NAVY

SAFETY AND OCCUPATIONAL HEALTH (SOH)

PROGRAM MANUAL

FOR FORCES AFLOAT

OPNAV INSTRUCTION 5100.19E
VOLUME I
SOH AND MAJOR HAZARD-SPECIFIC PROGRAMS

DEPARTMENT OF THE NAVY

OFFICE OF THE CHIEF OF NAVAL OPERATIONS

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IN REPLY REFER TO

OPNAVINST 5100.19E
N09F
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OPNAV INSTRUCTION 5100.19E, VOLUME I

From: Chief of Naval Operations

Subj: NAVY SAFETY AND OCCUPATIONAL HEALTH (SOH) PROGRAM MANUAL FOR FORCES AFLOAT

Ref: (a) OPNAVINST 5100.23G
(b) OPNAVINST 5100.8G
(c) SECNAVINST 5212.5D

Encl: (1) Navy Safety and Occupational Health Program Manual for Forces Afloat, Volume I

1. Purpose. To implement the Navy Safety and Occupational Health (SOH) Program and the requirements of reference (a) for afloat commands. This instruction has been administratively revised and should be reviewed in its entirety.

2. Cancellation. OPNAVINST 5100.19D, Volume I; OPNAV 5102-4, Motor Vehicle Mishap Report; OPNAV 5102-5, Diving Mishap (with or without hyperbaric treatment) Report; OPNAV 5102-6, Mishap Report; OPNAV 5102-7, Mishap Investigation Report; OPNAV 5102-7A, Mishap Investigation Report Endorsements (MIREs); OPNAV 5102-10, Off-duty, Recreation, Athletics, and Home Safety (RAHS) Mishap Report; DD-A&T (AR) 1020 (5102), Explosive Mishap or Conventional Ordnance Deficiency Report.

3. Discussion

a. References (a) and (b) provide policy and outline responsibilities for the implementation of the total Navy Safety and Occupational Health Program. The Navy program encompasses all safety disciplines such as aviation safety, weapons/explosives safety, off-duty safety, traffic safety, and occupational safety and health. This instruction covers the implementation of the SOH Program elements unique to an afloat environment. Injury and illness investigation, reporting and

recordkeeping requirements have been removed from chapter A6 of this instruction and now reside in 5102.1D, chapters 3 and 6.

b. This instruction updates the safety guidance and precautions contained in OPNAVINST 5100.19D. It reflects modifications to regulatory requirements and embodies lessons learned from mishaps. This document has been revised with significant input and coordination with representatives of the Fleet Commanders and Type Commanders staffs. Since this document modifies every chapter and most of the paragraphs from OPNAVINST 5100.19D, it does not identify modified, added, or deleted paragraphs.

c. Due to limitations on ship design and construction, paragraph B0611e was incorporated with the following implementation schedule for applicability and compliance. Beginning in fiscal year 2008, ships shall equip all new and/or upgraded fixed breathing air compressor systems with high-temperature cut-off switches. Beginning in fiscal year 2009, new and/or upgraded portable breathing air compressor systems will be equipped or operated with carbon monoxide monitor and alarm systems during SCBA air cylinder charging operations.

4. Action. All levels of command shall implement and manage the SOH Program in compliance with the policies, procedures, actions, and guidance set forth by this instruction. Reference (c) provides guidance on records disposition and shall be followed by shore and afloat commands. The policies, procedures, and actions prescribed here are published without the necessity for implementing instructions from the Echelon 2 commands, bureaus, and offices, except where specifically directed. However, commands having significant SOH responsibilities should provide appropriate supplemental guidance.

5. Forms and Reports

a. The following forms are available at Navy Forms On-line, https://forms.daps.dla.mil:

(1) OPNAV 3120/5, Safety Hazard Report, S/N 0107-LF-016-9300;

(2) OPNAV 4790/2K, Ship's Maintenance Action Form – 2 KILO, S/N 0107-LF-047-9011;

(3) OPNAV 5100/17, Heat Stress Monitoring Sheet;

(4) OPNAV 5100/18, Used Hazardous Material Identification Label, S/N 0107-LF-127-4700;

(5) OPNAV 6260/2, Caution – Asbestos Dust Hazard Sign, S/N 0107-LF-062-6010.

b. The following forms are available at the Department of Defense Forms Program, http://www.dtic.mil/whs/directives/infomgt/forms/formsprogram.htm:

(1) DD 771, JUL 1996, Eyewear Prescription;

(2) DD 2215, JAN 2000, Reference Audiogram;

(3) DD 2216, JAN 2000, Hearing Conservation Data;

(4) DD 2493-1, JAN 2000, Asbestos Exposure Part I, Initial Medical Questionnaire;

(5) DD 2493-2, JAN 2000, Asbestos Exposure Part II, Periodic Medical Questionnaire.

(6) DD 2521, OCT 2000, Hazardous Chemical Warning Label (8-1/2" x 11");

(7) DD 2522, OCT 2000, Hazardous Chemical Warning Label (4" x 6").

c. The following medical surveillance examination forms are available from the Navy Environmental Health Center, http://www-nehc.med.navy.mil/downloads/occmed/Medical matrix Feb 2001.pdf:

(1) #113, Asbestos Current Worker;

(2) #115, Asbestos Past Worker, 10+ Years Since First Exposure;

(3) #116, Asbestos Past Worker, 0 to 10 Years Since First Exposure;

(4) #161, Lead (Inorganic);

(5) #503, Noise;

(6) #512, Noise – Follow Up;

(7) #506, Radiation, Laser (Class III and IV);

(8) #505, Radiation, Ionizing;

(9) #716, Respirator User Certification Exam.

d. The following industrial hygiene forms are available from the Navy Environmental Health Center, http://www-nehc.med.navy.mil/ih/ihfom.htm:

(1) NEHC 5100/17 (July 2006), Industrial Hygiene Noise Survey Form;

(2) NEHC 5100/18 (July 2006), Industrial Hygiene Noise Dosimetry Survey Form;

(3) NEHC 5100/20 (August 2003), Heat Stress Afloat Form;

(4) CIHL 006 (May 2002), Asbestos Bulk Sample Analysis Form.

e. The laser and radio frequency radiation (RFR) exposure reporting requirements are exempted from reports control by SECNAVINST 5214.2B.

f. OSHA Form 174, Material Safety Data Sheet, is available from the Occupational Safety and Health Administration, Office of Publications, Room S1212, 200 Constitution Ave., N.W., Washington, D.C. 20210, or from the General Services Administration (GSA) Business Service Centers in Boston, New York, Philadelphia, Atlanta, Chicago, Kansas City, Fort Worth, Denver, San Francisco, Los Angeles, Seattle, and from GSA Specification Sales, Bldg. 197, Washington, D.C. 20407.

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Electronic only, Department of the Navy Issuances Website
http://doni.daps.dla.mil

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SUBMARINE SAFETY STANDARDS

CHAPTER A1

INTRODUCTION

A0101. BACKGROUND

a. The Navy has conducted safety and occupational health (SOH) programs for many years. These programs gained special prominence after passage of the Occupational Safety and Health Act (OSHAct) in 1970. The primary thrust of the OSHAct was directed at the private sector employer; however, section 19 of the OSHAct and several subsequent presidential executive orders directed federal agencies to establish and maintain occupational safety and health programs. Requirements for such programs are contained in Title 29 Code of Federal Regulations (CFR), Part 1960 (29 CFR 1960).

b. References A1-1 and A1-2 issued policy statements and outlined responsibilities for the implementation of the total safety and occupational health program for the Navy. The total safety and occupational health program includes all safety disciplines, such as system safety, aviation safety, weapons/explosives safety, traffic, recreational and off-duty and occupational safety and health.

c. Reference A1-3 is the Navy's SOH program manual and applies to both shore and afloat commands. Due to the many unique and specific situations associated with forces afloat, this manual was developed to be the primary SOH resource document for implementing the SOH Program for afloat commands.

d. Reference A1-4 provides policy and procedures for mishap investigation, reporting, and recording.

A0102. PURPOSE AND ORGANIZATION OF THIS MANUAL

a. The purpose of this manual is to provide commanding officers, safety officers, managers, supervisors, and workers for afloat commands with a document that gives the guidance and direction necessary to implement the SOH program.

b. This manual addresses all aspects of afloat SOH program management. In some instances, small ships (less than 300 personnel) may have to modify program management to suit their command. To ensure uniformity, group and squadron commanders may specify how small ships under their command are to implement the program management aspects of this manual (see paragraphs A0202(e) and A0202(f)).

c. This manual is organized into four sections.

(1) **Section A:** SOH Program Administration. This section outlines the overall administration, organizational, and training aspects of the SOH program, including a statement of policy and a listing of responsibilities.

(2) **Section B:** Major Hazard Specific Chapters. This section is divided into chapters which address specific hazards such as asbestos management, heat stress, hazardous material control and management, radiation protection, electrical safety, gas free engineering, tag-out and personal protective equipment. This section is addressed to personnel who have SOH management responsibilities and assist the commanding officer in implementing SOH requirements (e.g., safety officer, electrical safety officer, gas free engineer, hazardous material coordinator, and the medical department representative).

(3) **Section C:** Surface Ship Safety Standards. This section contains basic safety requirements that are applicable to surface ship activities and/or equipment. These precautions comprise the SOH safety standards for surface ships required by reference A1-1. It may be necessary, when conducting operations and maintenance on specific systems or equipment, to consult other Navy publications such as the Naval Ships Technical Manual (NSTM), naval warfare publications (NWPs), technical/operating manuals, and equipment maintenance requirement cards (MRCs) from the planned maintenance system (PMS) for additional safety precautions. This section is written for the individual deck-plate sailor and his/her supervisor.

(4) **Section D:** Submarine Safety Standards. This section contains basic safety requirements that are applicable to submarine activities and/or equipment. These precautions provide similar guidance to submarines as section C does for surface ships. These standards do not duplicate or supersede

the safety precautions found in either the standard submarine organization and regulations manual (SSORM), the ships systems manuals (SSMs), or the standard operating procedures (SOPs) applicable to submarines. These other standards augment section D precautions.

A0103. APPLICABILITY

a. The provisions of this manual apply to all Navy ship operations afloat including United States naval ships (USNS) of the Military Sealift Command (MSC) manned by federal civil service mariners and military personnel. Due to the manning complexities for MSC ships, there may be some administrative procedures in this manual that will need to be tailored for MSC ship applications. These procedures shall, at a minimum, provide protection equal to or better than that provided by this manual. Aviation squadrons and other embarked units that are required to comply with reference A1-3 ashore shall coordinate safety program requirements with the ship. The provisions also apply to Marine Corps personnel embarked in the aforementioned vessels. Information contained within volume I of this manual that specifically applies to submarines or that which exempts submarines is annotated as such. Shore activity service craft shall comply with the requirements of reference A1-3.

b. Requirements of this instruction are applicable to ship's forces while underway and during pier side evolutions. Other Navy instructions and requirements may have precedence during availabilities and when shore side personnel (military, Navy, civilian, or commercial) are on-board performing operations while pier side. Examples include energy control, gas free engineering, hazardous material, and fire watches. Afloat commands shall coordinate with appropriate personnel during pre-planning meetings for availabilities and pier side operations involving shore side personnel to ensure applicable Navy SOH instructions are identified and implemented.

c. Under the statutory authority of the Atomic Energy Act of 1954, as amended, and Executive Order 12344, codified in Public Law 98-525, the Director, Naval Nuclear Propulsion Program (CNO (NOON)), is responsible for the safety of reactors and associated naval nuclear propulsion plants, and the control of radiation and radioactivity associated with naval nuclear propulsion plant activities, including prescribing and enforcing

standards and regulations for these areas as they affect the environment and the safety and health of workers, operators, and the general public. Nothing in this manual shall affect the standards and requirements established by the Director, Naval Nuclear Propulsion Program (CNO NOON)), for areas under his cognizance. However, for areas other than those described above, such as asbestos control, heat-stress, electrical safety, and gas free engineering, the requirements of this manual apply to activities involved with naval nuclear propulsion.

d. This manual addresses the identification and maintenance of safe and healthful conditions in afloat work places or occupational environments. Recreational and off-duty safety and traffic safety program requirements are provided in references A1-5 and A1-6. Some, but not all, of aviation safety (chapters C7 and C12) and explosives safety (chapter C14) are addressed. Additional guidance in these areas is provided in references A1-7 through A1-10.

A0104. REFERENCES AND DEFINITION OF TERMS

For matters of convenience and organization, references for a specific chapter appear at the end of each chapter. Special terms and their definitions appear in the glossary at the end of volume I of the manual.

A0105. SOH MANUAL CHANGES

a. Users who identify a requirement for a modification to this manual shall initiate a change recommendation as follows:

(1) A proposed alteration to this manual or a safety requirement shall be submitted by the identifying command to Chief of Naval Operations (CNO), Special Assistant for Safety Matters (N09F), via the chain of command.

(2) A proposed alteration to a health standard/ criterion may be submitted by an individual or command to the Navy Environmental Health Center (NAVENVIRHLTHCEN) via the chain of command. NAVENVIRHLTHCEN shall submit the proposed modification to the Department of Navy, Bureau of Medicine and Surgery (BUMED), with a recommendation regarding incorporation of the modification into the manual.

b. Modifications to the manual shall be issued in the following manner:

(1) Alterations which are necessary for immediate incorporation into the manual and which cannot wait for the development of the next manual change shall be issued as advanced changes (A/Cs) by CNO (N09F). These changes may be issued by message or letter depending upon the requirement for manual entry timeliness.

(2) Periodically when a large number of modifications to the manual are necessary, a change to the manual shall be issued by CNO (N09F). These changes shall incorporate previously issued advanced changes.

(3) Changes to this manual shall be accomplished by page replacement.

A0106. TERMINOLOGY

The words shall, will, must, should, may, and can are used throughout this manual. Shall, will, and must are directive in nature and require mandatory compliance. Should is a strong recommendation, but compliance is not required. May or can, when used, are optional in nature and compliance is not required.

A0107. PRECEDENCE

In cases of conflicting safety standards among various directives and technical manuals, precedence shall be given to the directive issued by the highest authority and of the most recent issue date (i.e., Federal, DoD, SECNAV, OPNAV, Echelon 2, TYCOM, etc.). If a standard is not provided within any of those documents, then nationally recognized consensus standards, such as the American National Standards Institute (ANSI), American Conference of Governmental Industrial Hygienists (ACGIH), National Institute of Safety and Health (NIOSH) or other federally recognized national consensus standard may be cited.

CHAPTER A1

REFERENCES

A1-1. SECNAVINST 5100.10J

A1-2. OPNAVINST 5100.8G

A1-3. OPNAVINST 5100.23G

A1-4. OPNAVINST 5102.1D/MCO P5102.1B

A1-5. OPNAVINST 5100.25A

A1-6. OPNAVINST 5100.12G

A1-7. OPNAVINST 3750.6R

A1-8. Naval Warfare Publication/Fleet Marine Force Manual, NWP 3-04.1M/FMFM 5-34, Shipboard Helicopter Operating Procedures

A1-9. Naval Warfare Publication, NWP 3-50.1, Navy Search and Rescue Manual

A1-10. Naval Sea Systems Command, NAVSEA OP-4, Ammunition and Explosives

CHAPTER A2

SOH PROGRAM ORGANIZATION AND RESPONSIBILITIES

A0201. POLICY

Navy policy is to maintain safe and healthy working conditions for personnel and enhance operational readiness and mission accomplishments by establishing an aggressive safety and occupational health (SOH) program that will reduce occupational injuries, illnesses or deaths, and material loss or damage. The safety aspects of the program address the elimination or control of hazards that can result in immediate injury or death. The occupational health aspects are primarily concerned with the identification, elimination, or control of hazardous chemical, physical, and biological agents with potentially adverse health effects. Also included is the diagnosis and treatment of work related illnesses and injuries.

A successful Navy SOH program that reduces work-related injuries and illnesses results when the program is emphasized at every level of the organization. The Navy is in accordance with this principle, and the overall responsibility for the SOH program is vested in the Secretary of the Navy and implemented through the chain of command. The maintenance of safe and healthful working conditions is a responsibility of the chain of command.

A0202. OVERALL NAVY PROGRAM

a. The Assistant Secretary of the Navy (Installations and Environment) is the designated SOH official for the Department of the Navy.

b. Chief of Naval Operations (CNO) is responsible for implementation and management of the SOH program and, in coordination with the Commandant of the Marine Corps, for matters of mutual concern. The CNO shall:

(1) Issue appropriate SOH policy and standards. Chief of Naval Operations, Special Assistant for Safety Matters (N09F), is responsible for developing program policy and guidance and issuing standards under references A2-1 through A2-6.

(2) Ensure that fleet commanders maintain a staff of qualified SOH professionals who shall be responsible for maintaining a comprehensive SOH program. This includes providing guidance, direction, and policy for SOH matters throughout the fleet.

(3) Establish appropriate planning, programming, staffing requirements, and budgeting for the SOH program and training.

(4) Conduct research and development to preclude occupational hazards or exposures from causing physical injury or degrading health status or work performance.

(5) Develop SOH program evaluations/inspection criteria.

(6) Provide for occupationally-related medical support.

(7) Develop procedures for prompt investigation of reports of unsafe or unhealthful working conditions and ensures corrective action is taken within appropriate time periods.

(8) Ensure personnel receive thorough and continuing training on SOH matters and risk management.

(9) Adopt, develop, and review proposed alternate standards and promulgate SOH standards.

c. Commander, U.S. Fleet Forces (CFFC) Command; Commander, U.S. Pacific Fleet (COMPACFLT); Commander, Military Sealift Command (COMSC); and Commander, Special Warfare Command (COMSPECWARCOM). As safety is an inherent responsibility of command, CFFC, COMPACFLT, COMSC, and COMSPECWARCOM shall maintain a staff of qualified SOH professionals who shall be responsible for maintaining a comprehensive SOH program. This includes providing policy, direction, guidance, and oversight for SOH matters throughout the fleet and ensuring that subordinate commanders, commanding officers, and officers in charge:

(1) Conduct and maintain an aggressive and comprehensive SOH program.

(2) Assign SOH responsibilities to qualified personnel as a primary duty billet.

(3) Set SOH performance targets and measures, with concurrence of the type commanders, for comparison by ship class and operational cycle and provide them to the Board of Inspection and Survey (INSURV). These targets and the measures shall be reviewed on an annual basis.

(4) Coordinate with Commander, Navy Installations Command (CNIC), systems commands, Commander, Naval Safety Center, and regional and shore host activity commanders regarding support services for traffic, recreational and off-duty, home, hazardous materials/waste, and other aspects of SOH provided to local afloat units.

(5) Ensure timely, thorough safety investigations are conducted in accordance with reference A2-7.

d. Type Commanders (TYCOMs). Oversight of subordinate commands' SOH programs and coordination of matters of mutual concern are the primary responsibilities of TYCOMs. Accordingly, TYCOMs shall:

(1) Ensure that subordinate commands implement the SOH afloat program. Program oversight shall be in accordance with reference A2-1.

(2) Assign TYCOM SOH responsibilities to qualified personnel as a primary duty billet. If the TYCOM safety officer has not previously attended this course, ensure newly assigned TYCOM safety officer(s) attends the Afloat Safety Officer course (A-4J-0020) or Submarine Safety Officer course (F-4J-0020), as appropriate, prior to or within six months of assignment.

(3) Provide SOH assist visits, upon request.

(4) Coordinate and promote those aspects of the SOH program of mutual concern to forces afloat.

(5) Coordinate industrial hygiene support and minimally retain cover letter(s), executive summaries or electronic versions of industrial hygiene surveys for units under their cognizance.

(6) Ensure timely, thorough safety investigations are conducted in accordance with reference A2-7.

e. Immediate Superiors in Command (ISICs) shall:

(1) Assign SOH responsibilities to qualified personnel. Ensure that the ISIC safety officer attends the Afloat Safety Officer Course (A-4J-0020) or Submarine Safety Officer Course (F-4J-0020), as appropriate, prior to or within six months of assignment.

(2) Assist afloat commands to ensure that afloat workplace SOH discrepancies beyond shipboard capability are identified and prioritized in the workload availability package.

(3) Ensure timely, thorough safety investigations are conducted in accordance with reference A2-7.

(4) Ensure afloat commands complete required safety surveys and baseline and periodic industrial hygiene surveys.

(5) Ensure SOH program oversight inspections of subordinate commands are conducted at a minimum of once every three years, to include reviews of the traffic safety program (reference A2-6), the recreational/off-duty safety program (reference A2-7) and operational risk management implementation (reference A2-8) are performed. INSURV safety and occupational health inspections and Naval Safety Center afloat safety surveys will meet this requirement provided that copies of the results are provided to the ISIC by the unit commanding officer. The unit commanding officer must provide a copy of the report and written status to the ISIC of all discrepancies identified during the survey within 30 days of receipt of the report. The report should indicate those discrepancies that have been corrected, those on the consolidated ship maintenance project (CSMP) (including job sequence number (JSN)), and those beyond capability of the command to correct without outside assistance. Program implementation reviews should utilize the checklists provided in this instruction and the Naval Safety Center website at: http://www.safetycenter.navy.mil/afloat/checklists.

f. Specified Support Areas. Specified support areas are concerned with those aspects of the SOH program requiring special attention or technical expertise. The Commander, Naval Sea Systems Command; Commander, Naval Air Systems Command; Chief, Bureau of Medicine and Surgery; Naval Safety Center; and the Chief, Naval Education and Training, in coordination with or at the

direction of respective primary program sponsors, develop procedures, SOH standards, and instructions for the specified support areas. The designated officials will carry out these responsibilities as follows:

(1) **Commander, Naval Sea Systems Command (COMNAVSEASYSCOM), and Commander, Naval Air Systems Command (COMNAVAIRSYSCOM)**, ensure that:

(a) SOH aspects are considered in the design and engineering of all ships and aircraft, weapons or weapon systems, equipment, materials, supplies, and facilities which are acquired, constructed, or provided through COMNAVSEASYSCOM/COMNAVAIRSYSCOM.

(b) Engineering control of significant occupational health problems, such as noise, asbestos, and hazardous materials, is emphasized.

(2) **Bureau of Medicine and Surgery** (BUMED). BUMED provides support in all aspects of occupational health, including occupational medicine, industrial hygiene, and environmental health. BUMED, through the Navy Environmental Health Center (NAVENVIRHLTHCEN), shall ensure appropriate audit control and overall centralized management of the Consolidated Industrial Hygiene Laboratories (CIHLs). Navy environmental and preventive medicine units and naval medical treatment facilities provide assistance to afloat commands in the occupational health aspects of the SOH program.

(3) **Commander, Naval Safety Center** (COMNAVSAFECEN). COMNAVSAFECEN, in addition to serving as CNO (N09F), Special Assistant for Safety Matters, collects and analyzes mishap data and disseminates lessons learned and other safety information. COMNAVSAFECEN provides direct support and assistance to fleet units in safety matters upon request. COMNAVSAFECEN sponsors and coordinates the CNO safety awards, conducts safety surveys, and assists as requested with safety investigations conducted in accordance with reference A2-7.

(4) **Naval Education and Training Command** (NETC) and **Navy Occupational Safety and Health and Environmental Training Center** (NAVOSHENVTRACEN) ensure that all elements of the SOH Navy Training Systems Plan, NTSP S-40-8630D, for afloat units are properly executed.

(5) **President, Board of Inspection and Survey** (PRESINSURV) conducts SOH oversight inspections/assessments for forces afloat as part of the regular INSURV inspection process.

A0203. COMMAND PROGRAM

a. Ships or other afloat units can only achieve a safe and healthful working environment through the full participation and cooperation of all personnel assigned. Establishing and implementing a comprehensive SOH program is achieved through the ship's chain of command.

b. Commanding Officers. The commanding officers of ships and other afloat units shall:

(1) Implement and maintain a continuing SOH program per this instruction.

(2) Designate a command primary duty or collateral duty safety officer. Ensure that the command safety officer is provided with SOH management training in accordance with chapter A5 of this instruction.

(3) Ensure the command has received a baseline industrial hygiene survey and has a copy of the survey report on-board. Any additional industrial hygiene information received after the baseline survey, such as the periodic IH survey, or follow-on reports shall be appended to the baseline survey.

(4) Coordinate occupational health support with the cognizant BUMED activity.

(5) Incorporate required SOH training into the command's training program.

(6) Ensure timely, thorough safety investigations are conducted in accordance with reference A2-7.

(7) Serve as the chair of the Safety Council.

(8) Designate a command web-enabled safety system (WESS) safety authority so that access to unit data may be retrieved.

(9) Ensure that an INSURV safety and occupational health inspection or Naval Safety Center afloat safety survey is conducted at a minimum of every three years. A copy of the inspection/survey results will be provided to the ISIC by the unit commanding officer within 30 days of receipt of inspection/survey report along with written status report of all discrepancies identified during the inspection/survey visit. The status report should indicate those discrepancies that have been corrected, those on the consolidated ship maintenance (CSMP) (including job sequence number (JSN)), and those beyond capability of the command to correct without outside assistance.

c. Safety Officer/Collateral Duty Safety Officer. The safety officer is responsible for managing the SOH program. The safety officer reports directly to the commanding officer on SOH matters and to the executive officer for the administration of the SOH program. Primary duty safety officers shall be assigned to CV, CVN, LHA, LHD, AS, type ships. Ship and submarine squadrons and groups shall appoint a commissioned officer as the safety officer. On ships without a primary duty safety officer, the commanding officer shall appoint a commissioned officer of department head status and seniority as collateral duty safety officer (hereafter referred to as the safety officer). TYCOMs may grant waivers for small ships with limited officer manning to appoint a chief petty officer as the safety officer. The safety officer shall:

(1) Act as the principal advisor to the commanding officer on shipboard SOH matters.

(2) Oversee ship-wide planning to implement all elements of the SOH program.

(3) Prepare and submit, through the chain of command, requests for external SOH support such as industrial hygiene surveys, safety surveys, safety assist visits or technical guidance.

(4) Participate in mishap and safety investigations, as appropriate, per reference A2-7.

(5) Ensure timely and accurate recording and reporting of required mishap reports, per reference A2-7.

(6) Maintain and analyze SOH records (inspection/assessment reports, injury reports, and mishap statistics) and determine trends.

(7) Ensure that an annual internal safety inspection is performed.

(8) Ensure dissemination of SOH information.

(9) Schedule/coordinate required SOH training with the training officer/planning board for training. Conduct training as appropriate and ensure records of that training are maintained.

(10) Serve as advisor-recorder of the safety council. Prepare agenda for issuance by the chairperson.

(11) Serve as chairperson of the enlisted safety committee.

(12) Ensure, that SOH discrepancies beyond ship's force capability are properly identified, prioritized, and documented for corrective action.

(13) Complete the Afloat Safety Officer course (A-4J-0020) or the Submarine Safety Officer course (F-4J-0020), as appropriate, prior to or within six months of assignment.

NOTE:

On ships where an industrial hygiene officer (IHO) is the assistant safety officer, the IHO shall complete the Afloat Safety Officer Course (A-4J-0020) prior to or within six months of assignment.

On ships where the safety officer has attended and successfully completed the department head course at Surface Warfare Officer School Command, completion of the Afloat Safety Officer Course is not required as the Department Head Course contains the A-4J-0020 curriculum and is considered its equivalent.

(14) Ensure timely processing and follow-up on safety hazard reports submitted by crew members.

(15) Coordinate with the command's traffic safety coordinator and recreation and off-duty safety (RODS) coordinator to include these programs in the overall SOH program.

(16) On ships where the assigned safety officer or assistant safety officer is an industrial hygiene officer (IHO):

(a) Maintain and ensure calibration of all industrial hygiene equipment.

(b) Participate in and demonstrate proficiency in asbestos laboratory quality assurance programs as required by the TYCOM.

(c) Ensure that exposure monitoring for the command is performed, and provide technical assistance on request to tended units and other afloat units.

(17) Establish web-enabled safety system (WESS) account on COMNAVSAFECEN website.

d. Ship's Medical Officer/Medical Department Representative. In support of the SOH Program, the ship's medical officer/medical department representative shall:

(1) Participate in the SOH program (e.g., assist division officers/work-center supervisors by providing occupational health information).

(2) Coordinate external occupational medicine support as necessary.

(3) Initiate injury reports on personnel treated by the medical department to the commanding officer via the chain of command with a copy to the safety officer for investigation (and a copy to the officer of the deck for entry into the deck log).

(4) Maintain a hard copy or electronic log of work-related injuries and illnesses for military personnel, according to reference A2-7, with separate logs for on-duty and off-duty personnel, and a separate log for any assigned civilian personnel.

(5) Maintain medical surveillance records and coordinate screening exams as advised in the baseline or periodic industrial hygiene surveys.

e. Department Heads, Division Officers, and Work-Center Supervisors shall:

(1) Ensure that all assigned workspaces are inspected and maintained free of hazards and are in compliance with applicable SOH standards.

(2) Ensure that all assigned personnel are properly trained, advised of any associated hazards, are equipped/provided with appropriate protective clothing/equipment, and complete any required medical surveillance screenings.

(3) Take prompt action to abate/correct any identified deficiency under their control.

(4) Integrate safety in all activities consistent with mission requirements.

(5) Ensure that mishaps, hazards, and near-mishaps are reported to the safety officer.

(6) Division officers shall appoint a senior petty officer (E-5 or above) as the division safety petty officer to assist in the responsibilities outlined above and provide appropriate on board indoctrination to ensure satisfactory performance in the safety field.

Note:

For submarines. Division safety petty officers are not required aboard submarines.

f. Master-at-Arms (MAA) (not applicable to submarines). MAA personnel shall, during routine inspections, identify and report physical hazards that could result in injury to personnel or damage to equipment, and enforce the use of safety devices and protective equipment.

g. Division Safety Petty Officers/Aviation Safety Petty Officers (not applicable to submarines). The division safety petty

officer or aviation safety petty officer (when embarked onboard ship) shall:

(1) Inspect division spaces and submit hazard reports per OPNAV 3120/5, chapter A3.

(2) Advise the division officer on the status of the SOH program within the division including any safety-related items revealed through maintenance, such as non-compliance with or deficiency in the planned maintenance system(PMS).

(3) Keep the division officer informed of safety training needs within the division.

(4) Conduct division SOH training and ensure documentation of that training is maintained.

(5) Assist in mishap or hazard investigations and provide recommendations to division officers for correction.

(6) Serve on the enlisted safety committee.

(7) Perform or supervise the performance of required safety petty officer maintenance index page (MIP) planned maintenance.

h. Safety Council. The safety council consists of the commanding officer (chairperson), safety officer (recorder), training officer, all department heads, medical officer/representative, a safety representative from each embarked unit (e.g., air wing safety officer, Marine expeditionary unit (MEU) safety officer, explosive ordnance disposal (EOD) detachment), and the ship's command master or senior chief petty officer. The safety council shall meet at least quarterly and develop agendas and action items based on the afloat unit’s scope of operations and hazard or mishap experiences. Safety council meetings may be held in conjunction with other meetings of similar attendance. Minutes of each meeting shall be recorded (electronic or hard copy) and retained by the safety officer, with proof that the commanding officer has reviewed and approved the minutes (initials, signature, or electronic record). Specifically, the safety council:

(1) Reviews statistics compiled by the safety officer from mishap, hazard and inspection reports, safety or health

related messages, and related reports from the medical representative.

(2) Establishes mishap prevention goals and plans.

(3) Establishes program improvement plans based on mishap experience, program deficiencies and other information.

(4) Reviews issues and recommendations submitted by the enlisted safety committee.

(5) Review compliance with operational risk management (ORM) implementation in all applicable operations and evolutions.

i. Enlisted Safety Committee (not applicable to submarines). The enlisted safety committee consists of the safety officer (senior member), division safety petty officers, a safety representative from each embarked unit (e.g., aviation safety petty officer or Marine safety specialist), and the chief master-at-arms. If desired, the enlisted safety committee may be incorporated into the safety council. The committee meets at least quarterly, and the safety officer shall retain minutes of each meeting (electronic or hard copy). The safety officer shall appoint a recorder. The purpose of the committee is to:

(1) Identify and discuss SOH problems.

(2) Discuss interdepartmental safety issues.

(3) Submit issues and recommendations in writing to the safety council by copy of the safety committee minutes.

j. All hands shall:

(1) Comply with all safety precautions/standards and use required personal protective equipment.

(2) Promptly report suspected unsafe or unhealthful work procedures or conditions to their immediate supervisor, the division safety petty officer, or the safety officer.

(3) Report injuries, occupational illnesses, or property damage resulting from a mishap immediately to their supervisor.

CHAPTER A2

REFERENCES

A2-1. SECNAVINST 5100.10J

A2-2. DoD Instruction 6055.1, DoD Safety and Occupational Health (SOH) Program

A2-3. OPNAVINST 3500.39B, Operational Risk Management

A2-4. DoD Instruction 6055.5, Industrial Hygiene and Occupational Health, of

A2-5. OPNAVINST 5100.12G

A2-6. OPNAVINST 5100.25A

A2-7. OPNAVINST 5102.1D/MCO P5102.1B

CHAPTER A3

INSPECTIONS, SURVEYS, ASSISTS, HAZARD REPORTING AND MEDICAL SURVEILLANCE

A0301. DISCUSSION

a. This chapter addresses hazard identification and detecting adverse health effects. The principle way to identify hazards is through workplace inspections. Workplace inspections involve chain of command observation of operations at the job site on a routine basis to identify potential hazards. Workplace inspections also involve evaluations of ship's spaces and equipment by appropriate occupational safety and health personnel. Industrial hygiene surveys are another essential tool for identifying workplace hazards, characterizing risk and developing appropriate controls to reduce hazards.

b. Hazard identification, risk assessment, and hazard management and control are key steps in the Navy operational risk management (ORM) process outlined in reference A3-1. Navy personnel at all levels are required to use ORM as a decision-making tool by anticipating and assessing hazards (risk) and reducing the potential for mishap.

A0302. WORKPLACE INSPECTIONS

Routine inspection of all workspaces to identify hazardous conditions and/or unsafe work practices is a basic requirement of the SOH program. Such jobsite work observation is intended to identify and correct hazards. Hazards may be a result of many things, including unsafe work practices, violations of standards of sections C or D of this manual, not posting warning or equipment placards, or not following planned maintenance system (PMS) procedures. Identification of hazard trends may warrant a ship-wide safety inspection as part of a safety stand-down (chapter A5) to raise the command's safety awareness.

a. Safety Inspections. The safety officer shall ensure that all workspaces are inspected at least annually, for safety. They shall inspect high hazard areas more frequently based upon an assessment of the potential for injuries, occupational illness or damage to Navy property. An experienced officer or

chief petty officer, accompanied by a division safety petty officer (for submarines, a submarine qualified senior petty officer from the division), shall be assigned to accomplish the safety inspection of a workplace. It is not necessary to conduct safety inspections of all work spaces/equipment at one time. "Safety" shall be reviewed at all regularly scheduled zone or 'division in the spotlight' inspections required by reference A3-2. These zone inspections will include all aspects of the safety inspection. A copy of the completed deficiency list, such as a zone inspection deficiency list (ZIDL), shall be provided to the safety officer upon completion of the inspection. The safety officer shall retain the inspection results for at least two years, and review and track corrective actions on safety and industrial hygiene deficiencies as specified in paragraph A0404.

b. Master-at-Arms Force Inspections (not applicable to submarines). The master-at-arms (MAA) force shall act as roving safety inspectors during their normal tours of the command. They shall be alert to any deficiencies or hazards which could result in injury to personnel or damage to equipment. The MAA force shall assist the safety officer in keeping the SOH program visible to all hands and enforcing safety. The MAA force shall attempt to have any observed deficiency or hazard, or failure to use safety devices and protective equipment, corrected "on the spot." If this is not possible, the ship's force MAA will report the deficiency on a safety hazard report (OPNAV 3120/5) available on-line at https://forms.daps.dla.mil.

c. Oversight Inspections. SOH and environmental protection (EP) inspections are conducted by the Board of Inspection and Survey (INSURV) during final contract trials (FCTs) and regularly scheduled (4-5 years) material inspections (MI). In addition to the SOH elements of this instruction, additional items inspected during these MIs or FCTs are identified in the traffic safety program, reference A3-3, recreation/off-duty safety program, reference A3-4, and in the INSURV inspection instructions, references A3-5 or A3-6. Copies of all SOH-related discrepancy results from these inspections shall be routed to the safety officer to ensure that identified safety hazards are documented, and tracked to correction. Checklists are available at: http://www.spawar.navy.mil/fleet/insurv.

A0303. SELF ASSESSMENTS

Self-assessments of all safety programs applicable to the afloat unit will be conducted at least annually as part of the annual workplace safety inspection. These may be conducted as a single project or staggered throughout the year. Copies of the self-assessment results, hard copy or electronic, will be retained by the safety officer for at least two years. The safety officer will advise the safety council and safety committee, as applicable, of the results of these self-assessments and status of any corrective actions. Checklists are available at http://www.safetycenter.navy.mil/afloat/checklists, at the end of each applicable topic chapter, or developed and customized by the afloat unit, as a self-assessment tool.

A0304. INDUSTRIAL HYGIENE SURVEYS

a. Navy industrial hygiene personnel anticipate, recognize, evaluate, and make recommendations to control unacceptable workplace exposures. Exposure assessment of Navy workplaces requires a sound, logical strategy and shall be based on references A3-7 and A3-8. The purpose of such a strategy is to accomplish at least four goals:

(1) To assess potential health risks faced by Navy personnel by understanding their exposures, to differentiate between acceptable and unacceptable exposures, and to control unacceptable exposures.

(2) To establish and document a historical record of exposure levels for Navy personnel and to communicate exposure monitoring results.

(3) To ensure and demonstrate compliance with safety and health exposure criteria.

(4) To provide a base for medical surveillance examinations.

b. The occupational exposure assessment strategy is the plan for recognizing, evaluating, and documenting all exposures, and for developing controls for occupational exposures that are judged unacceptable. There are five major steps in setting up a functioning occupational exposure assessment program:

(1) Basic characterization;

(2) Exposure assessment;

(3) Further information gathering;

(4) Communications and documentation;

(5) Reassessment.

c. Chief, Bureau of Medicine and Surgery (BUMED), shall provide all afloat activities with a current, thorough occupational exposure assessment of each workplace according to reference A3-7. BUMED activities shall routinely update the exposure assessment. The following subparagraphs outline the basic requirements for occupational exposure assessment.

(1) **Basic Characterization of the Workplace (Walk-through Survey).** The first step in the Navy's exposure assessment strategy is to characterize the workplace, workforce and environmental agents. The cognizant industrial hygienist (IH) shall conduct a survey of each workplace to obtain, as a minimum, the following information:

(a) Descriptions of operations, tasks and work practices that take place in the workplace (e.g., welding, spray painting). The description shall include a layout sketch incorporating relevant aspects of the factors listed below, along with the number of persons assigned to the operation/task and the specific work area(s) occupied. The IH shall note the frequency and duration of events taking place within the workplace.

(b) A list of hazardous materials (HM) used in the workplace that present significant risk. The list shall include a description of use at each workplace. Reproductive hazards and carcinogens shall be specifically identified.

NOTE:

IHs shall have access to a copy of the authorized use list for the workplaces being surveyed.

(c) A list of physical hazards (e.g., noise, ergonomic stressors, non-ionizing radiation) in the workplace that present significant risk including a brief description of their source(s).

(d) A description of existing controls (e.g., industrial ventilation and personal protective equipment).

(2) **Exposure assessment**. The BUMED IH will assess exposures using all the information available. The outcomes include: groupings of workers having similar exposures, definition of an exposure profile for each similarly exposed group and judgments about the acceptability of each exposure profile. The BUMED IH shall make appropriate control strategy recommendations regarding the workplace, workforce, and environmental agents based on the results of the exposure assessments by using accepted industrial hygiene practices, which comply with appropriate regulatory requirements.

(3) **Further information gathering**. Exposure profiles that are not well understood, or for which acceptability judgments cannot be made with high confidence must be further characterized by collecting additional information. Information needs may be quantitative or qualitative depending on the exposure profile and judgment.

(4) **Quantitative Exposure Monitoring**. Monitoring the workplace for toxic substances and/or harmful physical agents is the primary means of assessing:

(a) Personnel exposures.

(b) The need to control exposures.

(c) The effectiveness of measures directed at reducing or eliminating health hazards.

An IH shall accomplish these assessments using data gathered from representative sampling programs in the workplace. Analysis and interpretation of the data from this sampling assists in the timely assessment of hazards, in making recommendations for changes to existing conditions, and in determining requirements for the medical surveillance of exposed personnel.

(5) **Qualitative Exposure Decisions**. Examples may include exposure modeling, biological monitoring or determining an appropriate occupational exposure level. The IH shall determine the appropriate information needed, gather it, and evaluate it so that an acceptable or unacceptable exposure assessment is reached and appropriate controls and recommendations can be implemented.

(6) **Communications and Documentation**. Exposure assessment reports and records are critical elements of the exposure assessment process. Reports and records are needed to ensure effective communication of workplace findings and successful continuity of the industrial hygiene program.

d. Baseline Industrial Hygiene Surveys. Each ship and submarine shall arrange for a baseline industrial hygiene survey. This survey may be scheduled and obtained through the supporting Navy Environmental and Preventive Medicine Unit (NAVENPVNTMEDU) or Bureau of Medicine and Surgery (BUMED) medical treatment facility (MTF). The survey will consist of the following elements:

(1) A detailed hazard evaluation of all operations which present a potential for exposure to hazardous chemicals and/or harmful ergonomic, physical (e.g., noise, heat stress) or biological agents.

(2) When sampling is warranted to quantitatively characterize workplace exposures, collect samples per reference A3-8. Navy occupational exposure limits (OELs) and Federal Occupational Safety and Health Administration (OSHA) permissible exposure limits (PELs) will be determined using chapter 16 of reference A3-7. Reference A3-9 provides requirements for submarine atmosphere sampling and guidance for submarine unique PELSs. The survey shall include a list of exposures that require routine monitoring (e.g., exposure monitoring plan).

(3) An assessment of the effectiveness of general and local exhaust ventilation systems used for the control of contaminants, flammable storerooms, and hazardous material storerooms. Ventilation systems require routine evaluation and shall be included in the exposure monitoring plan.

(4) Findings (e.g., ventilation system deficiencies) which can be used as additional justification for inclusion of material issues on the ships consolidated ship maintenance project (CSMP).

(5) Recommendations for personal protective equipment, respiratory protection, emergency equipment (eyewash stations and deluge showers), posting of hazards, and actions on specific survey results (noise, air sampling, etc.), including:

(a) A list of noise hazardous areas/equipment

(b) A list of eye hazardous areas/processes and recommended emergency eyewash and deluge shower locations

(c) A list of each area/process requiring respiratory protection and the recommended type(s)

(6) Medical surveillance requirements.

e. An update of the baseline industrial hygiene survey is necessary as system, equipment, or loadout changes significantly affect the on-board hazard and/or risk. Deterioration of existing controls, modifications and additions to shipboard processes and equipment will occur over time. An update of the industrial hygiene survey is required at least every two years to address all changes that may have occurred. A more limited survey to address specific concerns is available at the discretion of the commanding officer. Examples of changes that could significantly affect the on-board hazard and/or risk are as follows:

(1) New or modified equipment or processes.

(2) Introduction of new hazardous chemicals and/or harmful physical or biological agents.

(3) Deterioration of existing controls (e.g., ventilation) which degrade over time.

Some of these changes would be the expected result of a shipyard availability period and commanding officers may consider requesting industrial hygiene assistance from their supporting NAVENPVNMEDU or MTF following a major availability.

For submarines, detailed atmosphere sampling, per reference A3-9, is required at the completion of a major shipyard availability or prior to post scheduled availability (PSA) to demonstrate that there are no built in contaminants as a result of construction activities and proper functioning of the atmosphere control system.

f. New construction. On new construction ships, industrial hygiene services are necessary prior to final contract trials (FCTs). This will assist the ship in correcting any deficient material conditions that may arise due to potential deviation by the builder from contract specifications. At a minimum, the supporting NAVENPVNTMEDU or MTF will perform the following services prior to the end of FCTs, and provide the ship a list of safety and health related material discrepancies and recommended corrective actions:

(1) An evaluation of ventilation systems used for the control of contaminants and for hazardous material (HM) stowage.

(2) An evaluation of occupational noise hazard areas/installed equipment (this is in addition to any ambient noise surveys conducted by the shipbuilder).

(3) An evaluation of the locations of plumbed and portable eyewash stations and deluge showers.

Initiate the baseline industrial hygiene survey for new construction ships as soon as possible after commissioning. Ships shall be in receipt of the completed survey report no later than six months after post shakedown availability.

g. Ship Class Database: The supporting NAVENPVNTMEDU or MTF will forward a copy of all industrial hygiene reports to the Navy Environmental Health Center for the purpose of updating the ship class profile. BUMED shall provide ship class profiles to new construction ships prior to FCTs. This is a generic database that characterizes shipboard hazards and control measures common to that class.

A0305. SHIPBOARD SAFETY SURVEY

a. Naval Safety Center conducts the shipboard safety survey of one or two day's duration. The interval between surveys,

surface ships and submarines, shall not exceed 36 months. The safety survey normally will be conducted during the Fleet Readiness Training Program (FRTP). The ship's immediate superior in command (ISIC) will allocate time early in the ship's FRTP so the commanding officer can use the safety survey results in deployment preparations. For two-crew submarines (e.g., SSBNs), the survey should be conducted during a refit/major maintenance period when both crews are on-board.

b. The shipboard safety survey includes training and a survey of a representative sample of the entire ship, identifying safety hazards, training safety officers and safety petty officers, and providing the commanding officer with an evaluation of the safety status of the command. The survey is intended to promote operational risk management as the primary tool in preventing mishaps and reducing the risks inherent to the operational Navy. The survey report shall be provided to the ship, including a relative standing for safety performance among the ship class. Within 30 days of the completion of the survey, commanding officers shall provide their ISIC, in writing, the status of the significant discrepancies identified during the survey and indicate those that have been corrected, those on the CSMP (including job sequence number (JSN)), and those beyond capability of the command to correct without outside assistance. To arrange a survey, contact the Naval Safety Center, Afloat Directorate, at SAFE-AFLOAT@navy.mil, or by naval message.

A0306. HAZARDOUS MATERIAL CONTROL AND MANAGEMENT ASSIST

Ships needing assistance for implementation, day-to-day operations, or equipment problems with their hazardous materials minimization centers (HAZMINCENs) may request an assist from the logistics support center (LSC) at the local fleet industrial supply center (FISC).

A0307. HAZARD REPORTING BY INDIVIDUAL CREWMEMBERS

Detection of unsafe or unhealthful working conditions at the earliest possible time and prompt control of hazards identified as a result is essential to a successful SOH program. The following procedure enables any member to submit a report of unsafe or unhealthful conditions:

a. All hands are encouraged to orally report unsafe or unhealthful working conditions to their immediate supervisor. That supervisor shall promptly evaluate the situation and take appropriate corrective actions. Supervisors will contact the division safety petty officer, the division officer, or the safety officer for assistance, if necessary. Inform the reporting crewmember of all actions taken.

b. If the notified supervisor has not taken action to investigate the situation or if they are not satisfied with the result, they may submit a written report of an unsafe or unhealthful working condition on a safety hazard report (OPNAV 3120/5, available on-line at https://forms.daps.dla.mil). The report may be handwritten and should simply state the nature of the condition and its location. If the originator desires that his or her name not be revealed, this should be so stated in the report.

c. Upon receipt of a report, the safety officer shall contact the originator to acknowledge receipt and discuss the seriousness of the reported condition. The safety officer shall advise the cognizant division officer that an unsafe/unhealthful working condition has been reported.

d. The safety officer will evaluate all submitted reports. Alleged critical danger situations will be evaluated immediately. If possible, potentially serious or moderate situations shall be evaluated within three days (see paragraph A0404 for descriptions of critical, serious, or moderate hazards or deficiencies). If necessary, the safety officer may request assistance from support activities for the evaluation.

e. Provide an interim or final response in writing to the originator of the reported condition under the authority of the safety officer within 10 working days of report receipt. Interim responses will include the expected date for a final response. If the evaluation identifies a hazard and its causative deficiency, the final response shall include a summary of the action taken for abatement of the deficiency. If no significant hazard is found to exist, the reply shall include the basis for that determination.

f. The final response shall encourage the originator to contact the safety officer if he or she desires additional

information or is dissatisfied with the response. If the originator remains dissatisfied after discussing the matter, the safety officer shall advise him or her of the right to appeal to the commanding officer. The appeal (or report) shall be in writing and contain, at least, the following information:

(1) A description of the condition including its location, nature of the alleged hazard, and standards violated (if known) (a copy of the original hazard report will suffice).

(2) How, when, and to whom the original report was submitted.

(3) What actions (if known) were taken as a result of the original report.

g. The commanding officer, or his/her representative, shall respond to the originator of the appeal within 10 working days. An interim response will suffice if the evaluation is incomplete at that time. If further appeal is warranted, refer to reference A3-2.

A0308. VARIANCES AND ALTERNATE STANDARDS

a. Variances. In certain situations, it may be impossible to comply with an applicable SOH standard. In this case, the safety officer can initiate a request for a variance by submitting the request to CNO (N09F) via the appropriate fleet commander and the chain of command. Variance requests shall explain why compliance is impossible and describe actions taken to achieve the maximum degree of protection possible.

b. Alternate Standards. In certain cases, it may be possible to achieve equal or better protection through the application of procedures/criteria different than those specified by a SOH standard. Submit proposed alternate standards to CNO (N09F) through the chain of command for approval.

A0309. FEDERAL AND STATE OCCUPATIONAL SAFETY AND HEALTH (OSH) INSPECTIONS OF NAVY, CIVILIAN, OR CONTRACTOR WORKPLACES ON BOARD NAVY SHIPS

This section provides guidance and procedures regarding requests by Federal or state OSH officials to inspect or investigate Navy civilian or contractor workplaces on board Navy ships in port or located at associated facilities (e.g., industrial activities).

a. Subject to the conditions and exceptions stated below, Navy afloat activities are advised that permission is granted for Federal OSHA compliance officials to be taken aboard U.S. Navy ships in port to conduct safety and health inspections and investigations of Navy civilian and contractor workplaces. State occupational safety and health officials **shall not** be granted access aboard naval ships and service craft or in areas of exclusive federal jurisdiction. A summary of inspector access is provided in appendix A3-B.

(1) Except for the limitations imposed in paragraphs A0309a(2) and (3), provide OSHA compliance officials, upon request, immediate access to Navy civilian or contractor workplaces where the Navy repair activity or contractor has equipment or other work-related material or paraphernalia in the workplace under government work or a government contract. Forward requests for access to inspect those workplaces where Navy civilian or contractor employees have worked or will work but where the work force is no longer deployed, or has yet to deploy any work-related material or paraphernalia, by message and by telephone to the CNO (N09F), copy to Commander, Naval Sea Systems Command (COMNAVSEASYSCOM) (copy to the Navy repair activity for Navy civilian workers), with information to the chain of command. All message requests shall identify the workplace involved and furnish all immediately available details. A reply to such requests will be forthcoming without delay.

(2) If the requested inspection/investigation involves handling or storage of ammunition or explosives, deny the request for access. Report any such request to the CNO (N09F), information to the chain of command (and for Navy civilians, to the Navy repair activity), by message.

(3) With respect to nuclear propulsion plant spaces on nuclear-powered ships, to related nuclear shipyard facilities,

ashore or afloat, shipboard nuclear support facilities, or to nuclear weapons areas, forward the request for access by message and by telephone to CNO (N09F) with copies to COMNAVSEASYSCOM (SEA-08) and the chain of command. All message requests shall identify the workplace involved and furnish all other immediately available details. Withhold access pending receipt of the reply and, where granted, shall be subject to the requirements of this chapter and any conditions imposed in the CNO reply. CNO will furnish such a reply expeditiously, and, if possible, within three working hours from receipt of the request by the CNO.

(4) In cases of non-nuclear ships or nuclear ships, with the exceptions in paragraphs A0309(a)(2) and (3), and under the procedures of paragraph A0309(a)(1), access to Navy civilian and contractor workplaces, as defined above, grant upon request to Federal OSHA compliance officials to conduct inspections and investigations of such workplaces within reasonable limits and in a reasonable manner during regular working hours except when other times are mutually agreed upon by the concerned officials.

(5) Photographs by OSHA officials shall not be taken. Any photographs requested by OSHA officials shall be taken by Navy personnel, shall be tentatively classified CONFIDENTIAL, and shall not be delivered to OSHA compliance officials until all film, negatives, and photographs have been sent to COMNAVSEASYSCOM (SEA 00D2) and fully screened and censored, as appropriate, in the interest of national security. Also, forward any design or system performance data (e.g., recordings of noise sound level profiles and light level readings) to COMNAVSEASYSCOM (SEA 00D2) for screening as described above prior to release. This process shall normally be completed within a period of 15 working days from receipt of material by NAVSEASYSCOM.

(6) OSHA officials shall not be given copies of any federal records or reports. If access to Navy records or reports is requested by OSHA officials, forward the request to the appropriate releasing official(s).

(7) In addition to presenting appropriate identification credentials, all OSHA compliance officials shall be required to possess appropriate security clearance for entry into areas where the workplace is located.

(8) Representatives of the ship's commanding officer, and, if appropriate, the activity contracting officer and the commanding officer or officer in charge of the shore activity at which the ship is located, and the commanding officer of the Navy repair activity (for Navy civilian employees) shall accompany the OSHA compliance official at all times during this physical inspection of Navy civilian or contractor workplaces. A representative of the contractor and a representative of the employees may accompany the OSHA compliance official during the inspection/investigation provided proper security clearances are verified. If there is no authorized employee representative, the OSHA compliance official is authorized to consult with a reasonable number of employees only (contractor or Navy civilian), concerning matters of health and safety in the pertinent workplace.

(9) OSHA compliance officials are authorized to question privately the contractor, contractor employee, Navy civilian employee, or their authorized representatives.

b. Unless specifically requested by the responsible OSHA official, commanders and ship commanding officers shall not provide contractors with advance notice of OSHA inspections except in cases of apparent imminent danger to Navy or contractor employees. Any person who violates the foregoing is subject to a fine of not more than $1,000 or to imprisonment of not more than six months, or both.

c. Report in writing to the CNO full information regarding any OSHA inspection/investigation aboard ship with a copy to COMNAVSEASYSCOM and the chain of command.

A0310. MEDICAL SURVEILLANCE

a. Purpose. The medical surveillance program is designed to monitor the continuance of the health of individuals in the fleet and serve the following purposes:

(1) Job certification/recertification to determine an individual's fitness to begin or continue to perform a job safely and effectively.

(2) To monitor the effectiveness of major hazard-specific (e.g., noise, heat, asbestos) programs by following the health status of exposed personnel.

(3) Secondary prevention to detect early indicators of excessive exposure caused by the work environment before actual illness, disease, or injury occurs and to allow for the timely implementation of corrective actions to prevent any long-term adverse effects.

(4) To comply with the requirements of certain SOH standards as noted in section B of this manual.

b. Selection of personnel. Selection of personnel for medical surveillance examinations is based primarily on the results of industrial hygiene surveys. Selection for some medical surveillance programs may be based on a history of past exposure to certain hazardous materials such as asbestos and cadmium. The medical department representative (MDR), using the recommended medical surveillance requirements from the industrial hygiene survey and assisted by the safety officer, division officer, division safety petty officer and workplace supervisor, will identify personnel who require medical surveillance following the guidance of enclosure (1) to reference A3-10. Periodic occupational medical examinations should be scheduled on a birth-month basis or as operational requirements permit. When there is no Navy standard for medical surveillance for a specific agent, personnel shall be placed under medical surveillance when the action level (1/2 of the permissible exposure limit) of the agent is exceeded and the exposure exceeds 30 days per year or 10 days per quarter. Detailed requirements for these examinations shall be established by the Chief, Bureau of Medicine and Surgery (CHBUMED).

c. Medical Examinations. The ship's MDR shall make all arrangements for required medical examinations. These examinations include baseline (pre-placement), periodic, termination, certification, and special examinations as required by section B of this manual. The scope of these examinations will be determined by reference A3-10. The MDR will provide all available information regarding each individual's exposure to allow the cognizant shore-based medical treatment facility (MTF),

squadron medical officer, or the ship's medical department, if resources permit, to perform the proper examination.

d. Evaluation of Results. The MDR shall monitor all medical surveillance results for any trends apparently due to hazard exposure.

e. Medical Records. Maintenance, retention, and disposition of personnel medical records shall be per existing directives. The MDR shall ensure that the results of all hazard exposure medical examinations and personal exposure records are entered into each individual's medical record. The MDR shall also inform each individual, verbally or in writing, as to the significance of all findings, and provide access to such records upon request. For submarines, exceedance of the continuance exposure limit (CEL) as defined by reference A3-9 shall be recorded in effected crew members' medical records. Recorded information shall include time, date, contaminants, concentration, duration of CEL exceedance, and any pertinent information as to the nature of the cause.

CHAPTER A3

REFERENCES

A3-1. OPNAVINST 3500.39C

A3-2. OPNAVINST 3120.32C

A3-3. OPNAVINST 5100.12H

A3-4. OPNAVINST 5100.25A

A3-5. INSURVINST 4730.1E, Trials and Inspections of Surface Ships, of date

A3-6. INSURVINST 4730.2E, Trials and Inspections of Submarines, of date

A3-7. OPNAVINST 5100.23G

A3-8. NEHC Technical Manual TM 6290.91-2, Industrial Hygiene Field Operations Manual, latest revision (NOTAL)

A3-9. NAVSEA S9510-AB-ATM-010/(U), Nuclear Powered Submarine Atmosphere Control Manual, of date

A3-10. NEHC Technical Manual TM OM-6260, Medical Surveillance Procedures Manual and Medical Matrix (NOTAL), of date

Appendix A3-A

Inspection of Department of the Navy Workplaces by Federal and State OSH Representatives

	AFLOAT		
	Contractor Workplaces	Civilian Workplaces	Exclusively Military Workplaces
FEDERAL OSH REPRESENTATIVES	YES [1,2,3]	YES [1,2,3]	NO
STATE OSH REPRESENTATIVES	NO	NO	NO

NOTES:
1. Ships or service craft must be in port; Navy Department will not transport Federal OSHA representatives to ships or service craft that are underway.
2. Federal and state OSH representatives have no jurisdiction over military unique operations or equipment. In addition, these officials are not authorized to inspect workplaces or operations for compliance with any standard implementing 10 U.S.C. 172 (explosive safety) or 42 U.S.C. section, 2012, 2021, or 2022 (nuclear safety).
3. Inspections may be announced or unannounced.

CHAPTER A4

HAZARD CONTROL AND DEFICIENCY ABATEMENT

A0401. DISCUSSION

There are three methods of controlling hazards. The first, and preferred, is to prevent the hazard at the design and acquisition stages. The second is to identify and eliminate existing hazards. The third is to reduce the likelihood and severity of mishaps from hazards that cannot be eliminated.

A0402. HAZARD PREVENTION

Hazards may be prevented or mitigated during the design and acquisition/alteration processes. Many effective actions that should be taken to improve safety at those planning and design stages include designing safety improvements, conducting system safety activities (per MIL-STD-882 – Standard Practice for System Safety), holding design reviews, and developing operating, purchasing, maintenance, and logistical procedures. Such activities are primarily the responsibility of the appropriate Systems Command (SYSCOM), with design input from TYCOMs and others [life cycle engineering manager (LCEM), ship program manager (SPM), fleets]. Since up front activities like these are beyond ship's force, only those actions which can be taken at the shipboard level to prevent or eliminate hazards will be addressed in this chapter.

a. Preventive Maintenance. Some hazards arise as the result of an inadequate preventive maintenance program. An effective shipboard preventive maintenance program can keep equipment and material from degrading to the point where it becomes an operational hazard.

b. Operating Procedures. Standard operating procedures (SOPs), instructions, or similar directives that are issued to identify the manner in which work is to be performed can prevent hazards from occurring. Obvious examples include tank cleaning, foul weather operations, and asbestos removal. Personnel must be familiar with the appropriate SOPs and current updates applicable to their duties.

c. Operational Risk Management (ORM). ORM is the process of identifying, assessing and controlling risks. The systematic ORM process, discussed in reference A4-1, is applicable to all missions and environments and shall be used in the shipboard environment to identify hazards and mitigate risk. ORM shall be applied not only to operational missions, but at the deck plate level for day-to-day work unit operations as well.

d. Purchasing Procedures. Afloat units procuring material and equipment at the local/unit level can prevent hazards by purchasing approved material or equipment in the proper quantity (i.e., that which can reasonably be expected to be used to accomplish the operation or task for which it was procured). Procurement of unauthorized, or excess, material or equipment can introduce hazards to the workplace, as well as create stowage and disposal problems. Hazardous material is of special concern. All local purchases of potentially hazardous material shall be accomplished per paragraph B0305 of this instruction. Note: If ordering items through a catalog, ensure you verify the item and national stock number (NSN) are authorized as required by chapters C23 and D15.

A0403. PRINCIPLES OF HAZARD CONTROL

Short of complete elimination of the hazard, methods of hazard control, in order of preferred application, are substitution, engineering controls, administrative controls, and use of personal protective equipment.

a. Substitution. The risk of injury or illness may be reduced by replacement of an existing process, material, or equipment with a similar item having a lower hazard potential. Care must be exercised in any substitution to ensure that the substitute materials are technically acceptable and that a new hazard is not being introduced.

COMNAVSEASYSCOM/COMNAVAIRSYSCOM should be contacted for substitution approval. To propose a substitution for a material, tool, or procedure called for on a maintenance requirement card (MRC), submit a PMS feedback report (FBR) per reference A4-2.

b. Engineering Controls. This means of hazard control is accomplished primarily through design and advanced planning. Whenever these methods are used, the cognizant safety officer or

industrial hygienist should approve these methods prior to implementation. Examples of engineering control methods include isolation and ventilation.

(1) **Isolation**. Isolation is the physical separation of a hazard from personnel to eliminate or minimize contact or exposure. This involves the use of a barrier or limiter and may be in the form of a physical barrier, use of semi-automatic equipment that does not require constant attendance (time-separation), or distance. Examples include machine guards, electrical insulation, sound barriers, and remote controlled equipment.

(2) **Ventilation**. This is the control of potentially hazardous airborne substances through the movement of air. Two methods are "general ventilation" or "dilution ventilation" and "local exhaust ventilation." General ventilation is the dilution of an airborne substance by mixing it with quantities of uncontaminated air. Local exhaust ventilation is the removal of an airborne substance at its source or point of generation. Local exhaust ventilation is the preferred and more economical method. The use of general ventilation should be limited to the control of heat/humidity or low toxicity materials if no other ventilation is possible. Ventilation requirements for airborne substance control must be determined through an industrial hygiene survey.

c. Administrative Control. This method of abatement employs special operating procedures to reduce the exposure of individuals to hazards. Examples include limiting access to high hazard areas or adjusted work schedules. Adjusted work schedules are appropriate only when the hazard is recognized as having a limit below which all personnel may be repeatedly exposed without adverse effect.

The amount of time by which a limit may be exceeded for short periods without injury depends on several factors such as the nature of the hazard, whether or not the effects are cumulative, the frequency with which the hazard occurs, and the duration of the hazard. All factors must be taken into consideration in determining whether a hazardous condition exists and whether or not exposures above the limit are permitted. Do not allow exposures above established limits without the commanding officer's approval.

d. Personal Protective Equipment (PPE). This method of hazard control is the least preferred because any equipment breakdown, failure, or misuse immediately exposes the wearer to the hazard. Nevertheless, there are instances where adequate risk mitigation cannot be achieved through other methods and personal protective devices must be used, either alone or in conjunction with other control measures. Training, maintenance of PPE, and user acceptance are key to the successful use of PPE to protect personnel. Chapter B12 of this manual discusses personal protective equipment in general. Other chapters describe personal protective equipment requirements for specific programs and hazards.

A0404. HAZARD ABATEMENT PROGRAM PROCEDURES

The hazard abatement program is a process by which identified hazards that are not able to be immediately corrected are recorded and tracked to completion. Hazards are tracked until verified as corrected or eliminated. Some hazards may be corrected by ship's force, while others may require documentation to ensure they are noted for correction during availabilities or maintenance periods.

a. Some deficiencies can be corrected "on the spot." When this is possible, the division officer will either notify the safety officer or complete the applicable portion of the Safety Hazard Report and return it to the safety officer via the appropriate department head. This documentation is useful in the identification of similar hazards and trends.

b. Shipboard hazards that cannot be corrected "on the spot" shall be documented in the work-center deficiency log (WCDL)/job sequence number (JSN) log per reference A4-1, if applicable. The ship's 3M Coordinator shall forward any on-board maintenance management system - next generation (OMMS NG) safety hazard entries to the safety officer for review.

c. The safety officer shall provide the results of workplace inspections, industrial hygiene surveys, and Safety Hazard Reports (OPNAV 3120/5) to the division officer in charge of the operation/space evaluated. Upon receipt of this report, the division officer shall take prompt action to ensure correction of each identified deficiency.

NOTE:

When cases of imminent danger are identified, the senior person on the scene must be notified and must stop all work immediately except in an operational emergency. Notify the commanding officer of the situation, and take action as soon as possible. Imminent danger is defined as a shipboard condition that immediately threatens the loss of life, bodily injury, or illness to personnel.

d. The safety officer shall retain or maintain documentation of those hazards identified through inspections, surveys, or as reported by individuals. A log, notebook, electronic spreadsheet, or other means may be used as documentation of hazards awaiting correction or resolution. For each hazard documented, the safety officer shall assign a risk assessment code (RAC). Documentation for hazards shall consist of the following, at a minimum:

(1) Date, time, location, and description of hazard.

(2) Risk assessment code (RAC).

(3) Recommended corrective action to control or eliminate hazard.

(4) Action taken to implement that correction (e.g., who was notified, submitted a 4790/2K, when scheduled for availability, etc.)

(5) Verification and date hazard corrected/eliminated.

e. External Hazard Reports (HAZREPs). In some instances, where it would be helpful or prudent to notify others outside of the command of the hazard, the safety officer should complete a hazard report, using the web-enabled safety system (WESS), per reference A4-3.

f. Risk Assessment. The safety officer shall assign a RAC to each identified hazard that cannot be corrected immediately. The RAC provides a measure of the degree of risk associated with a deficiency by combining both the severity of the hazard and the mishap probability. The RAC provides a priority for the correction of deficiencies. The RAC is derived as follows:

(1) **Hazard Severity.** The hazard severity is an assessment of the worst reasonably expected consequence, defined by degree of injury, illness, or physical damage which is likely to occur as a result of the hazard. Hazard severity categories are assigned Roman numerals according to the following criteria:

Description	Category	Results
CATASTROPHIC	I	The hazard may cause death, loss of facility/asset or result in grave damage to national interests.
CRITICAL	II	The hazard may cause severe injury, illness, property damage, damage to national or service interests or degradation to efficient use of assets.
MARGINAL	III	The hazard may cause minor injury, illness, property damage, damage to national, service or command interests or degradation to efficient use of assets.
NEGLIGIBLE	IV	The hazard presents a minimal threat to personnel safety or health property, national, service or command interests or efficient use of assets.

(2) **Mishap Probability.** The mishap probability is the likelihood that a hazard will result in a mishap, based on an assessment of such factors as location, exposure in terms of cycles or hours of operation, and affected population. Mishap probability is assigned a letter according to the following criteria:

Subcategory	Description
A	Likely to occur immediately or in a short period of time.
B	Probably will occur in time.
C	May occur in time.
D	Unlikely to occur.

(3) **Risk Assessment Code (RAC).** To derive the RAC from the elements of hazard severity and mishap probability, use the matrix shown below. The RAC is expressed as a single Arabic number (1, 2, 3, 4, or 5) that can be used to help determine hazard abatement priorities.

		Mishap Probability			
		A	B	C	D
Hazard Severity	I	1	1	2	3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	5	5

Code Description

1. **Critical Safety or Health Deficiency – Correct as Soon as Possible**
   This is a deficiency which presents a critical safety hazard to personnel or machinery or health hazard to personnel which must be corrected immediately. This code is to be used for items such as electric shock hazards, inoperative interlock or safety devices, missing or damaged lifelines, inoperable escape scuttles, a leaking refrigerant system into a confined space, leaking component containing PCBs, and the like. All efforts must

be exerted to correct these items prior to any other maintenance deficiencies. Suspension of use of equipment/system/space is mandatory.

2. **Serious Safety or Health Deficiency - Suspension of Equipment/System/Space Use is Required**
These items deal with serious safety hazards to personnel or machinery or health hazards which must be corrected prior to resuming use of equipment/system/space.

3. **Moderate Safety or Health Deficiency -Waiver of Equipment/System/Space Use is Granted Pending Correction of the Item**
This category is to be used in cases where the equipment/system/space can be operated or utilized in a satisfactory manner without greatly risking personal injury, serious damage to the equipment/system/space, or greatly risking personal health.

4. **Minor Safety or Health Deficiency**
This is a category of safety or health deficiency that should be corrected when resources become available, but use of equipment/system/space is unrestricted.

5. **Negligible Safety or Health Deficiency**
This category is used to identify those deficiencies that are noted for record purposes and may be corrected when other work is accomplished on the equipment/system/space.

A0405. INTERIM CONTROLS

a. As soon as it is recognized that immediate correction of workplace deficiencies is not possible, establish and document appropriate interim controls on the safety hazard report. Interim controls may consist of physical barriers, written instructions, word passed over the 1 multi-channel (1MC), warning signs, or other measures as deemed appropriate. Interim controls shall meet or exceed minimum necessary requirements to prevent future damage to equipment or injury/death to personnel. The safety officer shall approve interim controls in effect more than 60 days.

b. Notify the commanding officer if an unabated deficiency is classified as critical or serious (RAC 1 or 2), and determine

who will personally approve interim protective measures. The appropriate department head shall approve interim controls for other unabated deficiencies.

CHAPTER A4

REFERENCES

A4-1. OPNAVINST 3500.39B

A4-2. OPNAVINST 4790.4D

A4-3. OPNAVINST 5102.1D/MCO P5102.1B

CHAPTER A5

TRAINING

A0501. DISCUSSION

a. Safety and occupational health (SOH) training is an integral part of operational risk management (see reference A5-1). References A5-2 through A5-4 reflect federal standards that require all safety managers, supervisors, and workers to be trained in safety program requirements and responsibilities, safety standards, recognition of hazards, and the safety hazard reporting process.

b. SOH training policy and requirements of this manual are implemented by the Navy safety and occupational health Navy training systems plan (NTSP S-40-8603E) (NOTAL). The ship's training officer, safety officer and divisional safety petty officers (leading petty officers for submarines) are responsible for implementing afloat safety training requirements.

A0502. SOH TRAINING FOR SHIPBOARD DUTIES AND PROGRAMS

a. Training consists of detailed courses regarding specific duties involved with supervising SOH Programs. The following training is available for ship and submarine safety officers and divisional safety petty officers, either as classroom courses, video tele-training (VTT) courses, computer-based training (CBT) or through Navy knowledge on-line (NKO). Specific information may be found at: http://www.safetycenter.navy.mil/training.

(1) **Afloat Safety Officer Course (A-4J-0020)**. This course is imbedded into the Department Head Course at Surface Warfare Officer School (SWOS), Newport, and is exported as a classroom course to major fleet centers. It trains officers in safety duties aboard Navy surface ships and includes instruction in the procedures for establishing and maintaining an effective ship's safety organization.

(2) **Safety Programs Afloat Course (A-493-2099)**. This course is offered by the NAVOSH and Environmental Training Center (NAVOSHENVTRACEN). This course provides surface ship supervisory personnel, E-5 through E-9, assigned as divisional

safety petty officers or safety supervisors, with the basic knowledge and skills required to carry out their duties. It also identifies responsibilities per this instruction and other applicable safety requirements. The Naval Safety Supervisor Course (NAVEDTRA 14167) is a pre-requisite.

(3) **Submarine Safety Officer Course (F-4J-0020)**. This course is taught by the NAVOSHENVTRACEN and provides submarine-qualified commissioned officers, chief petty officers, and selected first class petty officers who have been assigned as collateral duty safety officers aboard submarines, with the training to develop and maintain an effective submarine safety program

b. **Hazardous Material Control and Management Technician (HMC&M) Course (A-322-2600 or A-322-2601)**. This course is taught by the NAVOSHENVTRACEN. It provides afloat and shore military HMC&M Technicians with the training required to safely handle, use, store, dispose, transfer and offload hazardous material (HM)/hazardous waste (HW). Successful completion of this course confers the secondary Navy enlisted classification (SNEC) code 9595. Ships manning documents specify the require-ments for personnel holding this SNEC.

c. Appendix A5-A provides a list of Navy educational courses related to safety and occupational health. Appendix A5-B is a listing of safety and occupational health courses taught at the Navy Environmental and Preventive Medicine Units (NAVENVPVNTMEDUs). The command's training officer should be consulted for course location, eligibility requirements, and schedules. Course descriptions and other information are available at www.safetycenter.navy.mil/training.

A0503. SOH TRAINING REQUIREMENTS AND RESPONSIBILITIES

a. Ship safety officers shall attend the Afloat Safety Officer course, and submarine safety officers shall attend the Submarine Safety Officer Course prior to, or within six months of, assuming their duties. Safety officers who are graduates of Surface Warfare Officer School (SWOS) Department Head (DH) Course meet this requirement. Group and squadron safety officers (surface ship or submarine) shall attend the applicable safety officer course if they have not completed the SWOS DH Course or Submarine Safety Officer Course. If operations do not

permit the prospective collateral duty safety officer to attend formal training prior to assuming the position, he/she shall attend formal training at the first opportunity and, in the interim, complete the Naval Safety Supervisor Course (NAVEDTRA 14167). Safety officers and assistant safety officers should attend the Navy Ergonomics Program Course. Additional training may be obtained via courses offered by the NAVOSHENVTRACEN, conferences, and workshops related to the elements required by the command's specific safety program.

b. Within six months of being assigned, all divisional safety petty officers aboard ship shall complete the Naval Safety Supervisor Course (NAVEDTRA 14167) and Watch Station 301 of the safety programs afloat PQS (NAVEDTRA 43460-4B). In addition, at least fifty percent of all divisional safety petty officers shall attend the Safety Programs Afloat (SPA) Course (CIN A-493-2099) or the Aviation Safety Specialist Course (CIN A-493-0065) taught by the NAVOSHENVTRACEN. Divisional safety petty officers shall have a minimum of one year remaining before their projected rotation date (PRD). Completion of the Naval Safety Supervisor and the SPA courses satisfy part of the requirements for the Navy safety technician secondary Navy enlisted classification (SNEC) code 9571. (This paragraph is not applicable to submarines).

c. The safety officer will ensure SOH training is conducted as indicated in appendix A5-A. For submarines, this training may be integrated into phase one of submarine qualification.

d. Indoctrination training conducted by each command will concentrate on the practical aspects of the SOH program as implemented aboard ship and will include:

(1) Introduction of the SOH program and identification of key personnel, the chain of command, and mishap reporting.

(2) Hazard identification and risk assessment of known hazards (heat, noise, asbestos, hazardous material, and electrical shock, for example as applicable) and operational risk management (ORM) techniques per reference A5-1.

(3) Safety precautions and standards (section C or D)

(4) Safety, warnings/caution signs, and deck markings.

(5) Mishap prevention and reporting safety hazards, including their right to a timely response on a safety report and their right to appeal.

(6) Hazardous materials spill response training including the process of reporting a hazardous material spill on the ship.

(7) Oil spill emergency spill response training including the process of reporting an oil spill on the ship.

e. Conduct SOH training on safety precautions and potential hazards applicable to a division as part of the ongoing ORM process. Operational risk management training may be conducted prior to scheduled evolutions (such as CONREP, VERTREP, aircraft operations, towing, anchoring, or engineering drills) or at scheduled divisional training periods. Division officers shall ensure assigned personnel receive mandatory training on safety programs (e.g., heat stress, electrical safety, hazardous material control and management, the SOH program, and hearing conservation) and that at least two safety briefs are conducted at quarters or muster each month. Appendix A5-A is a consolidated list of training requirements directed by this instruction.

f. At a minimum, commands shall conduct one safety stand-down per year. Additional safety stand-downs may be warranted at the discretion of the commanding officer.

g. Where specified in this instruction division officers shall ensure training is documented using Navy career development program databases (e.g., R-Admin, COMPASS) or other standard electronic or hardcopy means. Divisional safety petty officer training completion shall be tracked by the safety officer. Training accomplishment shall be part of the annual safety self-assessment.

A0504. TRAINING RESOURCES AND PUBLICATIONS

a. A complete list of occupational safety and health correspondence courses can be found in appendix A5-C.

b. A number of safety periodicals are available to afloat commands. Articles from these periodicals can be used for general command safety training, division safety training, and plan of the day notes.

(1) **Ships Safety Bulletin - Issued quarterly by COMNAVSAFECEN.** Contains articles on shipboard safety problems, accident trends, and current technical information.

(2) **SeaShore Magazine - Issued quarterly by COMNAVSAFECEN.** Publicizes fleet-wide safety programs and provides information on afloat and shore mishap prevention. Also contains shore hazard information and mishap statistics about occupational safety and health, fire, motor vehicles, weapons and explosives, and off-duty and recreational topics. Issued by COMNAVSAFECEN.

(3) **Approach - Issued quarterly by COMNAVSAFECEN.** Aviation mishap prevention for naval aviators, flight officers, and air-crewmen.

(4) **Mech - Issued quarterly by COMNAVSAFECEN.** Articles on hazards, policy, and equipment information pertinent to readiness and safety in aviation maintenance at all levels of responsibility.

(5) **FLASH (Factual Lines About Submarine Hazards) - Issued quarterly by COMNAVSAFECEN.** A mishap prevention bulletin containing a summary of research from selected reports of submarine hazards. It is intended to give advanced coverage of safety-related information while reducing reading time.

(6) **Diving Safety Lines (DSL) - Issued quarterly by COMNAVSAFECEN.** Summary of the results of research from selected reports of diving hazards.

(7) **Ground Warrior – Issued bimonthly.** Marine Corps tactical operation safety.

(8) **Type Commander Newsletters, Advisories and Safety Notes.**

CHAPTER A5

REFERENCES

A5-1. OPNAVINST 3500.39B

A5-2. DoD Instruction 6055.1, DoD Safety and Occupational Health (SOH) Program, of date

A5-3. SECNAVINST 5100.10J

A5-4. OPNAVINST 5100.8G

Appendix A5-A
TRAINING REQUIREMENTS SUMMARY

*Courses can be, Mandatory(M), Formal(F), Informal(I)

Navy Personnel Training Requirement	Paragraph/ Reference	Course Title/Training Required*	Resource for Training	Length of Training	Periodicity
All hands	A0502c	General Ergonomics Awareness MI	Powerpoint Ship's instructors	TBD	Initially
Submarine safety officer - qualified E-6 personnel, chief petty officers, and commissioned officers.	A0503a	Submarine Safety Officer Course (F-4J-0020) MF	NAVOSHENVTRACEN	3 Days	Prior to or within 6 months of assignment
For prospective collateral duty safety officer or full-time safety officer	A0503a	Naval Safety Supervisor Course MF	NAVEDTRA 14167	TBD	Interim measure, until the Safety Officer Course can be attended.
Collateral duty or full time safety officers	A0503a	Afloat Safety Officer Course (A-4J-0020) MF	Surface Warfare Officer School (SWOS), Newport (See Note[1])	7 Days	Prior to or within 6 months of assignment

Navy Personnel Training Requirement	Paragraph/ Reference	Course Title/Training Required*	Resource for Training	Length of Training	Periodicity
Afloat Industrial Hygiene Officers (IHOs)		Annual continuing education[MI]	Navy Occupational Health and Preventive Medicine Workshop	TBD	Annual
[1]Division safety petty officers	A0503b	Division Safety Petty Officer, Watchstation 301, Naval Safety Supervisor[MI]	Supervisor, Safety Programs Afloat PQS, NAVEDTRA 14167	TBD	Within 6 months of assignment
Fifty percent of the petty officers assigned as division safety petty officers aboard ship	A0503b	Safety Programs Afloat (A-493-2099) or Aviation Safety Specialist (A-493-0065)[MF]	NAVOSHENVTRACEN	2 Days 3 Days	Within 6 months of assignment
All hands	A0501a C0103a D0103a	Occupational Safety and Health Training[MI]	Videotapes, Ship personnel	TBD	After reporting on-board and annually thereafter
Personnel designated to be on the EART	Appendix B1-C(6)	Shipboard Asbestos Response" (A-760-2166)[MF]	NAVOSHENVTRACEN	2 Days	Initially

[1] Must have at least 1 year before projected rotation. Not applicable to submarines.

Navy Personnel Training Requirement	Paragraph/ Reference	Course Title/Training Required*	Resource for Training	Length of Training	Periodicity
All personnel performing non-friable asbestos work: · Limited asbestos-containing floor tile removal · Asbestos-containing gasket replacement · Asbestos-containing brake assembly maintenance	B0104g	Asbestos Removal Procedures detailed in Appendix B1-B[MI]	For ships with no EART (**See NOTE[2]**) For ships with an EART (**See NOTE[3]**)	TBD	On-the-job training
All personnel that are required to wear personal protective clothing and equipment	B1202 (c) B1203e(3)	Proper Wear and Maintenance of Clothes and Equipment[MI]	Division Officer	TBD	Prior to initial use and at Division Officer's discretion thereafter
All Hands	B0206a	Heat-Stress Training[MI]	Videotape (Play it Cool)	TBD	Upon reporting aboard
Heat-stress surveyors assigned to perform WBGT surveys	B0206b	Heat-Stress Surveyor Watchstation 303[MF]	Safety Programs Afloat PQS 303, NAVEDTRA 43460-4A	TBD	Qualify within 12 weeks of assignment
HM Supervisor	B0302c(2)	HMC&M Technician Course (A-322-2600) or (A-322-2601)[MF]	NAVOSHENVTRACEN	4 days	Initial
Hazardous Material(HM) Coordinator	B0302c(1)	Afloat HM Coordinator Course (A-8B-0008)[MF]	Navy Supply School	2 days	Prior to or within 6 months of assignment

Navy Personnel Training Requirement	Paragraph/ Reference	Course Title/Training Required*	Resource for Training	Length of Training	Periodicity
Damage control teams required to combat HM spills/releases	B0304a(1)b B0304b(2) B0304d(1)a	HM/HW Emergency Procedures[MI]	DCA	TBD	Determined by DCA
Workcenter personnel	B0302a(12)b	Proper Procedure for Handling HM/HW[MI]	HM Coordinator/ Workcenter Supervisor	TBD	Prior to using or handling HM
All hands	B0302a(2) B3-C (69)	Job Specific HM/HW training[MI]	Workcenter supervisor	TBD	Initial
Assistants to the HM coordinator, personnel who control the day-to-day operation of the HMC&M program and personnel who manage the HAZMINCEN	B0302a(4)a	HM Control and Management Technician Course (A-322-2600)or (A-322-2601)[MF]	NAVOSHENVTRACEN	4 days	Initial
Personnel wearing hearing protection device (HPD) not in HCP	B0402(d) (3)	Use and Maintenance of HPDs[MI]	Division Officer/MDR	TBD	Initial
Personnel working in noise hazardous areas or with noise hazardous equipment	B0408a	Initial Training[MI]	MDR	TBD	Prior to beginning work and annually thereafter
All personnel in the Hearing Conservation Program	B0408b	Refresher Training for the HCP-Enrolled Personnel[MI]	NEHC Technical Manual, TM-6260.51.99-2, Navy Medical Department Hearing Conservation Program Procedures	TBD	Annually

Navy Personnel Training Requirement	Paragraph/ Reference	Course Title/Training Required*	Resource for Training	Length of Training	Periodicity
Respiratory Protection Manager	B0602b(1)	Respiratory Protection Program Manager (A-493-0072)[MF]	NAVOSHENVTRACEN	4 Days	Prior to assuming duties
All personnel performing preventive maintenance on brake assemblies	Appendix B1-B, 7	Respirator Fit-Testing, Selection, and Maintenance[MI]	Respiratory Protection Manager	TBD	Prior to donning a respirator, and annually thereafter
All personnel required to wear respirators	B0612a	Use and Maintenance of Respirators[MI]	Respiratory Protection Manager	TBD	Prior to use and annually thereafter
All-Hands	B0702(b) (1)	Basic Electrical Safety and PPE Use[MI]	Safety Officer, Electrical Officer, Electronics Material Officer	TBD	Once reporting aboard and annually thereafter
CPR Instructor	B0708b	CPR Certification[MF]	Training per American Heart Association, American Red Cross, or equivalent.		
Personnel who man the portable electrical tool issue room	B0708c	Electrical Tool Issue Room Watchstation 302[MI]	Safety Programs Afloat PQS, NAVEDTRA 43460-4A	TBD	Within 16 weeks of assignment

Navy Personnel Training Requirement	Paragraph/ Reference	Course Title/Training Required*	Resource for Training	Length of Training	Periodicity
Electrical Safety Officer	B0708d	Watchstation 304[MI]	Safety Programs Afloat PQS	TBD	Within 16 weeks of assignment
All newly reporting personnel assigned to work in RADHAZ areas	B0902(1)c	Awareness Training[MI]	Radiation Safety Officer/ Workcenter Supervisor	Appendix B9-A/ Baseline IHS	Upon reporting to workcenter

Detailed information regarding class schedules, quotas, etc. can be found on the NAVOSHENVTRACEN website at http://www.safetycenter.navy.mil/training//.

NOTE[1] For officers who have attended Department Head Course at Surface Warfare Officer School, this course contains the material covered in the Afloat Safety Officer Course (A-4J-0020) and is considered the equivalent. Completion of the Department Head Course satisfies the requirements for A-4J-0020.

NOTE[2] For ships with no Emergency Asbestos Response Team (EART), this training shall be accomplished by the safety officer or engineering officer as on-the-job training using the Standard Operating Procedures in appendix B1-B.

NOTE[3] For ships with an EART, this training shall be accomplished by the safety officer or engineering officer, or a member of the EART that has successfully completed "Shipboard Asbestos Response" A-760-2166, or Asbestos Supervisor/Worker (A-493-0069) as on-the-job training using the Standard Operating Procedures in appendix B1-B.

NOTE

Many NAVEDTRA manuals contain specific safety information related to the specific topic. Refer to the Catalog of Nonresident Training Courses (NAVEDTRA 12061) for a current listing of available products. The catalog may be accessed for view/download from: http://www.advancement.cnet.navy.mil

Appendix A5-B

Safety and Occupational Health-Related Courses Taught At Environmental and Preventive Medicine Units (NAVENPVNTMEDUs)

The following is a listing of Occupational Health and Preventive Medicine training courses including the appropriate course number and the NAVENPVNTMEDUs (abbreviated EPMUs below for convenience) at which it is taught. These courses are not controlled by Commander, Naval Education and Training Command (NETC) or by Commanding Officer NAVOSH and Environmental Training Center (NAVOSHENVTRACEN) and are not equivalent to NAVOSHENVTRACEN courses.

1. Health Effects/Control of Asbestos and Other Thermal Insulation (B-322-2330) (Hazard awareness and not asbestos ripout training)(EPMU-6)

2. Analysis of Airborne Asbestos Samples (B-322-2333) (EPMU-2, 6)

3. Analysis of Bulk Asbestos Samples (B-322-2334) (EPMU-2, 5, 6)

4. Heat Stress Afloat (B-322-2320) (EPMU-2, 6)

5. Hearing Conservation Afloat (B-322-2310) (EPMU-2, 6)

6. Industrial Hygiene Techniques/Workplace Monitoring (B-322-2306) (EPMU-6)

7. Lead Hazards and Control (B-322-2332) (EPMU-6)

8. Hazardous Material Awareness/Control (B-322-2365) (EPMU-6)

9. Basic Preventive Medicine & Epidemiology (B-6H-0017) (EPMU-2)

10. Food Safety Managers (B-322-2101) (EPMU-2)

11. Malaria Prevention & Control (B-322-2209) (EPMU-2)

12. Lab Identification of Malaria (B-322-2210) (EPMU-2)

13. Shipboard Pest Management (B-322-1075) (EPMU-2)

NOTE:

The courses, titles, and numbers are subject to change. Check with the appropriate NAVENPVNTMEDU or the CANTRAC for course name, content and convening date. NAVENPVNTMEDUs are at the following locations:

TWO	Norfolk, Virginia
FIVE	San Diego, California
SIX	Pearl Harbor, Hawaii

Similar training may be available from cognizant industrial hygiene staff.

CHAPTER B1

ASBESTOS MANAGEMENT

B0101. CHAPTER ORGANIZATION

a. The chapter has been reorganized to clarify ships' requirements and responsibilities for management of asbestos exposure.

b. There are three categories of asbestos work that can be performed aboard ship (paragraph B0105). These categories are referred to in this chapter as asbestos work protocols. Individual asbestos work protocols, which detail plan work scope, plan responsibilities, and equipment and training requirements, are included for each type of asbestos work.

c. This chapter contains two types of information. Paragraphs B0101 through B0106 contain information that is general in nature, and is mandatory for all ships. Paragraphs B0107 through B0109 detail information that is applicable to ships relative to the asbestos work protocol under which the ship must operate (paragraph B0105).

B0102. APPLICABILITY

Navy policy is that asbestos-contaminated insulating materials will not be used on U.S. ships. Naval Sea Systems Command (NAVSEASYSCOM) cannot definitively establish that a ship is free of asbestos-containing materials (ACM). Any previous guidance that may have exempted ships from establishing and maintaining an asbestos plan has been deleted from reference B1-1. Because of this, and the fact that all U.S. Navy ships contain some form of ACM, **all ships shall implement and maintain an asbestos management plan. This chapter, including work protocols, combined with supplemental recommendations and information, such as locations of ACM and suspected ACM, provided as part of the industrial hygiene survey shall constitute the ship's asbestos management plan. Commanding officers shall ensure that all required resources and personnel are assigned to accomplish this plan.** Ships with qualified teams to perform asbestos repair or removal may do so. However, due to inconsistent state-to-state, and increasingly stringent federal, air emissions reporting

requirements, each ship is required to contact their type commander's (TYCOM) industrial hygiene officer (IHO), and/or regional environmental coordinator (REC) to determine specific local emissions reporting guidance.

a. All ships shall implement, at a minimum, the protocol for ship's force (paragraphs B0105a and B0107). A ship may be required to implement and maintain an additional protocol - the protocol for emergency asbestos response team (EART) (paragraphs B0105b and B0108).

b. Any ship whose keel was laid prior to 1980 will be considered to contain friable asbestos thermal systems insulation (TSI), and shall therefore maintain an EART. Ships in this category shall implement and maintain both the ship's force (B0107) and EART (B0108) protocols.

c. Any ship whose keel was laid during or after 1980, per reference B1-2, was prohibited from being constructed with TSI, and by definition, does not require an EART. TSI repair work performed by facilities and contractors controlled by U.S. maritime regulations prevented asbestos TSI from being introduced onto the ship. Those same regulations were not always enforceable for work conducted by non-U.S. regulated repair facilities or contractors. See Note below for details.

NOTE:

Any ship that has had TSI repair work performed in any non-U.S. Navy regulated facility or contractor, should be handled as if the ship contains asbestos TSI, unless supporting documentation, substantiated by laboratory analysis (see B0104a(3)), can document that ACM was not introduced onto the ship. **Any ship, having any TSI repairs by any non-U.S. regulated facility or contractor, without supporting documentation to guarantee that no ACM was introduced onto the ship, regardless of the age of the ship, shall maintain an EART**. Therefore, all ships shall maintain, or have access to, adequate supplies of asbestos-free insulating materials for use in routine and emergency repair work conducted in non-U.S. operated facilities to prevent the introduction of ACM.

A non-U.S. regulated facility or contractor is defined as **"any facility or contractor outside the direct controls of the contracting official for all materials and work practices**

used during the repair."

B0103. DISCUSSION

a. Asbestos is a fibrous mineral that can be produced into a material that is fireproof, possesses high tensile strength, good heat and electrical insulating capabilities, and moderate to good chemical resistance. Because of these characteristics, asbestos has traditionally been used as thermal and acoustical insulation, pipe lagging, gaskets, brake and clutch linings, winch and capstan brakes, and roofing and flooring materials.

b. Asbestos fibers are a known health hazard. Inhalation of asbestos fibers has been demonstrated to cause at least two distinct disease states, asbestosis and cancer. Asbestosis is a progressively worsening disease of the lung and is recognized as a classic disabling or even fatal occupational disease. Asbestos has also been found as a causal factor in the development of lung cancer and of malignant pleural mesothelioma, and it is suspected of causing cancer of the gastrointestinal tract. When coupled with smoking tobacco products, the risk of developing lung cancer is increased dramatically. Mesothelioma is a rare malignant tumor of the membrane that lines the chest and abdominal cavity. It is rarely found except in those exposed to asbestos. Most symptoms of these asbestos-related diseases do not show up until 10-45 years after exposure.

c. Asbestos insulation and other asbestos-containing materials are normally not a health hazard when in good condition, secured in place, and unlikely to be disturbed. Bound asbestos materials, such as most gaskets, floor coverings, and cements are not generally health hazardous except when worked by punching, grinding, machining, or sanding or when the material is deteriorated. Of primary concern is asbestos that has the potential to become airborne through friability (able to be crushed under hand pressure). Gasket material that has been exposed to high heat over time, and damaged asbestos packing materials may also be friable.

d. There are no known acute (immediate) effects associated with exposure to asbestos. Therefore, avoid breathing asbestos dust even though it may not seem to produce any harmful effects at the time of exposure. There is only one way to completely prevent the possibility of asbestos-related illness, and that is

to eliminate asbestos from the work environment. Since total removal is not possible, the Navy has instituted a plan to control the use of asbestos and to replace any removed asbestos with a non-asbestos substitute where technically acceptable substitutes have been identified.

e. Asbestos is normally found aboard ship in insulation and lagging for high temperature machinery, boilers and piping, in Garlock®-type gasket material, electrical wiring, certain deck tiles and decorative paneling, and some packing material. For purposes of this afloat instruction, ACM is characterized as one of two types:

(1) **Friable.** Friable ACM is defined as material that can be crumbled, pulverized, or reduced to powder under hand pressure, thereby releasing airborne fibers. Friable ACM represents the most significant health hazard, because airborne fibers can be released during normal work operations. Typical examples are:

(a) Pipe lagging.

(b) Acoustical insulation.

(c) Sheet gasket material used in high temperature applications.

(2) **Non-friable.** This form of ACM, when dry, cannot be crumbled, pulverized or reduced to powder by hand pressure. The asbestos fibers in these materials cannot be readily released into the air under normal work conditions. Some examples are:

(a) Brake and clutch linings.

(b) Gaskets and adhesives.

(c) Floor tile and adhesives.

B0104. ASBESTOS CONTROL ELEMENTS

a. Identification of Asbestos Hazards

(1) Per chapter A3, an industrial hygienist shall survey all work places as part of the industrial hygiene survey. During this survey, the industrial hygienist shall identify any hazards associated with asbestos and provide recommended actions to the ship to eliminate or minimize the asbestos hazard. This information shall be included in the industrial hygiene survey and used to complete the asbestos management plan.

(2) It is necessary to determine if thermal insulation, due to be handled by ship's force for repair or removal, contains asbestos, prior to the time each repair or removal is to be performed. For non-nuclear propulsion spaces, a sample of the insulation material shall be obtained following the procedures in appendix B1-A, and submitted for analysis.

(3) For nuclear propulsion spaces, a thorough determination for the presence of asbestos prior to initiating thermal insulation shall be conducted. Reliable documentation, such as ship's drawings, work control documents, material history drawings, and prior sample results may be used to determine whether the material to be worked is free of asbestos. If documentation is unavailable, unreliable, or questionable, a sample of the insulation material shall be obtained following the procedures of B1-A and submitted for analysis.

(4) It is impossible to identify asbestos based solely on a visual inspection. Therefore, thermal insulation, especially on ships that were built before 1980, should be handled as if it contains asbestos, unless the insulation material is shown to be asbestos-free by laboratory analysis, or for nuclear propulsion plant spaces by reliable documentation addressed in the preceding paragraph (B0104a(3)). Ships having asbestos identification capability can provide this laboratory service, to positively identify suspected asbestos-containing materials. Naval shipyards, Navy Environmental Preventive Medicine Units (NAVENPVNTMEDUs), and medical treatment facilities (MTFs) also have the capability to test materials for the presence of asbestos. Identification by polarizing light microscopy or transfer electron microscopy (TEM) is acceptable.

(5) There are many means of marking asbestos-free thermal insulation. Do not rely on any such systems as positive identification of non-asbestos material.

b. Management of Asbestos in the Workplace

(1) Navy policy is to eliminate asbestos exposure hazards by substitution of ACM with asbestos-free materials, approved under the technical management of the NAVSEASYSCOM. The command shall not remove installed ACM, which are in good condition, for the sole purpose of eliminating asbestos. Where substitution is not possible, the command shall use engineering controls or and/or personal protective equipment. The command shall prohibit the use of administrative controls, (e.g., personnel rotation) as a means of keeping the exposure below the permissible exposure limit (PEL).

(2) Specific procedures to control the accumulation of asbestos-laden waste, dust, and scrap materials are found in the individual work protocol standard operating procedures (SOPs) (appendix B1-B for ship's force and appendix B1-C for emergency asbestos response team).

(3) **Warning Signs and Labels**

(a) The command shall provide and display warning signs, which comply with reference B1-3, at each location where asbestos work is performed. Post signs at a sufficient distance from the work area that personnel may read the signs and take necessary steps before entering the area. A listing of required protective equipment may be attached to, or be a part of the sign. The warning sign shall state:

DANGER

ASBESTOS CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
MAY BE REQUIRED IN THIS AREA

This warning sign is available from standard stock under NSN 9905-01-345-4519.

(b) Affix warning signs to containers of raw materials, mixtures, scrap, waste, debris, samples and other products containing asbestos materials. Print the warning labels in letters of sufficient size and contrast as to be readily visible and legible. Include the following information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

c. Adherence to Prescribed Work Practices. The work processes for asbestos removal or repair are specific to the type of asbestos work protocol. See the appropriate appendix for SOPs for each work protocol:

(1) Appendix B1-B details SOPs for ship's force asbestos work.

(2) Appendix B1-C is the SOP for EART work processes.

d. Proper Stowage and Offloading of Materials Containing Asbestos

(1) **Stowage of Unused Asbestos-Containing Gasket Materials and Packing**. Stow asbestos-containing gasket material and packing (e.g., Garlock® sheets) in double, heavy-duty (six millimeters thickness) plastic bags or other suitable impermeable containers. The storage material must be leak tight. All bags or containers must be provided with standard asbestos labels (paragraph B0104b(3)(b)). Exercise care in order to prevent bags and other containers from rupturing when being transported and stowed.

(2) **Handling, Packaging and Offloading of Removed ACM**. Adequately wet ACM during removal and maintain wet through disposal. Dispose of the wet waste material in double, heavy-duty (six millimeters thickness) plastic bags or other suitable impermeable containers. The waste container must be leak tight. Do not overfill the bags. Provide all bags or containers with standard warning labels per B0104b(3)(b). Distinctly color-code all asbestos waste containers red to ensure easy recognition. Exercise care in order to prevent bags and other containers from

rupturing when being transported to a shore activity for disposal. Accomplish disposal in accordance with appendix L of reference B1-4.

e. Asbestos Medical Surveillance Program (AMSP). The medical department representative (MDR) will determine placement of personnel into the AMSP per reference B1-5. It is possible that all three asbestos protocols may require placement of personnel into an AMSP.

f. Environmental Protection

(1) Repair and removal operations conducted at sea, at a distance greater than 3nm from U.S. shore, are not subject to Environmental Protection Agency (EPA) emissions and reporting standards for asbestos. However, EPA standards for disposal of ACM apply upon return to port. All ACM will be held on station and disposed of ashore per the appropriate EPA requirements.

(2) Ships with qualified teams to perform asbestos repair or removal may do so within 3nm of shore. However, due to inconsistent state-to-state, and increasingly stringent, federal air emissions reporting requirements, each ship is required to contact their TYCOM IHO or REC to determine specific local emissions reporting guidance.

g. Training

(1) Training requirements for personnel performing repair or removal work with ACM are specific to the type of work performed. Each protocol contains the specific requirements for training. The training matrices are as follows:

(a) Training matrix for ship’s force is appendix B1-D.

(b) Training matrix for the EART is appendix B1-E.

(2) In addition to the training requirements detailed in the specific protocols (paragraphs B0107c and B0108c), general training is required for all personnel currently exposed, or with the potential for being exposed to asbestos. All commands are responsible for asbestos training of their personnel. The work-center supervisor should conduct training upon personnel assignment to the work-center. General training shall include:

(a) The health effects/hazards of asbestos;

(b) The association between the use of tobacco products, exposure to asbestos, and the increased risk of developing lung cancer;

(c) Uses of asbestos that could result in an exposure;

(d) Engineering controls and work practices associated with an individual's work assignment;

(e) Purpose, proper use and limitations of protective equipment;

(f) Purpose and description of medical surveillance program;

(g) Description of emergency and clean-up procedures;

(h) Overall review of this chapter and the command's/activity's control plan; and

(i) Posting signs and affixing labels.

h. Recordkeeping. All shipboard asbestos records, including personal and environmental monitoring, quality control and quality assurance, and asbestos related respirator fit testing, shall be transferred to a supporting shore medical activity for permanent retention as required by reference B1-5 following transfer, discharge or retirement of the individual to whom the records refer. The supporting shore medical activity shall establish a file for each ship. If a ship changes homeport, the file will be provided to the new supporting shore medical activity. Upon decommissioning, the supporting shore medical activity shall forward the asbestos record to BUMED. Each individual currently or previously working with asbestos or any other person he or she may designate, shall have access to all such records within 15 days of a written request.

B0105. TYPES OF ASBESTOS WORK PERFORMED ABOARD NAVY SHIPS

For the purposes of this chapter, all work involving ACM has been divided into two protocols. The protocols are:

a. Ship's Force Protocol. This protocol details the requirements and procedures for the repair and removal of materials that contain non-friable ACM (B0107). All afloat commands must comply with the requirements of this protocol.

b. Emergency Asbestos Response Team (EART) Protocol (Formerly the Three Men Emergency Rip-Out Team). This protocol details the requirements and procedures for the minor repair and removal of friable ACM (i.e., asbestos work that can be accomplished using proper glove bag procedures (B0108)).

B0106. WORKPLACE RELEASE CRITERIA

a. Strict adherence to good housekeeping procedures, and dust control measures to minimize release of asbestos fibers during removal/repair of asbestos-containing materials are the most important and effective means of reducing downtime to reoccupy a workspace after asbestos repair or abatement operations.

b. Before a space, where asbestos work was performed, may be released for unrestricted access, the area must be thoroughly cleaned and inspected. Use the checklist found in appendix B1-F for this purpose if required by the protocol.

B0107. PROTOCOL FOR SHIP'S FORCE PERFORMING NON-FRIABLE ASBESTOS MAINTENANCE

a. All Navy ships have non-friable asbestos; therefore, all afloat commands shall comply with the specific requirements of this protocol. The SOPs for the work processes authorized for ship’s force personnel to perform are found in appendix B1-B. Additionally, all afloat commands are required to comply with the general requirements detailed in B0101 through B0106. Ship's force may perform:

(1) Replacement of asbestos-containing gasket/packing material;

(2) Limited asbestos floor tile removal (nine feet^2 maximum); and

(3) Preventive maintenance of brake and clutch assemblies.

b. Ship's Force Protocol Responsibilities

(1) **The safety officer shall:**

(a) Ensure that ship's force personnel performing work under this protocol are trained to accomplish the work described in appendix B1-B.

(b) If applicable (see B0102c NOTE), ensure that documentation, substantiated by laboratory analysis (see B0104a(3)), is obtained for any repair work performed in non-U.S. Navy-operated facility to ensure that no ACM is introduced onto the ship.

(2) **The engineering/repair/aviation intermediate maintenance department heads (as appropriate) shall:**

(a) Provide personnel who work with asbestos with the necessary equipment and protective clothing to perform work per this protocol. Appendix B1-G and appendix B1-H detail the personal protective equipment (PPE) and authorized equipment list (AEL) required for this protocol.

(b) Identify all personnel involved in asbestos repair or removal operations that warrant AMSP consideration, per this protocol (see appendix B1-B, medical surveillance sections), and provide their names to the MDR for consideration for inclusion in the AMSP. Ensure personnel, placed in the AMSP by the MDR, report for medical examinations as required.

(c) Ensure that all asbestos-containing waste materials are collected as required per paragraph B0104d(2) and appendix B1-B and properly stored while awaiting disposal ashore (paragraphs B0104d(1) and (2)).

(d) Ensure that only work described in paragraph B0107 is performed by ship's force.

(e) Ensure that ship's force personnel performing work under this protocol are trained to accomplish the work described in appendix B1-B.

(3) **The medical department representative shall** implement, if applicable, an AMSP, per reference B1-5 for personnel performing preventive maintenance on brake assemblies.

(4) **Division officers shall:**

(a) Notify the safety officer and engineer officer/repair officer prior to performing or authorizing any work that may include the repair or removal of ACM.

(b) Ensure that the workplace is properly cleaned and cleared prior to release for uncontrolled access per B0106 and appendix B1-F. The department head or division officer may designate a leading petty officer (LPO) to accomplish the workplace release inspection.

(c) Ensure that all mandatory training for work covered in this protocol is conducted. Training requirements are detailed in paragraph B0109 and appendix B1-D.

(5) **Work-center supervisors shall** train all hands who work in areas where asbestos-containing materials are present to recognize and report damaged ACM.

(6) **All hands shall:**

(a) Avoid areas posted with asbestos warning signs. Unless authorized, do not enter an asbestos-posted area.

(b) Inform appropriate supervisor of damage to materials covered under this protocol.

c. Training. All personnel currently exposed or with the potential of being exposed to asbestos and their division officer and work-center supervisor shall receive asbestos training prior to, or at the time of their initial assignment.

d. Personal Protective and Engineering Equipment. A matrix containing a general list of personal protective equipment (PPE) for work covered in this protocol is found in appendix B1-G. A detailed authorized equipment list (AEL) of all engineering equipment is found in appendix B1-H.

e. Disposal of Asbestos Waste. Dispose of asbestos waste per paragraph B0104d(2), appendix B1-B, and chapter B3.

B0108. PROTOCOL FOR EMERGENCY ASBESTOS RESPONSE TEAM (EART) (FORMERLY THE 3-MAN EMERGENCY RIP-OUT TEAM)

a. All afloat commands meeting the following criteria shall have an EART to perform emergency repair or replacement of ACM. Each EART team shall consist of a supervisor, a cutter, and a cleaner. Per paragraph B0102, the following afloat commands shall maintain an EART:

(1) Any ship whose keel was laid prior to 1980.

(2) Any ship whose keel was laid on or after 1980, not meeting the exemption for new ships detailed in paragraph B0102c NOTE.

(3) Ships requiring the EART shall comply with all of the general requirements of this chapter (paragraphs B0101 through B0106), the requirements of the protocol for ship's force (section B0107), and the specific requirements of this protocol (paragraphs B0108b through B0108(f)).

(4) The EART may perform:

(a) All work described in the protocol for ship's force per paragraph B0107.

(b) Asbestos repair or removal, limited to small-scale, short-duration repair or maintenance actions. Small-scale, short-duration actions are such tasks as minor repairs of asbestos-containing insulation on pipes. The definition of a minor repair includes removal and reinstallation of less than three linear feet of pipe insulation or less than one square foot (ft^2) of insulation on surfaces other than pipe (an amount that can be done within a glove bag). The standard operating procedure for this action is found in appendix B1-C and reference B1-1.

b. Emergency Asbestos Response Team (EART) Responsibilities

(1) **The safety officer shall:**

(a) Inspect each repair operation involving friable asbestos.

(b) Ensure that the ship has the required equipment to accomplish work per this protocol as defined in reference B1-1 and appendix B1-H.

(c) When asbestos removal or repair operations are completed, approve access to work area using the release criteria per paragraph B0106 and complete appendix B1-F.

(2) **The engineering/repair department head (as appropriate) shall:**

(a) Ensure that a qualified intermediate maintenance activity (IMA) (either afloat or shore) is scheduled to do the work, if asbestos work exceeds the scope of this protocol

(b) Provide personnel who work with asbestos, per this protocol, with the necessary equipment and protective clothing per reference B1-1 and appendix B1-I.

(c) Identify and provide a list of all personnel involved in asbestos operations to the medical department representative for consideration for entry into the AMSP.

(d) Ensure that all asbestos-containing waste materials are collected, stowed and disposed of as required by paragraph B0104d(2) and chapter B3.

(e) Ensure personnel are trained, and training is documented in the member's service record. Training requirements for this protocol are located in appendix B1-E.

(f) If a repair or removal of ACM, involving an IMA is scheduled, interface with the IMA personnel and attend the pre-work brief per paragraph B0109(c).

(3) **The division officer of the workspace where asbestos work is being conducted shall** attend the asbestos pre-work brief if required asbestos work exceeds the scope of this protocol (paragraph B0108a(4)(b) and appendix B1-J).

(4) **The MDR shall** implement an AMSP, per reference B1-5.

c. Training

(1) All members of the EART shall be graduates of Emergency Asbestos Response Team Course, CIN A-760-2166. (See appendix B1-E).

(2) This training shall be documented in the member's service record upon completion.

d. Personal Protective Equipment. Personnel engaged in work per this protocol, shall wear the protective clothing and equipment discussed in the appendix B1-I. A list of equipment and tools can be found in appendix B1-H.

NOTE:

Critical watchstanders, personnel who must remain in the immediate area, due to watch standing requirements, where asbestos repair or removal is being conducted, are required to wear the same PPE as those personnel performing the asbestos work, and at least a half-mask, air-purifying respirator with a filtering cartridge.

e. Disposal of Asbestos Waste. Dispose of asbestos waste per appendix B1-C and Chapter B3.

f. Medical Surveillance Requirements. Per references B1-1 and B1-5, a list of EART personnel shall be submitted to the medical department for consideration for entry into the command's AMSP.

CHAPTER B1

REFERENCES

B1-1. Naval Ship's Technical Manual, Chapter 635, Thermal Fire and Acoustic Insulation

B1-2. Title 29 Code of Federal Regulations (CFR), section 1915.1001, Asbestos Exposure in all Shipyard Employment Work

B1-3. Title 29 Code of Federal Regulations (CFR) section 1910.1001, (not required on board ship, but a pertinent reference)

B1-4. OPNAVINST 5090.1B

B1-5. NEHC Technical Manual TM OM-6260, Occupational Medical Surveillance Procedures Manual and Medical Matrix Edition 7.

B1-6. NEHC Technical Manual TM 6290.91-2B, Industrial Hygiene Field Operations Manual

Appendix B1-A

ASBESTOS INSULATION BULK SAMPLE COLLECTION AND SUBMISSION PROCEDURE

To determine if the thermal insulation to be handled for repair or rip-out is indeed asbestos, a sample of the material must be submitted to the industrial hygiene department of any NAVENPVNTMEDU, naval medical center, naval hospital or naval medical clinic, or to the IHO/safety officer aboard a tender for immediate analysis. Following are procedures for collecting a sample suspect asbestos material:

a. Restrict access within 10 feet of the area in which sampling is to be done to only personnel wearing a National Institute for Occupational Safety and Health (NIOSH)-approved half-mask air-purifying respirator equipped with high efficiency filtering cartridges/filters. Respiratory protection shall be worn by personnel collecting bulk samples of insulation.

b. Secure supply and exhaust ventilation systems in the area.

c. Lightly moisten the cut area with water using a plastic water spray bottle to control asbestos dust while cutting out bulk insulation samples. Adjust the spray to produce a mist, not a straight stream.

d. While cutting into the lagging, hold a disposable plastic bag under the area for collection of any debris.

e. Only a small sample is required for analysis. Carefully cut an approximate 1/2-inch (or quarter size) diameter core through the outer lagging cloth/paste and through the underlying insulation down to the covered metal surface. For soft insulation material, a knife may be appropriate. For hard preformed insulation, a chisel or sharpened screwdriver may be used. A knife is not safe for use with hard preformed insulation since the increased force necessary to penetrate the insulation makes accidental hand contact with the exposed blade a real probability. The ideal coring device is a sharpened steel punch that can be driven into the preformed insulation. Some Navy shipyards have locally fabricated stainless steel borers, modeled after cork borers but substantially strengthened,

for this purpose. Whatever device is used for sampling must be cleaned after each sample to prevent cross-contamination of samples. For boring tools, cleaning with a wire bore-brush followed by a water wash is recommended. A sample should be submitted for every 10 feet of lagging provided that the material appears to be the same. If there are breaks, seams, or changes in the direction of the lagging, a sample for each section is required. A sample for each type of tile and type of gasket or packing should also be submitted.

f. Using forceps, a spatula, some other instrument or a gloved hand, place the insulation in a four by four-inch polyethylene interlocking seal bag. Label the exterior of the bag as required in paragraph B0104b(3)(b). The bag shall be marked as to location of the sample, command, sampler's name, date of sample and any sample number, if applicable. Fold and place the labeled bag inside another four by four-inch polyethylene interlocking seal bag.

g. After collecting the sample, cover the exposed insulation with duct tape, place respirator in a plastic bag. Respirators should be cleaned per chapter B6. Cartridges and all rags or material used to wipe down the respirator and/or tools should be immediately disposed of as asbestos waste per paragraph B0104d(2). Wash hands, tools and sprayer.

h. The collected sample(s) should be submitted by mail or hand-delivered using the Navy Environmental Health Center industrial hygiene sample submission form. This form is found in reference B1-6.

i. Upon receipt, the sample will be analyzed using polarizing light and dispersion staining microscopy, results recorded on the DD 1222 and returned to the requesting command. A return phone call of results may also be arranged.

Appendix B1-B

STANDARD OPERATING PROCEDURES FOR SHIP'S FORCE PROTOCOL

Replacement of Asbestos-Containing Gasket/Packing Material

1. **Scope.** This standard operating procedure covers the repair and/or replacement of asbestos-containing gaskets or packing in pumps or valves and the replacement of asbestos-containing gaskets in pipes.

2. **Stowage.** Store all quantities of asbestos-containing materials (ACM) in sealed impermeable containers or plastic bags and labeled as asbestos-containing material until needed for repair/replacement per paragraph B0104d(1). Manufacturer's warning labels noting asbestos content are sufficient only if the materials are not removed from that packaging. Repackaged, unlabeled materials must have new labels applied. Similarly stow waste asbestos-containing materials for shore offload. Post storage areas with asbestos warning signs to advise personnel of asbestos presence per paragraph B0104b(3)(b).

3. **Personal Protective Equipment**. No personal protective equipment is required for this standard operating procedure.

4. **Procedures**

NOTE:

Do not consume food or beverages, chew gum or tobacco, smoke, or apply cosmetics during asbestos-containing gasket/packing maintenance operations.

a. Use an impermeable drop cloth below the work area.

b. Thoroughly wet the gasket or packing material with water prior to removing. For gaskets, wetting should be accomplished after the joint is loosened.

c. Avoid cutting, abrading, or breaking the gasket or packing material. Remove the gasket or packing material intact, if possible.

d. Place wet gasket or packing material into a disposal container and keep it wet until transferred to a closed receptacle.

NOTE:

A sealable, suitably sized plastic bag may be used for temporary stowage until transferred to an appropriately labeled container.

e. Remove any residue by scraping using wet methods.

NOTE:

Do not use power tools to remove gasket or packing residue.

f. Dispose of gasket or packing material and drop cloth as ACM.

g. Replace all asbestos-containing materials with approved asbestos-free material, if available. If replacement material contains asbestos, prior to cutting new gasket or packing, thoroughly wet gasket or packing material; then cut. Once cut gasket or packing is in place, dispose of residual debris, continuing to use wet methods. Wipe up debris with damp rags. Gasket or packing material that is still useable shall be placed in asbestos-labeled container/bag and properly secured.

NOTE:

Wire-wound (flexitallic) gaskets with asbestos between rings need not be wetted prior to installation.

h. At the conclusion of work, either use a cleaner with a high efficiency, particulate air (HEPA) filter to vacuum all dusty surfaces or wet and wipe them down with a damp rag. Dispose of damp rag(s) as ACM.

i. Clean and decontaminate all tools with damp rags. Dispose of rags as ACM.

j. Personnel shall wash their hands upon completion of gasket or packing repairs/replacements and before eating and drinking, chewing gum or tobacco, or applying cosmetics.

5. **Offload.** Offload the replaced gasket or packing material and any scrap materials as ACM. Handle all rags as asbestos waste. Handle drop cloths as ACM. Once asbestos waste is collected, place in red asbestos labeled bag and thoroughly wet all wastes. Tape-off the bag and place in second approved and appropriately-labeled bag (double bag). Seal up the second bag with tape and place in ACM-marked barrel/container for offload. Seal all bags with a "J" or goose-neck seal. Properly label the waste bag per all local requirements.

6. **Medical Surveillance.** Medical surveillance is not required for this operation.

7. **Training.** All personnel performing replacement of asbestos-containing gasket/packing material shall be trained on this standard operating procedure prior to performing any asbestos work. Accomplish training per paragraph B0109 and appendix B1-D. Training shall be accomplished as follows:

For ships with no Emergency Asbestos Response Team (EART), this training shall be accomplished by the safety officer or engineering officer as on-the-job training using the standard operating procedures in this appendix.

For ships with an EART, this training shall be accomplished by the safety officer or engineering officer, or a member of the EART that has successfully completed "Emergency Asbestos Response Team" (A-760-2166), as on-the-job training using the SOPs in this appendix.

This training shall be documented in the member's service record upon completion.

Appendix B1-B

STANDARD OPERATING PROCEDURES FOR SHIP'S FORCE PROTOCOL

Limited Asbestos Floor Tile Removal

1. **Scope.** This standard operating procedure (SOP) covers removal of a limited amount of asbestos-containing floor tile. Limited amount is defined as nine square feet of tile (approximately nine tiles). The intent of this SOP is operational; not to improve the aesthetics of a space.

2. **Stowage.** Store all quantities of asbestos-containing materials (ACM) in sealed impermeable containers or plastic bags and labeled as asbestos-containing material until needed for repair/replacement (see paragraph B0104d(1)). Manufacturer's warning labels noting asbestos content are sufficient only if the materials are not removed from that packaging. Repackaged, unlabeled materials must have new labels applied. Post storage areas with asbestos warning signs to advise personnel of the presence of asbestos per paragraph B0104b(3)(b).

3. **Personal Protective Equipment**

a. **Respiratory Protection**. No respiratory protective equipment is required for this standard operating procedure.

b. **Gloves**. Wear disposable gloves for this action. Surgical gloves are prohibited.

4. **Procedures**

a. Cordon off an area around the floor tile to be removed using rope or tape and appropriate signs.

NOTE:

Do not consume food or beverages, chew gum or tobacco, smoke, or apply cosmetics in the work area during maintenance operations.

b. Remove the floor tiles from the deck using a putty knife, spatula, or other manual, hand-operated tool. Do not use power

tools to remove floor tiles or mastic. Heat guns may be used to remove tiles. Avoid breaking the tiles, if possible.

c. Place removed floor tiles into a suitably colored and marked container.

d. If mastic will be removed from the deck, remove by scraping using wet methods. Mastic remover may be required to remove all mastic. Ensure mastic remover is authorized by checking the Ships Hazardous Material List (SHML) or through written commanding officer authorization.

e. Offload tile and mastic as ACM.

f. Use non-asbestos-containing replacement tiles. If replacement tiles contain asbestos, dispose of tile residue and debris as ACM. Wipe up debris with damp rags. Tile material that is still useable shall be replaced in asbestos-labeled container/bag and properly secured (see paragraph B0104d(1)).

g. At the conclusion of work, either HEPA vacuum all dusty surfaces or wet and wipe them down with a damp rag. Dispose of damp rag(s) as ACM.

h. Remove gloves and dispose of as ACM.

i. Clean all tools and decontaminate with damp rags. Dispose of rags as ACM.

j. Personnel shall wash their hands upon completion of tile/mastic removal action and before eating and drinking, chewing gum or tobacco, or applying cosmetics.

5. **Offload.** Dispose of removed tile and mastic material and any scrap materials as ACM. Handle all rags, disposable clothing, and respirator cartridges as ACM. Once all asbestos waste is collected, place in an impermeable ACM-labeled bag and thoroughly wet waste. Tape-off the bag and place in second approved and appropriately-labeled bag (double bag). Seal up the second bag with tape and place in ACM-marked barrel/container for offload. Seal all bags with a "J" or goose-neck seal. Properly label the waste bag per B0104b(3)(b).

6. **Medical Surveillance.** Medical surveillance is not required for this type of operation.

7. **Training.** All personnel performing replacement of limited amounts of asbestos-containing floor tile shall be trained on this standard operating procedure prior to performing the operation. Accomplish training as follows:

For ships with no EART, this training shall be accomplished by the safety officer or engineer officer as on-the-job training using the Standard Operating Procedures in this appendix.

For ships with an EART, this training shall be accomplished by the safety officer or engineering officer, or a member of the EART that has successfully completed "Emergency Asbestos Response Team" (A-760-2166), as on-the-job training using the SOPs in this appendix.

This training shall be documented in the member's service record upon completion.

Appendix B1-B

STANDARD OPERATING PROCEDURES FOR SHIP'S FORCE PROTOCOL

Preventive Maintenance on Brake Assemblies

1. **Scope.** This standard operating procedure covers brake planned maintenance system (PMS) on anchor windlass, capstan, and weight handling equipment (hoist, cranes, conveyors, elevators, winches, chainfalls, and come-a-longs) in which brakes are made of asbestos-containing materials.

2. **Stowage.** Store all quantities of ACM in impermeable, sealed containers or plastic bags and labeled as ACM until needed for repair/replacement. Manufacturer's warning labels noting asbestos content are sufficient only if the materials are not removed from that packaging. Repackaged, unlabeled materials must have new labels applied. Post storage areas with asbestos warning signs to advise personnel of the presence of asbestos.

3. **Personal Protective Equipment**

a. **Respiratory Protection.** Wear a half-mask air-purifying respirator equipped with high efficiency filtering cartridges for this operation. Do not wear single-use disposable respirators. Ensure that the Respiratory Protection Manager (RPM) is fully involved in the selection and fit testing of all respirators.

NOTE:

The command shall train, fit test and ensure that all personnel have been medically cleared to wear a respirator before allowing any personnel to don a respirator.

b. Wear disposable impermeable coveralls (Tyvek® Type II or equivalent) for this action. Seal the coveralls at the wrists, ankles, and neck. Wear disposable gloves to handle asbestos brake assemblies and tape gloves at the wrists.

4. **Procedures**

a. Cordon off the area and hang appropriate signs identifying the asbestos hazard.

NOTE:

Do not consume food or beverages, chew gum or tobacco, smoke, or apply cosmetics in the work area during maintenance operations.

b. During brake maintenance activities, control access to the space in which maintenance is being performed. This may require posting a Sailor at each entrance/exit to the space.

c. Use an impermeable drop cloth in the work area to assist in clean-up.

d. Do not use any equipment or perform any operation that liberates fibers or creates dust (e.g., dry sweeping or using an air hose in the work area).

e. Before commencing work, either wet the area in which the brake assembly is located or vacuum the area or both, whichever will be required to eliminate asbestos fibers or dust in the area. Use a high efficiency particulate air (HEPA) filter vacuum to ensure the area is thoroughly clean and good housekeeping is maintained.

CAUTION:

Do not use low pressure air to blow dust out of the brake assembly area.

f. Commence preventive maintenance in brake assembly area including repair/replacement of asbestos-containing components. During maintenance, take care not to use power tools that may generate dust. If a power tool must be used, consult either the shipboard assistant safety officer (if aboard)/industrial hygiene officer for further guidance.

g. At the conclusion of work, either HEPA vacuum all dusty surfaces or wet and wipe them down with a damp rag. Dispose of damp rag(s) as ACM.

h. Place all clothing removed in the reverse order it was applied. Dispose of coveralls as ACM.

i. Remove respirator last. Treat cartridges as ACM. The respirator face-piece shall be decontaminated and returned to proper storage.

j. Ensure all tools are cleaned and decontaminated with damp rags. Dispose of rags as ACM.

k. Personnel shall wash their hands upon completion of maintenance action and before eating and drinking, chewing gum or tobacco, or applying cosmetics.

l. Upon completion of all work, the safety officer shall inspect and clear the area using appendix B3-F prior to allowing general access to the space.

5. **Offload.** Offload the old brake pads and any scrap materials as ACM. Handle all rags, disposable clothing, respirator cartridges, and drop cloths as asbestos waste. Once all asbestos waste is collected, place in impermeable, appropriately-labeled bag and wet thoroughly. Tape off the bag and place in second approved and appropriately labeled bag (double bag). Seal up the second bag with tape and place in ACM-marked barrel/container for offload. Seal all bags with a "J" or goose-neck seal. Properly label the waste bag.

6. **Medical Surveillance.** Medical surveillance may be required for this asbestos operation. Placement of personnel into the asbestos medical surveillance program (AMSP) is based on past history and/or current exposure or potential exposure to asbestos. Placement into the AMSP is dependent upon industrial hygiene sampling data, and the determination of the medical department representative (MDR).

7. Training. All personnel performing brake assembly preventive maintenance shall be trained on this standard operating procedure prior to performing the operation. Accomplish training as follows:

For ships with no EART, this training shall be accomplished by the safety officer or engineering officer as on-the-job training using the Standard Operating Procedures in this appendix.

For ships with an EART, this training shall be accomplished by the safety officer or engineering officer, or a member of the EART that has successfully completed "Emergency Asbestos Response Team" (A-760-2166), as on-the-job training using the SOPs in this appendix.

This training shall be documented in the member’s service record upon completion.

Appendix B1-C

STANDARD OPERATING PROCEDURES FOR EMERGENCY ASBESTOS RESPONSE TEAM (EART) PROTOCOL

1. General

This SOP covers the emergency repair of asbestos-containing lagging. The intent of this SOP is for emergency asbestos lagging repair work, and is not for general maintenance or normal repair of asbestos lagging which must be conducted by an intermediate maintenance activity (IMA) or contractor personnel.

2. Personal Protective Equipment

a. **Respiratory Protection**. A half-facepiece, continuous flow supplied air respirator shall be used.

NOTE:

All personnel wearing respiratory protective equipment shall be trained, fit tested, and medically cleared before donning a respirator.

b. **Gloves**. Wear disposable gloves for this action. Surgical gloves are prohibited as an outer glove. Surgical or patient exam gloves may be worn as an inner glove during removal operations.

c. **Disposable Sacksuits**. Wear impermeable coveralls (e.g., Tyvek® or equivalent disposable sacksuits) with integral booties and hood.

d. **Boots**. Wear rubber slip-resistant booties over the Tyvek® booties.

e. **Tape**. Duct tape shall be applied to wrists, ankles, and around the respirator and hood opening. While other tapes may work, duct tape is recommended due to its superior adhesive properties.

3. **Procedures**

a. Obtain the commanding officer's permission to remove asbestos for emergency repair.

b. Brief the EART.

c. Secure or redirect ventilation as necessary.

d. Cordon off the area around the asbestos lagging to be removed using rope or tape and appropriate signs.

e. Suit up team in required PPE ensuring that all openings are taped shut.

NOTE:

Do not consume food or beverages, chew gum or tobacco, smoke, or apply cosmetics during asbestos emergency repairs.

f. Use an impermeable drop cloth (polyethylene) below the work area.

g. Glove bag procedure

(1) Place any tools, encapsulant, etc., into glove bag before beginning securing operations.

(2) Attach glove bag to area being worked. Be sure to securely close all seams on and around the glove bag with duct tape.

(3) The glove bag should be tested for leaks using smoke tubes. Smoke tubes used in respiratory fit test procedures are ideal for this function. If leaks are found, secure with additional duct tape.

(4) Ensure HEPA vacuum and amended water sprayer are attached to appropriate points on the glove bag and taped to prevent leaks. When using HEPA vacuum to obtain negative pressure in a glove bag, it will be extremely difficult to maintain a negative pressure and accomplish work simultaneously. It is recommended that negative pressure be used only upon the

completion of the job, and when the glove bag is being removed from the repair site.

h. Thoroughly wet lagging with the amended water prior to and during the removal operation.

i. Remove the lagging as intact as possible.

j. Clean bare pipe and seal off exposed insulation using approved encapsulation methods.

k. Wash and wipe down inside of glove bag from top to bottom to remove potential fiber contamination.

l. Remove any recoverable tools by holding onto them and pulling them out. The glove should now be inside out. Twist the glove and seal with duct tape. Cut glove from glove bag with scissors or sharp knife, and hold for later decontamination.

m. Turn on HEPA vacuum and twist glove bag in the middle below the vacuum hose. Seal with duct tape and cut in two, cutting in the middle of the tape. Place this into an approved and appropriately labeled disposal bag.

n. Disconnect rest of glove bag and place into asbestos disposal bag.

o. Replace all asbestos-containing lagging with non-asbestos containing lagging.

p. Either HEPA vacuum and/or wet and wipe any dusty or potentially contaminated surfaces with a damp rag. Dispose of rags as ACM.

q. Clean and decontaminate all tools with damp rags. Dispose of rags as ACM.

r. Pick up drop cloth and dispose of as ACM.

s. Remove rubber booties and decontaminate with wet rags. Dispose of rags as ACM.

t. Remove the coveralls and dispose of as ACM. It is recommended that the arms be turned inside out, then roll the

suit down the body, and pull the legs inside out. This keeps contamination on the suit and away from the body.

u. Remove gloves by turning them inside out, and dispose of as ACM.

v. Remove respirator and decontaminate using warm soapy water.

w. Personnel shall shower upon completion of asbestos removal action and before eating and drinking, chewing gum or applying cosmetics.

4. **Disposal.** Dispose of glove bag, PPE, any scrap materials, all rags, and drop cloths as ACM. Once ACM is collected, place in an impermeable bag and thoroughly wet all wastes. Tape off the bag and place in a second approved and appropriately labeled bag (double bag). Seal up the second bag with tape and place in asbestos waste barrel/container for offload. Seal all bags with a "J" or goose neck seal.

5. **Medical Surveillance.** Medical surveillance is required for the EART.

6. **Training.** Personnel designated to be on the EART shall be trained through the two-day Emergency Asbestos Response Team (A-760-2166) offered through the Naval Occupational Safety and Health, and Environmental Training Center (NAVOSHENVTRACEN).

7. **Conflicts.** Application of asbestos-control requirements shall not be allowed to compromise the requirements for control of radioactive contamination in naval nuclear-powered ships as contained in NAVSEA 0389-LP-028-8000, Radiological Controls for Shipyards. Should conflicts be discovered, submit a proposed resolution to COMNAVSEASYSCOM (SEA 08).

Appendix B1-D

TRAINING REQUIREMENTS FOR SHIP'S FORCE PROTOCOL

Navy Personnel Training Requirement	Citation	Course Title/Training Required	Requirement	Formality	Resource for Training	Length of Training	Periodicity
All personnel performing non-friable asbestos work: • Limited asbestos-containing floor tile removal • Asbestos-containing gasket replacement • Asbestos-containing brake assembly maintenance	B0104g	Asbestos removal procedures detailed in Appendix B1-B	Mandatory	Informal	For ships with no EART (**See NOTE [1]**) For ships with an EART (**See NOTE[2]**)	TBD	On-the-job training

Navy Personnel Training Requirement	Citation	Course Title/Training Required	Requirement	Formality	Resource for Training	Length of Training	Periodicity
All personnel performing preventive maintenance on brake assemblies	Appendix B1-B, chapter B6	Respirator fit-testing, selection, and maintenance	Mandatory	Informal	RPM	TBD	Prior to donning a respirator, and annually thereafter

Detailed information regarding class schedules, quotas, etc. can be found on the NAVOSHETC website at http://www.safetycenter.navy.mil/training

NOTE [1] **For ships with no Emergency Asbestos Response Team (EART),** this training shall be accomplished by the safety officer or engineering officer as on-the-job training using the Standard Operating Procedures in appendix B1-B.

NOTE [2] **For ships with an EART,** this training shall be accomplished by the safety officer or engineering officer, or a member of the EART that has successfully completed "Emergency Asbestos Response Team" A-760-2166, as on-the-job training using the Standard Operating Procedures in appendix B1-B.

Appendix B1-E

TRAINING REQUIREMENT FOR ASBESTOS-RELATED WORK

Emergency Asbestos Response Team

Navy Personnel Training Requirement	Citation	Course Title/Training Required	Requirement	Formality	Resource for Training	Length of Training	Periodicity
EART Personnel performing glove bag asbestos removal	B0114	"Emergency Asbestos Response Team" A-760-2166	Mandatory	Formal Classroom	NAVOSHEN VTRACEN	2 days	Initially. No refresher required.
EART Personnel performing glove bag asbestos removal	Appendix B1-C chapter B6	Respirator fit-testing, selection, and maintenance	Mandatory	Informal	RPM	TBD	Prior to donning a respirator, and annually thereafter

Detailed information regarding class schedules, quotas, etc., can be found on the NAVOSHETC website at http://www.safetycenter.navy.mil/training.

Appendix B1-F

WORKPLACE RELEASE CHECKLIST

Upon completion of an asbestos repair or removal, use this checklist to inspect the asbestos work area. This inspection is a critical part of the asbestos removal operation. Failure to satisfactorily complete the inspection, which includes correction of all deficiencies observed, may result in asbestos exposure long after the project is completed. Complete this inspection prior to disestablishment of the asbestos work area. The department performing the asbestos work must retain a copy of the checklist with other records of the removal.

Provide the inspector with a standard flashlight equipped with fresh batteries, a complete set of personal protective equipment, including respirator (where applicable), required for entry into the asbestos work area. Do not begin the inspection until all surfaces within the regulated area are dry and visibly cleared of dust and debris to ensure that any contamination can be observed.

Inspector: _____ Last 4: (SSN) _____

Asbestos Removal Team Supervisor: _____

Date: _____ Time: _____

Area Inspected: _____

Ship's Name: _____ Hull No.: _____

		SAT	UNSAT
1	**All** surfaces within the regulated area are free of visible dust and debris. Use mirrors, flashlights, and other tools to accomplish this inspection. Inspect cable ways to the extent possible without disturbing the wires.		
2	Asbestos work area is still secured and properly posted.		
3	All asbestos waste is properly sealed in leak tight containers that are labeled with proper warning label (paragraph B0104b(3)(b).		
4	All asbestos containing material that was to have been removed has been removed.		
5	Surfaces exposed by the asbestos removal operation are free of **all** visible contaminants, rust, and scale. If rust and scale are present and can not be removed they must be encapsulated. This inspection requires that the exposed surface be disturbed to see if there is any residue. This may be accomplished with a screwdriver, scratch awl, or other pointed device.		
6	IMA protocol only – The project is considered complete if samples collected are no greater than 0.01 f/cc or background, whichever is greater, as measured prior to starting the non-emergency asbestos abatement, but never greater than 0.1 f/cc.		

I certify that the inspection is satisfactory and the regulated area may be released from asbestos controls for unrestricted access.

Signature: _____ Date/Time: _____

Signature Authority:

EART protocol: Safety officer signature required
Ship's force protocol: Department head or division officer

Appendix B1-G

PERSONAL PROTECTIVE AND SPECIAL EQUIPMENT

Ship's Force Performing Non-Friable Asbestos Repair and Removal

Operation	Required Personal Protective Equipment				Special Equipment
	Hood	Respirator	Gloves	Tyvek® (or equivalent coveralls)	HEPA Vacuum
Limited Floor Tile/Mastic Removal			√		optional
Brakes/Clutch Assemblies	√	√*	√	√	√
Replacement of Gaskets/ Packing materials					optional

* For work covered by this protocol, the worker will wear a half-face, air-purifying respirator with high efficiency filtering cartridge. The RPM will determine the type of respirator required for each work process.

Type, quantity, specific ordering information for this PPE is found in appendix B1-H

Gloves: Use medium weight rubber gloves with a thin cotton "under glove" to absorb perspiration.

See appendix B1-H for national stock numbers (NSNs) for this and all associated PPE and equipment.

NOTE:

Critical watchstanders, personnel who must remain in the immediate area, due to watch standing requirements, where asbestos repair or removal is being conducted, are required to wear the same PPE as those persons performing the asbestos work.

Appendix B1-H

AUTHORIZED EQUIPAGE LIST FOR ASBESTOS WORK PROTOCOLS

AEL 2-330024045

NOMENCLATURE	NSN	U/I	SHIP'S FORCE	EART
Bag, Disposal Red Plastic 55 GAL Cap	8105-01-086-5053	BX	1	1
Cooling Assembly	4240-01-083-3399	KT	0	3
Ambient Air Breathing Apparatus, Electric	4310-01-106-4121	EA	0	0
Warning Signs	9905-01-345-4519	EA	OAR*	OAR*
Coveralls, Disposable, sacksuit w/shoes and hood, Large	8415-01-092-7531	BX	0	1
Coveralls, Disposable, sacksuit w/shoes and hood, X-Large	8415-01-092-7532	BX	0	1
Glove Inserts, Surgeons	6515-01-354-3157	PG	10	20
Gloves, Clean Room, Medium	8415-01-399-0704	PG	10	20
Gloves, Clean Room, Large	8415-01-399-0702	PG	10	20
Overshoes, Rubber Medium	8430-00-421-7487	PR	0	6

NOMENCLATURE	NSN	U/I	SHIP'S FORCE	EART
Overshoes, Rubber Large	8430-00-421-7488	PR	0	6
Sprayer, Insecticide	3740-00-191-3677	EA	0	1
Spray Bottle, Plastic	8125-00-488-7952	EA	4	4
Duct Tape	5640-00-103-2254	RO	0	20
Plastic Sheeting, 6 mil	8135-00-579-6486	RO	0	2
Paper Towels, Absorbent	7920-00-823-9772	BX	1	2
Finger Grip Saw	5110-00-570-6896	EA	0	2
Keyhole Saw	5110-00-142-5010	EA	0	2
Nylon Brush	7920-00-324-2746	EA	0	2
Scouring Pad	7920-00-753-5242	EA	0	3
EAB Modification Kit for Submarines	4240-01-077-5994	EA	0	6
Ventilation Smoke Tube Kit (for glovebags)	MSA 458481	EA	0	1
Glass Smoke Tubes (10/PKG)	MSA 5645	PG	0	2

Negative Air Unit, Abatement Technologies, HEPA-Aire 1000, Part Number H1000V Replacement Parts: H1001 Primary Filter Pads, 30/cs. H1002-12 Pleated Secondary Filters, 12/cs. H1010E Wood Frame 99.97% HEPA, 1/cs.	Open Purchase: Abatement Technologies 3305 Breckenridge Blvd. #118 Duluth, GA 30136 1-800-634-9091	EA	0	0
Magnehelic Gauge	6685-00-910-6964	EA	0	0
HEPA Vacuum: Hako Minuteman Wet/Dry, 15-gallon capacity; C83985-05/-16. Replacement parts: *800317 Crush-proof Hose *800015 Wand (Operator's Handle) *800070 Gulper Tool *800024 Round Dust Brush *800116 Swivel Connector *110121PKG Impact Filters (12/Pkg.) *805037PKG Plastic Bags (12/Pkg.) *805038PKG Filter Protectors (12/Pkg.) 110010 HEPA Filter Replacement (85" Water Lift) Lid Assembly	GSA Contract Number: GS-07F-8158B	EA	0	0

110001 HEPA Filter Replacement (105"/130" Water Lift) Filter Replacement *Note: Items with an asterisk (*) are included as part of No. 800109, Wet/Dry Tool Kit 30B. **OR**				
HEPA Vacuum: Nilfisk VT60 Wet/Dry, 5 to 15-gallon capacity; *01799350/375101 Replacement Parts: *01722601 Impact Filter (washable) *017383 Main Filter Finger Tubes (washable) *616821 Microfilter *017840 Trolley Assembly *01727631 HEPA Cartridge *017196 10-foot Plastic Hose (1.5") *017193 Double-Curved Aluminum Wand *017192 14-inch Wheeled Floor Nozzle *0171941 3-inch Aluminum Dust Brush *017195 11-inch Plastic Crevice Nozzle	GSA Contract Number: GS-07F-8356C	EA	0	0

*017191 Container Polyliners (25/Pkg.) *Note: Items with an asterisk (*) are included as part of item number 01799350/375101.				

NOTE: See Appendices B1-I for PPE requirements for Ship's Force Protocol and B1-K for requirements for PPE requirements for Emergency Asbestos Response Team Protocol.

***OAR – Order As Required**

Appendix B1-I

PERSONAL PROTECTIVE AND SPECIAL EQUIPMENT

Emergency Asbestos Response Team Performing Glove Bag ACM Removal

Operation	Required Personal Protective Equipment						Special Equipment			
	Tyvek® or Equivalent									
	Coveralls	Hood	Booties	Z-87 Safety Goggles	Respirator	Gloves	HEPA Vacuum	Cooling Assembly	Finger Grip Saw	Keyhole Saw
Glove Bag Procedures ONLY										
<3 linear feet of pipe insulation or 1 square foot of insulation on surfaces other than pipes	√	√**	√**	√	√*	√	√	√	√	√

* The RPM will determine the type of respirator required for each work process. If the concentration of airborne asbestos is unknown, use a full face, continuous flow supplied air respirator. The self-contained breathing apparatus (SCBA) respirator meets this requirement.

** Type II Tyvek® (or equivalent) coveralls have hood and booties attached, therefore, separate hoods and shoe coverings are not required with this PPE.

Type, quantity, specific ordering information (NSN information) is found in appendix B1-H. Information contained in appendix B1-H is taken from AEL 2-330024045.

Gloves: Use medium weight rubber gloves with a thin cotton "under glove" to absorb perspiration.

See appendix B1-H for the national stock numbers (NSNs) for this and all associated PPE and equipment.

NOTE:

The proper use of protective clothing requires that all openings be closed and that garments fit snugly about the neck, wrists, and ankles. Accordingly, tape the wrist and ankle junctions, as well as the collar opening on the outer disposable coveralls to prevent contamination of skin and underclothing without restricting physical movement.

NOTE:

Critical watchstanders, personnel who must remain in the immediate area, due to watchstanding requirements, where asbestos repair or removal is being conducted, are required to wear the same PPE as those personnel performing the asbestos work, and at least a half-mask, air-purifying respirator with a high efficiency filtering cartridge.

FOR SUBMARINES

Personnel performing asbestos work shall wear an emergency air breathing (system) (EAB) modified to replace the demand regulator (see AELs 2-330023-47, 2-33034070, and 2-330024045 for EAB kit information). Watchstanders in the same compartment as the work being performed may wear an unmodified EAB mask.

Appendix B1-J

ASBESTOS REPAIR OR REMOVAL PRE-WORK BRIEF

To be conducted jointly between the IMA and the vessel receiving asbestos repair or removal support. Prior to conducting asbestos repair or removal operations on a ship, the IMA will conduct a pre-work briefing with the engineering officer, safety officer, division officer and/or work-center supervisor of the department of the ship receiving the asbestos work.

The briefing will include at least the following:

1. A listing of all spaces that will be affected by the asbestos work. These will include the spaces used for shower facilities if they are required.

2. A discussion of the asbestos controls that will be used to accomplish the work. This will include:

a. The exact location of the asbestos regulated area boundaries.

b. The requirement to secure ship’s ventilation in the area of the removal operation and its effect on the ship and personnel.

c. Disposal of any waste generated and who will be responsible for its disposal. Normally this will be the receiving ship.

d. Air monitoring that will be accomplished and how the results of the general area monitoring will be conveyed to the receiving ship.

3. A discussion of any vital watchstanders the receiving ship may require to remain in the asbestos regulated area. The IMA and the receiving ship will mutually agree to the need for these watchstanders.

4. The planned times that the asbestos area will be isolated and entry restricted.

Any additional aspects of the planned work that either party feels should be discussed.

CHAPTER B2

HEAT STRESS

B0201. DISCUSSION

a. This chapter establishes Navy policy and procedures for the control of personnel exposure to heat stress and applies to all ships, including submarines. Ships shall not expose personnel to excessive heat stress and shall provide a shipboard work environment that minimizes the probability of such exposure.

b. This chapter applies to heat stress control and personnel protection for most shipboard operating conditions. It does not apply for the determination of heat exposure limits specifically for personnel wearing layered or impermeable clothing such as chemical/biological warfare clothing, fire fighting protective clothing or ensemble, or chemical protective clothing (worn for use during clean-up of hazardous material spills) or any type of body cooling garment or device.

c. Heat stress is any combination of air temperature, thermal radiation, humidity, airflow, workload, and health conditions that may stress the body as it attempts to regulate body temperature. Ships can determine maximum exposure limits for various environmental conditions and individual work rates. Adherence to these maximal heat exposure guidelines can prevent or reduce the adverse physiological effects of heat stress. Sufficient recovery time in a cool environment will help reverse the harmful effects of heat stress. Recognizing personnel heat stress symptoms and obtaining prompt medical attention for affected persons is an all hands responsibility.

d. To obtain accurate and reliable data on heat stress conditions, ships shall conduct heat stress surveys to record dry-bulb (DB), wet-bulb (WB), and globe temperature (GT) readings. They must take DB and WB temperature with both thermometers shielded from radiant heat and the WB also must be properly ventilated to determine the effects of airflow. Measurement is accomplished by means of a globe thermometer that provides a value representing radiant and convection heat transfers to or from the body. The Navy uses either a wet-bulb-

globe temperature (WBGT) meter or an automated heat stress system (AHSS) to measure each of the above temperatures. The WBGT index is calculated using dry bulb, wet-bulb, and globe temperature. The WBGT index and physical exertion level are used determine how long an individual may be exposed safely to heat stress conditions. Appendix B2-A presents this information in a columnar format by means of the physiological heat exposure limits (PHEL) tables.

e. While heat stress conditions can occur anywhere on board a ship, machinery spaces, laundries, sculleries, galleys, incinerator rooms, flight decks, and steam catapult rooms are the most likely to have conditions that may cause heat stress. Conditions of elevated heat stress include operations in hot and humid climates, arduous physical tasks, steam and water leaks, boiler air casing leaks, missing or deteriorated thermal insulation, and ventilation system deficiencies.

In addition, other factors that reduce physical stamina and enhance susceptibility to heat stress illness are dehydration, lack of sleep, illness, use of medication, drugs, alcohol, and the presence of atmospheric contaminants such as combustion gases or fuel vapors.

f. PHEL curve stay-time guidance is not limited to watchstanders, but applies to all personnel present in the workspace. Exposure time for personnel completing their watch rotation but returning to the workspace to perform other duties (i.e., repairs, PMS) may be limited by the existing heat stress conditions. Additionally, the recovery time guidance provided in section B0204(d) may require a specific rest/recovery time out of the workspace between intervals of working in the space and standing the watch in the workspace.

g. Heat Acclimatization. In most individuals, continued (i.e., daily) exposure to heat stress causes a series of physiologic adaptations called acclimatization, whereby the body becomes more efficient in coping with the heat stress. Heat acclimatization occurs gradually, usually requiring three weeks or more (although most of the process occurs in the first week).

B0202. RESPONSIBILITIES

a. The commanding officer shall:

(1) Establish and enforce an effective heat stress policy that ensures personnel heat exposures are limited per this chapter except in an operational emergency.

(2) Review and initial daily, heat stress surveys that result in reduced stay times.

(3) Conduct an inquiry into the circumstances surrounding all heat injuries that result in unconsciousness.

(4) Report to the immediate superior in command (ISIC) those material deficiencies, beyond ship's force capability to correct, which contribute to heat stress conditions aboard the ship.

(5). Report heat stress related cases as specified in paragraph B0204f.

(6) For ships without an automated heat stress system (AHSS) installed, ensure at least two portable, calibrated, and operable WBGT meters are available onboard.

(7) If an AHSS is installed, maintain at least one portable, calibrated, and operable WBGT meter on-board in the event that the automated system should fail.

b. The medical department representative (MDR) shall:

(1) Review all engineering and non-engineering heat stress surveys to determine obvious inaccuracies, reduced PHEL stay times, and any personnel protective actions being taken. Submit heat stress surveys that result in reduced stay times to the commanding officer daily for review.

(2) Provide training to divisions on heat stress health hazards, symptoms, prevention, and first aid procedures, upon request.

(3) Prepare reports of heat stress related cases as specified in paragraph B0204f.

(4) **For submarines,** the MDR conducts heat stress surveys in engineering spaces.

c. The engineering officer/reactor officer shall:

(1) Ensure dry-bulb thermometers are installed per paragraph B0204b(1) and temperatures are monitored and recorded per paragraph B0204b(3) and (4).

(2) Assign and qualify engineering department personnel to perform heat stress surveys in engineering spaces.

(3) Assign and qualify supervisors to review dry-bulb temperatures or access AHSS readings and take the required actions per paragraph B0204.

(4) Review heat stress surveys and ensure stay times for engineering/reactor personnel are being properly determined as specified in paragraph B0205. Limit personnel heat exposures accordingly, except as approved by the commanding officer in an operational emergency.

(5) If maintenance or repair is required, record all heat stress related deficiencies on current ship's maintenance project (CSMP). Appendix B2-B provides heat stress trouble-shooting and recommended repair actions.

d. The supply officer, air boss, and other department heads shall:

(1) Ensure dry-bulb thermometers are installed per paragraph B0204b(1) and temperatures are monitored and recorded per paragraph B0204b(3) and (4).

(2) May assign and qualify departmental personnel to conduct heat stress surveys or access AHSS readings of departmental spaces. Qualification of personnel shall be as specified in paragraph B0206b.

(3) Ensure the heat stress surveyor conducts heat stress surveys per B0204c(4) and B0204c(5).

(4) Assign and qualify supervisors to review dry-bulb temperatures or access AHSS readings and take the required actions per paragraph B0204.

(5) Review heat stress surveys and ensure stay times for personnel are being properly determined as specified in paragraph B0205. Limit personnel heat exposures accordingly, except as approved by the commanding officer in an operational emergency.

(6) If maintenance or repair is required, record all heat stress related deficiencies on current ship's maintenance project (CSMP). Appendix B2-B provides heat stress trouble-shooting and recommended repair actions.

e. Division officers shall:

(1) Limit personnel heat exposures per established stay times, except as approved by the commanding officer in an operational emergency.

(2) If maintenance or repair is required, record all heat stress related deficiencies on Current Ship's Maintenance Project (CSMP). Appendix B2-B provides heat stress trouble-shooting and recommended repair actions.

f. Heat-stress surveyors shall:

(1) Be personal qualification standard (PQS) qualified per NAVEDTRA 43460-4B, heat stress monitor.

(2) Perform heat stress surveys as required by paragraph B0204.

g. All hands shall:

(1) Obtain prompt medical attention for personnel who exhibit heat stress symptoms.

(2) Follow recommended work practices and procedures for controlling heat stress hazards.

(3) All hands are required to complete heat stress training upon reporting aboard.

B0203. HEAT STRESS ELEMENTS

a. Monitoring and surveying of heat stress conditions. (See paragraph B0204.)

b. Establishing safe work schedules in heat stress environments. (See paragraph B0205.)

c. Investigating and reporting personnel heat injuries. (See paragraph B0204f and reference B2-1.)

d. Training. (See paragraph B0206.)

e. Recordkeeping. (See paragraph B0204c(3)(f).)

B0204. HEAT STRESS MONITORING AND SURVEYING

a. Definitions:

(1) **Monitoring.** Observing and recording temperatures of dry bulb (DB) thermometers at specified watch and/or workstations.

(2) **Surveys.** Use a WBGT meter or AHSS to measure DB, WB, and GT, and compute the WBGT index to determine the amount of time it is safe to work in a given space. Personnel conducting a survey shall validate the WBGT index using the following formula:

WBGT = (0.1 x DB) + (0.7 x WB) + (0.2 x GT)

(3) **Heat Stress Surveyor.** A trained person assigned to conduct or review AHSS readings for any required surveys.

b. Heat Stress Monitoring:

(1) **Dry-Bulb Thermometer Positioning.** A hanging DB thermometer (alcohol in glass - NSN 9G-6685-00-243-9964) shall be permanently mounted at watch and workstations throughout the ship where heat stress conditions may exist. Evaluation and designation of potential heat stress areas is part of the industrial hygiene survey. A DB thermometer shall also be mounted in non-air conditioned spaces, not normally manned, in which personnel may have to periodically work or conduct

maintenance, such as storerooms. These thermometers shall be mounted in a position so they indicate the most accurate representative temperature for the area where workers/watchstanders spend the majority of their time. Placement of the DB thermometers may be in or out of the ventilation air stream but must be hung at least two feet from any supply ventilation terminal/opening. Thermometers shall be hung with a non-heat conducting material such as plastic tie-wrap or string (never hang with metal wire) and positioned to minimize the influence of any adjacent or local heat or cold sources (avoid direct contact between thermometer and hot/cold structural surfaces). If the difference between the hanging DB thermometer and the DB temperature measured with the WBGT meter, during a survey, is five degrees Fahrenheit or greater at any watch or workstation, then the DB thermometer is not representative of the temperature at the workstation. DB thermometers do not require calibration, so if found inaccurate, the hanging DB must be relocated, replaced, or validated by aligning the etch mark with the freezing point (32 degrees Fahrenheit). A DB thermometer shall be temporarily mounted to monitor conditions where repairs or maintenance are being performed in a heat stress area. The ship shall install DB thermometers, at a minimum, in main machinery spaces, auxiliary machinery spaces, emergency diesel spaces and other engineering spaces containing heat sources, as well as in laundries, dry cleaning plants, sculleries, galleys, bake shops, and steam catapult spaces.

NOTE

"No Calibration Required" (NCR) stickers are not required to be placed on DB thermometers.

(2) **Automated Heat Stress System.** The AHSS units shall be mounted in a position so they indicate the most accurate representative temperature for the area where workers/watchstanders spend the majority of their time. The AHSS units shall be positioned so as to avoid interference with space activity. If ventilation is present at the workstation where an AHSS unit will be installed, then the sensor should be located in relation to the ventilation duct such that airflow to the sensor does not exceed 600 fpm.

NOTE

Dry-bulb thermometers must still be mounted on ships with AHSS. The ability to conduct manual dry-bulb reading procedures must be available in the event that access to the data on the AHSS workstation is unavailable due to power failure, securing of the workspace, etc.

(3) **Dry-Bulb Temperature Readings**. The ship shall record DB temperature readings when the ship is underway or when potential heat stress conditions exist while in port. The ship shall monitor the following compartments when manned: main machinery spaces, (fire rooms and engine rooms), auxiliary machinery spaces, emergency diesel spaces, laundry spaces, sculleries, galleys, bake shops, and steam catapult spaces. Assigned personnel shall monitor compartments as follows:

(a) Every four hours for manned spaces if DB temperatures do not exceed 85 degrees Fahrenheit.

(b) Every hour for manned spaces if DB temperatures exceed 85 degrees Fahrenheit.

(c) Every hour at temporary installations where the DB temperature exceeds 85 degrees Fahrenheit during repair or maintenance operations.

(4) **Dry-Bulb Temperature Recording**

(a) Hanging DB temperatures shall be recorded on a prepared paper log form and reviewed by the space supervisor (e.g., machinist mate of the watch (MMOW), galley captain). If a DB temperature exceeds 100 degrees Fahrenheit (watch/work length four hours or less), or 90 degrees Fahrenheit (watch/work length greater than four hours), or 85 degrees Fahrenheit (in the scullery) per paragraph B0204c(4)(a), the space supervisor shall circle (in red) the DB reading and immediately notify the watch supervisor (e.g., engineering officer of-the-watch (EOOW), division officer, etc.). The watch supervisor shall direct heat stress surveys to be conducted and enforce the resulting stay times.

(b) The space supervisor (e.g., MMOW, galley captain) shall record and review the DB temperatures for the

AHSS either as part of the centralized data acquisition system, or as printed copies. The space supervisor shall initial in the appropriate box and check the appropriate notation in the computer log. If a DB temperature exceeds the temperature per paragraph B0204c(4)(a), the space supervisor shall immediately notify the watch supervisor (e.g., EOOW, division officer). The watch supervisor shall direct heat stress surveys to be conducted and enforce the resulting stay times.

c. Heat Stress Surveys - WBGT Meter

(1) The heat stress surveyor determines environmental heat stress conditions using the WBGT meter (Model RSS 220, NSN 7G-6685-01-055-5298 or heat stress monitor - Model 960, NSN 3H-6665-01-333-2590), or the AHSS which provides a computer display, hard drive storage and printout of the heat stress information. Each method measures dry-bulb, wet-bulb, and globe temperature and integrates them into a single heat stress value, the WBGT index. Appendix B2-C, Use of the WBGT Meter, provides detailed information and procedures regarding the proper use and care of the WBGT meter. The surveyor uses the WBGT index, along with the individual's physical exertion level, to determine the permissible heat exposure limits referred to as the physiological heat exposure limits or PHEL stay times.

NOTE

The operating range for the RSS-220 and Vista Model 960 WBGT meters is 65 degrees Fahrenheit to 150 degrees Fahrenheit. The operating range for the AHSS is 32 degrees Fahrenheit to 150 degrees Fahrenheit and 10% to 95% relative humidity. Use of these meters outside of this range will not provide accurate temperature measurements.

(2) **Measurement Techniques**

(a) When surveying a work or watch station using the WBGT meter, the surveyor shall position the meter where the worker/watchstander would normally stand or where the intended work is to be performed, with ventilation arranged to provide normal ventilation at that location. For specific operating instructions, see appendix B2-C paragraph 3.

(b) The heat stress surveyor shall conduct the first WBGT measurement in the workspace after the meter has been in the space five minutes to enable it to equilibrate to the surrounding area. As the meter is moved from one site to another, the meter should be at each site for three minutes to allow for stabilization of the first reading (DB) in the series to be taken. To determine when each sensor has stabilized, the monitor should watch the 0.1 degrees Fahrenheit digit of the display. When the 0.1 degrees Fahrenheit digit stops changing or when it oscillates between a larger or smaller value, the sensor has stabilized and the value can be recorded. (If oscillating, always record the higher of the two values).

(c) Where AHSS units are used, watchstanders should take care not to shield the automated WBGT sensor from airflow or heat sources so that readings reflect an accurate watchstander stay time.

(3) **Recording and Reporting Survey Results:**

(a) The heat stress surveyor shall record all non-automated survey readings to the nearest 0.1 degrees Fahrenheit on a heat stress survey sheet similar to the OPNAV 5100/17 form available at Navy Forms on-line at http://forms.daps.dla.mil. The surveyor shall use the WBGT index reading to determine the PHEL stay time per section B0205. The surveyor shall record the PHEL curve used and the corresponding exposure time on the survey sheet. Upon completion of the survey and determination of PHEL stay times, the heat stress surveyor shall note any stay times for manned watch or workstations that, under routine conditions, are less than the watch or work period. The surveyor shall circle these readings on the sheet in red. The surveyor shall notify space supervisors and responsible department heads immediately of the reduced exposure times. If a survey results in a PHEL stay time which is less than the work or watch period, the department head responsible for the space shall promptly notify the commanding officer of the condition, indicating action being taken to protect personnel and/or to reduce the excessive heat-stress situation.

(b) The heat stress surveyor shall print all automated survey readings on a pre-formatted Heat Stress Survey Sheet. The surveyor shall circle in red, on the Heat Stress Survey Sheet, any PHEL stay times for manned watch or

workstations that, under routine conditions, are less than the watch or work period. The heat stress surveyor shall notify workspace supervisors and responsible department heads immediately of the reduced exposure times. The department head shall promptly notify the commanding officer of the condition, indicating personnel protective action being taken, and action, if any, to reduce the excessive heat stress situation.

(c) Ships shall use a heat stress survey sheet in a format similar to the OPNAV 5100/17 form available at Navy Forms on-line at http://forms.daps.dla.mil to record heat stress information. Ships using a database or the AHSS may use a computer printout for the heat stress survey sheet. The surveyor shall record the following heat stress information on the heat stress survey sheet manual or computer printout:

1. Date and time of survey;

2. In the follow-on survey form, identify a time and temperature;

3. Stations surveyed, including the following information for each station:

a. Time WBGT measurement was taken at the location;

b. Hanging DB temperature. Not required for the automated system;

c. WBGT meter readings for DB, WB, GT, and WBGT;

d. PHEL curve for the station and the corresponding exposure time.

NOTE

Only the column that pertains to the current watch/work situation needs to be completed (e.g., all four columns do not need to be filled in).

4. The heat stress surveyor shall check to ensure that the WB < DB; GT ≥ DB; and WB < WBGT < GT. Once this is verified then the heat-stress surveyor shall manually calculate the highest WBGT index obtained using the formula:

$$WBGT = (0.1 \times DB) + (0.7 \times WB) + (0.2 \times GT)$$

The surveyor shall compare calculated WBGT to the meter WBGT and the two readings shall be within 0.2 degrees Fahrenheit. A manual calculation of the WBGT value is not required with the AHSS.

(d) The heat stress surveyor shall note any material deficiencies that may be contributing to adverse heat stress conditions and record them on the survey sheet. Additionally, personnel shall comment on the availability of drinking water on the survey sheet.

(e) The surveyor shall record the hanging DB temperatures on the heat stress survey sheet. If the difference between the hanging DB thermometer and the DB temperature measured with the WBGT meter, during a survey, is five degrees Fahrenheit (°F) or greater at any watch or workstation, the DB thermometer is not representative of the temperature at the workstation. Relocate, replace or validate the hanging DB by aligning the etch mark with the freezing point (32 degrees Fahrenheit). Comparing the hanging DB temperature values with the AHSS DB values is not required.

(f) Following the department head's review, all Heat Stress Survey Sheets, including engineering, shall be delivered to the MDR. The MDR shall review all engineering and non-engineering heat stress surveys to determine obvious inaccuracies, reduced PHEL stay times, and any personnel protective actions being taken and submit heat stress survey sheets daily to the commanding officer. The commanding officer shall initial the survey sheets, and return the sheets to the MDR. The MDR shall retain heat stress surveys sheets for one-year.

(4) **Space Surveys.** Ships shall conduct the survey of spaces for heat stress using the WBGT meter or the AHSS:

(a) At all manned watch/workstations within the space whenever the temperature from a permanently mounted hanging DB thermometer reaches or exceeds the following temperature requirements:

PHEL I through III	
Watch/Work length 4 hours or less	DB => 100°F
Watch/Work length greater than 4 hours	DB => 90°F
PHEL IV through VI	DB = 85°F.

NOTES:

1. Daily WBGT space surveys at the hottest time of the day are no longer required.

2. Shipboard conditions cannot be adequately addressed by a single dry bulb value. For watches longer than four hours or activity levels greater than PHEL III, a 100 degrees Fahrenheit temperature would miss potentially serious heat stress conditions. The values listed above take into consideration likely levels of relative humidity, watch duration's, and levels of activity. Under normal operations, routine watches in engineering spaces are expected to be four hours at a PHEL III or lower. PHEL IV through VI apply to above average work rates.

(b) In any space when a heat injury (heat exhaustion or heat stroke) occurs.

(c) Prior to conducting engineering casualty control (ECC) drills:

1. If the drill-set exceeds three hours (not required in spaces not affected by the drill or in areas that are unmanned),

2. If already in a reduced stay time, the surveyor shall use the most current heat stress survey and calculate stay times for ECC watchstanders using the ECC PHEL values in appendix B2-A.

The length of the exercises cannot exceed the watch PHEL stay times.

(d) In any space when the commanding officer determines that a heat stress situation may occur.

(e) As required for follow-on surveys (see paragraph B0204.c(5)).

(5) **Follow-on Surveys**. Once a heat stress survey has been conducted, follow-on surveys for the remainder of that day shall be accomplished as identified below. Surveys on the next day shall be conducted according to paragraph B0204.c(4). Follow-on surveys shall be accomplished using the WBGT meter as follows:

(a) For engineering spaces on nuclear, gas turbine and diesel powered ships.

1. If the survey resulted in a PHEL stay time greater than the duration of the normal watch or work period and did not require a change from the normal watch/work time. No further follow-on surveys are required unless the hanging DB temperature increases by more than five degrees Fahrenheit from the hanging dry bulb temperature in the previous survey.

2. If the survey resulted in a PHEL stay time less than the duration of the manned watch or workstation then the watch/work times shall be adjusted to reflect the new PHEL stay times indicated by the WBGT. A follow-on survey is only required if the DB temperature increases by five degrees Fahrenheit or more from the hanging DB temperature in the previous survey. If the hanging DB temperature drops below the value in paragraph B0204c(4) and return to a normal watch/work time is desired, a survey shall be conducted to ensure conditions allowing a return to normal watch/work periods have been reestablished.

(b) Two options are provided for follow-on surveys for engineering spaces on non-nuclear, steam-powered ships and for laundries, sculleries, galleys, steam catapult spaces and arresting gear spaces.

1. Follow-on surveys where WB and DB temperatures are not monitored and recorded each hour. Follow-on surveys shall be conducted prior to the end if the current manned watch or work period as indicated in the previous survey. Follow-on surveys shall continue to be conducted each watch/work period until the conditions specified in paragraph B0204c(4) no longer exist.

2. Follow-on surveys where WB and DB temperatures are monitored and recorded each hour at manned workstations.

a. If the WBGT survey resulted in a PHEL stay time greater than the duration of the normal watch or work period, a change from the normal watch/work time is not required. Follow-on surveys are not required unless the DB temperature increases by five degrees Fahrenheit or more and/or WB temperature increases by three degrees Fahrenheit or more from the DB and WB temperatures recorded from the previous survey. The DB and WB temperature must be measured each time using the same instrument/device. The WBGT meter, motorized psychrometer, or commercially available hygrometer may be used to measure DB and WB temperature. If the DB temperature drops below the value in paragraph B0204c(4) and return to a normal watch/work time is desired, then a survey shall be conducted to ensure conditions allowing a return to normal watch/work periods have been reestablished.

b. If the WBGT survey resulted in a PHEL stay time less than the duration of the manned watch, or work period, the watch/work time shall be adjusted to reflect the new stay times indicated by the WBGT. Follow-on surveys are not required unless the DB temperature increases by five degrees Fahrenheit or more and/or WB temperature increases by three degrees Fahrenheit or more from the DB and WB temperatures recorded from the previous survey. The DB and WB temperature must be measured each time using the same instrument/device. The WBGT meter, motorized psychrometer, or commercially available hygrometer may be used to measure DB and WB temperature. If the DB temperature drops below the value in paragraph B0204c(4) and return to a normal watch/work time is desired, then a survey shall be conducted to ensure conditions allowing a return to normal watch/work periods have been reestablished.

NOTE:

The department head may elect to have more than one stay time rotation in a workspace if permitted by PHEL. This would allow the majority of personnel to take advantage of a longer stay time instead of limiting all personnel to the most restrictive stay time. If more than one watch time rotation is implemented for a space it shall be indicated on the heat stress survey sheet.

For example: A steam-powered ship in the Indian Ocean has obtained the following readings from an auxiliary space during the latest heat stress survey conducted at 1400:

Top Watch	WBGT = 92	PHEL = II,	Stay time = 4:10
Evap Watch	WBGT = 93	PHEL = II,	Stay time = 3:50
Air Comp Watch	WBGT = 92	PHEL = II,	Stay time = 4:10
SSTG Watch	WBGT = 92	PHEL = II,	Stay time = 4:10
Messenger	WBGT = 92	PHEL = III,	Stay time = 3:30

The engineering officer assigns a 3 X 6 watch (three hours watch in the space and six hours outside the space) for the evap watch and the messenger. The engineer officer assigns everyone else in the space to a 4 X 8 watch (four hours watch in the space and eight hours outside the space). The time outside the space must be in a cooler environment.

(c) **ECC**. A heat stress survey to restore the normal watch is not required at the end of the ECC drill set unless a DB temperature at any manned watch station exceeds the appropriate value identified in paragraph B0204c(4)(a).

(6) **Time Weighted Mean (TWM) WBGT Values.** The TWM WBGT is for use in especially hot environments where reduced stay times have been imposed on watch/work standers. The TWM WBGT is an optional, not mandatory provision, for use if an air-conditioned booth or cooler space is available for personnel to spend time in the cool climate and afford them some relief from the heat in the space. When implemented, the TWM changes the WBGT value for that individual and increases the length of time they can now spend at their watch/work station. Appendix B2-E provides ships that have this ability with a way of properly calculating the new WBGT value.

d. Recovery Time for Personnel Reaching Exposure Limits

(1) Supervisors shall direct personnel standing watch or working in spaces in reduced stay times (except in operational emergencies as directed by the CO) to leave the heat stress environment prior to the expiration of the PHEL stay time. These personnel shall move to a cool, dry area conducive to rapid physiological recovery (an area with a DB temperature of 80 degrees Fahrenheit or less).

(2) Preferred recovery environments are those that are air conditioned within the standards of reference B2-2. Provided there is no evidence of accumulated fatigue, the length of recovery time shall be equal to twice the exposure time or four hours whichever is less. After completing the necessary recovery period in preferred environmental conditions, an individual who nonetheless remains tired, unable to carry out normal work requirements, or has an increased incidence of health disorders shall be referred to the MDR for evaluation.

(3) Supervisors shall direct personnel experiencing heat stress symptoms while standing watch or working in the workspace, to report immediately to the MDR for evaluation.

e. Recommendations for Working in Heat Stress Environments.

(1) Drink more water than satisfies thirst, but not more than 1.5 liters (about one and half quarts) per hour. Do not wait until you are thirsty to start drinking (scuttlebutts must be readily available and in working order). It is important that personnel stay hydrated. A device that has proved very effective in helping personnel to stay hydrated on flight decks, steam catapult spaces, engineering spaces, laundry and in other hot locations on ship is the Camelbak® (or equivalent) drinking system. It holds 1.8 liters of water and is worn like a backpack with a straw mechanism that allows the person to drink anytime or anywhere. The Camelbak® (or equivalent) has proved very effective in helping to keep personnel hydrated especially in areas such as the Arabian Gulf. It is available in the stock system under NSN 9Q-8465-01-396-9855.

(2) Eat three well-balanced meals daily.

(3) Get adequate rest. At least six hours of continuous sleep per 24 hours is recommended.

(4) Except where fire retardant or fire-fighting clothing is required, wear clean clothing composed of at least 35 percent cotton (more natural fiber content allows more effective evaporation of water from clothing).

(5) Do not take salt tablets.

(6) Limit intake of caffeinated drinks.

(7) The fleet has used several cooling vests in the stock system in a limited capacity. Initial research on one of these vests shows that if properly used in a heat stress environment it can reduce thermal strain. However, when using cooling vests, personnel shall adhere to PHEL stay times as described in this chapter until revised PHEL curves are established for the cooling vest.

NOTE

The use of using cooling vests that contain paraffin-based phase change material is not recommended. This material is flammable and may release toxic vapors when burning. The MSDS information should be reviewed prior to using any of these products. This material must be stored per the requirements for flammable material in chapter C23.

f. Reports and Forms

(1) Personnel exposed to excessive heat stress may require the professional judgment of a trained MDR to determine the presence or absence of a heat-related disorder. If the result of the evaluation indicates a heat-related case the MDR shall enter the heat-related injury or illness into the web-enabled safety system (WESS) per reference B2-3.

(2) NAVENVIRHLTHCEN shall provide a fiscal year-end summary of shipboard heat stress cases from the WESS database by type of operation, and ship class to CNO (N09F).

B0205. PHEL DETERMINATION

a. The WBGT index provides a measure of environmental conditions. In order to determine the permissible heat exposure in these conditions, the amount of work of a particular job must be known. The more strenuous the job, the shorter the allowable exposure time. The Navy has developed six PHEL curves, each applying to a different work rate, ranging from light work (PHEL curve I) to heavy work (PHEL curve VI). The PHEL curve general applicability table (table B2-A-1) in appendix B2-A provides the applicable stay times allowed for a specific WBGT reading. For types of work not presented in table B2-A-1, the MDR should

consult reference B2-2, articles 3-12 and 3-13. For comparison, examples of light work include sweeping down, painting, adjusting automatic combustion controls, changing and cleaning lube oil strainers, and bleeding hydraulic oil. Examples of heavy work include manually chipping and wire brushing in preparation for painting, handling cargo and supplies, replacing large valves, cleaning lube oil sumps, and disassembly or reassembly of large or heavy equipment. The PHEL curves were developed and are accurate for normal, healthy, heat-acclimatized personnel who have had adequate rest, (six hours continuous sleep in the last 24 hours), adequate water intake, and adequate recovery time from previous heat stress exposure (two hours recover for every 1 hour exposure or four hours maximum). Personnel are assumed to be wearing clothing consisting of a least 35% cotton fiber, not containing starch, and readily permeable to water transfer. Table B2-A-2 presents the PHEL chart in a tabular format. Table B2-A-3 presents the PHEL values applicable when fuel combustion gases are present.

b. Procedures

(1) **Curve Selection**

(a) **Routine Operations**. Applicable PHEL curves should be determined by selecting the appropriate curve listed in table B2-A-1.

(b) **Non-routine Operations**. Non-routine operations, such as performing operations in out-of-normal plant configurations, increases in normal watchstander work rate, and minor equipment casualties require the use of the next higher number curve above that specified in table B2-A-1 for routine operations. For example, if the stay time for a particular watchstander is determined to be PHEL Curve I during normal operations, then the exposure limit for the watchstander should be determined using PHEL curve II during difficult or more active than normal watches.

(c) **Engineering Casualty Control Exercises**. Watchstanders shall have their stay times determined by selecting the appropriate curve listed in table B2-A-1.

(d) **Heavy Work**. Personnel conducting heavy repairs or other strenuous work shall have their stay time determined by using PHEL curve VI.

(2) **Effects of Personnel Health Status on Curve Selection**. As indicated, the PHEL curves and the assignment in table B2-A-1 are based on normal, healthy personnel who have adequate rest and recovery from previous heat stress exposures. Personnel having repetitive exposures to heat stress without sufficient recovery may experience cumulative fatigue. Additionally, personnel with a respiratory system cold and/or infection, lacking sufficient sleep (less than six hours in the past 24 hours), experiencing dehydration, having clinically confirmed hypertension or taking medication which adversely effects body temperature are much more prone to systemic heat injuries. Maximum exposure limits for these personnel cannot be reliably predicted using the PHEL chart in table B2-A-1. The senior MDR on a case-by-case basis shall determine appropriate exposure limits for these personnel.

(3) **Curve Selection if Personnel Heat Injuries Occur**. If, after determining personnel stay times per this section, a heat exhaustion or heat stroke occurs, then the stay times for all other personnel in the space shall immediately be reduced by recalculating stay times using the next numerically higher PHEL curve than specified by table B2-A-1. The work and health status of the individual suffering the injury shall be reviewed. When the cause of the injury has been reasonably resolved, the stay times for personnel in the space shall be determined using the latest WBGT index and the normally appropriate curves as indicated in table B2-A-1.

(4) **WBGT/PHEL Determination**. The heat stress surveyor shall use the PHEL table (table B2-A-2). To use the PHEL table, the heat stress surveyor must first round the recorded WBGT index to the next higher whole number value. This can be done easily as the WBGT index is recorded in tenths of a degree F. For example: 85.1 degrees Fahrenheit would be rounded to 86 degrees Fahrenheit and 89.9 degrees Fahrenheit would be rounded to 90 degrees Fahrenheit; but 92.0 degrees Fahrenheit would remain 92 degrees Fahrenheit. Using the whole number value of the WBGT index, the heat stress surveyor would obtain the permissible stay time in hours and minutes under the column for the PHEL curve determined using table B2-A-2. Hence, for a

recorded WBGT index of 85.1 degrees Fahrenheit or 85.8 degrees Fahrenheit the stay time for PHEL curve III is five hours and 55 minutes.

(5) The current WBGT/PHEL stay-time guidance for each watchstander can be read from any of the AHSS computer workstations.

(6) **Impact of Personal Status Change on Exposure Limits**. If a person's status changes during the period of a watch (e.g., the person assumes a watch in a different location or works at a different exertion level), stay times shall be computed using the procedures for remaining safe stay times provided in reference B2-2, article 3-13(5)(b).

(7) **Impact of Fuel Combustion Gases (Stack Gas) and Fuel Vapors on Exposure Limits.**

(a) Fuel combustion gases (stack gas) and fuel vapors can have severe physiological impact on personnel. The effects of these environmental factors are intensified by heat stress. Prolonged exposure to relatively low concentrations can impact the ability of personnel to work safely. If someone entering a workspace or area for the first time in approximately four hours or more can smell the odor of stack gas and/or fuel vapors, then a harmful concentration may be present. Personnel should be checked for the following symptoms:

1. Eyes watering and/or burning.

2. Difficulty breathing.

3. Tingling or numbness of the tip of the tongue, tip of the nose, finger tips and/or toes.

4. Generalized sensation of mild alcoholic intoxication without alcohol consumption within the past 24 hours.

(b) If two or more of the above symptoms are exhibited, then exposure limits must be reduced as follows:

1. Using the latest WBGT index values, determine the PHEL stay time by using table B2-A-3; or

2. Calculate the PHEL stay time for existing heat stress conditions per paragraph B0205b(4), and divide that stay time by three to obtain the new stay time. For example, if the exposure limit due to heat stress is four hours, then the exposure limit with stack gas and or fuel vapors present would be reduced to one hour and 20 minutes. Prompt removal of affected personnel to fresh air is essential. Article 3-11 of reference B2-2 discusses the physiological effects to personnel exposed to stack gas and fuel vapors in detail.

B0206. TRAINING

a. All hands shall receive heat stress training upon reporting aboard. This training may be conducted by showing the heat stress videotape "Play it Cool: Heat Stress Prevention Afloat" (8055801-DN). At a minimum this training must include:

(1) Heat stress health hazards;

(2) Symptoms of excessive heat stress exposure;

(3) Heat stress first aid procedures;

(4) Heat stress monitoring; and

(5) Causes of heat stress conditions.

b. Heat-stress surveyors assigned to perform WBGT surveys shall be trained and qualified using the heat stress surveyor watchstation 303 (formally heat stress monitor watchstation 303) of the safety programs afloat personnel qualifications standard (PQS), NAVEDTRA 43460-4B within 12 weeks of assignment.

c. Training and information on the automated heat stress system (AHSS) is available in appendix B2-C.

CHAPTER B2

REFERENCES

B2-1. OPNAVINST 5102.1D/MCO P5102.1B

B2-2. NAVMED P-5010-3, Manual of Naval Preventive Medicine, Chapter 3: Ventilation and Thermal Stress Ashore and Afloat

B3-3. NEHC Technical Manual NEHC TM OEM 6260.6A, Prevention and Treatment of Heat and Cold Stress Injuries

Table B2-A-1

PHEL CURVE GENERAL APPLICABILITY SELECTION

PERSONNEL	PHEL CURVE: Routine Watch	PHEL CURVE: Casualty Control Drills
I. Steam Propelled Ships		
A. Propulsion Spaces		
1. BTOW (Boiler Technician of the Watch)	II	III
2. Console Operator	I	I
3. Upper Levelman (checkman)	II	III
4. Lower Levelman	II	III
5. MFP (Main Feed Pump) Watch	II	III
6. Burnerman	II	III
7. EOOW (Engineering Officer of the Watch)	I	I
8. MMOW (Machinist's Mate of the Watch)	II	III
9. Throttleman	I	I
10. EMOW (Electrician's Mate of the Watch)	I	I
11. Upper Levelman(SSTG) (Ship's Service Turbine Generator)	II	III
12. Lower Levelman (Lube Oil/Condensate)	II	III
13. Evaporator Watch	I	II
14. Messenger (See Note Below)	III	IV

NOTE:

Messenger stay times should be determined by taking the average of all WBGT Index values for the space not including the console booth. In most cases this will give a longer stay time than using PHEL Curve values listed for the messenger above.

B. Auxiliary Spaces		
1. All Watches	II	II

II. Diesel Propelled Ships		
A. All Engineering Watch Personnel (unless specified below)	I	II
B. Evaporator Watch	II	II
C. Messenger	III	IV
III. Gas Turbine Propelled Ships		
A. FFG-7 and CG 47 Class Ships		
1. All Engineering Watch Personnel	I	II
B. DDG-51 Class Ships		
1. All Engineering Watch Personnel (unless specified below)	II	III
2. Sounding and Security Watch	III	III

*Includes restricted maneuvering and casualty control drills

IV. Steam Catapult Spaces		
A. All Watches	II	II
V. All Other Surface Ship Spaces		
A. ECC Monitors/Inspectors	I	II
B. Laundry Personnel	III	NA
C. Scullery Personnel	V	NA
D. Galley & Food Service Line Personnel	II	NA
VI. Submarines		
A. Engine Room		
1. EOOW	I	I
2. EWS	II	III
3. Throttleman	I	I
4. Reactor Operator	I	I
5. Electrical Operator	I	I
6. Upper Level	II	III
7. Lower Level	II	III

8. Evaporator Watch	I	II
9. Engineering Drill Monitors	NA	II
B. Auxiliary Spaces		
1. All Watches	II	II
C. Other Spaces		
1. Food Service Personnel	II	NA

FIGURE B2-A-1

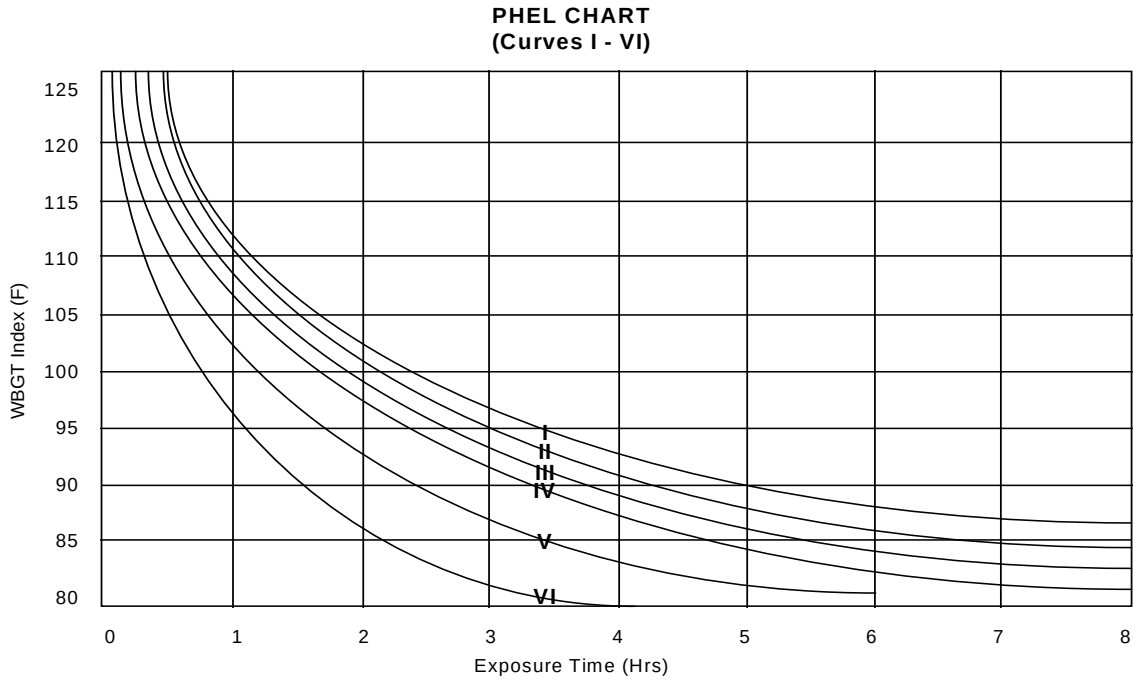


Table B2-A-2
PHYSIOLOGICAL HEAT EXPOSURE LIMITS (PHEL) TIME TABLE
(Without the presence of fuel combustion gases/fuel vapors)

	Six PHEL Curves (Total Exposure Time in Hours: Minutes)					
WBGT Index (F)	I	II	III	IV	V	VI
80.0	>8:00	>8:00	>8:00	8:00	6:35	4:30
81.0	>8:00	>8:00	>8:00	7:45	6:00	4:05
82.0	>8:00	>8:00	8:00	7:05	5:25	3:40
83.0	>8:00	8:00	7:45	6:25	4:55	3:20
84.0	>8:00	8:00	7:05	5:55	4:30	3:05
85.0	8:00	7:45	6:30	5:20	4:05	2:50
86.0	8:00	7:05	5:55	4:55	3:45	2:35
87.0	7:25	6:30	5:25	4:30	3:25	2:20
88.0	6:45	5:55	4:55	4:05	3:10	2:10
89.0	6:10	5:25	4:30	3:45	2:50	2:00
90.0	5:40	5:00	4:10	3:25	2:40	1:50
91.0	5:15	4:35	3:50	3:10	2:25	1:40
92.0	4:50	4:10	3:30	2:55	2:15	1:30
93.0	4:25	3:50	3:15	2:40	2:00	1:25
94.0	4:05	3:35	3:00	2:25	1:50	1:15
95.0	3:45	3:15	2:45	2:15	1:45	1:10
96.0	3:25	3:00	2:30	2:05	1:35	1:05
97.0	3:10	2:45	2:20	1:55	1:25	1:00
98.0	2:55	2:35	2:10	1:45	1:20	0:55
99.0	2:40	2:20	2:00	1:40	1:15	0:50
100.0	2:30	2:10	1:50	1:30	1:10	0:45
101.0	2:20	2:00	1:40	1:25	1:05	0:45
102.0	2:10	1:50	1:35	1:15	1:00	0:40
103.0	2:00	1:45	1:25	1:10	0:55	0:35
104.0	1:50	1:35	1:20	1:05	0:50	0:35
105.0	1:40	1:30	1:15	1:00	0:45	0:30
106.0	1:35	1:25	1:10	0:55	0:45	0:30
107.0	1:30	1:15	1:05	0:50	0:40	0:25
108.0	1:20	1:10	1:00	0:50	0:35	0:25
109.0	1:15	1:05	0:55	0:45	0:35	0:25
110.0	1:10	1:00	0:50	0:40	0:30	0:20
111.0	1:05	1:00	0:50	0:40	0:30	0:20
112.0	1:00	0:55	0:45	0:35	0:25	0:20
113.0	0:55	0:50	0:40	0:35	0:25	0:15
114.0	0:55	0:45	0:40	0:30	0:25	0:15
115.0	0:50	0:45	0:35	0:30	0:20	0:15
116.0	0:45	0:40	0:35	0:25	0:20	0:15
117.0	0:45	0:40	0:30	0:25	0:20	0:10
118.0	0:40	0:35	0:30	0:25	0:15	0:10
119.0	0:35	0:35	0:25	0:20	0:15	0:10
120.0	0:35	0:30	0:25	0:20	0:15	0:10
121.0	0:35	0:30	0:25	0:20	0:15	0:10
122.0	0:30	0:25	0:20	0:15	0:15	0:10
123.0	0:30	0:25	0:20	0:15	0:10	0:10
124.0	0:25	0:25	0:20	0:15	0:10	0:05

TABLE B2-A-3

(With the presence of fuel combustion gases/fuel vapors)

	Six PHEL Curves (Total Exposure Time in Hours:Minutes)					
WBGT Index (F)	I	II	III	IV	V	VI
80.0	4:50	4:15	3:30	2:55	2:15	1:30
81.0	4:25	3:50	3:10	2:40	2:00	1:20
82.0	4:00	3:30	2:55	2:25	1:50	1:15
83.0	3:40	3:10	2:40	2:10	1:40	1:10
84.0	3:20	2:55	2:25	2:00	1:30	1:00
85.0	3:00	2:40	2:10	1:50	1:25	0:55
86.0	2:45	2:25	2:00	1:40	1:15	0:50
87.0	2:30	2:10	1:50	1:30	1:10	0:45
88.0	2:20	2:00	1:40	1:25	1:05	0:40
89.0	2:05	1:50	1:30	1;15	1:00	0:40
90.0	1:55	1:40	1:25	1:10	0:55	0:35
91.0	1:45	1:30	1:15	1:05	0:50	0:30
92.0	1:35	1:25	1:10	1:00	0:45	0:30
93.0	1:30	1:20	1:05	0:55	0:40	0:25
94.0	1:20	1:10	1:00	0:50	0:35	0:25
95.0	1:15	1:05	0:55	0:45	0:35	0:20
96.0	1:10	1:00	0:50	0:40	0:30	0:20
97.0	1:10	0:55	0:45	0:40	0:30	0:20
98.0	1:05	0:50	0:40	0:35	0:25	0:15
99.0	0:55	0:45	0:40	0:30	0:25	0:15
100.0	0:50	0:45	0:35	0:30	0:20	0:15
101.0	0:45	0:40	0:35	0:25	0:20	0:15
102.0	0:40	0:35	0:30	0:25	0:20	0:10
103.0	0:40	0:35	0:30	0:25	0:15	0:10
104.0	0:35	0:30	0:25	0:20	0:15	0:10
105.0	0:35	0:30	0:25	0:20	0:15	0:10
106.0	0:30	0:25	0:20	0:20	0:15	0:10
107.0	0:30	0:25	0:20	0:15	0:10	0:10
108.0	0:25	0:25	0:20	0:15	0:10	0:05
109.0	0:25	0:20	0:15	0:15	0:10	0:05
110.0	0:25	0:20	0:15	0:15	0:10	0:05
111.0	0:20	0:20	0:15	0:10	0:10	0:05
112.0	0:20	0:15	0:15	0:10	0:10	0:05
113.0	0:20	0:15	0:15	0:10	0:05	0:05
114.0	0:15	0:15	0:10	0:10	0:05	0:05
115.0	0:15	0:15	0:10	0:10	0:05	0:05
116.0	0:15	0:10	0:10	0:10	0:05	0:05
117.0	0:15	0:10	0:10	0:05	0:05	0:05

Appendix B2-B

HEAT STRESS TROUBLE-SHOOTING AND REPAIR ACTIONS

VENTILATION: If a ventilation problem is suspected, the WBGT meter should be positioned at the supply terminal/opening discharge such that the airflow is blowing into the left side of the WBGT meter. If the discharge air DB temperature is greater than 10 degrees Fahrenheit over the outside DB temperature, then a ventilation supply problem may be indicated. A reading of two terminals/openings per ventilation supply system serving the space is required. The below information may assist in determining the cause of the problem.

STANDARDS	HOW TO MEASURE DISCREPANCIES	CAUSES	RECOMMENDED ACTION
1. VENTILATION NSTM 510, Heating, Ventilation and Air Conditioning systems for Surface Ships			
a. Supply (1) Flow			
Duct velocity 2500 to 3500 fpm	Anemometer	Inlet obstructed	Remove obstructions
		Dirty screens	Clean Screens
Velocity of airflow at watchstander (NAVMED P-5010-3) about 250 fpm minimum		Wrong screen mesh (1-1/2 inches required	Replace with proper size mesh
		Toxic Gas Vent Dampers closed	Open and repair dampers
		Vent duct pressure losses due to dirty ductwork, leaks, unauthorized openings or missing access covers	Clean, repair or replace
		Supply terminal obstructed	Clean the terminal

STANDARDS	HOW TO MEASURE DISCREPANCIES	CAUSES	RECOMMENDED ACTION
(2) Flow (continued)		Terminal inoperable or missing	Replace terminal
		Supply fan not working properly:	Repair
		-Motor speed low (single phase or miswired)	Repair
		-Controller defective	Repair/Replace
		-Improper speed with exhaust fan	Repair fan interlock
		-Failed motor bearings	Repair
		Supply air short circuited by exhaust terminal	Relocate supply or exhaust terminal
At least one supply terminal at each watch-stander station without damper, which can be pointed at the watch-stander	Visual	Incorrect terminal type (should be corrosion resistant steel)	Replace terminal
		Terminal damper is not removed	Remove damper
High Efficiency Filters (HEPA) are dirty. (Ships equipped with a Collective Protection System)	HEPA filter differential pressure gauge. (See PMS)	Continuous use in a dirty environment such as an industrial availability or sand storm)	Replace filters

b. Exhaust			
Refer to specific HVAC Design Criteria Manual (DCM) for ship class. If no specific DCM exist for the ship class in question, refer to NAVSEA 0938-018-0010 (A/C & Ventilation DCM for Surface Ships). Exhaust ventilation is to be: -125% of supply ventilation for 1200 psi steam ships. -115% of supply ventilation for other ships except CPS ships -equal to supply ventilation on CPS ships plus sweep air from Type II airlocks	Anemometer	Exhaust fan not working properly: -Motor speed low (single phase or miss-wired) -Controller defective -Improper speed with exhaust fan -Failed motor bearings	Repair Repair Repair fan interlock Repair
Space pressure negative at ¼ to ½ inch of water is mandatory with supply and exhaust fans at the same speed (airflow should be into space when access is opened)	U-Tube Manometer	Exhaust inlet or outlet obstructed. Dirty screens. Wrong screen mesh (1-1/2 inches required.	Remove obstructions. Clean Screens. Replace with proper size mesh.
	Feel/visual	Vent duct pressure losses due to dirty ductwork, leaks, unauthorized openings or missing access covers. Toxic Gas Vent Dampers closed	Clean, repair or replace Open and repair dampers

Exhaust terminals in hot spots	Feel/Visual		Relocate terminal
2. INSULATION			
a. Piping & Machinery NSTM 635, Thermal, Fire and	Visual Check		
b. Acoustic Insulation Insulate all surfaces with temp. >125°F. Material/thickness IAW MIL-STD-769	Deteriorated cracked, worn, damaged	High traffic, walkway, standing, use of chain falls, etc.	Replace and install metal lagging/shielding
	Wet (water, oil, etc.)	Frequently occurring external leak Internal/ external one-time leak	Replace and cover with metal lagging/shielding Replace
	Missing insulation	Removed for access	Replace
		Replaceable pad missing Valve bonnets, etc	Install replaceable pad
c. After insulation is installed, surface temperature should not exceed 125°F. ***Note 1, 2**	Infrared handgun/ pyrometer-Note 1 Surface temp too high.	Insulation deteriorated/ compacted. Insulation too thin.	Increase insulation thickness. Paint surface with aluminum paint.

3. STEAM/WATER LEAKS

a. Turbine Shaft Seals NSTM 231, Propulsion and SSTG Steam Turbines			
Excessive shaft seal leakage, slight leakage is required to lubricate the shaft seals.	Visual	Shaft alignment	Align shaft
		Worn bearings	Replace bearings
		Improper or worn packing	Replace packing installation
Excessive shaft gland seal leakage, some turbine shaft seals are vented to a gland leak off system	Visual	Seal leaks beyond capacity of leak-off system	Repair Seal
		High exhaust steam Pressure	Rework exhaust dump Value
		Low vacuum in gland leak off system (less than 1/2 inch vacuum)	Secure unneeded auxiliary machinery. Check loop seals. Isolate idle equipment. Ensure gland exhaust fan operating
b. Mechanical Pump Seals NSTM 503, Pumps	Visual	Shaft alignment	Align shafting
		Worn bearings	Replace bearings
		Improper or worn package installation	Replace when leakage forms a stream

c. Pump Stuffing Boxes			
NSTM 503, Pumps	Visual	Packing not sufficiently tight	Tighten packing
Check for leakage for greater than 32 oz./min.	Measure	Gland bottomed out	Add packing
		Shaft alignment	Align shaft
		Worn bearings	Replace bearings
		Improper or worn packaging	Replace packing
d. Casing Joints			
NSTM 221, Boilers	Visual	Dirt on matting surfaces	Clean Surfaces
Check all areas of boiler casings for leakage	Feel	Improper bolt tightening	Retighten bolts
	Soap Suds	Warped doors/access	Replace doors/panels
		Cracked seams, fasteners missing or defective, faulty gaskets	Caulk seams, renew fasteners, replace/renew gaskets use tadpole gaskets
e. Piping			
NSTM 505, Piping	Visual	Pipe, valve or flange leaking	Repair or replace as necessary
Check for stained and wet lagging ***Notes 3, 4**		Pipe broken	Replace
f. Drains, Funnel			
No overflow	Visual	Check valve jammed	Repair check valve
		Drain funnel fouled	Clean drain funnel

4. BILGE

a. Dry Bilge Ships			
No water	Visual	Leaks Machinery Piping	Repair leaks
b. Wet Bilge Ships			
Minimize water (no quantitative standard)	Visual	Leaks Machinery Piping	Pump bilge water and/ or repair leaks

***Note 1** For ships designed to MIL-STD 769D or earlier revisions, the surface temperature after installing insulation was limited to 105°F.
***Note 2** Infrared Heat Gun Survey: Infrared heat guns may be borrowed from IMA or IMA requested to perform. (Heat gun should be used to detect hot spots. This equipment does not provide accurate temperatures).
***Note 3** Use extreme caution when inspecting pressurized or high temperature piping systems. Do not attempt repairs while system is pressurized.
***Note 4** Prior to removing lagging ensure that it does not contain asbestos

Appendix B2-C

USE OF THE WBGT METER

1. The basic instrument for assessing heat stress is the WBGT meter - a small, lightweight, portable instrument. The WBGT meter measures dry-bulb, wet-bulb, and globe temperature and electronically integrates these values into the WBGT Index. There are currently two meters available in the fleet: the RSS-220 meter and the Model 960. Each meter is assembled and operated per its technical manual, either NAVSEA SN000-AA-MMO-0010 for the RSS 220 meter, or NAVSEA S9491-AJ-MMO-010/0910/LP-464-1300 for the Model 960 meter, and the guidance contained within this instruction. Specific instructions for requisitioning and turn-in of units are available from Type Commanders. The Allowance Equipage List (AEL) for the meter is AEL 2-870003051. Experience has shown that the meter globe assembly may be damaged before the meter itself is damaged. Replacing the globe assembly, in the event of meter malfunction, may often eliminate the need to return the entire meter for repair. Similarly, the rechargeable batteries should also be checked before returning the entire meter for repair.

Supply information for the meter and accessories is:

a. Model RSS-220 (Note: No longer manufactured, but repair parts still available)

(1) WBGT meter. (NSN 7H-6685-01-055-5298)

(2) Globe assembly. (NSN 9G-6685-01-149-8635)

(3)Standard nickel cadmium rechargeable size AA batteries. (NSN 9G-6140-00-449-6001)

(4) WBGT meter accessories allowance parts list (APL) (100110001)

b. Model 960

(1) Heat stress monitor. (NSN 3H 6665-01-333-2590)

(2) Globe assembly. (Unavailable from SPCC at this time)

(3) Standard nickel cadmium rechargeable size AA batteries. (NSN 9G-6140-00-449-6001)

(4) Heat stress monitor allowance parts list (APL). (469990172)

2. **WBGT Index.** Environmental data displayed by the WBGT meter (heat stress monitor) are:

a. Shielded, ventilated dry-bulb temperature (DB).

b. Shielded, ventilated wet-bulb temperature (WB).

c. Globe temperature (GT). This temperature is an integration of radiant and convective (the heating or cooling effects of air movement) heat transfer (heat gained or lost).

d. WBGT Index. The meter calculates this value using the following mathematical equation:

$$WBGT = (0.1 \times DB) + (0.7 \times WB) + (0.2 \times GT)$$

e. Exposure Limit (Model 960 only). The calculated exposure limit can be read off the display for each of the PHEL curves (P1 through P6 positions). The heat stress monitor uses the data of appendix B2-A to perform this calculation.

3. **Use of the WBGT Meter (RSS-220)**

a. The procedure for turning on the WBGT meter readies it for operation. The turn-on procedure is:

(1) Install the globe sensor by pushing the phone jack on the base of the sensor into the receptacle on top of the meter. Hold the globe sensor by its phone jack end, not by the black sphere. The globe can easily be damaged by squeezing, bumping, or dropping.

(2) Fill the wet-bulb water reservoir. The reservoir is accessible through the end of the tunnel marked WATER FILL. When filled, water should completely cover the sponge and be well below the level of the tunnel. Excess water can be poured out of the tunnel end. Be careful to keep the dry-bulb sensor dry. If it becomes wet, dry it with tissue or a soft cloth before operating the meter.

(3) Turn the power switch to CHECK. Listen for the sound of the aspirating fan and see digits on the display.

(4) Turn the measurement function switch to DB, WB, GT, and WBGT. Wait five minutes for the initial reading (DB). Wait three minutes for subsequent readings. Each position will give a display reading of 100.0 $\pm$ 0.2 degrees Fahrenheit, if the meter is operating properly. If the proper reading cannot be obtained, do not use the meter.

(5) Turn the power switch to ON.

b. When taking measurements, the order in which the temperatures and WBGT Index are presented in paragraph 3a (DB, WB, GT, and WBGT Index) is the order in which data must be collected to ensure optimum reliability. This is the same order in which the meter will display data as the parameter selection switch is rotated clockwise from the DB position and is the order in which the individual sensors will stabilize (most to least quickly). As each value is obtained, it shall be recorded to the nearest 0.1 degrees Fahrenheit on a heat stress monitoring sheet (see paragraph B0204c(3)(a) for recording procedures). As the meter is moved from one site to another, the meter should be at each site for 5 minutes to allow for stabilization of the first reading (DB) in the series to be taken. To determine when each sensor has stabilized, the monitor should watch the 0.1 degrees Fahrenheit digit of the display. When the 0.1 degrees Fahrenheit digit stops changing or when it oscillates between a larger or smaller value, the sensor has stabilized and the value can be recorded. (If oscillating, always record the higher of the two values.)

c. While taking readings, hold the meter about chest high, one foot away from the body. If there is airflow at the reading location, the meter should be positioned to allow the airflow to enter the left side of the meter.

4. **Use of the Heat Stress Monitor (Model 960)**

a. The procedure for readying the heat stress monitor for operation is as follows:

(1) Fill the wet bulb reservoir. Flip up the top of the reservoir filler cap. Using the supplied filler bottle, fill the reservoir to the full mark. Push the cap cover down until

it snaps in place. The black O-ring that prevents excess water from spilling out of the reservoir may constrict the flow of water onto the WB wick. Feel the wick to ensure that the wick is properly wetted.

(2) Install the globe assembly by removing it from the carrying case and inserting the globe plug into the receptacle on the top of the monitor. Be careful not to get skin oils on the globe.

(3) Turn the monitor ON. Turn the TEST switch to TEST. The display will show either "EE.E" or "88.8." The "EE.E" means that the monitor has failed the test. The "88.8" means that the electronic portion of the unit is ready for use. If the monitor fails the test, check the battery charge level. If the level is low, charge the batteries. If the batteries are not low or the monitor fails the test after charging, the meter must be repaired.

(4) Turn the TEST switch to RUN. Check top of the bar in the Battery Charge Level window. If the top of the bar is in the green section, the batteries are well charged. If the top of the bar is in the yellow section, the batteries will need recharging soon. If the top of the bar is in the red section, the batteries must be recharged before use.

b. While taking readings, hold the meter about chest high, 18 inches away from the body. If there is airflow at the reading location, the monitor should be positioned to allow the airflow to enter the left side of the unit. When taking a measurement, the order in which the temperatures and WBGT index are taken are DB, WB, GT, and WBGT. Wait five minutes after turning the monitor on until taking the initial reading. Allow the temperature to stabilize before taking the subsequent readings. Following temperature readings, position the function switch to the PHEL curve (P position) from appendix B2-A which corresponds to the routine limit, the non-routine limit, the heavy work limit, and the drills limit. The exposure limits should be checked against table B2-B-2.

5. **Use of the Automated Heat Stress System (AHSS)**

a. Viewing/Printing AHSS Data:

(1) The AHSS PC workstation displays, stores and prints the heat stress information. The information on the monitor is updated each minute and stored each hour. A dry bulb (DB) log is available which displays the DB temperature values for each location. The AHSS software allows the workspace supervisor to review the DB log and enter the appropriate comments which will also record the time of the DB log review.

(2) A complete listing of all the WBGT and PHEL curve data are stored hourly and are available for review.

(3) The AHSS provides the ability to conduct a real-time and immediate heat stress survey. The heat stress survey printout includes the current WBGT and PHEL curve stay time information. Additionally, the AHSS software performs the comparison checks to verify that DB > WB, GT ≥ DB, and GT > WBGT > WB.

b. AHSS Operations:

(1) The AHSS unit has four sensor channels, from left to right, the first is capped, the second has the DB sensor, the third has the relative humidity (RH) sensor, the fourth has the GT (black globe) sensor. The WB value is calculated from the DB and RH values. The LED lights for the AHSS unit should be red, green, green, green indicating that the AHSS unit and the three sensors are operating correctly.

(2) A DB and GT value of 32 displayed on the AHSS workstation denotes a sensor failure and the LED light will be red. Follow the procedures in the AHSS technical manual to determine if the DB or GT sensor can become operational. If not, connect a spare sensor in the appropriate DB/GT channel, re-power the AHSS unit, and arrange to have the faulty sensor repaired.

(3) A RH value of either five or 98 displayed on the AHSS workstation denotes a sensor has drifted low or high and the LED light will be red. Follow the procedures in the AHSS technical manual to re-align low/high set points using the 33% and 75% RH salt solutions. If not, connect a spare sensor in the RH channel, re-power the AHSS unit, follow the RH sensor calibration procedures, and arrange to have the faulty sensor repaired. Note that the RH salts are a disposable item with a

one-year shelf life and must be replaced each year. Ordering information is provided in the AHSS technical manual.

Refer to the AHSS technical manual for a comprehensive review of the AHSS procedures.

6. **Periodic WBGT Meter Validation**

a. Each series of WBGT meter readings shall be validated by manually calculating the highest WBGT Index obtained using the equation of paragraph 2d above. This calculation shall be performed in the remarks section of the Heat Stress Monitoring Sheet. The reported WBGT Index value from the meter reading should agree within plus or minus 0.2 degrees Fahrenheit of the calculated WBGT Index value. If such agreement is not obtained, the following causes of error shall be considered:

(1) The operator may have rushed through the measurement procedures not allowing the sensors to stabilize.

(2) The operator may have misread or recorded the values incorrectly.

(3) The meter may not be functioning properly.

If agreement is not obtained, the operator shall conduct a meter check per the appropriate technical manual. If the meter check is satisfactory, the operator shall retake the meter readings, ensuring that the meter is allowed to stabilize properly prior to obtaining readings and ensuring that values are recorded properly. If the meter check is unsatisfactory, the operator shall obtain another WBGT meter and retake the readings.

b. During reviews of heat stress monitoring sheets by the MDR, the department head, and other supervisors, the temperature and WBGT Index values should be spot-checked to determine obvious errors. The following rules of thumb should be applied:

(1) WB temperatures must be less than DB temperatures (WB < DB).

NOTE:

If the WB temperature equals the DB temperature, the wick over the WB sensor is probably dried out. Check that there is water in the WB reservoir.

(2) GT for each set of readings should be greater than or equal to DB temperature for the same set of readings (GT $\geq$ DB).

(3) WBGT Index must be greater than WB temperature and less than the GT (WB <WBGT < GT).

(4) The higher the overall heat stress, the more important it is to periodically check the meter's WBGT Index value by manually calculating the WBGT Index. It is the reliability of the individual data and WBGT Index which determines the reliability of the exposure limit from the PHEL chart or table.

7. **Emergency Environmental Monitoring Equipment Method.**

The emergency environmental monitoring equipment method discussed here will almost always significantly underestimate the level of heat stress; this shortfall will result in an increased risk of personnel suffering heat injury. When there are no operable WBGT meters aboard ship, there are two alternative monitoring methods that may be used while the ship is underway. Motorized psychrometers (NSN 1H-6685-00-936-1389), carried aboard ships for meteorological purposes or commercially available hygrometers. These psychrometers only measure DB and WB temperatures. They do not have a globe thermometer and therefore cannot account for radiant and convective heating or cooling. Hence, all of the components in the WBGT Index equation are not available to calculate the WBGT Index. If using the motorized psychrometric DB and WB temperatures must be measured with the psychrometer shield in its proper position (the flared-open end of the shield must be facing away from the psychrometer). GT can be approximated by taking the difference (ΔT) between the DB temperature and the GT under similar plant operating conditions (power level, number of operating boilers, and approximately the same load on the propulsion plant) when a full set of WBGT meter measurements were obtained. This difference (ΔT) should be added to the DB temperature measured with the psychrometer. For example:

Previous DB	-	Previous GT	=	ΔT
98.3	-	110.4	=	12.1

Psychrometer DB	-	Psychrometer WB	=	Estimated GT(DB+ ΔT)
99.1	-	83.6	=	99.1 + 12.1 = 111.2

Using the formula:

WBGT = (0.1 x DB) + (0.7 x WB) + (0.2 x GT)

WBGT = (0.1 x 99.1) + (0.7 x 83.6) + (0.2 x 111.2)

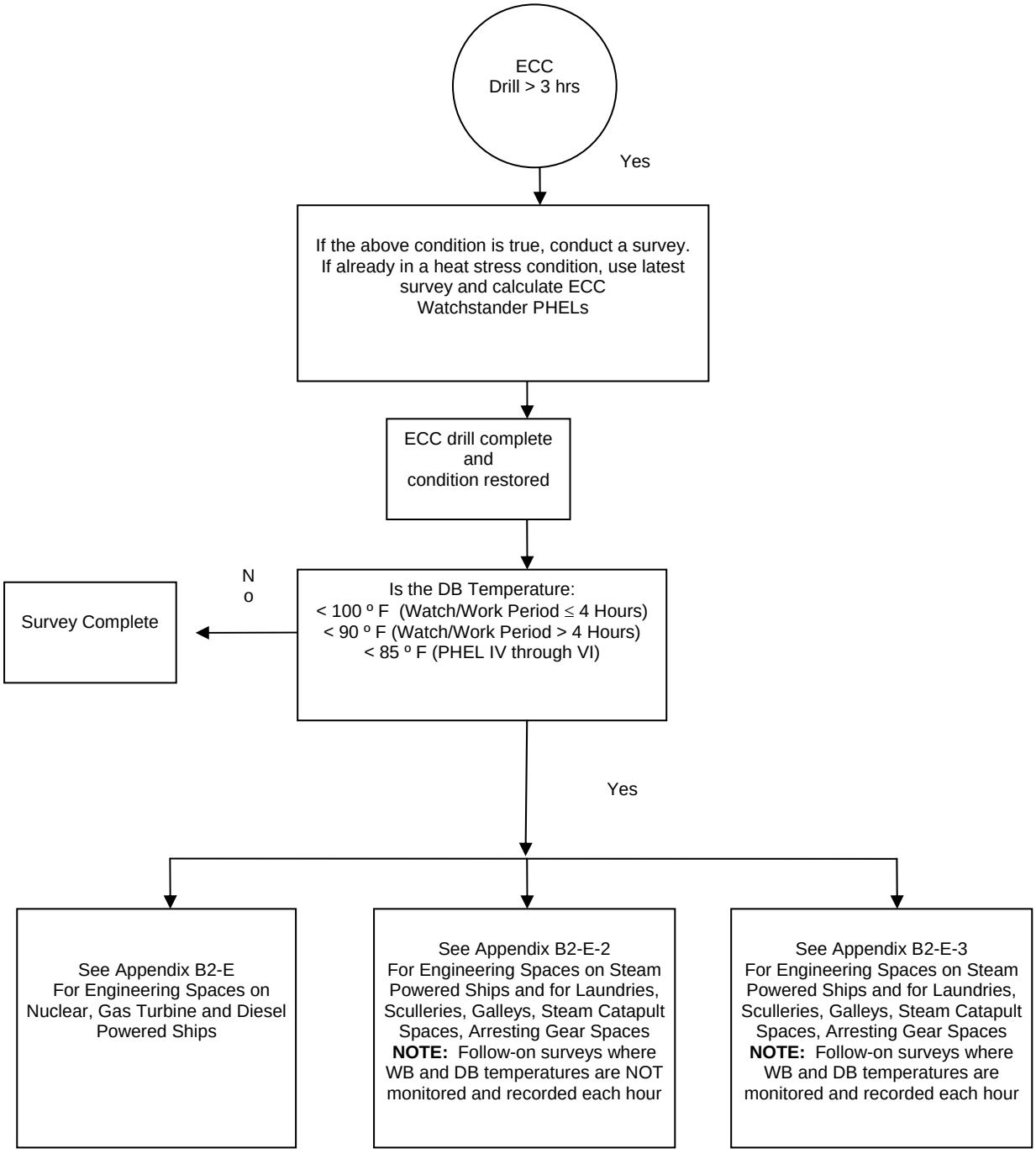
WBGT = 90.7

The WBGT Index values obtained by this strictly emergency monitoring method should be used with the PHEL chart (figure B2-B-1) or tables (tables B2-B-2 and B2-B-3). The resultant exposure limits will be approximations only.

Records should indicate whenever the emergency environmental monitoring equipment method was used. A casualty report shall be submitted. When reporting meter failure, give the serial and model numbers and describe the problems encountered.

Appendix B2-D

HEAT STRESS DECISION DIAGRAM



Appendix B2-E

TIME WEIGHTED MEAN (TWM) WBGT VALUES

Time Weighted Mean (TWM) WBGT Values. The TWM WBGT is intended for use in especially hot environments where reduced stay times have been imposed on watchstanders. The TWM WBGT is an optional provision, for use if an air-conditioned booth or cooler space is available for personnel to spend time in the cooler climate and afford some relief from the heat in the space. When the TWM is used it changes the WBGT value for that individual and increases the length of time spent at watch station. Ships that have this ability may properly calculate the new WBGT value using the following equation:

$$\text{Time (booth)} = \frac{[\text{WBGT (WATCH STATION)} - [\text{WBGT (desired)}] \times 60}{[\text{WBGT (watch station)} - \text{WBGT (booth)}]}$$

For example: Engineering spaces on a steam-powered ship in the Indian Ocean are on a four-hour watch rotation. The temperature on a hanging DB thermometer in a main space measured 101°F during the latest heat-stress survey:

Burnerman WBGT = 92, PHEL = II, Stay time = 4:10
Lower Levelman BGT = 92; PHEL = III; Stay time = 3:30
Console Booth WBGT = 80; PHEL = I; Stay time = 8:00

The lower levelman has a stay time less than four hours while other watch stations have stay times that are equal to greater than four hours. The engineering office decides to incorporate a TWM WBGT for the lower levelman to maintain a four-hour watch for all watchspace personnel. He/she looks up the WBGT value (in the PHEL Time Table in appendix B2-A) to achieve a four-hour stay time (90 WBGT = stay time of four hours) and does the calculation. The time that the lower levelman must spend in the cool booth each hour to achieve a four-hour watch would be calculated as follows:

For the Lower Levelman:

$$\text{Time (booth)} = \frac{[\text{WBGT (watch station)} - [\text{WBGT (desired)}] \times 60}{[\text{WBGT (watch station)} - \text{WBGT (booth)}]}$$

The 90 WBGT value is from the PHEL Table in appendix B2-A.

$$\text{Time (booth)} = \frac{[92 - 90] \times 60}{[92-80]} = 10 \text{ minutes}$$

TWM WBGT information shall be documented on the heat stress survey sheet.

CHAPTER B3

HAZARDOUS MATERIAL CONTROL AND MANAGEMENT (HMC&M)

B0301. DISCUSSION

a. To attain and maintain operational effectiveness, Navy ships require specified types and quantities of hazardous material (HM). Great care must be taken in handling, using, and storing HM to prevent injury to personnel, damage to equipment, or harm to the environment. Risks associated with HM are greater aboard ship than ashore because of the limited number, confined nature, and "at sea" environment of shipboard spaces. Consequently, both special precautions and an effective HM program are needed. The maintenance of safe and healthful working conditions for HM is a chain of command responsibility. Implementation begins with the commanding officer and extends to the individual Sailor.

b. In order to comply with Chief of Naval Operations (CNO) direction, all U.S. Navy ships are required to implement the consolidated hazardous material reutilization and inventory management program (CHRIMP). This program is a HM control and management plan calling for all HM to be centrally controlled onboard ships. CHRIMP requires the establishment/installation of hazardous material minimization centers (HAZMINCENs) on each ship for the centralized management of all shipboard HM, used and excess HM and empty HM containers. The HAZMINCEN is an issue/reuse site with HM inventory tracking software.

c. Execution of CHRIMP through the establishment of a HAZMINCEN should reduce on board quantities of HM through inventory control and management, in accordance with environmental, safety and health requirements. However, sufficient material should be available on board after these efforts to meet ship operational, habitability, and maintenance requirements. The ship must be able to perform the preventive, corrective, and facilities maintenance in support of ship operations.

d. This chapter addresses general management requirements and personnel responsibilities for HMC&M. Chapters C23 for surface ships and D15 for submarines contain specific management guidance and safety precautions for HMC&M.

e. Commands having dental facilities shall reference B3-1 for direction in implementing mercury control in affected spaces.

f. For Submarines. This chapter and chapter D15 provide guidance for all HM, including HM that contains atmosphere contaminants per reference B3-2. Some of these contaminants may be released to the submarine atmosphere during operations involving the use of the HM. When a HM is a source of submarine atmospheric contamination, chapter D15 provides additional controls on the storage and use of this material.

g. The following definitions apply to Navy HMC&M:

(1) **Hazardous Material (HM)** - Any material that, because of its quantity, concentration, or physical or chemical characteristics, may pose a hazard to human health or the environment during use, handling, storage, transportation, or spill. Excluded are those materials cited in reference B3-3, such as materials that do not require a material safety data sheet (MSDS), Food, Drug and Cosmetics Act items (e.g., packaged personal care products), articles (e.g., packaged solder or brazing alloy), ionizing (e.g., check sources for radiation monitors) and non-ionizing radiation (e.g., radiofrequency heat sealers, microwave or laser products) and biological hazards (e.g., products containing living organisms).

Materials that require special handling and disposal procedures include ammunition, weapons, explosives, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical waste, infectious materials, bulk fuels, asbestos, lead, and radioactive materials. Guidance/direction for these materials can be found in other related documentation.

NOTE:

Even though the above items may not be considered or handled as HM, submarine atmosphere control requirements in chapter D15 may apply.

(2) **Used Hazardous Material** – Used HM is material that has been used in a shipboard process or maintenance action and

for which there is no further, immediate use on board the ship possessing the material. Such material may ultimately be used on another ship, within the shore establishment, for the same purpose or a purpose other than that for which it was initially manufactured, or by commercial industry.

(3) **Excess Hazardous Material** – Excess HM is *unused* material in unopened, properly sealed containers for which there is no further, immediate use on board the ship possessing the material. Such material may ultimately be used on another ship, within the shore establishment, for the same purpose or a purpose other than that for which it was initially manufactured, or by commercial industry.

NOTE:

It is the responsibility of the shore receiving facility to determine if used/excess HM offloaded is reused or disposed of as hazardous waste (HW). See reference B3-4 for a definition of HW.

(4) **Consolidated Hazardous Material Reutilization Inventory Management Program (CHRIMP)** – A HM control and management program that requires all hazardous material (used and excess HM and all empty HM containers) to be centrally controlled onboard ships and submarines. CHRIMP requires the establishment/installation of HAZMINCENs. CHRIMP includes centralized inventory management, procurement, storage, issue/receipt/reissue, and collection/consolidation/offload of HM.

(5) **Hazardous Material Minimization Center (HAZMINCEN)** utilizes facilities, equipment, and procedures to execute CHRIMP. HAZMINCEN designs can vary greatly, depending on the size of the ship, mission, and requirements for HM.

The smallest ships (submarines, minesweepers, patrol craft) often require little HM and are too small to include a dedicated HAZMINCEN storeroom or office. In these instances, HM is stored in work-center lockers, and centrally managed/controlled in the Supply Department.
Other small ships (frigates, cruisers, destroyers) have only a small flammable storeroom and utilize lockers for other HM. HM on these ships can be issued from the flammable storeroom, and

centrally managed/controlled in the supply department. On these smaller ships, there usually is insufficient space to allow for a dedicated HM consolidation space. Consolidation takes place in the flammable storeroom.

On larger platforms (amphibious class ships, aircraft carriers), the ship is large enough to support a separate HAZMINCEN office, multiple HM storerooms, issue room(s), and a consolidation space.

(6) A **Material Safety Data Sheet (MSDS)** is a document that contains on the potential health effects of exposure to chemicals, or other potentially dangerous substances, and on safe working procedures when handling chemical products. It is an essential starting point for the development of a complete health and safety program. It contains hazard evaluations on the use, storage, handling and emergency procedures related to that material. The MSDS contains much more information about the material than the label and it is prepared by the supplier. It is intended to tell what the hazards of the product are, how to use the product safely, what to expect if the recommendations are not followed, what to do if accidents occur, how to recognize symptoms of overexposure, and what to do if such incidents occur.

(7) The **Hazardous Material Information Resource System (HMIRS)** is a Department of Defense (DoD) automated system developed and maintained by the Defense Logistics Agency. HMIRS is the central repository for MSDS for the United States government military services and civil agencies. It also contains value-added information input by the service/agency focal points. This value-added data includes hazard communication warning labels and transportation information. HMIRS provides this data for hazardous materials purchased by the federal government through the DoD and civil agencies. The system assists federal government personnel who handle, store, transport, use, or dispose of hazardous materials. HMIRS can be accessed via http://www.dlis.dla.mil/hmirs/. HMIRS MSDS contain hazard characteristic codes (HCC) that can be used to determine proper storage for HM.

(8) The **Ships Hazardous Materials List (SHML)** is the master HM authorized use list for surface ships. The list was developed to ensure only approved HM and corresponding units of issue authorized for use aboard ship are brought aboard ships,

to preclude stocking HM not needed aboard, and to match allowed quantities with maintenance requirements.

(9) The **Material Management Indicator (MMI)** code on the SHML that identifies which HM the HAZMINCEN controls. A SHML MMI code of "A" indicates the material is authorized for shipboard use. A SHML MMI code of "P" indicates material is prohibited for shipboard use and should not be stored or used aboard ship. A SHML MMI code of "R" indicates material having shipboard use restrictions. A SHML MMI of "Y" indicates the HAZMINCEN shall store and centrally control the HM. A SHML MMI of "N" indicates the HM is a low risk and does not require HAZMINCEN control.

(10) The **Hazardous Inventory Control System for Windows (HICSWIN)** is the principal software system used on Navy surface ships for implementing the Navy's consolidated hazardous material reutilization and inventory management program (CHRIMP)

(11) The **Submarine Hazardous Material Inventory and Management System (SHIMS)** is a menu driven HM inventory and management tool for use aboard submarines to easily track, identify storage location, and determine which HM has been approved for procurement and use. SHIMS allows submarines to be in full compliance with this instruction and applicable atmospheric control requirements. It assists the operator in the systematic, positive control and management of HM. SHIMS's provides:

(a) A standardized tool to assist in submarine HMC&M compliance, inventory management, and shelf-life management;

(b) A standardized tool to implement submarine atmospheric control requirements;

(c) A single data source for SMCL and MSDS information; and

(d) Standard reports, references and output that meet requirements of this instruction and references B3-2, B3-4 and B3-5.

(12) The **Submarine Material Control List (SMCL)** is a Navy data application that lists the authorized HM for use on submarines as established by reference B3-2.

(13) **Shipboard Safety Equipment Guide** - The Naval Safety Center Afloat Safety Program Directorate prepared this guide to provide national stock numbers for common safety equipment and personal protective clothing approved for surface ship and submarine use.

B0302. SURFACE SHIP HMC&M

a. Responsibilities

(1) **The Commanding Officer shall:**

(a) Assign the responsibility for implementation of the consolidated hazardous material reutilization inventory management program (CHRIMP) afloat through the operation of a hazardous material minimization center (HAZMINCEN) to the shipboard supply department. Augment the manning of the responsible department as necessary to accomplish CHRIMP.

(b) Appoint/assign, in writing, a HM coordinator. The HM coordinator shall be a graduate of the Afloat HM Coordinator Course or equivalent supply corps officer training. (See HM training paragraph.) Appointment shall be a person of ranking in the following order of preference:

1. A commissioned officer within the supply department,

2. A chief or leading petty officer (see note).

NOTE:

Ships and afloat activities specifically designated by the type commander in which the number of assigned officers is limited and appointment would pose an excessive burden to the ship may assign a chief or leading petty officer as HM coordinator.

(c) Appoint/assign a HM supervisor/lead petty officer, in writing, to operate the HAZMINCEN. The HM supervisor/lead petty officer shall be a graduate of the HMC&M Technician (secondary Navy enlisted classification (SNEC) code 9595) Course (see HM training paragraph).

(d) Annually, prepare and submit a report of HAZMINCEN operational efficiency to the chain of command. Report shall be based upon HICSWIN/R-Supply data and report the following: a) HM obtained onboard via ship procurement (Cost), b) HM obtained on-board via open purchase request, c) HM obtained on-board via reuse (from other ships or shore CHRIMP facilities), and d) HM offloaded.

(e) Approve, by signature, ship's hazardous material list (SHML) feedback reports (SFRs). A designated O-5 or above may be appointed, in writing, to approve SFRs for the commanding officer.

(f) Ensure compliance with OPNAV transfer and disposal policy guidance provided in reference B3-4, chapter 19, appendix L. Report to the fleet commanders by message, information to the chain of command, any conditions or system/equipment malfunctions that results in an **overboard discharge** of HM into or upon the marine environment per reference B3-4 and applicable operations orders (OPORDs).

NOTE:

The requirements detailed herein shall not preclude the overboard discharge of HM during an emergency where failure to discharge would clearly endanger the health or safety of shipboard personnel or would risk severe damage to the ship.

(2) **The Executive Officer shall:**

(a) With department heads, semi-annually review the list of HM to ensure that CHRIMP efforts are optimized to minimize HM stowage locations and eliminate excessive or unauthorized quantities of HM.

(b) Assign sufficient personnel to the HAZMINCEN to accomplish CHRIMP and ensure an individual with SNEC 9595

qualification is operating the HAZMINCEN. Use the HM work-center listed in the activity manpower document (AMD) as guidance for HAZMINCEN manning. If the ship's AMD does not list a HM Work-center,

(c) HAZMINCEN manning guidance should be obtained from the type commander.

(d) Upon request from the HM coordinator, approve work-center HM storage locations/lockers in writing, as applicable, to support daily evolutions.

(e) Receive and review the HAZMINCEN delinquent containers report generated from HICSWIN. Ensure action is taken to correct outstanding/repeated delinquencies.

(f) Ensure supply and safety officers make monthly satellite locker inspections and quarterly storeroom inspections and are taking action to correct deficiencies.

(g) Ensure that HM needed for embarked units (Marines, airwing squadrons, special forces, etc.) is authorized for use on board ship and that there is an agreement, in writing, detailing responsibilities of ships company and the embarked unit. The agreement shall address procurement, storage, reorder and offload. Note: Sufficient notice is required to allow the ship to order and receive the hazardous material for the embarked unit.

(h) Ensure HM brought on board by contractor and shipyard representatives is controlled and offloaded in accordance with contract requirements.

(i) Annually review the ship's training plan to ensure that HM awareness training is included.

(j) Ensure all supervisors (department heads, division officers and petty officers) annually receive the HM awareness training. Ensure supervisors provide HM awareness training to all hands.

(3) **Department Heads shall:**

(a) Assist the executive officer in a semi-annually review of the list of HM to ensure that CHRIMP efforts are optimized to minimize HM stowage locations and eliminate excessive or unauthorized quantities of HM.

(b) Ensure that HM retained within their work-centers is required for the operations and maintenance of assigned equipments and does not exceed the quantity needed to satisfy operational needs/requirements.

(c) Ensure that department personnel are available to receive annual HM awareness training.

(d) Ensure used or excess HM is properly turned into the HAZMINCEN for turn over to the shore activity offload personnel.

(4) **The Supply Officer/HM Coordinator/HM Supervisor shall:**

(a) Operate the HAZMINCEN in accordance with guidance in this chapter and in chapter C23. Provide control and inventory management of designated shipboard HM. Ensure receipt, stowage, consolidation, issue, inventory and accountability of all HM used on board.

(b) Weekly, prepare and submit a HAZMINCEN operation summary report to the chain of command. Report to include:

1. Listing of new HAZMAT requirements (lists new HM line items and provides status of the SHML feedback report (SFR) (when SFR was sent and what is the answer).

2. Summary of results from storeroom and satellite locker spot checks (Including size of sample taken, results, HICSWIN/RSUPPLY accuracy, and reason for inaccuracies/deficiencies).

3. Report of NIS (not in stock, but carried) and N/C (not carried item) (Any item on this list must also contain the name of the person requested it, the reason it was

requested, and the amount that was requested. Report also must provide the requisition number for the material, reason why the material is NIS or N/C, and the status of resolving the NIS and/or N/C issue).

4. Summary of HM training conducted (in addition to general and professional training).

(c) Quarterly, prepare and submit a report of HAZMINCEN operational efficiency to the CO. Report shall be based upon HICSWIN data and report the following: a) HM obtained on board via ship procurement (cost), b) HM obtained through open purchase request, c) HM obtained on board via reuse (from other ships or shore CHRIMP facilities), d) HM offloaded.

(d) The HM Coordinator shall be a graduate of the Afloat HM Coordinator Course or equivalent supply corps officer training. The HM supervisor/lead petty officer shall be a graduate of the HMC&M Technician (SNEC 9595) Course, (see HM training paragraph).

(e) Provide quarterly training to HAZMINCEN personnel on proper handling, issuing, labeling, stowage, receipt processing, inventories, spill response and disposal procedures; training based on chapter C23, chapter 4 of reference B3-6 and reference B3-7.

(f) Ensure HM training is provided quarterly to division/work-center personnel responsible for maintaining in-space storage lockers. Training should include proper inventorying, marking, stowage and the use of MSDS.

(g) Ensure a MSDS is on file (either hard copy or on CD-ROM) for all types and brands of HM taken aboard. Ensure that hard-copy MSDSs are readily accessible to all hands.

(h) Ensure only HM authorized for shipboard use by the Ship's Hazardous Material List (SHML) is requisitioned, or if necessary to do so, that a SHML feedback report (SFR) is promptly submitted (See chapter C2303b). Ensure SHML feedback reports (SFRs) are signed by the commanding officer (or a designated O-5 or above) and transmitted to NAVCIP for processing.

(i) Work with stock control officer to ensure all HM orders are approved by the HAZMINCEN prior to ordering or signing all purchase requests for HM items.

(j) Identify, in writing, locations and quantities of all HM/excess HM stored aboard ship and provide a list to the executive officer, department heads, gas free engineer, damage control assistant (DCA), fire marshal, safety officer and senior medical officer.

(k) Execute the following inspections, and take corrective action for all deficiencies found. Inspect the HM program in accordance with reference B3-6, section 8202, hazardous material division check off list. Inspect for locker/storeroom condition, HM compatibility, labels, corrosion, leaks, bulging cans/drums, and shelf life.

1. Monthly satellite locker inspections. Coordinate/conduct inspections with the safety officer. Additional locker inspection guidance is found in reference NSTM B3-7.

2. Monthly spot-check of HM practices of division personnel. Choose one division (randomly) which uses HM. Coordinate/conduct spot-checks with the safety officer. Ensure all divisions are checked at least twice per year.

3. Quarterly storeroom inspections. Coordinate/conduct with the safety officer.

4. Annual ship-wide physical inventory of all HM (including lockers and HAZMINCEN storerooms/spaces). Compare this inventory to the SHML and take appropriate action on all differences.

(l) Approve work-center HM storage locations/lockers in writing, as applicable, to support daily evolutions. Coordinate approval of locker locations with the safety officer, DCA, and XO.

(m) Act as the ship’s single point of contact in the offload of used/excess HM. Comply with the following:

1. Receive and segregate/consolidate used HM and ensure contents of offloaded HM are labeled/marked in accordance with chapter C23.

2. Supervise document preparation for offload of used/excess HM.

3. Prior to getting underway, ensure that no HM remains on the pier.

4. Ensure all contractor and shipyard representatives offload all HM brought on board following completion of their work.

(n) Ensure personnel assigned to the HAZMINCEN are trained on duties and responsibilities prior to assuming these duties. Ensure at least the number of persons specified in the ships manning document are assigned to operation the HAZMINCEN.

(o) Maintain HICSWIN.

(p) Manage embarked unit (Marines, airwing squadrons, special forces, etc.) HM in accordance with the following:

1. Ensure embarked units do not bring onboard prohibited HM; Embarked unit HM shall be screened against the ships T-SHML to ensure it is authorized for use onboard ship. Embarked units shall provide a valid requirement for material needed onboard ship (i.e., maintenance procedure, technical manual, etc.).

2. Ensure embarked units submit requirements for hazardous material to the ship prior to embarking. Sufficient notice shall be given to allow the ship to order and receive the hazardous material.

3. Ensure that the embarked unit only brings unique hazardous material on board that is authorized by the ship. In this case, ensure the embarked unit takes responsibility for the offload of the material (upon departure of the embarked unit or aircraft).

(q) Ensure HAZMINCEN is equipped with an oil and hazardous substance (OHS) spill kit. Ensure DCA is aware of his responsibility to maintain and replenish spill kit material. See B0304.

(r) Ensure HAZMINCEN pollution prevention afloat (P2A) equipment is operational, and being used safely in accordance with instructions.

(5) **Division Officers shall**:

(a) Ensure that only NAVSEA-approved, in-space storage lockers are used and that locations/installations are approved by the HM coordinator, safety officer, DCA and XO. Ensure lockers are installed and labeled in accordance with reference B3-7.

(b) Ensure that HM retained within their work-centers is specific to the operations and maintenance of assigned equipment. No more than a seven-day supply of HM issued by the HAZMINCEN to the work-center may be retained in work-center spaces. Longer storage to address special needs must be authorized, in writing, by the HM Coordinator, DCA, safety officer, and XO.

(c) Ensure HM training is provided quarterly to division personnel responsible for maintaining in-space storage lockers.

(d) Ensure used or excess HM is properly returned to the HAZMINCEN.

(e) Ensure that approved personal protective clothing and equipment are available for HM operations or incidents and personnel are trained in their proper use and maintenance as described in reference B3-8. Follow specific direction on applicable PMS cards and MSDSs.

(f) Make division personnel available to receive annual HM awareness training. Incorporate HM training into normally scheduled weekly divisional training. Ensure that upon reporting on board and annually thereafter, all personnel are educated on HMC&M (ordering, issuing, reutilization, handling, storing, using, disposal, and spill response)

(g) Mark any polychlorinated biphenol (PCB)-containing electrical or electronic components per reference B3-9 and associated NAVSEASYSCOM-issued PCB advisories.

(6) **The Safety Officer shall:**

(a) Approve work-center HM storage locations/lockers. Coordinate with the HAZMINCEN Division.

(b) Spot check monthly, in conjunction with the master-at-arms force and the HAZMINCEN Division, to ensure day-to-day compliance with CHRIMP requirements. Spot checks shall include checking for improper stowage and use of HM in the HAZMINCEN and work-center lockers. Ensure all divisions are checked at least twice per year.

(c) Coordinate the execution of the following inspections with the HAZMINCEN division:

1. Monthly satellite locker inspections.

2. Quarterly storeroom inspections.

(d) Ensure that the CHRIMP/HAZMINCEN program is evaluated annually for compliance and effectiveness.

(e) Report all HM mishaps as required by reference B3-10.

(7) **The Afloat Environmental Protection Coordinator (AEPC) shall** perform the functions described in reference B3-4. The AEPC shall ensure pollution prevention afloat (P2A) equipment is operational and in use.

(8) **The Damage Control Assistant (DCA) shall:**

(a) Coordinate HM spill response drills with the HAZMINCEN division as necessary. See section B0304.

(b) Approve work-center HM storage locations/lockers in writing, as applicable, to support daily evolutions. Coordinate approval of locker locations with the HAZMINCEN division.

(c) Maintain and replenish spill kit material.

(9) **The Medical Department Representative (MDR) shall**:

(a) Assist the HM coordinator/HM supervisor and work-center supervisors in training personnel regarding health information and personal protective equipment requirements for the HM they are using.

(b) Maintain a complete MSDS file. This may be on CD-ROM or hardcopy.

(10) **Division Supply Petty Officers/Repair Parts Petty Officers shall** request HM from the HAZMINCEN and shall ensure before HM is ordered that a valid requirement exists (specifically required by a maintenance procedure or other shipboard operation). HM listed on the SHML shall be used to avoid open procurement of HM. Submit an SFR to HAZMINCEN personnel whenever requesting HM not authorized by the SHML.

(11) **Embarked Unit Supply Petty Officers/Repair Parts Petty Officer shall:**

(a) Execute, in writing, an agreement detailing responsibilities of ships company and the embarked unit. The agreement shall address procurement, storage, reorder and offload.

(b) Submit requirements for hazardous material to the ship prior to embarking. Provide a valid requirement for material needed on board ship (i.e., maintenance procedure, technical manual, etc.). Ensure HM is screened against the ships T-SHML to ensure it is authorized for use on board ship. Sufficient notice shall be given to allow the ship to order and receive the hazardous material.

(c) Offload any HM (not supplied by the ship) brought onboard in accordance with applicable requirements.

(12) **Work-center Supervisors shall**:

(a) Ensure that required personal protective clothing and equipment are maintained and used. See reference B3-8, preventive maintenance system (PMS) and MSDS instructions.

(b) Ensure that prior to initial use or handling any HM, work-center personnel have been trained on the hazards associated with that material and are familiar with what an MSDS is, what it contains, and where a copy is available for review. Train work-center personnel in the use of MSDS.

(c) Ensure that a valid maintenance requirement exists for any HM item not listed in the SHML and initiate a SFR.

(d) Remove unauthorized HM from the work-center.

(e) Ensure a copy of the hazardous material user's guide (HMUG) is available for use by work-center personnel.

(f) Ensure work-center HM lockers are secured, labeled and have contents identified and approved by the XO, safety officer, DCA, and HAZMINCEN division. Locker installation shall comply with chapters B3, C23 and reference B3-7.

(13) **All Hands shall**:

(a) Properly stow or return HM to approved locker or the HAZMINCEN upon completion of use or no later than the end of the workday.

(b) Properly use and handle HM in accordance with the applicable MSDS and reference B3-8.

(c) Collect and segregate any residue resulting from use of HM issued from the HAZMINCEN for turn-in to the supply department/HAZMINCEN.

(d) Report any spills of HM to the officer of the deck, and/or damage control central/central control station.

(e) Annually complete HM awareness training.

b. HMC&M Program Elements. The following elements are essential for effective surface ship HMC&M. The requirements associated with these elements are described in C23.

(1) Centralized inventory management/tracking.

(2) Requisitioning and receiving authorized HM.

(3) HM container labeling.

(4) Storage of HM.

(5) Controlling HM issue/re-issue/return.

(6) HM container compatibility.

(7) Consolidation/offload/disposal of used or excess HM.

(8) HM use and handling requirements.

(9) Training (see paragraph c below)

c. HM Training

(1) The HM coordinator shall normally receive en route training at the Navy Supply Corps School's basic and department head courses. HM coordinators who are not supply corps officers shall attend the afloat HM Coordinator Course (A-8B-0008) taught by the Naval Occupational Safety and Health and Environmental Training Center (NAVOSHENVTRACEN). The course shall be completed prior to, or within six months of, being assigned this duty.

(2) The HM Supervisor/lead petty officer, and other assigned personnel as required by the activity manpower document, shall be a graduate of the HMC&M Technician (SNEC 9595) course (A-322-2600 or A-322-2601). At a minimum the HM supervisor shall also be a graduate of the CHRIMP/HICS Technician course. Both courses are taught by the NAVOSHENVTRACEN.

B0303. SUBMARINE HMC&M

a. Responsibilities

(1) **The Commanding Officer shall:**

(a) Report all HM mishaps as required by reference B3-10.

(b) Report to the fleet commanders by message, information to the chain of command, any conditions or system/equipment malfunctions that results in an overboard discharge of HM into or upon the marine environment per reference B3-4 and applicable operations orders (OPORDs).

(c) Ensure that spills of HM are handled per guidance specified in references B3-27 and B3-28.

(2) **The Executive Officer shall:**

(a) Grant written permission to carry on board any restricted HM during an underway period. Refer to chapter D15 and reference B3-2 for definitions of submarine material control usage categories.

(b) Ensure assigned personnel follow the conditions under which restricted or limited HM are stored or used on board to minimize the release (off-gassing, mists, or vapors) of potential atmospheric contaminants into the submarine. Restricted material may not be used on board during an underway period.

(c) Ensure restricted (R) and HM items pending for classification are not used on board while underway.

(3) **Department Heads shall:**

(a) Ensure that HM retained within their work-centers is unique to the operations and maintenance of assigned equipment and does not exceed the quantity needed to satisfy operational requirements.

(b) Ensure used or excess HM is properly returned to the supply officer for turn over to the shore activity.

(c) Report all items found with a restricted (R) or limited (L) use code that have not been logged in the submarine material control log to the supply officer for logging, labeling, and assignment of approved storage location, or disposal.

(d) Report all items found that are not listed (categorized) in the submarine material control list (SMCL) to

the supply officer. Items not listed in the SMCL are prohibited per paragraph D1502(a).

(e) Ensure that restricted items authorized for in port use only are removed from the submarine when no longer needed. Inform the supply officer of their removal to allow documentation in the submarine material control log. Obtain written permission from the executive officer to retain on board restricted items during underway.

(f) Ensure that all HM in their custody are used, handled, and stowed per the requirements of chapter D15.

(4) **The Supply Officer/HM Coordinator shall:**

(a) Ensure that management of shipboard HM follows procedures outlined in this chapter and chapter D15.

(b) Ensure an MSDS is on file (either hard copy or on CD-ROM) for all types and brands of HM taken aboard. Ensure that hard-copy MSDSs are readily accessible to personnel and their supervisors. Maintain the submarine hazardous material inventory and management system (SHIMS) which contains MSDS information. Submit hard copies of MSDSs which are not on the SHIMS system to Naval Surface Warfare Center, Carderock Division, code 634.

(c) Ensure no prohibited HM is brought on board.

(d) Maintain the submarine material control log per paragraph D1502d.

(e) Ensure all HM brought on board is authorized for storage and use on board by the Submarine Material Control List (SMCL). Affix an atmosphere contaminant tag (appendix D15-C) to all HM containers upon issue and mark with pre-designated usage category for any material that is a restricted (R) or limited use (L) HM. Atmosphere control tags can be printed from SHIMS.

(f) Initiate an investigation of any item suspected of being an atmosphere contaminant per the procedures of reference B3-2 and submit a SMCL feedback report per chapter D-15.

(g) Ensure that all restricted (R) and limited use (L) items are inventoried every six months or prior to a change of command.

(h) Review the submarine material control log weekly in port and monthly underway.

(i) Obtain commanding officer's written authorization prior to open purchasing any HM.

(5) **The Medical Department Representative shall**:

(a) Assist work-center supervisors in training personnel regarding health information and personal protective equipment requirements for the HM they are using.

(b) Provide medical assistance in the event of a HM spill or mishap involving HM. Use MSDS information in SHIMS provided by the supply officer.

(6) **Division Officers shall**:

(a) Ensure when HM is transferred into other containers the new containers are properly marked with the information specified in paragraph D1502d.

(b) Ensure approved personal protective clothing and equipment are available for HM operations or incidents and personnel are trained in their proper use and maintenance.

(c) Ensure personnel are made available to receive required HM training as detailed in section B0303c.

(d) Mark any PCB-containing electrical or electronic components per section D1506.e.

(7) **The Damage Control Assistant shall c**oordinate HM spill response drills with the HAZMINCEN division as necessary. See section B0304.

(8) **Repair Parts Petty Officers shall** ensure before HM is ordered, that a valid requirement (specifically required by a maintenance procedure or other shipboard operation) exists. Standard stock HM shall be used whenever possible to avoid procurement of open purchased HM.

(9) **Work-center Supervisors shall**:

(a) Ensure that approved personal protective clothing and equipment are maintained and utilized.

(b) Ensure that prior to using or handling any HM, work-center personnel have been trained on the hazards associated with that material and are familiar with what an MSDS is, what it contains, and where a copy is available for review.

(c) Ensure that a valid maintenance requirement exists for any HM item not listed in the SMCL and initiate a SMCL feedback report (SFR) requesting material certification in accordance with the requirements of reference B3-1, chapter 7.

(10) **All Hands shall**:

(a) Ensure that HM is returned to appropriate stowage upon completion of use or at the end of the workday, whichever is earlier.

(b) Follow instructions provided for the proper use of HM.

(c) Collect and segregate any used HM for proper offload per chapter D15.

(d) Report any spills of HM to the duty officer (in port) or the chief of the watch (underway).

(e) Report any violation of HM use, storage, and handling precautions to the supervisor for resolution/correction.

(f) Be alert to prevent the on board storage and use of restricted material during underway operations without prior approval/authorization from the executive officer. Ensure limited material is being used per SMCL guidance.

b. Hazardous Material Control and Management Elements. The following elements are essential for effective submarine HM control and management:

(1) Proper use of HM per SMCL guidance (see chapter D15).

(2) Designation of compliant storage for HM (see chapter D15).

(3) Controlling HM purchase (including type and quantity of material required), receipt, and issue to avoid accumulation of HM (see chapter D15).

(4) Avoiding open purchases of HM (see chapter D15).

(5) Following approved safety standards for the use of HM (see chapters B1, B3, B10 and D15 for specific requirements on use of HM).

(6) Reutilization of HM to reduce the amount of used HM generated (see chapter D15).

(7) Collection, segregation, and disposal of used or excess HM (see chapter D15).

(8) Responding to HM emergencies (see B0304).

(9) Obtaining and providing MSDSs for on board HM (see chapter D15).

(10) Training (see B0303c).

(11) Proper HM labeling (see chapter D15).

c. Training

(1) The HM coordinator receives en route training at the Navy Supply Corps School Basic Course (A-8B-0008).

(2) The leading SK shall be a graduate of the HMC&M Technician (SNEC 9595) Course (A-322-2600).

(3) Personnel expected to combat an emergency involving HM shall receive training on HM emergency procedures.

B0304. OIL AND HAZARDOUS SUBSTANCE (OHS) SPILL RESPONSE GENERAL (Surface and Submarine Applicable) REQUIREMENTS:

Because of the extremely hazardous nature of many HM used aboard ships, only personnel trained by the DCA shall respond to HM spills. Refer to appendices B3-A and B3-B. Reporting requirements for a HM spill which goes over the side are found

in reference B3-4, chapter 19. Additional response procedures for specific situations are provided in documents found in references B3-11 through B3-17 and B3-27 and B3-28 for submarines.

SURFACE SHIP REQUIREMENTS:

a. Responsibilities

(1) **The Damage Control Assistant shall:**

(a) Develop and implement a spill contingency plan (SCP), using the Navy's shipboard oil and hazardous substance (OHS) spill contingency plan guide per reference B3-4 and B3-13.

(b) Train and supervise ship's damage control teams (and fire department, if used aboard) in combating spills of HM and oil.

(c) Provide training to divisions regarding reporting, initial handling, and cleanup of HM and oil spills, as requested.

(d) Maintain the hazardous material spill response kit (AEL 2-550024007) and the oil spill response kit (AEL 2-550024006).

(e) Ensure that HM and oil spills are handled per appendices B3-A and B3-B.

(f) Inspect OHS spill kits monthly, and replenish material as required.

(g) Maintain an OTTO fuel spill kit (AEL A006350027) to respond to OTTO Fuel Spills. (OTTO fuel is propellant named after its developer, Dr. Otto Reitlinger)

b. Oil and Hazardous Substance (OHS) Spill Response Elements:

(1) The DCA shall implement a spill contingency plan (SCP) using the Navy's shipboard oil and hazardous substance (OHS) spill contingency plan guide. These plans include

information on spill response team makeup, spill cleanup equipment location, internal and external spill reporting criteria, as well as procedures that are unique to the ship.

(2) Damage control teams required to combat an emergency involving HM, and the ship's fire department (if used aboard) shall receive training on HM emergency procedures. The DCA shall ensure training is provided and supervise ship's damage control efforts to combat HM spills. Ships shall conduct and document at least one OHS spill response drill for each duty section annually as per reference B3-4.

c. OHS Spill Response Training

(1) Ships shall conduct and document at least one OHS spill for each duty section annually per reference B3-4. The ship shall train the spill response team, in-port watchstanders, command duty officers on in port OHS spill response procedures, the ship's spill contingency plan, and local notification requirements prior to assignment per reference B3-4.

SUBMARINE REQUIREMENTS:

d. Responsibilities

(1) **The Damage Control Assistant shall:**

(a) Train and supervise ship's damage control efforts to combat HM spills. Conduct HM spill response drills as necessary.

(b) Provide training to divisions regarding reporting, initial handling, and cleanup of HM spills, as requested.

(c) Maintain an OTTO fuel spill kit (AEL A006350027) to respond to OTTO fuel Spills.

(d) Hazardous material emergency response shall be conducted per guidance provided in references B3-27 and B3-28. The DCA shall follow the toxic gas bill in preparation for possible HM spills or releases to the environment. Reporting requirements for a HM spill which goes over the side are found in reference B3-4, chapter 19.

e. Oil and Hazardous Substance (OHS) Spill Response Elements:

The DCA shall implement a spill contingency plan (SCP) using the guidance provided in references B3-27 and B3-28. The DCA shall follow the toxic gas bill in preparation for possible HM spills or releases to the environment. Reporting requirements for a HM spill which goes over the side are found in reference B3-4, chapter 19.

B0305. PROGRAM EVALUATION

a. The HMC&M Program shall be evaluated annually for compliance and effectiveness. The checklists of appendices B3-C (surface ships), B3-D (submarines), and C23-B (surface) may be used for this purpose. Additional checks can be found in references B3-6 and B3-7. Where possible, industrial hygiene officer assistance shall be obtained in conducting the evaluation.

b. During HM coordinator spot checks and other inspections, all or portions of the checklists of appendices B3-C, B3-D, and C23-B may be used. The HM coordinator shall ensure the appropriate supervisor is included in inspections of work-centers and HM storage areas.

CHAPTER B3

REFERENCES

B3-1. BUMEDINST 6260.30, Mercury Control Program For Dental Treatment Facilities

B3-2. NAVSEA Manual S9510-AB-ATM-010(U), Nuclear Submarine Atmosphere Control Manual (NOTAL)

B3-3. 29 CFR – Labor, Standard Number 1910.1200, Hazardous Communication Standard

B3-4. OPNAVINST 5090.1B

B3-5. COMSUBLANT/COMSUBPACINST 4406.1E, Submarine Supply Procedures Manual

B3-6. NAVSUP Publication P-485, Naval Supply Procedures

B3-7. NSTM 670, Stowage, Handling, and Disposal of Hazardous General Use Consumables

B3-8. OPNAVINST 5100.28

B3-9. NAVSEA S593-A1-MAN-010, Shipboard Management Guide to PCBs (NOTAL)

B3-10. OPNAVINST 5102.1D/MCO P5102.1B, Navy and Marine Corps Mishap and Safety Investigation, Reporting, and Record Keeping Manual

B3-11. NAVSEA S9593-CT-MAN-010, Instruction Manual for the HM Spill Response Kit

B3-12. NAVSEA S9593-DV-HBK-010, Instruction Manual for the Oil Spill Response Kit

B3-13. OHS Spill Contingency Plan Guide – http://navyseic.dt.navy.mil/

B3-14 NSTM 079, Volume II, Practical Damage Control

B3-15. NAVAIR 00-80-R-14, US Navy Aircraft Firefighting and Rescue Manual

B3-16. Naval Warfare Publication 62-1, Surface Ship Survivability

B3-17. NSTM 555, Volume I, Surface Ship Firefighting

B3-18. OPNAV Publication P-45-114-95, CNO Policy Guide for Shipboard Hazardous Material Container Disposal

B3-19. Hazardous Inventory Control System Windows (HICSWIN) Afloat Desk Guide

B3-20. NAVSUP Publication P-722, Consolidated Hazardous Material Reutilization and Inventory Management Program (CHRIMP) Manual

B3-21. NAVSUP Publication P-573, Storage and Handling of Hazardous Materials

B3-22. Shipboard Safety Equipment Shopping Guide (NAVSAFECEN Publication)
http://safetycenter.navy.mil/osh/afloat/shoppingguide.htm

B3-23. NSTM 077, Personnel Protection Equipment

B3-24. NSTM 593, S9086-T8-STM-010/CH-593R4, Pollution Control

B3-25. NAVSEA S9593-DS-GYD-010, Preliminary Technical Manual Design and Installation Guidance for Hazardous Material Minimization Center (HAZMINCEN) Areas on Surface Ships

B3-26. NAVSEA Instruction 5100.3D, Control of Mercury, Mercury Compounds, and Components Containing Mercury or Mercury Compounds

B3-27. COMNAVSUBFOR Instruction 5400.38, "Standard Submarine Organization and Regulations Manual (SSBN)"

B3-28. COMNAVSUBFOR Instruction 5400.39, "Standard Submarine Organization and Regulations Manual (SSN)"

Appendix B3-A

Oil and Hazardous Substance (OHS) Spill Response Procedures (Surface Ships Only)

1. **Introduction**. Because of the extremely hazardous nature of many materials used aboard ships, only trained personnel shall respond to a hazardous material (HM) or oil spill. Personnel shall be trained by the damage control assistant or supervisory personnel to clean up small spills of oil and HM. Appropriate material safety data sheets (MSDSs) shall be used to conduct training.

Response procedures for many specific situations are provided in other documents. See reference B3-16 for repair party responsibilities. See references B3-17 for shipboard HM fire fighting procedures; reference B3-14, Volume 2 for HM damage control procedures; and reference B3-23, B3-7, and B3-8 for personal protective equipment guidance. See reference B3-15 for aircraft HM fire fighting procedures. For descriptive purposes, the spill response procedures have been divided into nine phases:

a. Discovery and notification.

b. Initiation of action.

c. Evaluation.

d. Containment and damage control.

e. Dispersion of gases/vapors.

f. Cleanup and decontamination.

g. Disposal of contaminated materials.

h. Certification for re-entry.

i. Follow-up reports and spill response kit replenishment.

Each response phase is **not** a separate response action entirely independent of all other phases. Several phases may occur

simultaneously and may involve common elements in their operation. For example, containment and damage control may also involve cleanup and disposal techniques.

2. **Spill Discovery and Notification**

a. Spills or potential spills of oil or HM may be discovered by regularly scheduled inspections of storerooms and workshops, by detection devices such as fire alarms and oxygen deficiency detectors, and during routine operations. All discoveries of spills or situations that may lead to a spill must be verbally reported **immediately** to supervisory personnel and the officer of the deck (OOD)/command duty officer (CDO). Crewmembers are **not** to remain in the area to investigate the spill. Whenever possible, however, the discoverer/initial response team shall report the following information:

(1) Time of spill discovery.

(2) Location of spill.

(3) Identification of spilled material.

(4) Behavior of material (reactions observed).

(5) Source of spill (e.g., tank or container).

(6) Personnel in vicinity of spill (list by name and department).

(7) Volume of spill.

(8) Anticipated movement of spill (e.g., leakage to lower deck passage from amidships toward galley, floating in water toward pier, etc.).

(9) Labeling or placarding information (copy data from spilled container only after exposure to spill is eliminated).

b. Overboard spills of reportable quantities of oil or HM shall be reported per reference B3-4.

3. **Initiation of Action**. Coordination and direction of spill response efforts at the scene of an oil or HM spill shall be accomplished by the ship's OOD, CDO, fire chief, damage control party leader, or senior person at the scene, as appropriate, who shall initiate the following actions:

a. Evacuate all personnel from areas that may be exposed to the spilled material.

b. Cordon off the affected area.

c. Arrange first aid for injured personnel.

CAUTION:

Do not enter the contaminated area until the necessary protective clothing and equipment have been determined.

d. Establish a command post and communications network.

e. Prevent spills from entering other compartments by any means that do not involve personnel exposure to the spill, such as closing drains, ventilation ducts, doors, and hatches.

f. Disperse gases or vapors to weather using blow-out (forced exhaust) ventilation or by natural ventilation such as opening doors or hatches. If atmosphere is suspected to be flammable or explosive, only explosion-proof fans shall be used for blow-out ventilation.

g. Eliminate any fire or explosion hazards such as electrical equipment, incompatible materials, and open flames.

4. **Evaluation**. Proper evaluation of a spill can prevent fires, explosions, personal injury, or permit steps to lessen their impact. This evaluation consists of the following three steps:

a. Obtain as much of the following information as possible from container labels and MSDS before starting response actions:

(1) Type and concentration of the spilled material.

(2) Hazardous characteristics of the spilled material, such as:

(a) Flash Point;

(b) Toxicity;

(c) Corrosiveness;

(d) Potentially incompatible substances;

(e) Effects resulting from exposure (fainting, dizziness, skin or eye irritation, nausea);

(f) First aid measures for exposure.

b. Determine dangerous conditions or potential consequences of the spill, including:

(1) Fire or explosion.

(2) Presence of oxygen-deficient atmosphere in compartment.

(3) Presence of toxic or explosive gases.

(4) Possibility of dangerous vapors being drawn into ship's ventilating system.

(5) Other HM in the compartment that would play a role in a fire or explosion or is incompatible with the spilled material.

c. Determine from the MSDS the appropriate spill response equipment and protective clothing necessary for safe and effective response.

5. **Containment and Damage Control**. Actions taken during this phase are directed toward controlling the immediate spread of the spill and minimizing the impact to the ship and crew. Depending on the type of spill, some or all of the following procedures may be employed:

a. Fight fire (if any), being careful to use fire fighting methods compatible with the material involved. Firefighting procedures are provided in reference B3-17.

b. Shut off or otherwise stem the spill at its source, whenever feasible, by:

(1) Replacing leaking containers.

(2) Plugging leaks in tanks.

(3) Emptying tank of remaining contents.

(4) Encapsulating a leaking container into a larger, liquid-tight container.

(5) Segregating leaking containers.

c. Predict spill movement and take further action to prevent the spill from possibly entering other compartments by closing scuppers, drains, ventilation ducts, doors, or hatches.

d. Contain liquid material using barriers, such as sand, sorbents, or other equipment suitable to dam the flow.

6. **Dispersion of Gas/Vapor**. If a flammable gas or vapor is released as a result of the spill, the gas/vapor shall be dispersed or diluted as soon as possible. The gas/vapor shall not be allowed to enter other compartments. In some cases, the explosive atmosphere shall be contained and diluted to lower its concentration below the lower explosive limit (LEL). Have the gas free engineer check the spill area for LEL and toxicity. The atmosphere can then be dispersed by one of the following methods:

a. Normal exhaust ventilation (explosion-proof only).

b. Blow-out ventilation (powerful exhaust ventilation provided in some HM storerooms--explosion-proof only).

c. Doors and hatches open to the weather.

d. Portable fans (explosion-proof only).

7. **Cleanup and Decontamination**. During this response phase, personnel, as directed by the person in charge, shall employ the spill cleanup materials from the oil spill response kit (AEL C550024006) or the HM spill response kit (AEL C550024007),

as applicable. Materials from the HM spill response kit can be used for the cleanup of mercury. Cleanup methods outlined in references B3-4 and B3-5 shall be used for the cleanup of HM and oil spills. In the case of a mercury spill, those procedures outlined in appendix B3-B shall be used. All surfaces shall be thoroughly cleaned of the spilled material. After the spill cleanup, the compartment shall be thoroughly ventilated. Reusable protective clothing shall be thoroughly decontaminated and otherwise maintained before it is returned to its proper storage location.

NOTE:

Identification of specific requirements for respiratory protection and proper use of this equipment is a critical aspect of all cleanup and decontamination operations.

8. **Disposal of Contaminated Materials**. All non-reusable cleanup materials are to be placed in impermeable containers, stored and disposed of as hazardous waste per appendix L of reference B3-2. These materials include unrecoverable protective clothing, sorbents, rags, brooms, and containers.

9. **Certification for Safe Re-Entry**. The spaces affected by the spill shall be certified safe by the OOD/CDO before normal shipboard operations are resumed in that space. The OOD/CDO shall ascertain the following before allowing re-entry:

a. All surfaces--deck, counters, bulkheads, and overheads--have been thoroughly cleaned of the spilled material.

b. All compartments have been adequately ventilated as determined from analysis by the gas free engineer.

c. All contaminated cleanup materials, including protective clothing, have been packaged, marked and handled as used HM.

10. **Follow-up Reports** and Spill Response Kit Replenishment.

a. Reporting procedures for overboard oil and HM spills are contained in reference B3-2. The OOD/CDO shall submit to the HM coordinator a spill report for all on board spills. A copy of this report shall be filed by the safety officer and shall contain the following information:

(1) Date spill occurred.

(2) Spill location.

(3) Identity of spilled material.

(4) Cause(s) of spill.

(5) Damage or injuries resulting from the spill.

(6) Response and cleanup measures taken.

(7) Any problems encountered.

(8) Method of disposing of contaminated material.

(9) Action taken to prevent the repeat of a similar spill.

b. All depleted spill response kit components shall be replenished with new stock and the kit returned to its designated storage location.

Appendix B3-B

Mercury Spill Response and Cleanup Procedures (Surface Ships Only)

1. **Mercury Spill Cleanup Procedures.** Procedures shall vary according to the size and complexity of the mercury spill. Refer to B3-4 and B3-26.

a. **Broken Fluorescent Bulbs**

(1) Set up local exhaust ventilation.

(2) Carefully sweep up bulb debris and double bag for disposal as HM.

(3) Clean the area with a solution of HgX® mercury decontaminant from the HM Spill Response kit.

b. **Small Spills**: Clean mercury spills with 50 grams (3/4 teaspoon or quarter size) or less immediately as follows:

(1) If spill is in a confined area, set up local exhaust ventilation. If ventilation cannot be provided, a suitable respirator should be worn.

(2) Spill cleanup personnel shall not eat, drink, smoke or apply cosmetics in spill area. They shall wash thoroughly with soap and water after cleanup.

(3) Apply absorbent material from the HM spill response kit to spilled mercury and dispose as HM.

(4) Wipe down spill area with HgX® solution from the spill kit.

(5) Discard any contaminated materials and protective clothing and dispose as HM.

c. **Large Spills**: Clean mercury spills of more than 50 grams (3/4 teaspoon or quarter size) immediately as follows:

(1) Stop work operations in the area.

(2) Warn personnel of the spill and its location, evacuate the area, and establish safe boundaries.

(3) Call the oil and hazardous substance (OHS) spill team. Describe the nature and location of the spill.

(4) Use a mercury vapor meter to determine mercury vapor and degree of hazard, if possible.

(5) Apply absorbent material from the HM Spill Response kit to spilled mercury and dispose as HM.

(6) Wipe down spill area with HgX® solution from the spill kit.

(7) Discard any contaminated materials and protective clothing and dispose as HM.

(8) Use a mercury vapor meter to detect any residual mercury. Reclean with HgX® if mercury vapor concentration exceeds 0.05 milligram per cubic meter (mg/m3).

(9) Use the mercury vapor meter after 24 hours to determine mercury vapor concentration. An allowable concentration of less than <0.01 milligram per cubic meter (mg/m3) must be attained in any space to be continually occupied by an individual for eight or more hours daily.

2. **Mercury Waste Disposal.** Mercury is an environmental pollutant and must not be discharged into any body of water or released into any ship's waste disposal system. Disposal should be coordinated with the HM coordinator and shore facility. All non-reusable cleanup materials are to be placed in impermeable containers, stored and disposed of per appendix L of reference B3-2. These materials include unrecoverable protective clothing, sorbents, rags, brooms, and containers.

Appendix B3-C

HAZARDOUS MATERIAL CONTROL AND MANAGEMENT (HMC&M) CHECKLIST SURFACE SHIP PROGRAM

	PROGRAM RESPONSIBILITIES	Yes	No
1.	Has the **commanding officer** assigned the responsibility for implementation of the consolidated hazardous material reutilization inventory management program (CHRIMP) afloat through the operation of a hazardous material minimization center (HAZMINCEN) to the shipboard supply department? B0302a (1)		
2.	Has the **commanding officer** appointed/assigned, in writing, a commissioned officer within the supply department (or a chief or leading petty officer) to be the HM coordinator in accordance with B0302a (1)?		
3.	Has the **commanding officer** appointed/assigned, in writing, a HM supervisor/lead petty officer that is a graduate of the HMC&M Technician (SNEC 9595) Course to operate the HAZMINCEN? B0302a (1)		
4.	Has the **commanding officer** prepared and submitted an annual report of HAZMINCEN operational efficiency to the chain of command? B0302a (1)		
5.	Has the **commanding officer** approved, by signature, ship's hazardous material list (SHML) feedback reports (SFRs)? If elected, has the **commanding officer** designated an O-5 or above, in writing, to approve SFRs? B0302a (1)		
6.	Has the **commanding officer** ensured compliance with OPNAV transfer and disposal policy guidance provided in reference B3-4, chapter 19, appendix L? Has the CO reported to the fleet commanders by message, information to the chain of command, any conditions or system/equipment malfunctions that results in an overboard discharge of HM within restricted waters per reference B3-4 and applicable operations orders (OPORDs)? B0302a (1)		

		Yes	No
7.	Has the **executive officer** semi-annually reviewed the list of HM to ensure that CHRIMP efforts are optimized to minimize HM stowage locations and eliminate excessive or unauthorized quantities of HM? B0302a (2)		
8.	Has the **executive officer** assigned sufficient personnel to the HAZMINCEN to accomplish CHRIMP and ensured an individual with SNEC 9595 qualification is operating the HAZMINCEN? B0302a (2)		
9.	Has the **executive officer** approved work-center HM storage locations/lockers in writing, as applicable, to support daily evolutions? B0302a (2)		
10.	Has the **executive officer** reviewed the HAZMINCEN delinquent containers report generated from the HM software inventory management program (hazardous inventory control system windows (HICSWIN)) and ensured that action was taken to correct outstanding/repeated delinquencies? B0302a (2)		
11.	Has the **executive officer** ensured that supply and safety officers are making monthly satellite locker inspections and quarterly storeroom inspections and are taking action to correct deficiencies? B0302a (2)		
12.	Has the **executive officer** ensured that HM needed for embarked units (Marines, airwing squadrons, special forces, etc.) is authorized for use on board ship and that there is an agreement, in writing, detailing responsibilities of ships company and the embarked unit? B0302a (2)		
13.	Has the **executive officer** ensured that HM brought on board by contractor and shipyard representatives is controlled and offloaded in accordance with contract requirements? B0302a (2)		
14.	Has the **executive officer** reviewed the ship's training plan annually to ensure that HM awareness training is included? B0302a (2)		

		Yes	No
15.	Has the **executive officer** ensured that all supervisors (department heads, division officers and petty officers) receive the HM awareness training annually? Has the **executive officer** ensured that supervisors provide HM awareness training to all hands? B0302a (2)		
16.	Have **department heads** assisted the executive officer in a semi-annual review of the list of HM to ensure that CHRIMP efforts are optimized to minimize HM stowage locations and eliminate excessive or unauthorized quantities of HM? B0302a (3)		
17.	Have **department heads** ensured that HM retained within their work-centers is required for the operations and maintenance of assigned equipments and does not exceed the quantity needed to satisfy operational needs/requirements? B0302a (3)		
18.	Have **department heads** ensured that department personnel are available to receive annual HM awareness training? B0302a (3)		
19.	Have **department heads** ensured that used or excess HM is properly turned into the HAZMINCEN for turn over to the shore activity offload personnel? B0302a (3)		
20.	Has the **supply officer/HM coordinator/HM supervisor** operated the HAZMINCEN in accordance with guidance in chapter B3 and in chapter C23? B0302a (4)		
21.	Has the **supply officer/HM coordinator/HM supervisor** prepared and submitted a weekly HAZMINCEN operation summary report to the chain of command IAW B0302a (4)? B0302a (4)		
22.	Has the **supply officer/HM coordinator/HM supervisor** prepared and submitted a quarterly report of HAZMINCEN operational efficiency to the CO? B0302a (4)		
23.	Is the **HM coordinator** a graduate of the Afloat HM Coordinator course or equivalent Supply Corps Officer training? Is the **HM supervisor**/lead petty officer a graduate of the HMC&M Technician (SNEC 9595) Course? B0302a (4)		

		Yes	No
24.	Has the **supply officer/HM coordinator/HM supervisor** provided quarterly training to HAZMINCEN personnel on proper handling, issuing, labeling, stowage, receipt processing, inventories, spill response and disposal procedures? B0302a (4)		
25.	Has the **supply officer/HM coordinator/HM supervisor** provided quarterly HM training is to division/work-center personnel responsible for maintaining in-space storage lockers? Does training include inventorying, marking, stowage and the use of MSDS? B0302a (4)		
26.	Has the **supply officer/HM coordinator/HM supervisor** ensured a MSDS is on file (either hard copy or on CD-ROM) for all types and brands of HM taken aboard? B0302a (4)		
27.	Has the **supply officer/HM coordinator/HM supervisor** ensured that only HM authorized for shipboard use by the Ship's hazardous material list (SHML) is requisitioned, or if necessary to do so, that a SHML feedback report (SFR) is promptly submitted? Have the SHML feedback reports (SFRs) been signed by the commanding officer (or a designated O-5 or above) and transmitted to NAVCIP for processing? B0302a (4)		
28.	Has the **supply officer/HM coordinator/HM supervisor** contacted the stock control officer to ensure all HM orders are approved by the HAZMINCEN prior to ordering or signing all purchase requests for HM items? B0302a (4)		
29.	Has the **supply officer/HM coordinator/HM supervisor** identified, in writing, locations and quantities of all HM/excess HM stored aboard ship? Has the list been provided to the executive officer, department heads, gas free engineer, damage control assistant (DCA), fire marshal, safety officer and senior medical officer? B0302a (4)		

		Yes	No
30.	Has the **supply officer/HM coordinator/HM supervisor** executed the following inspections, and taken corrective action for all deficiencies found? Have the inspection been in accordance with chapters B3, C23 and reference B3-6, section 8202, hazardous material division check off list? Have the inspections been conducted in coordination with the safety officer? B0302a (4) (1) Monthly satellite locker inspections; (2) Monthly spot-check of HM practices of division personnel; (3) Quarterly storeroom inspections; (4) Annual ship-wide physical inventory of all HM.		
31.	Has the **supply officer/HM coordinator/HM supervisor** approved work-center HM storage locations/lockers in writing, as applicable, to support daily evolutions? Was the approval of locker locations coordinated with the safety officer, DCA, and XO? B0302a (4)		
32.	Has the **supply officer/HM coordinator/HM supervisor** acted as the ship's single point of contact in the offload of used/excess HM? Has used HM been received and segregated/consolidated and labeled/marked in accordance with chapter C23? Has the **supply officer/HM coordinator/HM supervisor** supervised document preparation for offload of used / excess HM and prior to getting underway, ensured that no HM remains on the pier? Has the **supply officer/HM coordinator/HM supervisor** ensured that all contractor and shipyard representatives offload all HM brought on board following completion of their work? B0302a (4)		
33.	Has the **supply officer/HM coordinator/HM supervisor** ensured that personnel assigned to the HAZMINCEN are trained on duties and responsibilities prior to assuming these duties? Has the **supply officer/HM coordinator/HM supervisor** ensured at least the number of persons specified in the ships manning document are assigned to operation the HAZMINCEN? B0302a (4)		
34.	Has the **supply officer/HM coordinator/HM supervisor** maintained HICSWIN? B0302a (4)		

		Yes	No
35.	Has the **supply officer/HM coordinator/HM supervisor** managed embarked unit (Marines, Airwing Squadrons, Special Forces, etc.) HM in accordance with B0302? (i.e. ensure embarked units do not bring onboard prohibited HM; Screen embarked unit HM against the ships T-SHML; ensure embarked units provide a valid requirement for material needed onboard ship (i.e., maintenance procedure, technical manual, etc.); ensure embarked units submit requirements for hazardous material to the ship prior to embarking; Ensure that the embarked unit only brings unique hazardous material onboard that is authorized by the ship. In this case, ensure the embarked unit takes responsibility for the offload of the material (upon departure of the embarked unit or aircraft)) B0302a (4)		
36.	Has the **supply officer/HM coordinator/HM supervisor** ensured that the HAZMINCEN is equipped with an Oil and Hazardous Substance (OHS) spill kit? Has the **supply officer/HM coordinator/HM supervisor** ensured that the DCA is aware of his responsibility to maintain and replenish spill kit material? B0302a (4)		
37.	Has the **supply officer/HM coordinator/HM supervisor** ensured that the HAZMINCEN pollution prevention afloat (P2A) equipment is operational, and being used safely in accordance with instructions? B0302a (4)		
38.	Have the **division officers** ensured that only NAVSEA-approved, in-space storage lockers are used and that locations/installations are approved by the HM coordinator, safety officer, DCA and XO? Have the **division officers** ensured lockers are installed and labeled in accordance with reference B3-7? B0302a (5)		

		Yes	No
39.	Have the **division officers** ensured that HM retained within their work-centers is specific to the operations and maintenance of assigned equipment and that no more than a seven-day supply of HM is retained in work-center spaces? Have the **division officers** ensured that longer storage to address special needs is authorized, in writing, by the HM coordinator, DCA, safety officer, and XO? B0302a (5)		
40.	Have the **division officers** ensured that HM training is provided quarterly to division personnel responsible for maintaining in-space storage lockers? B0302a (5)		
41.	Have the **division officers** ensured that used or excess HM is properly returned to the HAZMINCEN? B0302a (5)		
42.	Have the **division officers** ensured that approved personal protective clothing and equipment are available for HM operations or incidents and personnel are trained in their proper use and maintenance as described in reference B3-8 and on applicable PMS cards and MSDSs? Have the **division officers** ensured that upon reporting on board and annually thereafter; all personnel are educated on HMC&M (ordering, issuing, reutilization, handling, storing, using, disposal, and spill response? B0302a (5)		
43.	Are **division personnel** available to receive annual HM awareness training? Have the **division officers** incorporated HM training into normally scheduled weekly divisional training? B0302a (5)		
44.	Have the **division officers** ensured that any PCB-containing electrical or electronic components are labeled/marked per reference B3-9 and associated NAVSEASYSCOM-issued PCB advisories? B0302a (5)		
45.	Has the **safety officer** approved work-center HM storage locations/lockers, in coordination with the HAZMINCEN Division? B0302a (6)		

		Yes	No
46.	Has the **safety officer** conducted monthly spot checks, in conjunction with the master-at-arms force and the HAZMINCEN division, to ensure day-to-day compliance with CHRIMP requirements? Have the spot checks included checking for improper stowage and use of HM in the HAZMINCEN and work-center lockers? Are spot checks conducted such that all divisions are checked at least twice per year? B0302a (6)		
47.	Has the **safety officer** executed the following inspections with the HAZMINCEN division: (1) Monthly satellite locker inspections; (2) Quarterly storeroom inspections? B0302a (6)		
48.	Has the **safety officer** evaluated the CHRIMP/HAZMINCEN program annually for compliance and effectiveness? B0302a (6)		
49.	Has the **safety officer** reported all HM mishaps as required by reference B3-10? B0302a (6)		
50.	Has the **afloat environmental protection coordinator (AEPC)** performed the functions described in reference B3-4 and ensured that HAZMINCEN pollution prevention afloat (P2A) equipment is operational and in use? B0302a (7)		
51.	Has the **damage control assistant (DCA**) coordinated HM spill response drills with the HAZMINCEN division as necessary? B0302a (8)		
52.	Has the **damage control assistant (DCA)** approved work-center HM storage locations/lockers in writing, as applicable, to support daily evolutions in coordination with the HAZMINCEN division? B0302a (8)		
53.	Has the **medical department representative (MDR)** assisted the HM coordinator/HM supervisor and work-center supervisors in training personnel regarding health information and personal protective equipment requirements for the HM they are using? B0302a (9)		
54.	Has the **medical department representative (MDR)** maintained a complete MSDS file? B0302a (9)		

		Yes	No
55.	Have the **division supply petty officers/repair parts petty officers** requested HM from the HAZMINCEN and ensured before HM is ordered that a valid requirement exists? Have the **division supply petty officers/repair parts petty officers** used HM listed on the SHML to avoid open procurement of HM, and submitted an SFR to HAZMINCEN personnel whenever requesting HM not authorized by the SHML? B0302a (10)		
56.	Have the **embarked unit supply petty officers/repair parts petty officers** executed, in writing, an agreement detailing responsibilities of ships company and the embarked unit, including procurement, storage, reorder and offload of HM? B0302a (11)		
57.	Have the **embarked unit supply petty officers/repair parts petty officers** submitted requirements for hazardous material to the ship prior to embarking and provided a valid requirement for material needed on board ship (i.e., maintenance procedure, technical manual, etc.)? Have the **embarked unit supply petty officers/repair parts petty officers** ensured that the HM is screened against the ships T-SHML to ensure it is authorized for use on board ship? Have the **embarked unit supply petty officers/repair parts petty officers** given sufficient notice to allow the ship to order and receive the hazardous material? B0302a (11)		
58.	Have the **embarked unit supply petty officers/repair parts petty officers** offloaded any HM (not supplied by the ship) brought on board in accordance with applicable requirements? B0302a (11)		
59.	Have **work-center supervisors** ensured that required personal protective clothing and equipment are maintained and used? B0302a (12)		

		Yes	No
60.	Have **work-center supervisors** ensured that prior to initial use or handling any HM, work-center personnel have been trained on the hazards associated with that material and are familiar with what an MSDS is, what it contains, and where a copy is available for review? Have **work-center supervisors** trained work-center personnel in the use of MSDS? B0302a (12)		
61.	Have **work-center supervisors** ensured that a valid maintenance requirement exists for any HM item not listed in the SHML and initiated a SFR? B0302a (12)		
62.	Have **work-center supervisors** removed unauthorized HM from the work-center? B0302a (12)		
63.	Have **work-center supervisors** ensured a copy of the hazardous material user's guide (HMUG) is available for use by work-center personnel? B0302a (12)		
64.	Have **work-center supervisors** ensured that work-center HM lockers are secured, labeled and have contents identified and approved by the XO, safety officer, DCA, and HAZMINCEN division? B0302a (12)		
65.	Have **all hands** stowed or returned HM to approved locker or the HAZMINCEN upon completion of use or no later than the end of the workday?		
66.	Have **all hands** used and handled HM in accordance with the applicable MSDS and reference B3-8?		
67.	Have **all hands** collected and segregated any residue resulting from use of HM issued from the HAZMINCEN for turn-in to the supply department/HAZMINCEN?		
68.	Have **all hands** reported any spills of HM to the officer of the deck, and/or damage control central/central control station?		
69.	Have **all hands** completed annual HM awareness training?		

	OIL AND HAZARDOUS SUBSTANCE (OHS) SPILL RESPONSE	Yes	No
70.	Has the **damage control assistant (DCA)** developed and implemented a spill contingency plan (SCP), using the Navy's shipboard oil and hazardous substance (OHS) spill contingency plan guide per reference B3-4 and B3-13? B0304a (1)		

		Yes	No
71.	Has the **damage control assistant (DCA)** trained and supervised ship's damage control teams (and fire department, if used aboard) in combating spills of HM and oil? B0304a (1)		
72.	Has the **damage control assistant (DCA)** provided training to divisions regarding reporting, initial handling, and cleanup of HM and oil spills, as requested? B0304a (1)		
73.	Has the **damage control assistant (DCA)** maintained the hazardous material spill response kit (AEL 2-550024007) and the oil spill response kit (AEL 2-550024006)? B0304a (1)		
74.	Has the **damage control assistant (DCA)** ensured that HM and oil spills are handled per appendices B3-A and B3-B? B0304a (1)		
75.	Has the **damage control assistant (DCA)** inspected OHS spill kits monthly and replenished material as required? B0304a (1)		
76.	Has the **damage control assistant (DCA)** maintained the OTTO fuel spill kit (AEL A006350027) to respond to OTTO fuel Spills? B0304a (1)		

Appendix B3-D

HAZARDOUS MATERIAL CONTROL AND MANAGEMENT (HMC&M) CHECKLIST SUBMARINE PROGRAM

	PROGRAM RESPONSIBILITIES	Yes	No
77.	Has the **commanding officer** reported all HM mishaps as required by OPNAVINST 5102/MCO P5102.1B? B303a (1)		
78.	Has the **commanding officer** reported to the fleet commanders by message, information to the chain of command, any conditions or system/equipment malfunctions that results in an overboard discharge of HM into or upon the marine environment per reference B3-4 and applicable operations orders (OPORDs)? B303a (1)		
79.	Has the **commanding officer** ensured that spills of HM are handled per the submarine SORM? B303a (1)		
80.	Has the **executive officer** granted written permission to carry on board any restricted HM during an underway period (refer to chapter D15 and reference B3-2 for definitions of submarine material control usage categories)? B303a(2)		
81.	Has the **executive officer** ensured assigned personnel follow the conditions under which restricted or limited HM are stored or used on board to minimize the release (off-gassing, mists, or vapors) of potential atmospheric contaminants into the submarine? B303a(2)		
82.	Has the **executive officer** reviewed the submarine material control log prior to each underway operation of 24 hours or greater, conducted in the recirculation mode, to ensure that restricted (R) items have been removed from the submarine? B303a(2)		
83.	Have the **department heads** ensured that HM retained within their work-centers is unique to the operations and maintenance of assigned equipment and does not exceed the quantity needed to satisfy operational requirements? B303a (3)		
84.	Have the **department heads** ensured used or excess HM is properly returned to the supply officer for turnover to the shore activity? B303a(3)		

		Yes	No
85.	Have the **department heads** reported all items found with a restricted (R) or limited (L) use code that have not been logged in the submarine material control log to the supply officer for logging, labeling, and assignment of approved storage location, or disposal? B303a(3)		
86.	Have the **department heads** reported all items found that are not listed (categorized) in the submarine material control list (SMCL) to the supply officer? Items not listed in the SMCL are prohibited per paragraph D1502(a). B303a(3)		
87.	Have the **department heads** obtained written permission from the executive officer to retain on board restricted items during underway operations? B303a(3)		
88.	Have the **department heads** ensured that restricted items authorized for in-port-use-only are removed from the submarine as soon as the need for them no longer exists? Have the **department heads i**nformed the supply officer of their removal to allow documentation in the submarine material control log? B303a(3)		
89.	Have the **department heads** ensured that all HM in their custody are used, handled, and stowed per the requirements of chapter D15? B303a(3)		
90.	Has the **supply officer/HM coordinator** ensured that management of shipboard HM follows procedures outlined in chapter B3 and chapter D15? B303a(4)		
91.	Has the **supply officer/HM coordinator** ensured an MSDS is on file (either hard copy or on CD-ROM) for all types and brands of HM taken aboard? Has the **supply officer/HM coordinator** ensured that hard-copy MSDSs are readily accessible to personnel and their supervisors, and maintained the submarine hazardous material inventory and management system (SHIMS) which contains MSDS information? Has the **supply officer/HM coordinator** submitted hard copies of MSDSs which are not on the SHIMS system to Naval Surface Warfare Center, Carderock Division, code 634? B303a(4)		
92.	Has the **supply officer/HM coordinator** ensured no prohibited HM is brought on board? B303a(4)		

		Yes	No
93.	Has the **supply officer/HM coordinator** maintained the submarine material control log per paragraph D1502d? B303a(4)		
94.	Has the **supply officer/HM coordinator** ensured all HM brought on board is authorized for storage and use onboard by the submarine material control list (SMCL)? Has the **supply officer/HM coordinator** affixed an atmosphere contaminant tag (appendix D15-C) for any material that is a shipboard restricted (R) or limited (L) use code HM? B303a(4)		
95.	Has the **supply officer/HM coordinator** initiated an investigation of any item suspected of being an atmosphere contaminant per the procedures of reference B3-2 and submitted a SMCL feedback report per chapter D15? B303a(4)		
96.	Has the **supply officer/HM coordinator** ensured that all restricted (R) and limited (L) items are inventoried every six months or prior to a change of command? B303a(4)		
97.	Has the **supply officer/HM coordinator** reviewed the submarine material control log weekly in port and monthly underway? B303a(4)		
98.	Has the **supply officer/HM coordinator** obtained commanding officer's written authorization prior to open purchasing any HM? B303a(4)		
99.	Has the **medical department representative (MDR)** assisted work-center supervisors in training personnel regarding health information and personal protective equipment requirements for the HM they are using? B303a(5)		
100.	Has the **MDR** provided medical assistance in the event of a HM spill or mishap involving HM and used MSDS information in SHIMS provided by the supply officer? B303a(5)		
101.	Have the **division officers** ensured that when HM is transferred into other containers the new containers are properly marked with the information specified in paragraph D1502d? B303a(6)		

		Yes	No
102.	Have the **division officers** ensured approved personal protective clothing and equipment are available for HM operations or incidents and personnel are trained in their proper use and maintenance? B303a(6)		
103.	Have the **division officers** ensured personnel are made available to receive required HM training as detailed in section B0303c? B303a(6)		
104.	Have the **division officers** marked any PCB-containing electrical or electronic components per chapter D15? B303a(6)		
105.	Has the **damage control assistant** coordinated HM spill response drills with the HAZMINCEN division as necessary? B303a(7)		
106.	Has the **repair parts petty officer** ensured that before HM is ordered, a valid requirement (specifically required by a maintenance procedure or other shipboard operation) exists? Do **repair parts petty officers** use standard stock HM whenever possible to avoid procurement of open purchased HM? B303a(8)		
107.	Have the **work-center supervisors** ensured that approved personal protective clothing and equipment are maintained and utilized? B303a(9)		
108.	Have the **work-center supervisors** ensured that prior to using or handling any HM, work-center personnel have been trained on the hazards associated with that material and are familiar with what an MSDS is, what it contains, and where a copy is available for review? B303a(9)		
109.	Have the **work-center supervisors** ensured that a valid maintenance requirement exists for any HM item not listed in the SMCL and initiated a SMCL feedback report? B303a(9)		
110.	Have **all hands** ensured that HM is returned to appropriate stowage upon completion of use or at the end of the workday, whichever is earlier? B303a(10)		
111.	Have **all hands** followed instructions provided for the proper use of HM? B303a(10)		
112.	Have **all hands** collected and segregated any used HM for proper offload per chapter D15? B303a(10)		

		Yes	No
113.	Have **all hands** reported any spills of HM to the duty officer (in port) or the chief of the watch (underway)? B303a(10)		
114.	Have **all hands** reported any violation of HM use, storage, and handling precautions to the supervisor for resolution/correction? B303a(10)		
115.	Have **all hands** been alerted to prevent the on board storage and use of restricted material during underway operations without prior approval/authorization from the executive officer? Are **all hands** using limited material per SMCL guidance? B303a(10)		

	OIL AND HAZARDOUS SUBSTANCE (OHS) SPILL RESPONSE	Yes	No
116.	Has the **damage control assistant (DCA)** provided training and supervision of the command's damage control efforts to combat HM and oil spills? Has the **damage control assistant (DCA)** conducted HM spill response training? B0304d (1)		
117.	Has the **damage control assistant (DCA)** provided training to divisions regarding reporting, initial handling, and cleanup of HM spills, as requested? B0304d (1)		
118.	Has the **damage control assistant (DCA)** maintained an OTTO FUEL spill kit (AEL A006350027) to respond to OTTO Fuel Spills? B0304d (1)		
119.	Has the **damage control assistant (DCA)** conducted hazardous material emergency response per the submarine SORM? Has the reporting requirements for a HM spill which goes over the side been followed?(reference B3-4) B0304d (1)		