This should be the name of the individual who is submitting the form.

C.2.2 Requester Organization*. Enter the organization, activity name, and/or code of the requester.

C.2.3 Requester Phone Number*. Enter the phone number of the requester. Do not include parentheses or hyphens in the entry.

C.2.4 Requester E-Mail*. Enter the E-Mail of the requester.

C.2.5 Waiver Submission Date*. Enter submission date of the NAVSEA Hazardous Material Waiver Request Form.

C.2.6 Government POC*. Enter the complete government POC name (First Last). This should be the name of the program Principal for Safety (PFS) (or equivalent) or system engineering agent. If applicable, the government POC can be identical to the requester name.

C.2.7 Government POC Phone Number*. Enter the phone number of the government POC. Do not include parentheses or hyphens in the entry.

C.2.8 Government POC E-Mail*. Enter the E-Mail of the government POC.

C.2.9 Program Executive Office. Select the program executive office from the drop down list associated with the program.

C.2.10 Program*. Enter the program associated with the use of the product.

C.3 PRODUCT INFORMATION.

C.3.1 Chemical on the N-LTC*. Select the “Prohibited” or “Restricted” chemical from the drop down list that is found in the specified product. If there are multiple chemicals in the product that must be identified, use the additional drop down lists. The chemicals in the drop down list are associated with a specific chemical abstract services (CAS) number found on the N-LTC. Due to variations in chemical nomenclature, consult the N-LTC to cross reference a CAS number to a chemical.

C.3.2 Percent Composition (%). Enter the percent composition of each chemical identified in the specified product (e.g., 5.0%). This information is commonly found on a safety data sheet (SDS) and will often list a percent composition (by weight or volume) for each component.

C.3.3 National Stock Number. Enter the 13 digit national stock number associated with the product. This is the federal supply classification (4 digits) + the national item identification number (9 digits). Do not include hyphens in the entry.

C.3.4 Attach SDS?*. If you select “yes”, a browser will appear to search your computer files for a document. Select the file associated with the SDS for the product.

C.3.5 Product Vendor*. Enter the company name or vendor of the requested product.

C.3.6 Product Trademark Name*. Enter the company or vendor trademark name for the product. This field should contain the company or vendor part number for the product.

C.3.7 Product Specification. Enter the specification associated with the product.

C.3.8 Unit of Issue. Select the unit of issue from the drop down list.

C.3.9 Unit of Measure. Enter the appropriate unit of measure.

C.4 TECHNICAL INFORMATION.

C.4.1 Structural or Consumable*. Select either “structural” or “consumable” from the drop down list.

C.4.2 Temperature(s) Where Product Will Be Used. Enter the average and maximum ambient and surface temperatures of the area where the material will be used. Enter temperatures in degrees Fahrenheit.

C.4.3 Quantity of HM Within the System*. Enter the quantity of material required per application, the frequency of application, and the quantity required to be store onboard. Enter the total quantity of material requested.

C.4.4 Special HM Control, Training, Handling Measures, and Personal Protection Equipment (PPE) Needed*. Enter the HM control, training, handling measures, and personal protection equipment (PPE) needed for use of the product.

C.4.5 System*. Enter the system associated with the product.

C.4.6 Usage Information*. Enter the application, process, or activity whereby quantities of hazardous material are embedded in the system or used during operations and support of the system.

C.4.7 Maintenance Index Page(s). Enter the maintenance index page(s) associated with the product.

C.4.8 Maintenance Requirement Card Number(s). Enter the maintenance requirement card(s) associated with the product.

C.4.9 Allowance Part or Equipage List(s). Enter the allowance part or equipage list(s) associated with the product.

C.4.10 Technical Manual(s). Enter the technical manual(s) associated with the product.

C.5 RISK ASSESSMENT INFORMATION.

C.5.1 Mishap Severity Category*. Select the mishap category from the drop down list.

C.5.2 Rationale for Mishap Severity Category*. Enter the rationale for the mishap severity category selection. It may be stated that the severity category was chosen in accordance with the guidance provided by the NAVSEA List of Targeted Chemicals (N-LTC). If the severity category has been elevated above this assignment, rationale must be provided.

C.5.3 Mishap Probability Level*. Select the mishap probability level from the drop down list.

C.5.4 Rationale for Mishap Probability Level*. Enter the rationale for the mishap probability category selection.

C.5.5 Risk Assessment Code. This field will be automatically populated based on the mishap severity category and probability level selections.

C.5.6 Discuss How Risk Will Be Mitigated and/or Managed Throughout Life-Cycle*. For each Environmental, Safety, and/or Occupational Health risk associated with using the requested material, describe how the risk will be mitigated and/or managed throughout the life-cycle.

C.6 NAVSEA 05 TECHNICAL COMMUNITY RECOMMENDATION(S) AND PROGRAM MANAGER DECISION.

These sections should not be filled out by the requester. Information in this section will be populated by the appropriate NAVSEA 05 Technical Community POCs and Program Manager.

NAVSEA 05 HAZARDOUS MATERIAL WAIVER REQUEST FORM

Administrative Information

Requester Name		Waiver Submission Date	
Requester Organization		Government POC	
Requester Phone Number		Government POC Phone Number	
Requester E-Mail		Government POC E-Mail	
Program Executive Office		Program	

Product Information

Chemical(s) on the N-LTC		Percent Composition (%)	
		Percent Composition (%)	
		Percent Composition (%)	
		Percent Composition (%)	
		Percent Composition (%)	
National Stock Number		Attach SDS?	
Product Vendor			
Product Trademark Name			
Product Specification			
Unit of Issue		Unit of Measure	

Technical Information

Structural or Consumable		Temperature(s) where product will be used	
Quantity of HM within the system			
Special HM control, training, handling measures, and Personal Protection Equipment (PPE) needed			

Figure C-1. NAVSEA Hazardous Material Waiver Request Form.

NAVSEA 05 HAZARDOUS MATERIAL WAIVER REQUEST FORM

System	
Usage Information	
Maintenance Index Page(s)	
Maintenance Requirement Card Number(s)	
Allowance Part or Equipage List(s)	
Technical Manual(s)	
<u>Risk Assessment Information</u>	
Mishap Severity Category	
Rationale for Mishap Severity Category	
Mishap Probability Level	
Rationale for Mishap Probability Level	
Risk Assessment Code	
Discuss how risk will be mitigated and/or managed throughout product life-cycle	

Figure C-1. NAVSEA 05 Hazardous Material Waiver Request Form - Continued.

NAVSEA 05 HAZARDOUS MATERIAL WAIVER REQUEST FORM

NAVSEA 05 Technical Community Recommendation(s)

Name	Title	Code	Date	Recommendation	Signature

Programmatic Authority Decision

Name	Title	Code	Date	Decision	Signature

Print Form

Figure C-1. NAVSEA 05 Hazardous Material Waiver Request Form – Continued.

APPENDIX D LIST OF ACRONYMS

D.1 LIST OF ACRONYMS.

ACRONYM	TITLE
ACGIH	American Conference of Governmental Industrial Hygienists
AUL	Authorized Use List
CDRL	Contract Data Requirements Lists
DOD	Department of Defense
ESOH	Environmental, Safety, and Occupational Health
HM	Hazardous Material
HMMP	Hazardous Material Management Plan
IMF	Intermediate Maintenance Facilities
ISEA	In-Service Engineering Agents
LCM	Life-Cycle Managers
MOA	Memorandums of Agreement
MSDS	Material Safety Data Sheets
NAVSEA	Naval Sea Systems Command
NAVSEA HQ	Naval Sea Systems Command Headquarters
NKO	Navy Knowledge Online
N-LTC	NAVSEA List of Targeted Chemicals
NSWC	Naval Surface Warfare Center
NUWC	Naval Undersea Warfare Center
OFA	Other NAVSEA Field Activities
PARM	Participating Area Responsible Managers
PDS	Product Data Sheets
PEL	Permissible Exposure Limit
PEO	Program Executive Offices
PMS	Program Managers Ships/Systems
PPE	Personal Protective Equipment
RAC	Risk Assessment Code
RDT&E	Research, Development, Test, and Evaluation

ACRONYM	TITLE
RMC	Regional Maintenance Centers
SDS	Safety Data Sheets
SEIC	Shipboard Environmental Information Clearinghouse
SFR	SHML/SMCL Feedback Report
SHML	Shipboard Hazardous Material List
SMCL	Submarine Material Control List
SM	Submarine Materials
SME	Subject Matter Expert
SOW	Statements of Work
SSP	Strategic Systems Program
SUPSHIPS	Supervisors of Shipbuilding
TDM	Technical Domain Manager
TLV	Threshold Limit Value
TWH	Technical Warrant Holder

NAVSEA/SPAWAR TECHNICAL MANUAL DEFICIENCY/EVALUATION REPORT (TMDER)

INSTRUCTIONS: Continue on 8 ½" x 11" on page if additional space is needed.

1. Use this report to indicate deficiencies, problems and recommendations relating to publications.
2. For **CLASSIFIED** TMDERs see OPNAVINST 5510H for mailing requirements.
3. For TMDERs that affect more than one publication, submit a separate TMDER for each.
4. Submit TMDERs at web site <https://nsdsa.nmci.navy.mil> or mail to: **COMMANDER, CODE 310 TMDERs, NAVSURFWARCENDIV NSDSA, 4363 MISSILE WAY BLDG 1389, PORT HUENEME CA 93043-4307**

1. PUBLICATION NUMBER	2. VOL/PART	3. REV/DATE OR CHG/DATE	4. SYSTEM/EQUIPMENT ID
5. TITLE OF PUBLICATION			6. REPORT CONTROL NUMBER (6 digit UIC-YY-any four: xxxxxx-10-xxxx)
7. RECOMMEND CHANGES TO PUBLICATION			
7a. Page #	7b. Para #	7c. RECOMMENDED CHANGES AND REASONS	
8. ORIGINATOR'S NAME AND WORK CENTER		9. DATE	10. ORIGINATOR'S E-MAIL ADDRESS
			11. TMMA of Manual (NSDSA will complete)
12. SHIP OR ACTIVITY Name and Address (Include UIC/CAGE/HULL)		13. Phone Numbers:	
		Commercial () - DSN - FAX () -	

FOLD HERE AND TAPE SECURELY
PLEASE DO NOT STAPLE

INCLUDE COMPLETE ADDRESS

USE
PROPER
POSTAGE

FOR OFFICIAL USE ONLY

**COMMANDER
CODE 310 TMDERs
NAVSURFWARCENDIV NSDSA
4363 MISSILE WAY BLDG 1389
PORT HUENEME CA 93043-4307**

FOLD HERE AND TAPE SECURELY
PLEASE DO NOT STAPLE