OCCUPATIONAL SAFETY & HEALTH

OPNAVINST 5100.19D

NAVY

OCCUPATIONAL SAFETY AND HEALTH (NAVOSH)

PROGRAM MANUAL FOR FORCES AFLOAT

OPNAV INSTRUCTION 5100.19D
VOLUME I
NAVOSH AND MAJOR HAZARD-SPECIFIC PROGRAMS

DEPARTMENT OF THE NAVY

OFFICE OF THE CHIEF OF NAVAL OPERATIONS

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SUBJ/ADVANCE CHANGE 1/1 TO OPNAVINST 5100.19D//
REF/A/LTR/CNO/30APR2001//
AMPN/REF A IS E-MAIL FROM CNO (N45) CDR HAGEN TO COMNAVSAFECEN (39) STEVE SCUDDER.//
POC/S. V. SCUDDER/GS12/NAVSAFECEN 39/LOC:NORFOLK /TEL:(DSN) 564-3520 X7115/EMAIL:SSCUDDER@SAFETYCENTER.NAVY.MIL//
RMKS/1. PER REF A, THIS ADVANCE CHANGE TO OPNAVINST 5100.19D PROVIDES THE HIGHLIGHTS OF CHANGES TO CHAPTER A6 AND THE GLOSSARY WHICH WILL BE INCORPORATED IN CHANGE 1. CHANGE 1 WILL BE PROMULGATED LATER THIS YEAR.

2. IN CHAPTER A6:

A. PARA A0601B(1): CHANGE SENTENCE TO ADD "AND FLOATING DRY-DOCKS."

B. PARA A0601D(1)(C): DELETE "OR AN INJURY PREVENTING AN INDIVIDUAL FROM PERFORMING REGULARLY SCHEDULED DUTY OR WORK BEYOND THE DAY OR SHIFT ON WHICH IT OCCURRED,"

C. PARA A0601D(1)(D): CHANGE TO READ:

"(D) AFLOAT SPECIAL CASE MISHAP. THE FOLLOWING SPECIAL CASE AFLOAT MISHAPS REQUIRE THE SUBMISSION OF THE INDICATED REPORT FORM:

"1. ALL CASES OF ELECTRIC SHOCK. INCLUDE THE VOLTAGE IN THE REPORT. (MISHAP REPORT, APPENDIX A6-I)

"2. ALL CASES OF GROUNDING, COLLISION, AND FLOODING. IN THE CASE OF COLLISIONS INVOLVING ONLY U.S. NAVY OR MILITARY SEALIFT COMMAND SHIPS OR CRAFT, EACH COMMAND WILL SUBMIT A SEPARATE REPORT. IN ALL OTHER COLLISIONS (INCLUDING A SHIP RUNNING INTO A STATIONARY OBJECT), THE REPORT WILL INCLUDE AN ESTIMATE OF THE DAMAGE TO THE OTHER SHIP, CRAFT, OR OBJECT. (MISHAP REPORT, APPENDIX A6-I)

"3. ALL FIRES. (ALL CASES EXCEPT SMALL TRASH OR SIMILAR FIRES IN WHICH NO PERSONNEL WERE INJURED AND THE MATERIAL DAMAGE WAS LIMITED TO THE CONTAINER IN WHICH THE FIRE ORIGINATED. (MISHAP REPORT, APPENDIX A6-I)

"4. ALL CASES OF HAZARDOUS MATERIAL, CHEMICAL OR TOXIC EXPOSURE REQUIRING MEDICAL ATTENTION. (MISHAP REPORT, APPENDIX A6-I)

"5. ALL MISHAPS INVOLVING EXPLOSIVES, OXIDIZERS, INCENDIARIES, EXPLOSIVE SYSTEMS OR CHEMICAL WARFARE AGENTS. MISHAPS INCLUDE DETONATION, ACCIDENTAL LAUNCH, MALFUNCTION, DANGEROUS DEFECT, IMPROPER HANDLING, DAMAGE TO A LAUNCHING DEVICE, WEAPON IMPACT OFF RANGE, OR OTHER UNUSUAL OR UNEXPECTED WEAPONS-RELATED OCCURRENCE. (EXPLOSIVE MISHAP OR CONVENTIONAL MISHAP REPORT, APPENDIX A6-J)

"6. ALL DIVING CASES INVOLVING CENTRAL NERVOUS SYSTEM (CNS) OXYGEN TOXICITY, PULMONARY OVER INFLATION SYNDROME (POIS) OR HYPERBARIC TREATMENT. (DIVING MISHAP

REPORT WITH HYPERBARIC TREATMENT, APPENDIX A6-M OR DIVING MISHAP REPORT NOT REQUIRING HYPERBARIC TREATMENT, APPENDIX A6-N)

"7. ALL CASES OF BACK INJURY RESULTING FROM A MISHAP REQUIRING MEDICAL ATTENTION. (MISHAP REPORT, APPENDIX A6-I)"

D. PARA A0603B: ADD THE FOLLOWING PARAGRAPH:

"(2) IN ALL CASES INVOLVING DEATH OR INJURY, THE APPOINTING AUTHORITY SHALL INCLUDE A MEDICAL OFFICER, OR MEDICAL DEPARTMENT REPRESENTATIVE FOR LCACS, AS AN ADDITIONAL MEMBER TO THE MIB."

E. PARA A0604B(2)(C)2: CHANGE TO READ: "TO DETERMINE THE COST OF REPAIR OR REPLACEMENT OF ALL DOD PROPERTY INVOLVED IN THE MISHAP, USE ACTUAL COST OF MATERIALS OR ESTIMATES PROVIDED BY THE REPAIR ACTIVITY. IF NECESSARY, USE ESTIMATES BASED ON THE ACTUAL COST OF MATERIALS AND $18 FOR EACH HOUR OF ORGANIZATIONAL OR INTERMEDIATE LEVEL LABOR OR $60 FOR EACH HOUR OF DEPOT LEVEL LABOR."

F. PARA A0604H: CHANGE SUBPARAGRAPHS (1) AND (1)(A) THROUGH (C) IN THEIR ENTIRETY TO READ:

"H. MIR ENDORSEMENTS

"(1) MIR ENDORSEMENTS ARE PRIVILEGED AND SHALL BE MADE BY MESSAGE IN THE FORMAT OF ATTACHMENT A6-G. SINCE MIR ENDORSEMENTS BECOME A PART OF THE MIR AND FALL UNDER THE CONCEPT OF PRIVILEGED INFORMATION, ENDORSERS SHALL PROVIDE COMPLETE AND OPEN INFORMATION, OPINIONS, AND RECOMMENDATIONS.

"(A) IF AN ENDORSER AGREES WITH THE ANALYSIS OF FINDINGS AND RECOMMENDATIONS IN THE MIR, AS MODIFIED BY PREVIOUS ENDORSEMENTS, THEN A BRIEF STATEMENT OF CONCURRENCE IS SUFFICIENT.

"(B) TO DISAGREE, ENDORSERS SHALL LIST EACH PROBABLE CAUSE, REJECTED PROBABLE CAUSE, AND RECOMMENDATION AND RECOMMENDED ACTION AGENCY FROM THE MIR OR PREVIOUS ENDORSEMENTS AND STATE THEIR REASON FOR DISAGREEMENT. IF THE MIR, OR A PREVIOUS ENDORSER, RECOMMENDED ACTION BY THE CURRENT ENDORSER, STATE THE ACTION TAKEN TO DATE ON THAT RECOMMENDATION.

"(C) THROUGH ANALYSIS OF THE MIR AND PREVIOUS ENDORSEMENTS, AN ENDORSER MAY INCLUDE ADDITIONAL CAUSES AND RECOMMENDATIONS OR CHANGES TO THE ACTION AGENCY FOR PREVIOUS RECOMMENDATIONS. SUBSEQUENT ENDORSERS SHALL STATE THEIR AGREEMENT OR DISAGREEMENT FOR EACH ADDITIONAL PROBABLE CAUSE AND RECOMMENDATION."

G. PARA A0604K: MAKE SUBPARAGRAPH (G) PART OF PARAGRAPH (F) AND DELETE (G).

H. A0605D(1)(D): CHANGE TO READ: "COMMANDER, NAVAL SEA SYSTEMS COMMAND (PEO EXW WASHINGTON DC/PMS377/) AND INFORMATION TO NAVAL COASTAL SYSTEMS CENTER (NAVSURFWARCEN COASTSYSTA PANAMA CITY FL/A41/), CNO WASHINGTON DC/N76D/N766D/, AND ACU FOUR AND ACU FIVE FOR MISHAPS INVOLVING LCACS."

I. PARA A0605D(1)(E): CHANGE TO READ: "COMNAVSAFECEN NORFOLK VA/40/30/ AND COMMANDANT OF THE MARINE CORPS (CMC WASHINGTON DC/SD/) FOR MISHAPS INVOLVING EMBARKED MARINES AND MARINE CORPS EQUIPMENT."

J. PARA A0606C(3)(D)1: CHANGE COMNAVSAFECEN PHONE NUMBERS TO READ: "COMNAVSAFECEN (CODE 43) - DSN: 564-3520, EXT. 7164, OR COMMERCIAL: (757)444-3520, EXT. 7164."

K. PARA A0608A(1): CHANGE TO READ: "ANY CLASS B, REPORTABLE CLASS C, OR SPECIAL CASE DIVING MISHAP INVOLVING NAVY DIVERS WHEN DIVING FROM THE SHIP OR SUBMARINE, SHIP'S BOAT, OR WHEN DIVING FROM A SHORE COMMAND. CLASS A DIVING MISHAPS ARE REPORTED USING A MISHAP INVESTIGATION REPORT (MIR) AS DESCRIBED IN PARAGRAPH A0604 AND APPENDIX A6-E, AS MODIFIED BY PARAGRAPH A0608D(1)."

L. PARA A0608E(3)(C): CHANGE "...10 DAYS..." TO "...30 DAYS..."

M. CHAPTER A6 REFERENCES: CHANGE A6-7 TO READ: "DOD INSTRUCTION 6055.7, 'MISHAP INVESTIGATION, REPORTING, AND RECORDKEEPING' DATED OCTOBER 3, 2000 (NOTAL)."

3. IN APPENDIX A6-B:

A. IN THE RMKS SECTION, RE-NUMBER CURRENT PARAGRAPH NUMBER 5 TO NUMBER 6 AND ...

B. IN THE RMKS SECTION: ADD THE FOLLOWING AS NEW PARAGRAPH 5: "5. UPON COMPLETION OF THE INVESTIGATION, THE SENIOR MEMBER SHOULD SEND THE MISHAP INVESTIGATION REPORT TO THE FOLLOWING MINIMUM ENDORSERS:

"A. MISHAP SHIP
"B. ISIC
"C. TYCOM
"D. COMNAVSAFECEN"

4. IN APPENDIX A6-D:

A. WITNESS STATEMENTS - DELETE THE FOLLOWING PARAGRAPH ON PAGE A6-D-4 IN ITS ENTIRETY: "IF WITNESSES SEEM RELUCTANT TO DISCUSS THE EVENTS SURROUNDING A MISHAP WITHOUT BEING GRANTED THE PROTECTION PROVIDED UNDER THE CONCEPT OF PRIVILEGE, THE MISHAP INVESTIGATION BOARD SHOULD EXPLAIN THE CONCEPT OF PRIVILEGE TO THE WITNESS. IF THE WITNESS DESIRES, HE OR SHE MAY MAKE A STATEMENT TO THE MISHAP INVESTIGATION BOARD UNDER THE CONCEPT OF PRIVILEGE; BUT, IT MUST BE AT THE SPECIFIC REQUEST OF THE WITNESS AND NOT THE MIB MEMBER."

B. WITNESS STATEMENTS - ADD THE FOLLOWING SENTENCE AT THE END OF THE SECOND PARAGRAPH ON PAGE A6-D-4: "THE MIB WILL DETERMINE WHICH WITNESSES WILL BE OFFERED TO MAKE A STATEMENT TO THE MISHAP INVESTIGATION BOARD UNDER THE CONCEPT OF PRIVILEGED."

5. IN APPENDIX A6-E:

A. IN "TO" PARAGRAPH, DELETE COMNAVSEASYSCOM AND ADD: "PEO EXW WASHINGTON DC/PMS377/"

B. CHANGE FIRST TWO SENTENCES IN "INFO" PARAGRAPH TO READ:
"NAVSURFWARCEN COASTSYSTA PANAMA CITY FL/A41/ (LCAC ONLY)
"CNO WASHINGTON DC/N7/N76D/N771D/N785/N789E1/N09/N45/"

ADD THE FOLLOWING TWO ADDEES:
"ACU FOUR (LCAC ONLY)
"ACU FIVE (LCAC ONLY)"

C. IN PARAGRAPH 14 DELETE LAST SENTENCE AND REPLACE WITH "USE ESTIMATES BASED ON ACTUAL COST OF MATERIALS AND $18 FOR EACH HOUR OF ORGANIZATIONAL OR INTERMEDIATE LEVEL LABOR OR $60 FOR EACH HOUR OF DEPOT LEVEL LABOR."

D. ADD NEW PARAGRAPH 26 TO READ, "RISK ASSESSMENT CODE

(RAC) (OPTIONAL)."

E. CHANGE SECTION BRAVO (PRIVILEGED), PARAGRAPH 4 OPINIONS OF THE MISHAP INVESTIGATION BOARD TO READ:

"4. OPINIONS OF THE MISHAP INVESTIGATION BOARD (AS APPLICABLE)

"A. THE ADEQUACY AND USE OF APPROVED PROCEDURES

"B. THE QUALIFICATIONS OF THE PEOPLE INVOLVED

"C. THE STATE OF TRAINING OF THE PEOPLE INVOLVED AND OF THE CREW IN COMBATING THE MISHAP

"D. THE EFFECTIVENESS OF SUPERVISION

"E. THE EFFECTIVENESS OF THE QUALITY ASSURANCE PROGRAM, WHERE APPLICABLE

"F. THE EFFECTIVENESS OF DAMAGE CONTROL EFFORTS

"G. THE ROLE PREVENTIVE AND CORRECTIVE MAINTENANCE PLAYED IN THE MISHAP

"H. ANY EXISTING MATERIAL DEFICIENCIES OR SHORTCOMING WHICH MAY HAVE CONTRIBUTED TO THE MISHAP"

6. IN APPENDIX A6-F:

A. CHANGE PARAGRAPH 3D. TO READ: "UNCLASSIFIED, NON-PRIVILEGED DOCUMENTS NOT SENT TO COMNAVSAFECEN.

B. DELETE THE SENTENCE IN PARA 3D(1) IN ITS ENTIRETY AND ADD:

"(1) OPNAVIST 3120.32C"

7. IN APPENDIX A6-G:

A. CHANGE FIRST TWO SENTENCES IN "INFO" PARAGRAPH TO READ:

"NAVSURFWARCEN COASTSYSTA PANAMA CITY FL/A41/ (LCAC ONLY)
"CNO WASHINGTON DC/N7/N76D/N771D/N785/N789E1/N09/N45/"

ADD THE FOLLOWING THREE ADDEES:

"PEO EXW WASHINGTON DC/PMS377/"
"ACU FOUR (LCAC ONLY)
"ACU FIVE (LCAC ONLY)"

B. CHANGE PARAGRAPH 3 TO READ: "PROVIDE ANY AMPLIFYING INFORMATION, ADDITIONAL COMMENTS, CAUSES, RECOMMENDATIONS, OR THE ACTIONS TAKEN OR INTENDED BY THE ENDORSER CONCERNING THE MISHAP."

8. IN APPENDIX A6-I:

A. IN "TO" PARAGRAPH, DELETE COMNAVSEASYSCOM AND ADD:

"PEO EXW WASHINGTON DC/PMS377/"

B. CHANGE FIRST TWO SENTENCES IN "INFO" PARAGRAPH TO READ:

"NAVSURFWARCEN COASTSYSTA PANAMA CITY FL/A41/ (LCAC ONLY)
"CNO WASHINGTON DC/N7/N76D/N771D/N785/N789E1/N09/N45/"

ADD THE FOLLOWING TWO ADDEES:

"ACU FOUR (LCAC ONLY)
"ACU FIVE (LCAC ONLY)"

C. ADD PARAGRAPH 12 TO READ, "RISK ASSESSMENT CODE (RAC) (OPTIONAL)"

9. IN APPENDIX A6-M:

A. CHANGE THE POINT OF CONTACT FIELD TO READ:

"POC/NAME/RANK/PRIMARY PHONE/-/LOCATION/SECONDARY PHONE/E-MAIL ADDRESS/(POC SHOULD BE THE DMO, DMT OR MDV RESPONSIBLE FOR MAKING THE DIAGNOSIS AND CONDUCTING THE TREATMENT)"

B. ADD NEW PARA ALPHA (6) AS FOLLOWS:

"(6) DIVE LOCATION (CHOOSE ONE OF THE FOLLOWING:)

(A) OPEN WATER

(B) CHAMBER

(C) TRAINING TANK OR POOL"

C. CHANGE PARA BRAVO (NON-PRIVILEGED) DIVE DATA TO READ:

"(1) DIVING SYSTEM AND APPARATUS USED (INCLUDE TYPE OF DIVING SYSTEM EMPLOYED AND DESCRIPTION OF EQUIPMENT MALFUNCTION, IF APPLICABLE.)

(2) SOURCE OF GAS SUPPLY (CHOOSE FROM ONE OF THE FOLLOWING)

(A) COMPRESSOR
(B) AIR BANKS
(C) GAS BANKS
(D) BOTTLES MAN CARRIED
(E) MIX MAKER
(F) OTHER (PLEASE DESCRIBE)

(3) BREATHING GAS PERCENTAGE (FOR EXAMPLE: 79% N2/21% O2, 100% O2, AND 87% HE/13% O2).

(4) LOCAL TIME LEFT SURFACE (USE 24-HOUR CLOCK. FOR EXAMPLE, 0630 AND 1800).

(5) MAXIMUM DEPTH OF DIVE IN FEET, SALT WATER (FSW)

(6) BOTTOM TIME AND SCHEDULE. IF REPETITIVE DIVE, LIST DEPTHS, BOTTOM TIMES, SURFACE INTERVALS AND SCHEDULES OF ALL DIVES.

(7) LOCAL TIME REACHED SURFACE (USE 24-HOUR CLOCK. FOR EXAMPLE, 0800, 0930, AND 1500).

(8) TOTAL DECOMPRESSION TIME OF DIVE

(9) AIR TEMP/WATER TEMP/PURPOSE OF DIVE/DIVE PLATFORM

(10) TYPE OF DRESS

(11) SATURATION DIVE DATA: COMPRESSION RATES TO DEPTHS AS FEET PER MINUTE (FPM) TO FSW (FOR EXAMPLE, FOR A 700 FSW DIVE: 30 FPM TO 100 FSW/20 FPM TO 250 FSW/3 FPM TO 700 FSW)

(A) STORAGE ATMOSPHERE IN FSW
(B) CHAMBER ATMOSPHERE IN OXYGEN PARTIAL PRESSURE (MINIMUM AND MAXIMUM)
(C) MINIMUM EXCURSION DEPTH ATTAINED (IN FSW)
(D) MAXIMUM EXCURSION DEPTH ATTAINED (IN FSW)"

D. CHANGE PARA CHARLIE (4) TO READ:

"(4) INITIAL DIAGNOSIS (FOR EXAMPLE, ARTERIAL GAS EMBOLISM, DCS TYPE I, OR TYPE II. IN ADDITION, LIST WHO MADE THE INITIAL DIAGNOSIS. A TYPICAL ENTRY WOULD READ: 'AGE BY MDV')"

E. CHANGE PARA CHARLIE (13) TO READ:

"(13) FINAL DIAGNOSIS (THIS IS THE FINAL DIAGNOSIS ATTACHED TO THE CASE AFTER ALL TREATMENTS, LABORATORY TESTS, X-RAYS, SCANS, PSYCHOMETRIC TESTS, ETC., HAVE BEEN COMPLETED AND EVALUATED. IF THE REPORT IS PRELIMINARY, STATE, "PENDING." IN ADDITION, INDICATE WHO MADE THE FINAL DIAGNOSIS)"

10. IN APPENDIX A6-N:

A. CHANGE THE POINT OF CONTACT FIELD TO READ: "POC/NAME/RANK/PRIMARY PHONE/-/LOCATION/SECONDARY PHONE/E-MAIL ADDRESS/(POC SHOULD BE THE DMO, DMT OR MDV RESPONSIBLE FOR MAKING THE DIAGNOSIS AND CONDUCTING THE TREATMENT)"

B. CHANGE PARA ALPHA (2) TO READ:

"(2) TYPE OF MISHAP (FOR EXAMPLE, EQUIPMENT DAMAGE OR PERSONNEL INJURY INVOLVING 5 DAYS (1 DAY FOR EMBARKED

MARINES) OR MORE LOST WORK TIME. DIVING INJURIES MAY INCLUDE: BAROTRAUMA, CNS OXYGEN TOXICITY, CARBON DIOXIDE INTOXICATION, HYPOXIA, HYPOTHERMIA OR HYPOTHERMIA, CHEMICAL BURNS, INJURY RELATED TO ACUTE UNDERWATER NOISE EXPOSURE OR BLAST, ILLNESS RELATED TO DIVING IN POLLUTED WATER, ACCIDENTAL RADIATION EXPOSURE, TRAUMA OTHER THAN MINOR CUTS, SCRAPES, BRUISES OR STRAINS.)"

C. ADD NEW PARA ALPHA (6) AS FOLLOWS:

"(6) DIVE LOCATION (CHOOSE ONE OF THE FOLLOWING:)

(A) OPEN WATER

(B) CHAMBER

(C) TRAINING TANK OR POOL"

D. CHANGE PARA BRAVO (NON-PRIVILEGED) DIVE DATA TO READ:

"(1) DIVING SYSTEM AND APPARATUS USED (INCLUDE TYPE OF DIVING SYSTEM EMPLOYED AND DESCRIPTION OF EQUIPMENT MALFUNCTION, IF APPLICABLE.)

(2) SOURCE OF GAS SUPPLY (CHOOSE FROM ONE OF THE FOLLOWING)

(A) COMPRESSOR

(B) AIR BANKS

(C) GAS BANKS

(D) BOTTLES MAN CARRIED

(E) MIX MAKER

(F) OTHER (PLEASE DESCRIBE)

(3) BREATHING GAS PERCENTAGE (FOR EXAMPLE: 79% N2/21% O2, 100% O2, AND 87% HE/13% O2).

(4) LOCAL TIME LEFT SURFACE (USE 24-HOUR CLOCK. FOR EXAMPLE, 0630 AND 1800).

(5) MAXIMUM DEPTH OF DIVE IN FEET, SALT WATER (FSW)

(6) BOTTOM TIME AND SCHEDULE. IF REPETITIVE DIVE, LIST DEPTHS, BOTTOM TIMES, SURFACE INTERVALS AND SCHEDULES OF ALL DIVES.

(7) LOCAL TIME REACHED SURFACE (USE 24-HOUR CLOCK. FOR EXAMPLE, 0800, 0930, AND 1500).

(8) TOTAL DECOMPRESSION TIME OF DIVE

(9) AIR TEMP/WATER TEMP/PURPOSE OF DIVE/DIVE PLATFORM

(10) TYPE OF DRESS

(11) SATURATION DIVE DATA: COMPRESSION RATES TO DEPTHS AS FEET PER MINUTE (FPM) TO FSW (FOR EXAMPLE, FOR A 700 FSW DIVE: 30 FPM TO 100 FSW/20 FPM TO 250 FSW/3 FPM TO 700 FSW)

(A) STORAGE ATMOSPHERE IN FSW

(B) CHAMBER ATMOSPHERE IN OXYGEN PARTIAL PRESSURE (MINIMUM AND MAXIMUM)

(C) MINIMUM EXCURSION DEPTH ATTAINED (IN FSW)

(D) MAXIMUM EXCURSION DEPTH ATTAINED (IN FSW)"

E. CHANGE PARA B1(2):

"(2) ESTIMATED COST TO REPAIR OR REPLACE DOD PROPERTY PROVIDE THE TOTAL DOLLAR VALUE, UIC, AND NAME OF COMMAND HAVING CUSTODY OF THE PROPERTY (IF DIFFERENT FROM REPORTING ACTIVITY) AND RUC (REPORTING UNIT CODE) IF USMC EQUIPMENT IS INVOLVED. TO DETERMINE THE COST OF REPAIR OR REPLACEMENT OF ALL DOD PROPERTY INVOLVED IN THE MISHAP, USE ACTUAL COST OF MATERIALS OR ESTIMATES PROVIDED BY THE REPAIR ACTIVITY. IF NECESSARY, USE ESTIMATES BASED ON THE

ACTUAL COST OF MATERIALS AND $18 FOR EACH HOUR OF ORGANIZATIONAL OR INTERMEDIATE LEVEL LABOR OR $60 FOR EACH HOUR OF DEPOT LEVEL LABOR."

F. CHANGE PARA CHARLIE(4) TO READ:

"(4) INITIAL DIAGNOSIS (FOR EXAMPLE, CNS OXYGEN TOXICITY, CARBON DIOXIDE POISONING, BAROTRAUMA. IN ADDITION, LIST WHO MADE THE INITIAL DIAGNOSIS. A TYPICAL ENTRY WOULD READ: CHEMICAL BURN BY MDV)"

11. IN THE GLOSSARY:

A. AFLOAT MISHAP A: CHANGE TO READ: "COMMISSIONED, U.S. NAVY SHIPS AND THEIR EMBARKED BOATS AND LANDING CRAFT OR LEASED BOATS AND FLOATING DRY-DOCKS."

B. AFLOAT MISHAP PARA C: DELETE IN ITS ENTIRETY.

C. AFLOAT MISHAP PARA D: RE-LETTER PARAGRAPH "D" TO PARAGRAPH "C."

D. AFLOAT MISHAP: ADD NEW PARAGRAPH "D" TO READ: "D. ALL ON-DUTY DIVING MISHAPS."

E. AFLOAT SPECIAL CASE MISHAPS: RE-LETTER PARAGRAPH "B" TO "D," PARAGRAPH "C" TO PARAGRAPH "G," AND PARAGRAPH "D" TO PARAGRAPH "E." THEN, ADD THE FOLLOWING:

"B. ALL CASES OF GROUNDING, COLLISION AND FLOODING. IN THE CASE OF COLLISIONS INVOLVING ONLY U.S. NAVY OR MILITARY SEALIFT COMMAND SHIPS OR CRAFT, EACH COMMAND WILL SUBMIT A SEPARATE REPORT. IN ALL OTHER COLLISIONS (INCLUDING A SHIP RUNNING INTO A STATIONARY OBJECT), THE REPORT WILL INCLUDE AN ESTIMATE OF THE DAMAGE TO THE OTHER SHIP, CRAFT, OR OBJECT.

"C. ALL FIRES. (ALL CASES EXCEPT SMALL TRASH OR SIMILAR FIRES IN WHICH NO PERSONNEL WERE INJURED AND THE MATERIAL DAMAGE WAS LIMITED TO THE CONTAINER IN WHICH THE FIRE ORIGINATED.)

"F. ALL DIVING CASES INVOLVING CENTRAL NERVOUS SYSTEM (CNS) OXYGEN TOXICITY, PULMONARY OVER-INFLATION SYNDROME (POIS) OR HYPERBARIC TREATMENT."

F. CLASS A MISHAP (AFLOAT): CHANGE LAST SENTENCE IN THE PARAGRAPH TO READ: "CLASS A MISHAPS OCCURRING ASHORE OR AS A RESULT OF MOTOR VEHICLE MISHAPS SHALL BE REPORTED BY MISHAP REPORT (MR), MOTOR VEHICLE MISHAP REPORT (MV), OR AN OFF-DUTY RECREATION, ATHLETIC AND HOME MISHAP REPORT, AND DO NOT REQUIRE A MISHAP INVESTIGATION BOARD."

G. CLASS B MISHAP (AFLOAT): CHANGE LAST PART OF SENTENCE TO READ: "OR A MISHAP RESULTING IN THE HOSPITALIZATION OF THREE OR MORE PEOPLE."

H. CLASS C MISHAP (AFLOAT): CHANGE TOTAL COST OF REPORTABLE PROPERTY DAMAGE FROM $10,000 TO $20,000.

I. CLASS C MISHAP (AFLOAT): CHANGE PARAGRAPH "A" TO READ: "THE RESULTING TOTAL COST OF REPORTABLE PROPERTY DAMAGE IS $20,000 OR MORE, BUT LESS THAN $200,000."

J. MISHAP CAUSES: CHANGE TO READ: "CONDITIONS OR EVENTS EXPLAINING WHY A MISHAP OCCURRED. REFER TO CHAPTER A6, APPENDIX A6-E, PAGES 4 THROUGH 6 FOR MISHAP CAUSE CATEGORIES."

K. MISHAP COSTS - PARAGRAPH A: CHANGE TO READ:

"A. DOD PROPERTY DAMAGE COSTS. THE COST OF REPAIR OR REPLACEMENT OF ALL DOD PROPERTY INVOLVED IN THE MISHAP BY DETERMINING THE ACTUAL COST OF MATERIALS OR BY ESTIMATES PROVIDED BY THE REPAIR ACTIVITY. IF NECESSARY, USE

ESTIMATES BASED ON THE ACTUAL COST OF MATERIALS AND $18 FOR EACH HOUR OF ORGANIZATIONAL OR INTERMEDIATE LEVEL LABOR OR $60 FOR EACH HOUR OF DEPOT LEVEL LABOR."

L. MISHAP INVESTIGATION REPORT (MIR): DELETE "LIMITED USE" FROM FIRST SENTENCE.

M. MISHAP REPORT (MR): CHANGE PARAGRAPH TO READ:

"A REPORT CONTAINING PRIVILEGED INFORMATION. SURFACE SHIPS, LCACS, FLOATING DRY-DOCKS, AND SUBMARINES SUBMIT A MR FOR ALL REPORTABLE SHIPBOARD MISHAPS NOT INVESTIGATED BY A MIB. SEE APPENDIX A6-I FOR MR FORMAT."

N. NEAR MISHAP: DELETE SECOND SENTENCE IN ITS ENTIRETY.

O. PRIVILEGED INFORMATION: CHANGE TO READ, "THAT INFORMATION VOLUNTARILY PROVIDED UNDER A PROMISE OF CONFIDENTIALITY, OR INFORMATION WHICH WOULD NOT HAVE BEEN DISCOVERED BUT FOR INFORMATION VOLUNTARILY PROVIDED UNDER A PROMISE OF CONFIDENTIALITY. THE DELIBERATIVE ANALYSES OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS OF THE MISHAP INVESTIGATION BOARD (MIB) IN THE MISHAP INVESTIGATION REPORT ARE PRIVILEGED. ALSO PRIVILEGED ARE CALCULATIONS AND DEDUCTIONS THE MIB MAKE THAT WOULD REVEAL THE BOARD'S DELIBERATIVE PROCESS. MISHAP INVESTIGATION REPORT ENDORSEMENTS (MIRES) ARE ALSO PART OF THE DELIBERATIVE PROCESS AND ARE SIMILARLY PRIVILEGED AGAINST DISCLOSURE. APPENDIX A6-A THOROUGHLY DISCUSSES PRIVILEGED INFORMATION."//

BT

#1530

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, D.C. 20350-2000

IN REPLY REFER TO

OPNAVINST 5100.19D
N45
05 October 2000

OPNAV INSTRUCTION 5100.19D, VOLUME I

From: Chief of Naval Operations

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

Ref: (a) OPNAVINST 5100.23E (NOTAL)
(b) SECNAVINST 5212.5C (NOTAL)

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

1. Purpose. To implement the NAVOSH Program and the requirements of reference (a) for afloat commands.

2. Cancellation. OPNAVINST 5100.19C, volume I.

3. Discussion

a. Reference (a) is the Navy Occupational Safety and Health Program Manual and its general concepts apply to forces afloat. OPNAVINST 5100.19D is the primary afloat safety reference and provides specific guidance for implementing NAVOSH Program elements unique to an afloat environment. This document has been revised with significant input and coordination with representatives of the Fleet Commanders in Chief and Type Commander staffs.

b. This instruction updates the safety guidance and precautions contained in OPNAVINST 5100.19C. It reflects modifications to regulatory requirements, embodies lessons learned from mishaps, and incorporates changes directed by the Fleet Review Board to enhance the afloat NAVOSH Program. Since this document modifies every chapter and most of the paragraphs from OPNAVINST 5100.19C, it does not identify modified, added, or deleted paragraphs.

4. Action. All levels of command which comprise the naval afloat establishment shall implement and manage the NAVOSH Afloat Program as set forth in this instruction. The policy, procedures, and actions prescribed here are published without the necessity for implementing separate instructions unless additional guidance is considered necessary by the chain of

command. As such, Commanders in Chief, Type Commanders, Wings, Squadrons, and Commanding Officers may promulgate more stringent policy.

5. Distribution. This instruction will be incorporated into the next CD-ROM produced by Navy Directives and distributed to all commands. In the interim to ensure timely distribution, a separate CD-ROM of this instruction will be distributed to each afloat Safety Officer within 90 days. Paper copies of this instruction are no longer distributed. Defense Automated Printing Service is authorized to produce paper copies of CD-ROM instructions at cost to the requesting command.

6. Records Disposition. Apply appropriate records disposition standards of reference (b) to all records generated. To the extent that any disposition standard in this instruction is inconsistent with reference (b), the requirements of reference (b) shall take precedence.

7. Reports and Forms

a. The following reports are required in this instruction:

(1) Safety Hazard Report (no report symbol), Chapter A3

(2) Mishap Investigation Report, Report Symbol OPNAV 5102-7, Chapter A6.

(3) Mishap Report, Report Symbol OPNAV 5102-6, Chapter A6.

(4) Motor Vehicle Mishap Report, Report Symbol OPNAV 5102-4 (MVSR), Chapter A6.

(5) Diving Mishap (with or without hyperbaric treatment), Report Symbol OPNAV 5102-5, Chapter A6.

(6) Off-duty, Recreation, Athletics, and Home Safety (RAHS) Mishap Report, Report Symbol OPNAV 5102-10, Chapter A6.

(7) Explosive Mishap or Conventional Ordnance Deficiency, Report Symbol DD-A&T(AR)1020(5102), Chapter A6.

(8) Radio-frequency Radiation (RFR) Incident Report (no report symbol), Chapter B9.

(9) Laser Radiation Incident Report (no report symbol), Chapter B9.

b. The Safety Hazard Report, the Radio-frequency Radiation (RFR) Incident Report, and the Laser Radiation Incident Report are exempted from reports control by SECNAVINST 5214.2B.

c. The following forms are available from the Navy Supply System and may be requisitioned per NAVSUP P-2002:

FORM	TITLE	STOCK NUMBER
DD 771 (9/68)	Eyewear Prescription	0102-LF-007-6202
DD 1222 (2/62)	Request for and Results of Tests	0102-LF-012-0600
DD 2005 (2/76)	Privacy Act Statement - Health Care Records	0102-LF-002-0051
DD 2214 (9/79)	Noise Survey	0102-LF-002-2140
DD 2215 (9/79)	Reference Audiogram	0102-LF-002-2151
DD 2216 (9/79)	Hearing Conservation Data	0102-LF-005-8900
DD 2493-1 (3/87)	Asbestos Exposure, Part I, Initial Medical Questionnaire	0102-LF-002-4935
DD 2493-2 (3/87)	Asbestos Exposure, Part II, Periodic Medical Questionnaire	0102-LF-002-4940
DD 2521 (12/88)	Hazardous Chemical Warning Label	0102-LF-012-0800
DD 2522 (12/88)	Hazardous Chemical Warning Label	0102-LF-012-1100
NAVMED 6260/2 (10/88)	Hazardous Noise Warning Decal	0105-LF-004-7200
NAVMED 6260/2A (10/88)	Hazardous Noise Label	0105-LF-004-7800
NAVMED 6260/5 (5/90)	Periodic Health Evaluation Navy Asbestos Medical Surveillance Program	0105-LF-009-9800
NAVMED 6500/1 (5-99)	Heat/Cold Case Form	0105-LF-015-0800
*OPNAV 3120/5 (Rev. 12-93)	Safety Hazard Report	0107-LF-016-9300
OPNAV 4790/2K (6/75)	Ship's Maintenance Action Form - 2 KILO	0107-LF-047-9011

OPNAV 5100/17 (5-99)	Heat Stress Monitoring Sheet	0107-LF-016-9500
OPNAV 5100/18 (12-93)	Navy Used Hazardous Material Identification Label	0107-LF-016-9100
OPNAV 5102/4 (10/92)	SAFETYGRAM	0107-LF-015-8400
OPNAV 6260/2 (10/78)	Caution - Asbestos Dust Hazard Sign	0107-LF-062-6010

e. The following form is available from the General Services Administration (GSA):

FORM	TITLE	STOCK NUMBER
SF 600 (5/84)	Chronological Record of Medical Care	7540-00-634-4176

L. C. BAUCOM
By direction

Distribution:
SNDL 21A (Fleet Commanders in Chief)
22A (Fleet Commanders)
23 (Force Commanders)
24 (Type Commanders)
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26F (Operational Test and Evaluation Force)
26H (Naval Coastal Warfare Group)
26J (Afloat Training Group and Detachment)
26U (Regional Maintenance Center)
26W (Cargo Handling Group and Battalions)
26GG (Explosive Ordnance Disposal Mobile Group and Unit) (EODGRU NINE Det. Fallon, only)
28 (Squadron, Division, and Group Commanders - Ships) (less 28K)
29 (Warships) (less 29B, 29M2, 29N, 29P2, 29Q, and 29S)
29B (Aircraft Carrier) (CV) (CVN)
30 (Mine Warfare Ships)
31 (Amphibious Warfare Ships)
32 (Auxiliary Ships)
36 (Service Craft)

Copy to:
SNDL 41A (Commander MSC))
A2A (Department of the Navy Staff Offices) (CHINFO, JAG only)
A5 (Chief of Naval Personnel)
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B5 (U.S. Coast Guard) (COMDT COGARD, only)
FA6 (Air Station LANT) (NAS Key West only)
FB30 (Ship Repair Facilities)
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FKA1 (Systems Commands)
FKP7 (Shipyards)
FKP8 (Supervisor of Shipbuilding, Conversion, and Repair, USN)
FT1 (Chief Naval Education and Training)
FT24 (Fleet Training Center)
FT29 (Recruit Training Command)
FT30 (Service School Command)
FT31 (Training Center)
FT39 (Technical Training Center)
FT43 (Surface Warfare Officers School Command)
FT54 (Submarine School)
FT111 Occupational Safety and Health and Environmental Training Center

OPNAV (N09, N45 (100), N143D (12), N86, N87, and N88)

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SECTION A
NAVOSH PROGRAM

This section outlines the overall administrative, organizational, and training aspects of the NAVOSH Program including a statement of policy and a listing of responsibilities.

CHAPTER A1

INTRODUCTION

A0101. BACKGROUND

a. The Navy has conducted occupational safety and health 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 systems safety, aviation safety, weapons/explosives safety and off-duty safety (recreation, public and motor vehicle), as well as occupational safety and health. Thus, the Navy Occupational Safety and Health (NAVOSH) Program is a major component of the total program.

c. Reference A1-3 was developed as a basic NAVOSH implementation document. It applies to both shore and afloat commands; however, many of the unique and specific situations associated with forces afloat were not fully addressed or taken into account. Consequently, this manual is intended as the primary NAVOSH resource document for implementing the NAVOSH Program for afloat commands.

d. Reference A1-4 established and implements a Mishap Investigation and Reporting Program and provides revised policy and procedures for aggressive mishap prevention, investigation, and reporting. This manual complements and supports the principles established in this reference.

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 NAVOSH Program.

b. This manual addresses all aspects of afloat NAVOSH 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 A0202e and A0202f).

c. This manual is organized into four sections.

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

(2) **Section B: Major Hazard Specific Chapters.** This section outlines NAVOSH chapters which address specific hazards such as asbestos control, heat stress, hazardous material control and management, radiation protection, electrical safety, and gas free engineering as well as tag-out and personal protective equipment. The objective of this section is to reduce to a manageable degree NAVOSH management requirements that are applicable to shipboard personnel. This section is addressed to personnel who would assist the commanding officer in NAVOSH management, 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 NAVOSH 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 Planned Maintenance System (PMS) cards for additional safety precautions. This section is addressed to the individual deckplate 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 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. 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 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 (NNPP) 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.

c. This manual specifically addresses the identification and maintenance of safe and healthful conditions in afloat work places or occupational environments. Off-duty safety is not addressed. Some, but not all, of aviation safety (chapters C7 and C12) and explosives safety (chapter C14) are addressed.

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. NAVOSH 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 manual policy requirements shall be submitted by the identifying command to Chief of Naval Operations (CNO) (N45) via the chain of command.

(2) A proposed alteration to a safety standard should be submitted by an individual or command to the Naval Safety Center (NAVSAFECEN). The Naval Safety Center shall submit the proposed modification to CNO (N45) with a recommendation regarding incorporation of the modification into the manual.

(3) A proposed alteration to a health standard/criteria 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 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 (N45). 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 (N45). 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.

CHAPTER A1

REFERENCES

A1-1. SECNAV Instruction 5100.10H, "Department of the Navy Policy for Safety, Mishap Prevention, Occupational Health, and Fire Protection Programs" (NOTAL)

A1-2. OPNAVINST 5100.8G, "Navy Safety and Occupational Safety and Health Program" (NOTAL)

A1-3. OPNAVINST 5100.23E, “Navy Occupational Safety and Health (NAVOSH) Program Manual” (NOTAL)

A1-4. OPNAVINST 5102.1C, “Mishap and Investigation Reporting” (NOTAL)

CHAPTER A2

NAVOSH PROGRAM ORGANIZATION AND RESPONSIBILITIES

A0201. POLICY

Navy policy is to 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 and to maintain safe and healthy working conditions for personnel. 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 and elimination, where possible, of adverse health effects of hazardous chemical, physical, and biological agents. This includes effective exposure control where hazard elimination is impossible or impractical and the diagnosis and treatment of work related illnesses and injuries.

A successful Navy Occupational Safety and Health (NAVOSH) Program, one that truly reduces work-related injuries and illnesses, results when the program is emphasized at every level of the organization. The Navy is in accord with this principle, and the overall responsibility for the NAVOSH 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)**. The Assistant Secretary of the Navy (Installations and Environment) is the designated safety and occupational health (SOH) official for the Department of the Navy (DON) and establishes, maintains, and updates the SOH program that implements the requirements of the Department of Defense (DoD) OSH issuances to provide protection for both civilian employees and military personnel.

b. **Chief of Naval Operations (CNO)**. The CNO is responsible for implementation and management of the NAVOSH Program and, in coordination with the Commandant of the Marine Corps, for mutual concern:

(1) Provides appropriate NAVOSH policy and standards

(2) Ensures that fleet commanders in chief (CINCs) 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) Establishes appropriate planning, programming, staffing requirements, and budgeting for the NAVOSH Program

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

(5) Develops SOH program evaluations/inspection criteria

(6) Provides for occupationally-related medical support

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

(8) Ensures personnel receive thorough and continuing training on NAVOSH matters

(9) Adopts, develops, and reviews proposed alternate standards and promulgates NAVOSH standards.

c. **Fleet Commanders in Chief (CINCs)**. Because safety is an inherent responsibility of command, the chain of command shall implement all elements of the NAVOSH Program. Fleet CINCs shall ensure that their subordinate commanders, commanding officers, and officers in charge:

(1) Conduct and maintain an aggressive and comprehensive NAVOSH Program.

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

(3) Set NAVOSH performance targets and measures, with concurrence of the type commanders (TYCOMs), for comparison by ship class and operational cycle and provide them to the Board of Inspection and Survey (INSURV). Fleet CINCs shall review these targets and the measures on an annual basis.

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

(1) Ensure that subordinate commands implement the NAVOSH Afloat Program.

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

(3) Provide NAVOSH assist visits, upon request.

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

(5) Coordinate industrial hygiene support.

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 6 months of assignment.

(2) Schedule the intervening Navy Occupational Safety and Health/ Environmental Protection (NEP) assessment

(3) Assist afloat commands ensuring that afloat workplace NAVOSH discrepancies beyond shipboard capability are identified and prioritized in the Workload Availability Package.

f. **Primary Program and Specified Support Areas**. The higher echelon administration and management of the SOH Program is divided into primary program areas and specified support areas.

(1) **Primary Program Areas**

(a) The NAVOSH Program for a specific type of naval force is implemented, directed, and supervised, within the Office of the CNO (OPNAV), by the respective OPNAV Principal Official. The Special Assistant for Safety Matters (N09F) assures compatibility and continuity, and provides interface for the primary program areas.

(b) The Deputy Chief of Naval Operations (DCNO) (Logistics) (N4) is responsible for developing NAVOSH Program policy and guidance and issuing NAVOSH standards. When NAVOSH policy or standards are applicable to operational forces under the cognizance of another OPNAV Principal Official, N4 will coordinate with other elements of the OPNAV staff.

(2) **Specified Support Areas**. Specified support areas are concerned with those aspects of the NAVOSH Program requiring special attention or technical expertise. The Commander, Naval Sea Systems Command; Commander, Naval Air Systems Command; Chief, Bureau of Medicine and Surgery; Commander, Naval Safety Center; and the Chief, Naval Education and Training, in coordination with or at the direction of respective primary program sponsors, develop procedures, NAVOSH standards, and instructions for the specified support areas. The designated officials will carry out these responsibilities as follows:

(a) **Commander, Naval Sea Systems Command (COMNAVSEASYSCOM)/ Commander, Naval Air Systems Command (COMNAVAIRSYSCOM)**. COMNAVSEASYSCOM and COMNAVAIRSYSCOM ensure that 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. Engineering control of significant occupational health problems, such as noise, asbestos, and hazardous materials, is emphasized.

(b) **Chief, Bureau of Medicine and Surgery (CHBUMED)**. CHBUMED provides support in all aspects of occupational health, including occupational medicine, industrial hygiene, and environmental health. CHBUMED 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 NAVOSH Program.

(c) **Commander, Naval Safety Center (COMNAVSAFECEN)**. COMNAVSAFECEN collects and analyzes mishap data and disseminates safety information. COMNAVSAFECEN provides direct support and assistance to fleet units in safety matters upon request. COMNAVSAFECEN sponsors and coordinates the CNO Safety awards.

(d) **Chief, Naval Education and Training (CNET)**. CNET ensures that all elements of the NAVOSH and Hazardous Material Control and Management (HMC&M) Navy Training Systems Plan for afloat units are properly executed.

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

A0203. COMMAND PROGRAM

a. The NAVOSH Afloat Program involves all personnel assigned to a ship or other afloat unit. The actual implementation structure is the ship's normal chain of command.

b. **Commanding Officer**. The commanding officer shall:

(1) Implement and maintain a continuing NAVOSH Program per this instruction.

(2) Designate a command primary duty or collateral duty safety officer. Ensure that the command safety officer is provided with NAVOSH management training in accordance with chapter A7 of this instruction.

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

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

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

c. **Safety Officer/Collateral Duty Safety Officer**. The safety officer is responsible for managing the NAVOSH Program. The safety officer reports directly to the commanding officer on SOH matters and to the executive officer for the administration of the NAVOSH Program. Primary duty safety officers shall be assigned to CV, CVN, LHA, LHD, AS, AOE type ships. Ship 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 NAVOSH Program.

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

(4) Participate in mishap investigations, as appropriate.

(5) Ensure timely and accurate submission of required mishap reports.

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

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

(8) Ensure dissemination of NAVOSH information.

(9) Schedule/coordinate NAVOSH training with the training officer/ Planning Board for Training. Conduct training as appropriate.

(10) Serve as advisor-recorder of the Safety Council. Prepare agenda for issuance by the Chair.

(11) Serve as Chairperson of the Enlisted Safety Committee.

(12) Ensure, with the assistance of the 3M coordinator, that NAVOSH discrepancies beyond ship's force capability are properly identified in the Current Ships Maintenance Project (CSMP), prioritized, and entered into the Availability Workload Package.

(13) 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 and other afloat units.

(14) Complete the Afloat Safety Officer Course (A-4J-0020) at SWOS or the Submarine Safety Officer Course (F-4J-0020), as appropriate, prior to or within 6 months of assignment.

NOTE:

On ships where an (IHO) is the Assistant Safety Officer, they shall complete the Afloat Safety Officer Course (A-4J-0020) prior to or within 6 months of assignment.

d. **Ship's Medical Officer (SMO)/Medical Department Representative (MDR)**. In support of the NAVOSH Program, the medical officer/representative shall:

(1) Participate in the NAVOSH Program, e.g., assist division officers/work center supervisors by providing health information.

(2) Coordinate external occupational medicine support as necessary.

(3) Provide 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).

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 NAVOSH standards.

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

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

(4) Integrate safety in all activities (work, driving, recreational, and off-duty), consistent with mission requirements.

(5) Ensure that mishaps 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.

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.

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 on board ship) shall:

(1) Inspect division spaces and submit Hazard Reports, OPNAV 3120/5 per Chapter A3.

(2) Advise the division officer on the status of the NAVOSH 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 NAVOSH training.

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

(6) Serve on the Enlisted Safety Committee.

(7) Complete the appropriate watchstation qualification from Programs Afloat PQS (NAVEDTRA 43460-4A) or Aviation Safety Petty Officer/NCO PQS (NAVEDTRA 43218) within 6 months of their assignment.

(8) 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 or executive officer (chairperson), safety officer (recorder), training officer, all department heads (including the air wing safety officer when embarked), medical officer/representative, and the ship's command master or senior chief petty officer. The Safety Council meets at least quarterly to develop specific NAVOSH policies and to analyze the progress of the overall program. Safety Council meetings may be held in conjunction with other meetings of similar attendance. Minutes of each meeting shall be recorded and retained by the safety officer. Specifically the Council:

(1) Reviews statistics compiled by the safety officer from mishap/near mishap reports, inspection reports, safety or health related messages, and related reports from the medical representative.

(2) Reviews issues and recommendations submitted by the Enlisted Safety Committee.

i. **Enlisted Safety Committee (not applicable to submarines)**. The Enlisted Safety Committee consists of the safety officer (senior member), division safety petty officers, aviation safety petty officers (when embarked), and the chief master-at-arms. On small ships (less than 300 persons), 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. The safety officer shall appoint a recorder. The purpose of the committee is to:

(1) Identify and discuss NAVOSH 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.

A0204. NAVOSH STANDARDS

These standards are based on established procedures for minimizing risk. Compliance with NAVOSH Standards is mandatory. Thorough monitoring is necessary to determine the adequacy of the command's standards and to recommend new standards to correct hazardous conditions. Safety standards are provided in Sections C or D of this manual.

CHAPTER A3

INSPECTIONS, SURVEYS, ASSISTS, HAZARD REPORTING AND MEDICAL SURVEILLANCE

A0301. DISCUSSION

a. The core of the Navy Occupational Safety and Health (NAVOSH) Program is training and the identification, risk assessment and elimination or control of safety and health hazards. Hazard control is covered in Chapter A4, training in Chapter A5. This chapter addresses the methods used to identify hazards and the means of detecting adverse health effects. The principle way to discover hazards is through workplace inspections. Workplace inspections involve chain of command observation of operations at the job site on a routine basis to detect and correct hazards resulting from non-compliance with the safety standards of sections C and D of this manual. Workplace inspections also involve evaluations of ship's spaces and equipment by appropriate occupational safety and health personnel. Industrial hygiene surveys are another essential risk management tool for identifying workplace hazards, characterizing their risk and eliminating them or developing appropriate controls. Medical surveillance primarily involves hazard-specific medical examinations of crewmembers to detect adverse health effects resulting from exposure to health hazards associated with their duties.

b. Hazard identification, risk assessment, and hazard control are key steps in the Navy Operational Risk Management (ORM) process for reference A3-1. Navy personnel at all levels use ORM as a decision-making tool by anticipating and assessing hazards (risk) and reducing the potential for mishap. Results of inspections, assessment surveys and assist provide expert information that contribute to the baseline knowledge of afloat personnel, minimize risk, and implement controls.

A0302. SELF ASSESSMENTS

Appendix A3-A of this chapter may be used by the ship as a self-assessment tool. This self-assessment tool will be used as part of the NAVOSH evaluation for Material Inspections (MI), Final Contract Trials (FCT), and NAVOSH and Environmental Protection (NEP) Assessments conducted by the Board of Inspection and Survey (INSURV). INSURV will collect and maintain Data to calculate performance measures for comparison by ship class and operational cycle.

A0303. WORKPLACE INSPECTIONS

a. **Routine inspection** of all workspaces to identify hazardous conditions and/or unsafe work practices is a basic requirement of the NAVOSH Program. Such jobsite work observation is intended to detect and correct hazards resulting from worker non-compliance with the safety standards of Sections C or D of this manual, with posted warning or equipment placards, with Planned Maintenance System (PMS) procedures, or with issued operating procedures "on-the-spot." Frequent examples of non-compliance may warrant a shipwide safety inspection as part of a safety stand-down (chapter A5) to raise the command's safety awareness.

b. **Safety Inspections**. The safety officer shall ensure that all workspaces are inspected at least annually, for safety. 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 inspections required by reference A3-1. These zone inspections will comprise the safety inspection. A copy of the completed deficiency list such as a Zone Inspection Deficiency List (ZIDL) shall be returned to the safety officer upon completion of the inspection. The safety officer shall review and track corrective action on safety deficiencies as specified in paragraph A0404.

c. **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 NAVOSH Program visible to all hands. The MAA force shall attempt to have any observed deficiency or hazard corrected "on the spot." If this is not possible, the MAA Force will report the deficiency on a Safety Hazard Report (OPNAV 3120/5) (see appendix A3-B).

d. **Oversight Inspections**. NAVOSH and Environmental Protection (EP) assessments are conducted by the (INSURV) during Final Contract Trials (FCTs), surveys, and regularly scheduled (4-5 years) Material Inspections (MIs). A combined NAVOSH/EP assessment will be conducted during non-UMI interdeployment training cycles (IDTCs), not to exceed 36 months. Since regular INSURV inspections occur every 5 years and NAVOSH oversight evaluation is required at least every 3 years, ships' immediate superiors in command (ISICs) will schedule the intervening NAVOSH/EP assessment. These NAVOSH/EP assessments will be conducted in-port during the IDTC by INSURV officers and technical experts as required in oil pollution abatement, marine sanitation devices, and plastic waste processors. In addition to the NAVOSH elements of this instruction, the assessment will include program training requirements, the tag-out/lock-out program and the gas free engineering program. The assessment should take approximately 2 days with a letter report being provided to the commanding officer and ISIC. Data collected in the intervening NAVOSH/EP assessments will be combined with that from FCTs/UMIs in the INSURV database for use by type and fleet commanders, CNO (N45), NAVSAFECEN, and NAVOSH/EP organizations. For ships not in a normal IDTC cycle, a NAVOSH/EP assessment either as part of a UMI or an intervening NAVOSH/EP assessment will be conducted at least every 36 months. Copies of all NAVOSH-related discrepancy sheets from these inspections and intervening assessments shall be routed to the safety officer to ensure that identified safety hazards are entered into the Navy Occupational Safety and Health Deficiency Abatement Plan (NAVOSHDAP) (see chapter A4 for a description of the NAVOSHDAP).

A0304. INDUSTRIAL HYGIENE SURVEYS

a. As part of their operational risk management responsibilities (reference A3-2), commanding officers are required to identify potential hazards, assess the risks presented by hazards, and provide controls to prevent exposures to personnel. An essential risk management tool is the industrial hygiene survey. The survey provides:

(1) Identification of hazards

(2) Characterization of risk for each hazard

(3) Recommended controls to prevent adverse health effects

(4) Medical surveillance recommendations

(5) Consultative services, including assistance in establishing the NAVOSH program.

b. **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 toxic chemicals and/or harmful physical (e.g. noise) or biological agents. Reproductive hazards and their controls are found in reference A3-4.

(2) When sampling is warranted to quantitatively characterize workplace exposures, collect samples per reference A3-3. Navy Occupational Exposure Limits (OELs) will be determined using chapter 16 of reference A3-4.

(3) A summary of controls, which at a minimum, will include:

(a) An assessment of the effectiveness of general and local exhaust ventilation systems used for the control of contaminants, flammable storerooms, and hazardous material storerooms.

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

(c) A list of all personal protective equipment required for each area/process and the recommended type(s).

(4) A list of exposures and ventilation systems that require routine monitoring (exposure monitoring plan)

(5) A list of noise hazardous areas/equipment

(6) A list of eye hazardous areas/processes

(7) Medical surveillance requirements.

c. An update of the baseline industrial hygiene survey is necessary when system, equipment, or loadout changes significantly affect the onboard 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 to address all changes which may have occurred, or a more limited survey to address specific concerns are available at the discretion of the commanding officer. Examples of changes that could significantly affect the onboard hazard and/or risk are as follows:

(1) New or modified equipment or processes

(2) Introduction of new toxic 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.

d. New construction. On new construction ships, industrial hygiene services are necessary prior to final contract trials. 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 final contract trials, 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 noise hazard areas/installed equipment

(3) An evaluation of plumbed and portable eye wash stations and deluge showers.

Initiate the baseline industrial hygiene survey for new construction ships as soon as possible after commissioning, and ships shall be in receipt of the completed survey report no later than 6 months after post shakedown availability.

e. Ship Class Database: Forward a copy of all industrial hygiene reports by the supporting NAVENPVNTMEDU or MTF 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

Naval Safety Center conducts the Shipboard Safety Survey of 1 or 2 day's duration. It 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. Shipboard Safety Surveys are optional, at the discretion of the commanding officer. The survey report is made only to the ship. No grade or relative standing is assigned and follow-up reports are not required. This survey, which is available by request to NAVSAFECEN, is recommended once every 3 years (2 years for submarines).

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 Consolidated Hazardous Materials Re-Use Inventory Management/Hazardous Materials Inventory Control System (CHRIMP/HICS) Assist Teams. These teams may be contacted through Naval Inventory Control Point (NAVICP).

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 NAVOSH 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. Also advise all crewmembers that, if the notified supervisor has not taken action to investigate the situation or if they are unsatisfied with the result, they may submit a written report of an unsafe or unhealthful working condition on a Safety Hazard Report (OPNAV 3120/5, appendix A3-B). 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 3 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 A3-1.

A0308. VARIANCES AND ALTERNATE STANDARDS

a. **Variances**. In certain situations, it may be impossible to comply with an applicable NAVOSH standard. In this case, initiate a request for a variance by the safety officer and submit to the Fleet Commander in Chief via 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 NAVOSH standard. Submit proposed alternate standards to CNO (N45) 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 (N4), 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 (N4), 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 (N4) 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 3 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 A0309a(2) and (3), and under the procedures of paragraph A0309a(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, installation 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 6 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 NAVOSH standards as noted in Section B of this manual.

b. Base selection of personnel for medical surveillance examinations 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 A3-5. 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 a 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 A3-5. The MDR will provide all available information regarding each individual's exposure to allow either 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.

CHAPTER A3

REFERENCES

A3-1. OPNAVINST 3120.32C, "Standard Organization and Regulations of the U.S. Navy, Article 620.13, Zone Inspection Bill"

A3-2 OPNAVINST 3500.39, Operational Risk Management (NOTAL)

A3-3. NEHC Technical Manual, Industrial Hygiene Field Operations Manual, latest revision (NOTAL)

A3-4 OPNAVINST 5100.23E, Navy Occupational Safety and Health (NAVOSH) Program Manual.

A3-5. NEHC Technical Manual, Medical Surveillance Procedures Manual and Medical Matrix, latest revision.

Appendix A3-A

Afloat
Navy Occupational Safety and Health (NAVOSH)
Process Assessment Questions

VOLUME B

Asbestos Control

1. Are asbestos work processes present (from Baseline Industrial Hygiene Survey (BIHS) or Thermal Insulating Substance (TIS) determination data)?

= (# of workcenters (W/C) with asbestos processes in BIHS)

2. What level of work is required (from Baseline Industrial Hygiene Survey (BIHS) or Thermal Insulating Substance (TIS) determination data)?

$$=\frac{(\text{\# of W/C with WRCs})}{(\text{\# of W/C requiring WRCs})}$$

3. Are minimum Allowage Equipage List (AEL) components available for the level of work? (See AELs)

4. Are Workcenter Release Checklists (WRCs) used for each job and retained by the workcenter supervisor?

Heat Stress Control

1. Are Heat Stress (HS) areas and/or processes identified?

2. Are dry bulb (DBT) hung properly?

$$\frac{\text{\# of properly mounted DBT}}{\text{\# of DBT required}}$$

3. Are appropriate HS flow charts (appendix B2-E) used?

4. Are all required HS meters (calibrated and functioning) on board?

(# of calibrated and functioning meters $\geq$ 2)

5. Are all HS surveyors PQS qualified (or within 12 weeks of designation)?

$$\frac{(\text{\# of PQS-Qualified HS surveyors})}{(\text{\# of required surveyors})}$$

Hazardous Material Control and Management (HMC&M)

1. Is HICS available and used to manage HM inventory?

2. Is HM spill kit available and complete (items on hand or ordered)?

3. Was an HM spill drill conducted at least every IDTC?

4. Within each HM storeroom:

a. Has ventilation been evaluated and reported adequate in BIHS? (if inadequate, contact IH after problem has been corrected.)

b. Is only compatible HM stowed together?

c. Is adequate stowage space available?

d. Is stowed HM secured properly?

5. Within workcenters (W/C) authorized to stow HM:

a. Are NAVSEA-approved lockers used?

b. Is HM properly stored and labeled within lockers?

c. Are appropriate and adequate quantities of PPE available?

6. How many chemical/toxic mishaps were reported per IDTC?

Lead Control

1. Have any lead workcenters or processes been identified?

2. Does the hazard evaluation require any controls?

3. Is there adequate:

a. PPE?

b. Engineering controls?

c. Training?

4. Are workcenter personnel required to receive medical surveillance?

a. If so, are any blood-leads over 30 micrograms/dL?

5. Is lead monitoring listed in the exposure monitoring plan?

a. Are any of the results over 0.03 micrograms/M^3?

Hearing Conservation

1. Is area/process listed as noise-hazardous in the BIHS (If unknown or new equipment, contact IH service provider)?

2. Is area/process posted?

3. What are the maximum or ambient sound pressure levels (dBA)?

a. > 84 < 104 - Single Hearing Protection (HP)# by type of each HP available

b. 104 < 114 - Double HP # by type of each HP required

c. > 114 - Double HP and time limits

4. Are personnel required by BIHS to be in Hearing Conservation Program (HCP)?

5. Have all personnel in HCP received required audiograms?

6. Was anyone diagnosed with Permanent Threshold Shift (PTS)?

Sight Conservation

1. Are eye hazardous workcenter (W/C) processes and equipment evaluated, including recommended type of eye protection?

2. Does W/C have an adequate supply of required eye protection?

3. Are eye hazardous areas/processes posted and decks marked?

4. If required, is the emergency eyewash approved and properly functioning per B0508?

5. Are all eye injuries referred to medical?

Respiratory Protection

1. Does the ship have a Respiratory Protection Manager (RPM) trained per B0612?

2. Are W/C process evaluations included in the Baseline Industrial Hygiene Survey (BIHS)?

3. Has the RPM been contacted to determine respiratory protection requirements for those work processes not evaluated in the BIHS?

4. Have personnel required to wear respirators been:

a. Trained?

b. Fit tested?

c. Provided with medical surveillance?

5. Is a sufficient supply of prescribed respiratory protective equipment available?

6. Are respirator problems reported to the supervisor?

7. Are issued respirators:

a. Intact?

b. Functional?

c. Cleaned?

8. Does breathing air meet requirements of B0611 (tested and certified to Grade D)?

Electrical Safety

1. Is personal electrical/electronic equipment authorized for shipboard use?

2. Are 50 percent of electrical/electronic rates Basic Life Support (BLS) certified?

3. Do all required equipment have quarterly electrical check (spot check)?

4. Are all tool issue personnel PQS qualified to check/issue equipment IAW NSTM 302?

5. Is CO/CDO’s approval obtained prior to working on energized equipment?

Radiation Safety

1. Are ionizing radiation sources present?

a. Is RASO audit current?

b. Is medical X-ray certification current?

2. Is the Radiation Hazard (RADHAZ) Survey current based on five triggers?

3a. Is there an RFR heat sealer?

3b. Is it evaluated in the Baseline Industrial Hygiene Survey (BIHS)?

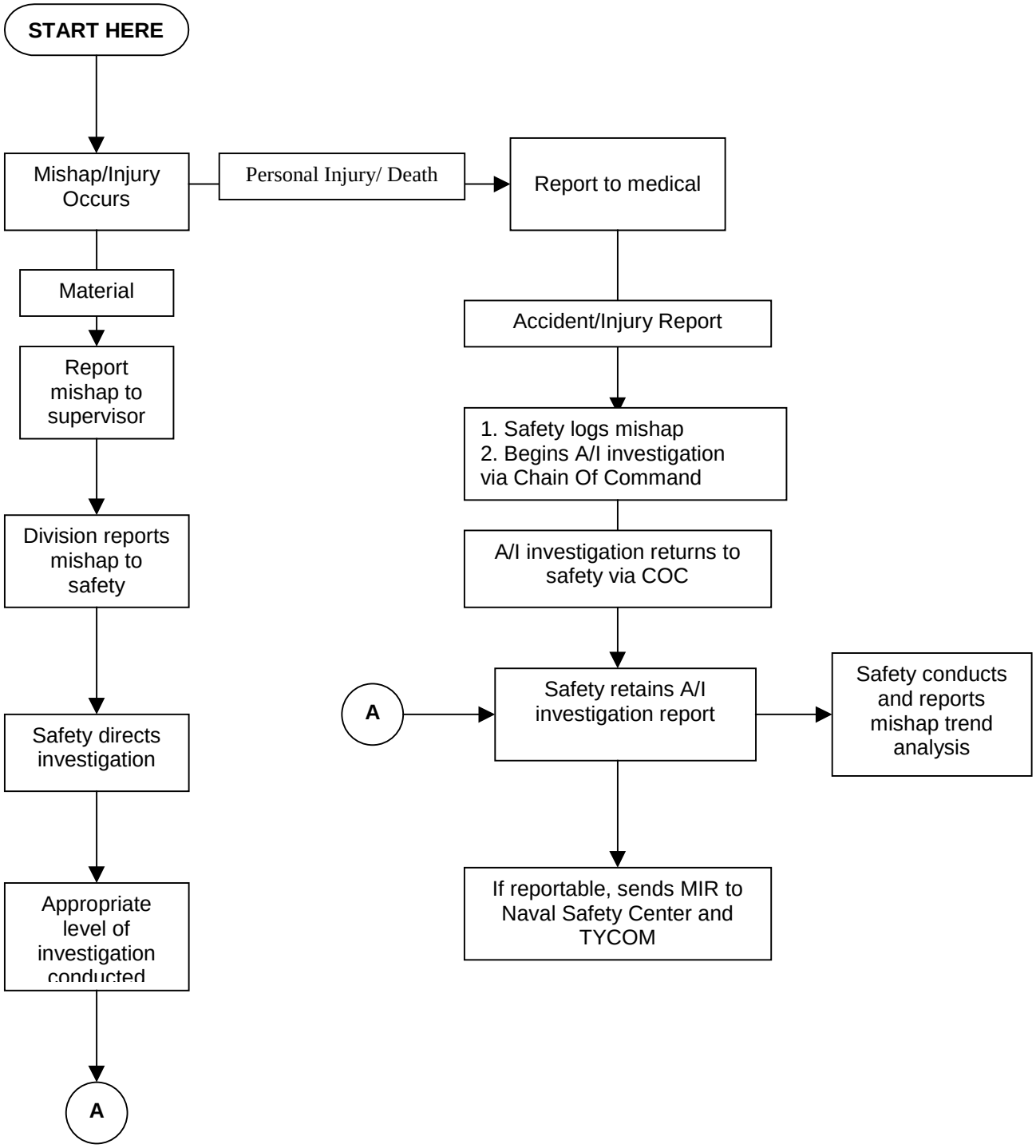
4. Are all Radio Frequency Radiation (RFR) hazard areas properly marked on the deck and posted?

5. Are workers/watchstanders trained to report accidental exposures?

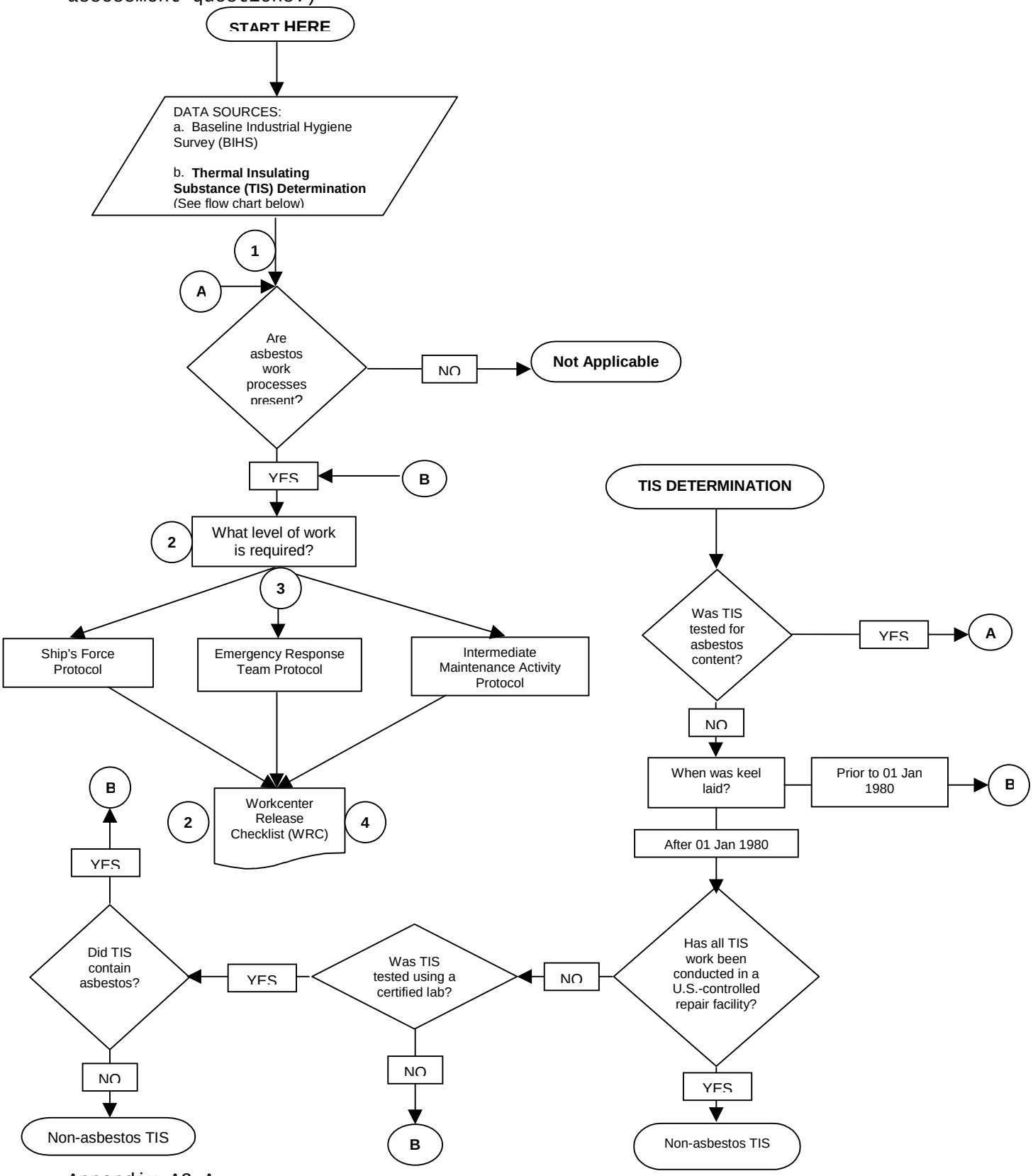
6. Are RFR exposures in excess of the Permissible Exposure Limit (PEL) reported to BUMED?

Afloat
Navy Occupational Safety and Health (NAVOSH)
Process Flow Charts

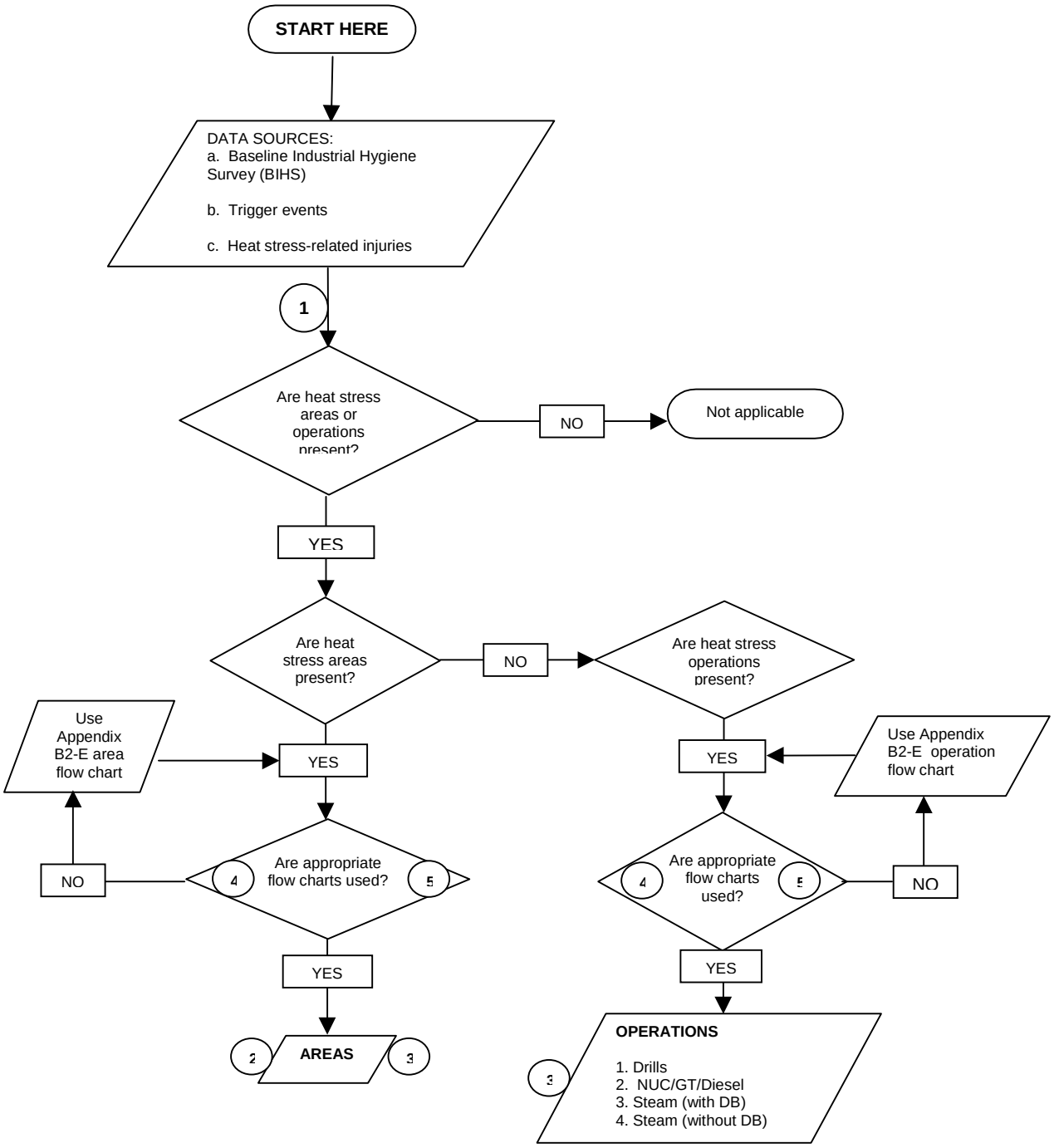
1. Non-Mishap Investigation Board (MIB) Investigations. (NOTE: Numbers in circles refer to applicable assessment questions.)



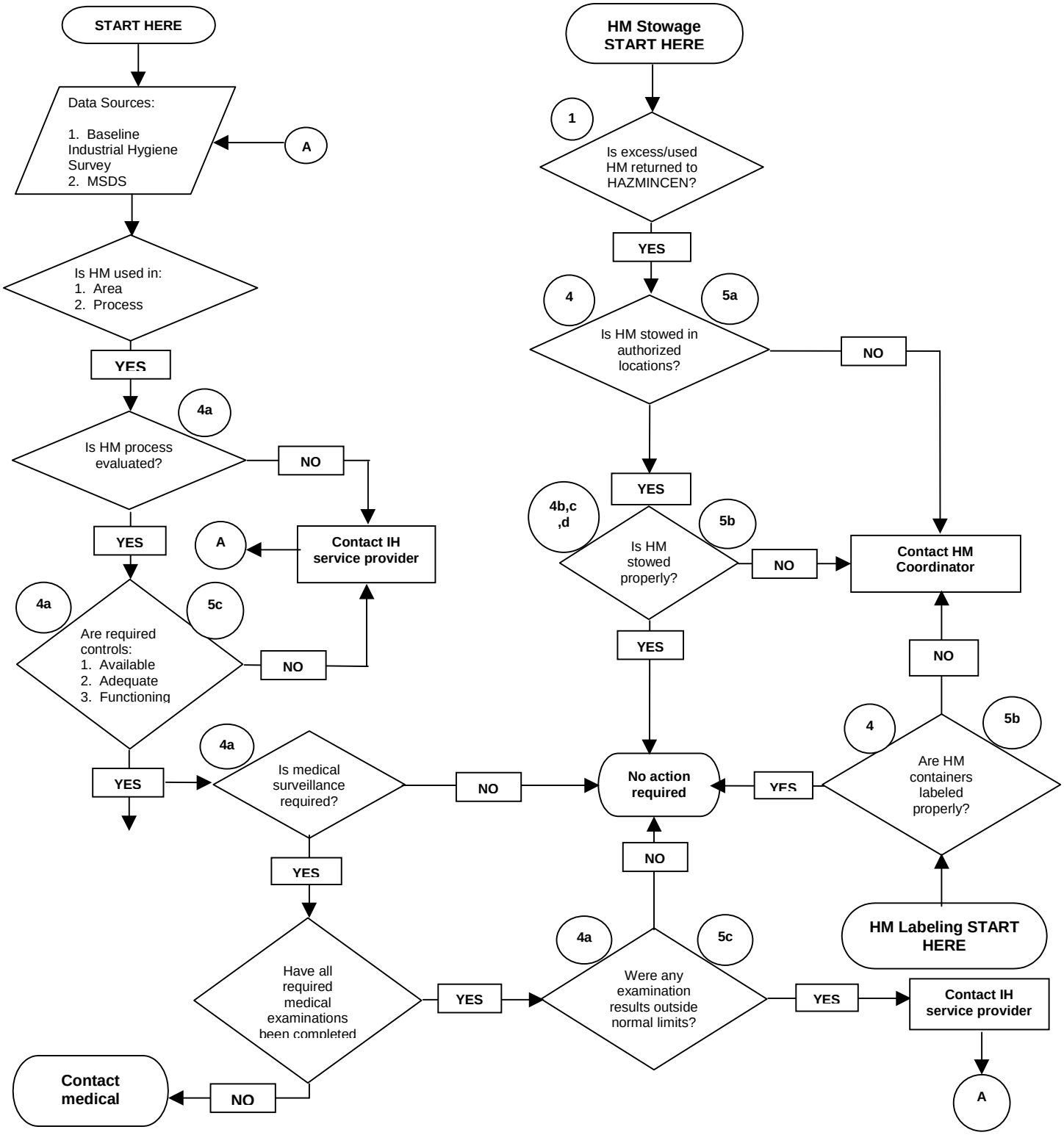
2. Asbestos Control. (NOTE: Numbers in circles refer to applicable assessment questions.)



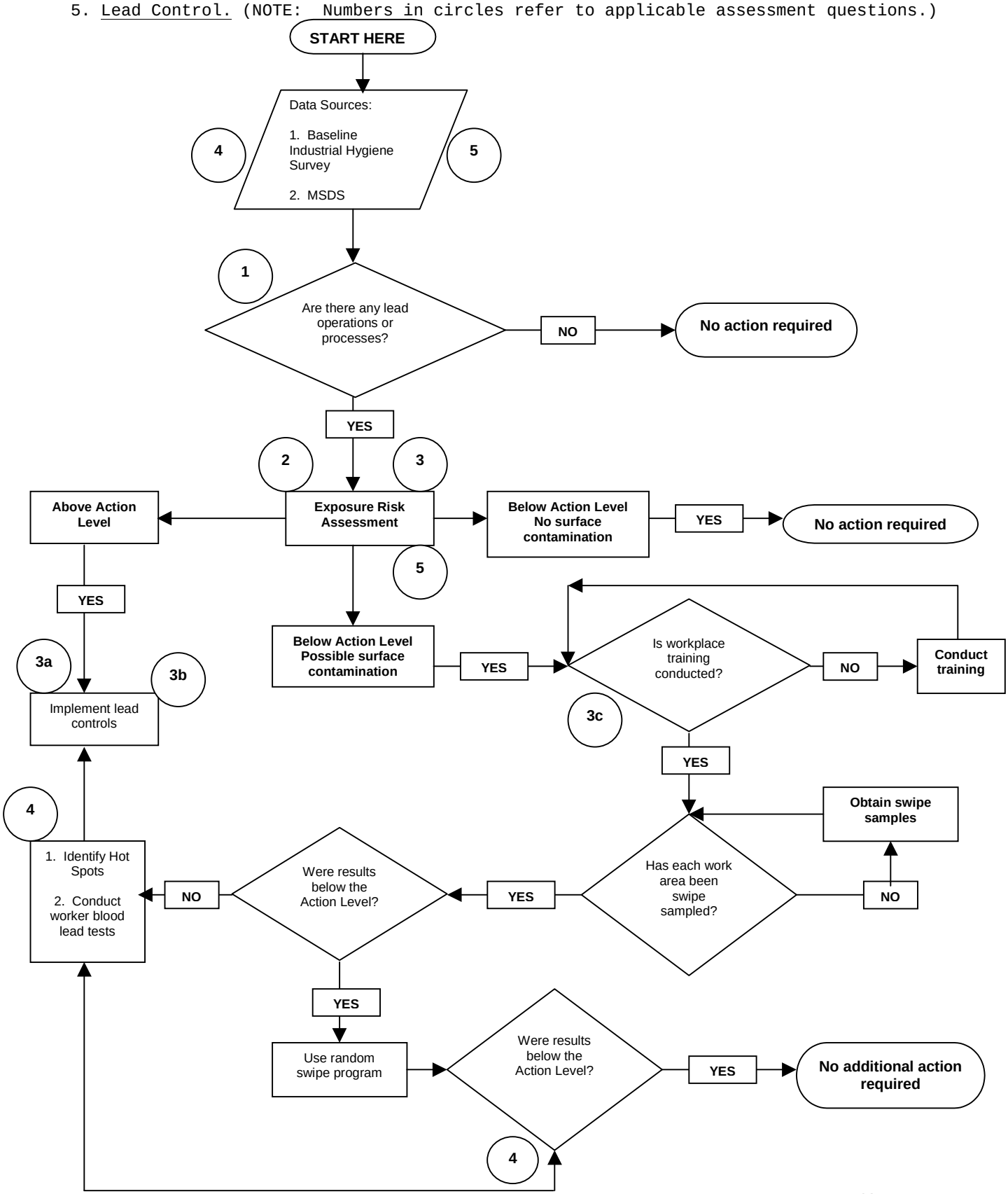
3. Heat Stress Control. (NOTE: Numbers in circles refer to applicable assessment questions.)



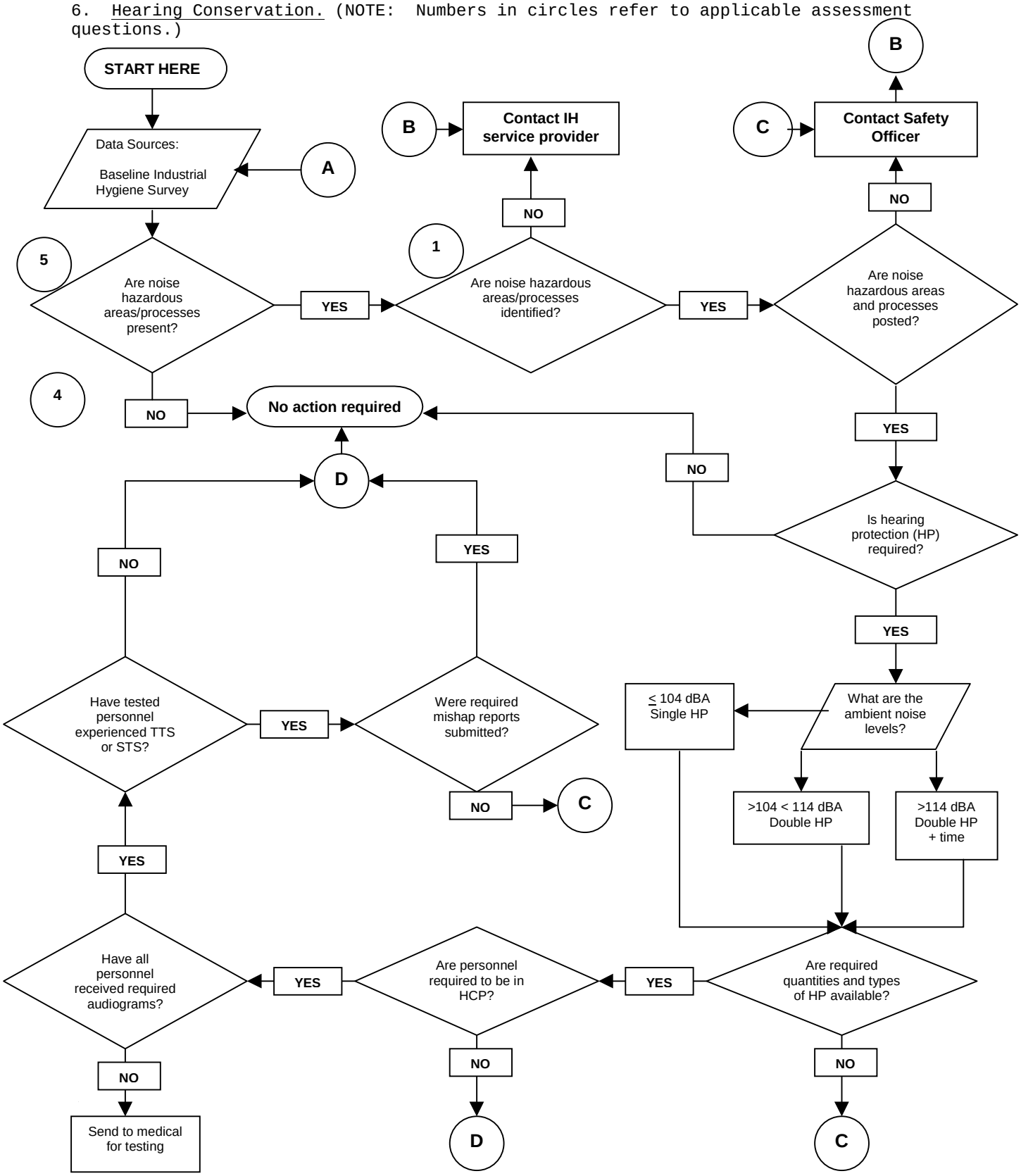
4. Hazardous Material Control and Management. (NOTE: Numbers in circles refer to applicable assessment questions.)



5. Lead Control. (NOTE: Numbers in circles refer to applicable assessment questions.)



6. Hearing Conservation. (NOTE: Numbers in circles refer to applicable assessment questions.)



Appendix A3-B
Safety Hazard Report

SAFETY HAZARD REPORT		1. ID NUMBER
A. REPORTING INDIVIDUAL/SAFETY OFFICER SECTION		
2. ISSUED BY		3. ISSUED TO
4. HAZARD NOTED		5. RISK ASSESSMENT CODE (See explanation on back 0before completing)
A. DATE	B. TIME	
6. LOCATION OF HAZARD		7. NATURE OF HAZARD
B. DIVISION OFFICER SECTION		
1.CORRECTIVE ACTION TAKEN		
2. INTERIM CORRECTIVE MEASURES		
3. NAME, RANK, AND TITLE	4. SIGNATURE	5. DATE FORWARDED
C. DEPARTMENT HEAD SECTION		
1. ACTION TAKEN ☐ CORRECTIVE ACTION TAKEN IN ITEM B1 ADEQUATE ☐ ADDITIONAL ACTION TAKEN/REQUIRED (GIVE EXPLANATION IN C2)		2. EXPLANATION OF ADDITIONAL ACTION TAKEN/REQUIRED
3. NAME, RANK, AND TITLE	4. SIGNATURE	5. DATE FORWARDED
D. RECORD SECTION		
1. REVIEW OF ACTION TAKEN IN SECTIONS A, B, AND C		2. IS CSMP ENTRY REQUIRED? ☐YES ☐NO JSN FOR 4790/2K _____
		3. IF YES: ACTION COMPLETE _____ DATE SIGNATURE _____ SAFETY OFFICER

TITLE	INITIALS	DATE
SAFETY OFFICER		
DEPARTMENT HEAD		
EXECUTIVE OFFICER		
COMMANDING OFFICER		

ACCOMPLISH REVIEW WITHIN 72 HOURS OF REPORT INITIATION

OPNAV 3120/5 (Rev. 5-99) (Previous editions can be used)

A. Risk Assessment. Each identified/validated hazard shall be assigned a Risk Assessment Code (RAC) by the activity safety office. The RAC represents the degree of risk associated with the deficiency and combines the elements of hazard severity and mishap probability. The RAC is derived as follows:

1. Hazard Severity. The hazard severity is an assessment of the worst possible consequence, defined by the degree of injury, occupational illness, or property damage which is likely to occur as a result of a deficiency. Hazard severity categories shall be assigned by Roman numeral according to the following criteria:

(a) Category I - **Catastrophic**: The hazard may cause death or loss of a facility.

(b) Category II - **Critical**: May cause severe injury, severe occupational illness, or major property damage.

(c) Category III - **Marginal**: May cause minor injury, minor occupational illness, or minor property damage.

(d) Category IV - **Negligible**: Probably would not affect personnel safety or health, but is nevertheless in violation of a NAVOSH standard.

2. Mishap Probability. The mishap probability is the probability 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 shall be assigned an Arabic letter according to the following criteria:

(a) **Subcategory A** - Likely to occur immediately or within a short period of time.

(b) **Subcategory B** - Probably will occur in time.

(c) **Subcategory C** - May occur in time.

(d) **Subcategory D** - Unlikely to occur.

3. Risk Assessment Code (RAC). The RAC is an expression of risk which combines the elements of hazard severity and mishap probability. Using the matrix shown below, the RAC is expressed as a single Arabic number that can be used to help determine hazard abatement priorities.

HAZARD SEVERITY	MISHAP PROBABILITY			
	A	B	C	D
Category I	1	1	2	3
Category II	1	2	3	4
Category III	2	3	4	5
Category IV	3	4	5	5

RAC
1 - Critical
2 - Serious
3 - Moderate
4 - Minor
5 - Negligible

OPNAV FORM 3120/5 (Rev. 5-99) BACK

Appendix A3-C

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 the impact of hazards. The first, and preferred, is to prevent the hazard at the design stage. 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 through appropriate actions during the design process, when operating procedures are developed and when equipment is purchased. Since many effective actions such as system safety reviews, design reviews, and the development of operating and purchasing procedures are the responsibility of the Systems Commands, only those actions which can be taken at the shipboard level to prevent hazards will be addressed.

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. **Purchasing Procedures**. Many hazards may be prevented by incorporating appropriate specifications into purchase orders for equipment/material. Normally, ship personnel have little control over specifications for equipment/material purchased through the Navy supply system. However, since a considerable amount of material/equipment is locally purchased, the ship can prevent hazards by purchasing the proper types of material and the proper amounts. Hazardous material is of special concern. Accomplished per paragraph B0305 of this manual, all local purchases of potentially hazardous material.

A0403. PRINCIPLES OF HAZARD CONTROL

Deficiency abatement will help control the frequency and severity of mishaps for those hazards which are impossible to eliminate in the operational environment. 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.

b. **Engineering Controls**. This means of hazard control is primarily accomplished through design and advanced planning. Whenever these methods are used for abatement aboard ship, 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. This involves the use of a barrier or limiter and may be in the form of a physical barrier, 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 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 solvent vapors if no other ventilation is possible.

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 and use of semi-automatic equipment that does not require constant attendance (time-separation). 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**. 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 reduction cannot be achieved through other methods and personal protective devices must be used, either alone or in conjunction with other protective measures. Other chapters describe personal protective equipment requirements for specific programs.

A0404. ABATEMENT PROCEDURES

a. The safety officer shall provide the results of workplace inspections and surveys and 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, which immediately threatens the loss of life, bodily injury, or illness to personnel.

b. **Abatement Priorities**. Once the results of workplace monitoring are evaluated, assign validated deficiencies a Risk Assessment Code (RAC) and make recommendations to eliminate the deficiency and therefore control the hazard. The ship's 3M Coordinator shall forward all OPNAV 4790/2Ks with a Block 15 entry to the safety officer for review. The safety officer shall enter the RAC into the NAVOSH Deficiency Abatement Plan (NAVOSHDAP). HADAP is an optional database that may be used for abatement tracking and is available for download at http://www.navosh.net.

c. **Risk Assessment**. The RAC provides a measure of the degree of risk associated with a deficiency by assessing both the severity of the hazard produced by the deficiency and the probability of a mishap occurring and, therefore, 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 potential consequence, defined by degree of injury, illness, or physical damage which is likely to occur as a result of the deficiency. Hazard severity categories are assigned Roman numerals according to the following criteria:

Description	Category	Results
CATASTROPHIC	I	Death or operational system loss.
CRITICAL	II	Severe injury, severe occupational illness, or major operational system damage.
MARGINAL	III	Minor injury, minor occupational illness, or minor system damage.
NEGLIGIBLE	IV	Probably would not effect personnel safety or health, but is nevertheless a violation of a NAVOSH standard.

(2) **Mishap Probability**. The mishap probability is the likelihood that a deficiency 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
	I	1	1	2	3
Hazard Severity	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, which 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, which are noted for record purposes and may be corrected when other work is accomplished on the equipment/system/space.

d. **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.

e. Shipboard hazards that cannot be corrected "on the spot" shall be documented in the Work Center Work List (WCWL)/Job Sequence Number (JSN) Log per reference A4-1, if applicable.

f. The NAVOSH Deficiency Abatement Plan (NAVOSHDAP) shall consist of Option D of the Current Ships Maintenance Project (CSMP) 1 printout and other CSMP supporting documents required by reference A4-1. The safety officer shall maintain at least a quarterly updated copy of the Safety Report from the CSMP.

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 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 4790.4C, Ships Maintenance and Material Management (3-M) Manual

CHAPTER A5

TRAINING

A0501. DISCUSSION

a. Training is a process used to provide current guidance and instruction on recognized hazards to minimize risk. The information provided in training is based upon lessons learned, expert analysis of mishaps and regulatory requirements. NAVOSH training is an integral part of the Navy Operational Risk Management Process (see reference A5-1).

b. The ship's training officer, safety officer and divisional safety petty officers (leading petty officers for submarines) shall implement and execute the afloat training program.

c. NAVOSH training policy and requirements of this manual are implemented by the Navy Occupational Safety and Health and Hazardous Material Control and Management Navy Training Systems Plan (NTSP S-40-8603D) (NOTAL). To ensure suitable participation in development of NAVOSH training, the NAVOSH Quality Council established a NAVOSH Training and Education Quality Management Board (T&E QMB). The objectives of the NAVOSH T&E QMB are:

(1) Assess the effectiveness of NAVOSH training.

(2) Define NAVOSH training requirements.

(3) Recommend priorities for NAVOSH training courses and support material development.

(4) Identify and recommend actions to solve NAVOSH training issues.

(5) Review Navy Training Systems Plan (NTSP) requirements. Monitor progress of required action. Recommend changes to the NTSP.

A0502. NAVOSH TRAINING FOR SHIPBOARD DUTIES AND PROGRAMS

a. Training consists of detailed courses regarding specific duties involved with NAVOSH Programs. The following training is available for ship and submarine safety officers and divisional safety petty officers:

(1) **Afloat Safety Officer Course (A-4J-0020)**. This course is offered at Surface Warfare Officer School (SWOS), Newport, and is exported 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 at 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.

(3) **Submarine Safety Officer Course (F-4J-0020)**. This is a 4-day course taught by the NAVOSHENVTRACEN. It provides submarine-qualified commissioned officers, warrant 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

c. **Hazardous Material Control and Management Technician (HMC&M) Course (A-322-2600)**. 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 SNEC 9595. Ships manning documents specify the requirements for personnel holding this SNEC.

d. Appendix A5-A provides a list of Navy educational courses related to occupational safety and health. Appendix A5-B is a listing of occupational safety and 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.

e. **Selection of Training Courses**

(1) Training requirements and needs are different for every command.

(2) When analyzing training needs, the following procedures and considerations may be used:

(a) Refer to equipment technical manuals and personnel qualification standards (PQS).

(b) Contact the safety officer, Safety Council, and department heads of other ships of the same class or types whenever possible to enhance the exchange of information on safety problems and tips.

(c) Ensure that sufficient personnel assigned are trained on equipment and systems. This will eliminate any gaps in NAVOSH education as a result of personnel turnover.

(d) Provide supervisors with available supervisory instruction. Such instruction normally provides safety as a part of its curricula. Program safety at the supervisory level is not always the same as practical safety at the hands-on level.

A0503. AFLOAT NAVOSH TRAINING 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 6 months of, assuming their duties. Safety officers who are graduates of SWO Department Head School meet this requirement. Group and Squadron safety officers (surface ship or submarine) shall attend the applicable Afloat 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 Collateral Duty Safety Officer Watchstation 305, of the Safety Programs Afloat Personnel Qualification Standard (PQS), NAVEDTRA 43460-4 (Series). Additional training may be obtained via courses offered in the annual NAVOSHENVTRACEN course schedule distributed by the Chief of Naval Education and Training (CNET) and conferences and workshops related to the elements required by the command's specific safety program.

b. Fifty percent of the petty officers assigned as divisional safety petty officers aboard ship shall attend the Safety Programs Afloat Course within 6 months of being assigned to the job. All divisional safety petty officers shall complete the Division Safety Petty Officer, Watchstation 301, of the Safety Programs Afloat PQS within 6 months of being assigned these duties and shall have at least 1 year remaining before projected rotation date (PRD). Divisional safety petty officers may complete the requirements for Navy Enlisted Code (NEC) 9571 during their assignment to this responsibility(This paragraph is not applicable to submarines).

c. Conduct occupational safety and health training as indicated in appendix A5-A. For submarines, this training may be integrated into Phase I of submarine qualification. Indoctrination training will concentrate on the practical aspects of the NAVOSH Program as implemented aboard ship and will include:

(1) Introduction of the NAVOSH 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) using 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 back injury prevention

(6) Hazardous materials emergency spill response.

Accomplish training through the use of videotapes for general subject matter and by ship's instructors for command specific topics. Additionally, obtain and show videotapes or films on occupational safety and health subjects and publish periodic NAVOSH notes in the Plan of the Day as a part of the command's General Military Training Program.

d. Conduct frequent occupational safety and health training on safety precautions and potential hazards applicable to a division as part of the ongoing ORM process. Conduct operational risk management training 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 NAVOSH 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.

e. 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.

f. Where specified in this instruction division officers shall ensure training is documented. Divisional safety petty officer training shall be tracked by the safety officer.

g. A complete list of occupational safety and health correspondence courses can be found in appendix A5-C or at http://dodimagery.afis.osd.mil/dvi/Top/mainbody.html.

h. Personnel may be assigned as divisional safety petty officer prior to qualification, but must complete their PQS within 6 months.

i. A list of available training aids on occupational safety and health topics can be found in appendix A5-D.

j. 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**. Contains articles on shipboard safety problems, accident trends, and current technical information. Issued by COMNAVSAFECEN.

(2) **Fathom Magazine - Issued quarterly**. Publicizes fleet-wide safety programs and provides information on nautical mishap prevention. Issued by COMNAVSAFECEN.

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

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

(5) **ASHORE - Issued quarterly**. 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.

(6) **FLASH (Factual Lines About Submarine Hazards) - Issued quarterly**. 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. Issued by COMNAV-SAFECEN.

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

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

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

CHAPTER A5

REFERENCES

A5-1. OPNAVINST 3500.39, “Operational Risk Management” (NOTAL)

Appendix A5-A
TRAINING REQUIREMENTS SUMMARY DRAFT

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

Navy Personnel Training Requirement	Citation	Course Title/Training Required*	Resource for Training	Length of Training	Periodicity
Personnel performing jobs requiring lifting	A0406b	Training on back injury prevention[MI]	Videotapes, ship's instructors	TBD	Annually
Qualified E-6 personnel, chief petty officers, warrant officers, and commissioned officers.	A0702 and A0703a	Submarine Safety Officer Course (F-4J-0020)[MF]	NAVOSHENVTRACEN	4 Days	Prior to or within 6 months of assignment
For collateral duty prospective safety officer	A0703a	Collateral Duty Safety Officer Watchstation 305 [MI]	Safety Programs Afloat PQS, NAVEDTRA43460-4A	TBD	Interim measure, until the Safety Officer Course can be attended.
Ship Safety Officers	A0703a	Afloat Safety Officer Course (A-4J-0020)[MF]	Surface Warfare Officer School (SWOS), Newport	7 Days	Prior to or within 6 months of assignment
Afloat safety officers	A0703a	Refresher Training [F]	NAVOSHENVTRACEN/ CNO NAVOSH PDC	TBD	Optional/ As necessary
Afloat Industrial Hygiene Officers (IHOs)	A0703a	Annual continuing education[MI]	Navy Occupational Health and Preventive Medicine Workshop	TBD	Annual

Navy Personnel Training Requirement	Citation	Course Title/Training Required*	Resource for Training	Length of Training	Periodicity
Fifty percent of the petty officers assigned as divisional safety petty officers aboard ship	A0703b	Safety Programs Afloat (A-493-2099)[MF]	NAVOSHENVTRACEN	5 Days	Within 6 months of assignment
[1]Division safety petty officers All hands	A0703b & h A0703c	Divisional Safety Petty Officer, Watchstation 301[MI] Occupational Safety and Health Training[MI]	Supervisor, Safety Programs Afloat PQS, Videotapes, Ship personnel	TBD TBD	Within 6 months of assignment 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
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 or IMA (**See NOTE [1]**) For ships with an EART (**See NOTE[2]**) For ships with an IMA (**See NOTE [3]**)	TBD	On-the-job training
All personnel that are required to wear personnel protective clothing and equipment	B1202 (c)/ B1205	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) or Training Guide available http://www.norva.navy.mil/navosh	TBD	Upon reporting aboard

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

Navy Personnel Training Requirement	Citation	Course Title/Training Required*	Resource for Training	Length of Training	Periodicity
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
E-5 through E-7[2]	A0702	HMC&M Technician Course (A-322-2600)[MF]	NAVOSHENVTRACEN	5 days	Initial
HM Supervisor	B0302e	HMC&M Technician Course (A-322-2600)[MF]	NAVOSHENVTRACEN	5 days	Initial
Hazardous Material(HM) Coordinator	B0302e	Afloat HM Coordinator Course (A-8B-0008)[MF]	Navy Supply School or NAVOSHENVTRACEN	2 days	Prior to or within 6 months of assignment
Damage control teams required to combat HM spills/releases	B0302e	HM/HW emergency procedures[MI]	DCA	TBD	Determined by DCA
Workcenter personnel	B0302a	Proper procedure for handling HM/HW[MI]	HM Coordinator/ Workcenter Supervisor	TBD	Prior to using or handling HM
All hands	B0302	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	B0310g	HM Control and Management Technician Course (A-322-2600)[MF]	NAVOSHENVTRACEN	5 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/NAVEDTRAMAN 10074	TBD	Prior to beginning work and annually thereafter

[2] Aviation squadron, surface ship, submarine, and shore military personnel either serving in, or en route to an authorized SNEC 9595 billet as indicated in the activity manpower document

Navy Personnel Training Requirement	Citation	Course Title/Training Required*	Resource for Training	Length of Training	Periodicity
All personnel in the Hearing Conservation Program	B0408b	Refresher training for the HCP-enrolled personnel[MI]	NEHC Technical Manual, TM-6260.51.99-1, Navy Medical Department Hearing Conservation Program Procedures	TBD	Annually
All personnel performing preventive maintenance on brake assemblies	Appendix B1-B, Chapter B6	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	B0702(C)(3)	CPR Certification[MF]	Training per American Heart Association or Red Cross		
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
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	B0902c	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 NAVOSH ETC website at http://www.norva.navy.mil/navosh

NOTE [1] **For ships with no Emergency Asbestos Response Team (EART) or Intermediate Maintenance Activity (IMA)**, 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 “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 [3] **For ships with an Intermediate Maintenance Activity (IMA)**, this training shall be accomplished by the safety officer or engineer officer, or a member of the IMA that has successfully “Asbestos Supervisor/Worker”, A-493-0069, as on-the-job training using the Standard Operating Procedures in Appendix B1-B.

Appendix A5-B

NAVOSH-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 NAVENPVNT-MEDUs (abbreviated EPMUs below for convenience) at which it is taught. These courses are not controlled by Commander, Naval Education and Training and are not equivalent to NAVOSHENVTRACEN courses unless otherwise specified.

1. Health Aspects of Marine Sanitation Devices (B-322-2130) (EPMU-2, 5, 6, 7)

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

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

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

5. Navy Occupational Safety and Health (NAVOSH) Programs Afloat (B-322-2301) (EPMU-2, 7)

6. Heat Stress Afloat (B-322-2320) (EPMU-2, 6, 7)

7. Hearing Conservation Afloat (B-322-2310) (EPMU-2, 6, 7)

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

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

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

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
SEVEN	Sigonella, Italy
FIVE	San Diego, California
SIX	Pearl Harbor, Hawaii

Similar training may be available from cognizant industrial hygiene staff.

Appendix A5-C

NAVOSH-RELATED TRAINING MANUALS AND CORRESPONDENCE COURSES

The following Naval Education and Training (NAVEDTRA) manuals and correspondence courses contain information related to the NAVOSH (Afloat) Program:

TITLE	NAVEDTRA NUMBER
NAVAL SAFETY SUPERVISOR	12961
HEAT STRESS*	13028
TOOLS AND THEIR USES	12085
BASIC MILITARY REQUIREMENTS	12018
MILITARY REQUIREMENTS PO3	12024
MILITARY REQUIREMENTS PO2	12045
MILITARY REQUIREMENTS PO1	12046
MILITARY REQUIREMENTS CPO	12047
MASTER-AT-ARMS	12740
SAFETY PROGRAMS AFLOAT	43460
TRAINING COURSES	10075-C
NAVAL ORIENTATION	12966
NAVOSH TRAINING GUIDE FOR FORCES AFLOAT**	10074

NOTES:

NAVEDTRA titles and number are subject to change. 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.cnet.navy.mil/netpdtc/nac/neas.htm

* Refer to BUMED homepage of Nonresident Training Courses for a current listing of available products. The catalog may be accessed for view/download from: http://www-nshspts.med.navy.mil/

** Refer to NAVOSHENVTRACEN homepage. The catalog may be accessed for view/download from: http://www.norva.navy.mil/navosh/ NAVOSH Training Guide for Forces Afloat.

Appendix A5-D

NAVOSH TRAINING AIDS

The following is a list of resources for training aids, which can be used as a part of the on board training program.

1. Defense Automated Visual Information System/Defense Instructional Technology Information System (DAVIS/DITIS)

- DAVIS/DITIS web site
  - http://afishp6.afis.osd.mil/dodimagery/mainbody.htm

- DAVIS - http://afishp6.afis.osd.mil/dodimagery/davis/

2. Naval Education & Training Professional Development & Technology Center (NETPDTC)

- Technology Information Products Services
  - Video catalog - http://www.cnet.navy.mil/netpdtc/vicat/catalog.htm

3. Naval Occupational Safety, Health, and Environmental Training Center (NAVOSHENVTRACEN)

- NAVOSHENVTRACEN web site - http://www.norva.navy.mil/navosh/

- Training Aids - http://www.norva.navy.mil/navosh/video1.htm

4. Copies of NAVOSH videos can be ordered through the CNET Navy Media Library. This is the central source of training, education, and information media to support Navy wide training requirements.

- POC: Director/NETPDTC
  Norfolk Regional Electronic Media Center
  9770 Decatur Ave, Suite 250, Bldg. W313
  Norfolk, Virginia 23511-3292
  (757) 444-4011/1486 or DSN 564-4011/1468
  Fax: (757) 444-3711 or DSN 564-3711

CHAPTER A6

MISHAP INVESTIGATION AND REPORTING

A0601. DISCUSSION

a. Comprehensive, accurate mishap investigation is essential to the success of the Naval Safety Program. The reports required by this chapter are separate and independent of any investigative report required by the Manual of the Judge Advocate General (JAGMAN), reference A6-1. Mishap investigation reports (MIR) require answers to the questions: who, what, where, when, and why; and require damage assessments and a description of the effectiveness of measures used to limit further damage after the mishap has occurred. The entire mishap investigation effort is focused on preventing future mishaps.

b. This chapter applies to:

(1) Commissioned, U.S. Navy ships and their embarked equipment, boats, and landing craft, or leased boats.

(2) Pre-commissioned, U.S. Navy ships and their embarked equipment, boats, and landing craft, or leased boats beginning when the ship gets underway for Acceptance Trials.

(3) USNS ships manned by Federal civilian mariners assigned to ships in the Military Sealift Command (MSC).

(4) All on-duty diving mishaps.

NOTE:

Reference A6-2 contains guidance and administrative procedures for use by MSC ships and assigned civil service mariners and military detachment personnel.

c. Shipboard mishap investigation and reporting procedures in this chapter apply to mishaps resulting in:

(1) Damage to the ships and the ships' embarked equipment and craft listed above at all times, both underway and moored.

(2) Death or injury to all personnel (including embarked personnel) aboard ships or craft listed above while underway.

(3) Death or injury to ship's or embarked craft's military and Federal civilian mariner crew members (permanent or under temporary orders) when moored and when on-duty ashore.

d. Mishap Reporting Requirements

(1) Reportable Afloat Mishaps

(a) Class A Mishap. Total cost of reportable damage is $1,000,000 or more; or any injury or work-related illness resulting in death or permanent total disability.

(b) Class B Mishap. The total cost of reportable property damage is $200,000 or more, but less than $1,000,000; an injury or work-related illness resulting in permanent partial disability; or a mishap resulting in the hospitalization of three or more people.

(c) Class C Mishap. The resulting total cost of reportable property damage is $20,000 or more, but less than $200,000; or an injury preventing an individual from performing regularly scheduled duty or work beyond the day or shift on which it occurred; or an injury or disability preventing personnel from performing regularly scheduled duty for 5 days (1 day for embarked Marines) or more after 2359 on the day of injury or onset of illness.

(d) Afloat Special Case Mishap. The following special case afloat mishaps require the submission of an MR:

1. All cases of electric shock. Include the voltage in the report.

2. All cases of grounding, collision and flooding.

3. All fires.

4. All cases of hazardous material, chemical or toxic exposure requiring medical attention.

5. All mishaps involving explosives, oxidizers, incendiaries, explosive systems or chemical warfare agents. Mishaps include detonation, accidental launch, malfunction, dangerous defect, improper handling, damage to a launching device, weapon impact off range, or other unusual or unexpected weapons-related occurrence.

6. All diving cases involving central nervous system (CNS) oxygen toxicity, pulmonary over inflation syndrome (POIS) or hyperbaric treatment.

7. All cases of back injury resulting from a mishap requiring medical attention.

(2) Mishaps not reportable by this instruction:

(a) Mishaps involving nuclear weapons, nuclear propulsion plants, or radioactive materials involved in these systems. However, mishaps associated with the secondary side of the ship’s nuclear propulsion plant or non-nuclear components are reportable.

(b) Damage or injury by direct action of an enemy or hostile force. This does not include suspected cases of friendly fire.

(c) Malfunction or failure of parts due to normal wear and tear, if the malfunction or failure is the only damage. The only necessary corrective action is to replace or repair the broken or failed part. (Note: Any collateral damage or injury caused by normal wear and tear is reportable.)

(d) Injuries associated with non-occupational diseases or chronic medical conditions, when the disease itself, not the injury, is the cause of the lost time.

(e) Suicide, attempted suicide, homicide, or intentionally self-inflicted injuries.

(f) Injuries resulting from altercations, attack, or assault, unless they are incurred in the performance of official duties when an attack or assault would not be a felony.

(g) Injuries sustained before entry into the military service, or civilian employment, unless specifically aggravated by current tenure of service.

(h) Hospitalization for treatment where the patient is retained beyond the day of admission solely for administrative reasons.

(i) Hospitalization for observation or administrative reasons not related to the immediate injury or occupational illness.

(j) Injuries resulting from:

1. Pre-existing musculoskeletal disorders.

2. Minimum stress and strain (simple, natural, nonviolent body positions or actions as in dressing, sleeping, coughing, or sneezing).

(k) Injuries or fatalities to anyone eluding or escaping from military or civilian custody or arrest.

(l)Death due to natural causes unrelated to the work environment.

(m) Intentional or expected damage to Department of Defense (DoD) equipment or property during authorized testing or combat training, including missile and ordnance firing.

(n) Foreign object damage (FOD) to gas turbine engines discovered during scheduled engine disassembly or bore-scope inspection.

(o) Injury or property damage resulting from vandalism, riots, civil disorders, sabotage, terrorist activities, or criminal acts, such as arson.

(p) Adverse bodily reactions resulting directly from the use of drugs under the direction of competent medical authority.

(q) Death or injury resulting solely from illegal use of drugs or other substances.

(r) Normal, residual damage as a result of a missile launch.

(3) Unless underway, mishaps involving non-embarked military and Federal civilian personnel assigned to a shore unit identification code (UIC) shall be investigated and reported per references A6-3 and A6-4. Other civilians, dependents, or foreign personnel are not reportable under this chapter.

e. Concept of Privilege. Military and Federal courts recognize that information given under the promise of confidentiality is protected from release under executive privilege. Concept of privilege is explained in detail in appendix A6-A.

A0602. RESPONSIBILITIES

a. Deputy Chief of Naval Operations (Logistics) (N4) shall:

(1) Serve as the central Navy office for ensuring accomplishment of ammunition, explosives, and chemical agents and systems mishap reporting, and as the point of contact between the Department of Defense Explosives Safety Board and U.S. Navy activities.

(2) Modify NAVOSH policies and guidance as a result of lessons learned from mishap investigations.

b. Deputy Chief of Naval Operations (Resources, Warfare Requirements, and Assessments) (N8) shall direct and supervise mishap investigation and reporting training for afloat primary and collateral duty safety officers.

(1) Director, Surface Warfare Division (N86) is responsible for the safe operation of assigned surface ships and support craft, and ensuring training in mishap investigation and reporting is provided for primary and collateral duty safety officers.

(2) Director, Submarine Warfare Division (N87) is responsible for the safe operation of submarines, assigned surface ships, deep submergence systems, support craft, and diving operations; and ensuring training in mishap investigation and reporting is provided for primary and collateral duty safety officers.

(3) Director, Air Warfare Division (N88) is responsible for the safe operation of assigned surface ships and support craft; and ensuring training in mishap investigation and reporting is provided for primary and collateral duty safety officers.

c. Systems Commanders shall:

(1) Assist mishap investigators in the investigative process.

(2) Respond to the recommendations and corrective actions.

(3) Issue proper documentation to correct hazardous conditions.

(4) Review and analyze Mishap Investigation Report’s (MIRs) when included in the endorsement chain.

d. COMNAVSAFECEN shall:

(1) Periodically review this chapter and make interim changes with concurrence of CNO (N45) for publication. As CNO (N09F), COMNAVSAFECEN retains responsibility for mishap report control symbols and making necessary changes to mishap reporting formats to ensure the data collected satisfy the Navy's safety information requirements.

(2) Contact appropriate fleet and type commander(s) upon learning about a possible Class A or other afloat mishaps to remind them of the investigation requirements and the availability of mishap investigation advisors.

(3) Provide a qualified advisor to Mishap Investigation Boards (MIBs) for all afloat Class A mishaps. An advisor also may be provided for other than Class A mishaps upon request.

(4) Coordinate, with the Commandant of the Marine Corps, the investigation of mishaps involving embarked Marines and Marine Corps equipment when embarked in U.S. Navy ships and in their landing craft (up to the high water mark during amphibious or inshore warfare training operations).

(5) Take custody of all relevant evidence (whether referenced in the MIR or not).

(6) Make available, upon request, any evidence which is not privileged to:

(a) MIR endorsers.

(b) Individuals conducting a concurrent investigation under proper regulatory authority of any agency or department of the government of the United States or by attorneys representing the interests of the United States in any litigation related to the incident which is the subject of the mishap investigation.

(7) Make available, upon request, any evidence which is privileged (As defined in appendix A6-A) to MIR endorsers.

(8) Conduct the final review, analysis and endorsement of MIRs within 14 days of receipt. Hard copies of the MIRs, endorsements and evidence shall be retained for five years. Electronic copies shall be retained indefinitely.

(9) Ensure prompt distribution of sanitized MIR’s to affected fleet commands.

(10) When beneficial, ensure prompt distribution of better business practices (lessons learned) to appropriate type commanders, based on the MIR.

(11) Monitor the completion of corrective action resulting from an MIR.

(12) Maintain a centralized database for trend analysis and lessons learned.

(13) Sanitize MRs, MIRs, and endorsements prior to distribution.

e. Fleet Commanders in Chief; Numbered Fleet Commanders; and Commander Military Sea lift Command shall:

(1) Ensure subordinate commands comply with current CNO safety and mishap prevention and injury reporting requirements.

(2) Serve as the appointing authority for mishaps involving more than one subordinate type commander and provide the senior member with an endorsement chain. Submit message using sample format in appendix A6-B.

(3) Review and endorse the MIR for mishaps involving more than one type commander within 14 days of receipt.

f. Type Commanders, Commander Naval Special Warfare Command, Commander Mine Warfare Command, and Commanders MSC Atlantic and Pacific shall:

(1) Direct the investigation of any Class B or other mishaps or near mishaps that may reveal vital safety information if investigated by a MIB.

(2) Incorporate mishap prevention, investigation, and reporting into the training requirements of type commander training manuals, master training plans, or training guides.

(3) Serve as the appointing authority for mishaps involving more than one subordinate squadron or group commander and provide the senior member with the required endorsers. Submit message to the above and COMNAVSAFECEN.

(4) Coordinate with COMNAVSAFECEN, COMNAVSEASYSCOM, and other technical agencies in providing assistance to the mishap board, when requested.

(5) Provide relevant safety information from the MIR to COMNAVSEASYSCOM, or other technical agencies, when appropriate; unless otherwise restricted.

(6) Request any waivers or modifications to the investigation and reporting requirements from CNO (N8).

(7) Ensure all appropriate organizations are apprised of hazards identified during a mishap investigation.

(8) Collect and disseminate best business practice (lessons learned) and safety-related information. Include COMNAVSAFECEN NORFOLK VA//30/054// as an information addressee on any lessons learned issued.

(9) Review and endorse the MIR within 14 day of receipt.

g. Group and Squadron Commanders shall:

(1) Ensure subordinate commands incorporate mishap prevention, investigation, and reporting training, as directed by the type commander, into the group and squadron training requirements.

(2) Ensure commanding officers are apprised of hazards identified by a mishap investigation.

(3) Review and endorse the MIR within 14 days of receipt.

h. ISICs, including Commanding Officers of Assault Craft Units (ACUs) Five and Four shall:

(1) Serve as the appointing authority for MIBs, unless otherwise directed.

(2) Review and endorse the MIR within 14 days of receipt

i. The appointing authority shall:

(1) Appoint, in writing, the senior member of MIBs.

(2) Appoint, the remaining members of MIBs.

(3) Ensure no one directly involved in a mishap, or having personal interest that might conflict with his/her objective and impartial performance of duties, serves as a member of MIBs.

(4) Provide the endorsement change via message to all endorsers with a copy to COMNAVSAFECEN.

j. Commanding Officers, Masters, Officers in Charge, and Craftmasters shall:

(1) Protect the mishap site or damaged area from loss or further damage. Operational requirements or damage control measures may require disturbing the scene of the mishap before the MIB arrives. In such cases, make every reasonable effort to:

(a) Make an accurate plot of the scene.

(b) Take photographs or videotape recordings of the wreckage, its distribution, and the surrounding area.

(c) Make a diagram of any underwater damage.

(2) Direct the investigation and report of Class B mishaps, Class C mishaps, and all afloat special case mishaps not investigated by a MIB per A0605. Near-mishaps may be investigated and reported.

(3) Ensure the COMNAVSAFECEN NORFOLK VA//30//00// is an information addressee on any OPREP-3 or UNIT SITREP messages submitted per reference A6-5 and A6-6. Include COMNAVSAFECEN NORFOLK VA//40//30//and CMC WASHINGTON DC//SD// for all mishaps involving embarked Marines and Marine Corps equipment.

(4) Ensure personnel assigned to conduct internal mishap investigations, assigned as a member of a MIB, or assigned to assist the board are excluded from assignment to a JAG investigation of the same incident conducted per reference A6-1. Personnel currently assigned to full-time safety positions shall not be appointed as a member of any legal investigation board.

(5) Coordinate, with the commanding officer or officer in charge of embarked units and detachments, the investigation of mishaps involving Marines and Marine Corps equipment when embarked in U.S. Navy ships and on landing crafts (up to the high water mark during amphibious or inshore warfare training operations).

(6) Direct the collection of any transitory medical evidence, such as specimens to determine blood alcohol and drug levels, pertinent to the mishap investigation.

(7) Direct the autopsy and toxicological screen of all personnel killed in the mishap as authorized by Article 17-2(1), Manual of the Medical Department (NAVMED P-5065).

(8) Provide administrative and logistic support for the MIB. Give the senior member authority to release messages specifically related to the mishap investigation and the MIR.

(9) Review and endorse the MIR within 7 days of receipt.

k. Ship's Safety Officer and Assault Craft Unit (ACU) Safety Officers shall:

(1) Assist the commanding officer in conducting mishap investigations for all mishaps except those investigated by a MIB.

(2) Coordinate with safety officers from embarked units and detachments on the investigation, reporting, and correction of the causes of afloat mishaps.

(3) Ensure ship-wide dissemination of safety information and lessons learned resulting from mishap investigations.

(4) The safety officer shall maintain a complete file of MRs required by higher authority, internal Mishap/Near Mishap Reports, and Injury Reports. Such reports will be retained for 5 years and then destroyed.

l. Department Heads, Division Officers, and Work Center Supervisors shall notify the safety officer of all mishaps and near mishaps. Appendix A6-H can be used for an internal report.

m. The command's Safety Council and Enlisted Safety Committee shall evaluate mishap and injury reports and logs as part of the command safety program evaluation. This evaluation should ensure mishap investigation and reporting procedure aid in determining causes, trends, places and groups to target for specific training topics to prevent recurrence.

A0603. MISHAP INVESTIGATION BOARD

The immediate superior in command (ISIC), or other higher authority, shall appoint a mishap investigation board (MIB) for all afloat Class A mishaps. All MIBs shall consist of a senior member and at least two additional members. The board's purpose is to investigate the mishap to determine the causes. The board then prepares a (MIR) with its findings, conclusions and recommendations.

a. Appointment of a Mishap Investigation Board:

(1) When a serious shipboard mishap occurs, the commanding officer or craftmaster shall notify Commander, Naval Safety Center (COMNAVSAFECEN) and the chain of command. This is accomplished through an OPREP-3 or UNIT SITREP message submitted per references A6-5 and A6-6.

(2) Upon notification of a potential Class A mishap, the fleet or type commander shall send a message to the appointing authority providing the

minimum endorsement chain including Naval Safety Center as an information addressee. (Appendix A6-B provides the sample message format).

(3) MIB members are appointed, in writing. Unless a senior in the chain of command assumes the capacity as appointing authority, the ISIC is normally the appointing authority. For Military Sealift Command (MSC), the appointing authority is Commander, Military Sealift Command, (PM1 for Naval Fleet Auxiliary Force (NFAF) civilian mariner manned ships, PM2 for special mission civilian mariner manned ships, and PM3 for USNS Kaiser). (Appendix A6-C provides the sample letter format).

b. Members of the MIB:

(1)The senior member shall be an unrestricted line officer in the U.S. Navy or U.S. Marine Corps, or a senior official in MSC. The senior member should be senior to the commanding officer of the command involved in the mishap. If junior to the commanding officer, the senior member shall be from another command. In addition to the senior member, the appointing authority shall appoint a minimum of two commissioned officers to the MIB. If a Marine or U.S. Marine Corp equipment is involved in the mishap, the appointing authority should appoint a U.S. Marine Corps officer as a member of the MIB.

c. Requirements of MIB Members

(1) The Senior Member shall:

(a) Convene and direct the mishap investigation.

(b) Request technical assistance for the investigation from the appointing authority or type commander, when required.

(c) Provide direction to MIB members on specific policies, procedures, and restrictions per appendix A6-D.

(d) Refer requests to COMNAVSAFECEN representative, if there are questions about releasability, for any physical evidence, summaries of witness’ statements, logs, photographs, negatives, or tape recordings either by transfer or originals, if appropriate, or by making copies.

(e) Prepare and send the MIR within 30 days of convening to MIB.

(f) Transfer custody of all relevant documentary evidence, board members' personal notes, original copies of summaries of all statements, photographs and negatives, and tape recordings to COMNAVSAFECEN. Include an inventory itemizing all the evidence the board considered. Send a copy of the inventory to all endorsers.

(2) COMNAVSAFECEN Advisor

(a) COMNAVSAFECEN shall appoint a trained mishap investigation advisor for all afloat Class A mishaps and provide an advisor for other mishaps when a trained investigator would be beneficial to the investigation. The advisor shall be present at the initial convening of the board, if logistically feasible.

(b) The advisor is not a member of the MIB, but serves to advise the board in investigation and reporting procedures.

(c) The senior member shall extend to the advisor unrestricted access to all evidence, summaries of witness' statements, and proceedings.

(d) The advisor may depart before the completion of the investigation, if the senior member and COMNAVSAFECEN agree.

(3) Technical Assistance

(a) The MIB may require the assistance of technical experts. Sources of technical assistance include, but are not limited to: COMNAVSAFECEN; Armed Forces Institute of Pathology; Navy Environmental and Preventive Medicine Units (NAVENPVNTMEDUs); COMNAVSEASYSCOM; Naval Coastal Systems Center (NAVCOASTSYSCEN); Naval Surface Warfare Center, Ship Systems Engineering Station (NSWC NAVSSES); naval shipyards; hospitals; aviation depots; and equipment technical representatives.

1. Request for Assistance. The appointing authority, the commanding officer of the ship involved, or the senior member may request assistance from local activities. Only the type commander, however, may request assistance when it involves distant activities, external agencies, or travel funding.

2. Advisory Nature of Technical Assistance. Assistance given to a board is advisory in nature. Technical or medical specialists (other than the assigned medical member) are not members of the board. Serious consideration should be given to the recommendations offered by technical or medical specialists, but the board is not obligated to accept them. Except for the COMNAVSAFECEN mishap investigation advisor, the senior member shall not give the specialists access to board deliberations or the contents of Part Bravo of the MIR.

(b) The senior member should contact the COMNAVSAFECEN (Code 30) if any questions or doubts arise during the mishap investigation.

(4) MIB members shall:

(a) Collect, organize, interpret, and protect all evidence.

(b) Ensure photographs and videotapes accurately depict the mishap scene, whether taken prior to or after arrival of the board.

1. Photographs staged by the MIB (planned or posed to illustrate a specific condition or situation) are privileged because of the deliberative process. Other photographs are not but may be protected from release under the Privacy Act or exemption b(6) of the Freedom of Information Act (FOIA).

2. All captions or markings placed on photographs suggesting the mishap board's deliberative process also are privileged.

3. Photographs of injuries or human remains that are not staged are not privileged, but may be exempt from disclosure under exemption b(6) of the Freedom of Information Act.

(c) Interpret logs, records, blueprints, schematics, and written procedures.

(d) Take oral statements from witnesses. Advise all witnesses in writing of the restricted uses of privileged testimony (The concept of privilege is explained in appendix A6-A).

(e) Reconstruct the sequence of events leading up to, and immediately following, the mishap.

(f) Not divulge, except during deliberations, any information or opinions of the board.

A0604. MISHAP INVESTIGATION REPORT (MIR), Report Symbol OPNAV 5102-7, Appendix A6-E

Formal investigations conducted by a designated MIB are required for all Class A afloat mishaps. The mishap investigation takes precedence over any other investigation of the same mishap, unless the investigation uncovers evidence of a criminal act. A sample message format for MIRs is contained in appendix A6-E.

a. Mishap Investigation Board Proceedings

(1) The ISIC and the commanding officer of the unit involved shall coordinate the time and location of the initial meeting of the MIB. The ISIC provides the convening date and location to the operational chain of command and COMNAVSAFECEN as soon as possible.

(2) The ISIC or commanding officer of the unit involved shall provide accommodations, local transportation, and administrative support. The senior member shall have authority to release messages specifically related to the mishap investigation and the MIR.

(3) The MIB shall conduct its investigation of a mishap separately from all other investigations. Members of the board shall not release information revealing the source of any physical evidence obtained as a result of privileged information nor any testimony given under the assurance of privilege. Despite those limitations, cooperation and access to nonprivileged physical evidence and witnesses among investigators is required.

NOTE:

Privilege/Non-Privilege is discussed throughout the rest of this chapter. Refer to Appendix A6-A

(4) The most frequent, concurrent investigation is the JAGMAN investigation. The U.S. Navy chain of command directs JAGMAN investigations for legal or administrative purposes.

(a) Members of a MIB shall neither participate in nor conduct a JAGMAN investigation of the same mishap.

(b) Except for physical evidence, the JAGMAN investigator shall not use any part of the mishap investigation.

(c) The senior member of the MIB shall coordinate the disposition of physical evidence and the restoration of the mishap scene with JAGMAN, and other investigators.

(d) If, during the investigation, an investigator discovers signs of a criminal act related to the mishap, the senior member immediately shall inform the appointing authority who shall confer with legal counsel and notify the Naval Criminal Investigative Service (NAVCRIMINVSER) together with COMNAVSAFECEN.

1. Nonprivileged evidence gathered by the MIB may be released to other investigators. The senior member shall not release information revealing the source of any physical evidence obtained as a result of privileged information, nor any testimony given under the assurance of privilege.

2. The senior member shall turn over all other nonprivileged physical evidence to the senior NAVCRIMINVSER agent.

3. The senior member may continue the mishap investigation, if directed by the appointing authority and approved by Office of the Judge Advocate General (OJAG). Valuable safety information may result from investigating a mishap that occurred subsequent to the criminal act.

4. According to the 1984 Memorandum of Understanding Between the Departments of Justice and Defense “Relating to the Investigation and Prosecution of Certain Crimes”, where a criminal investigation or prosecution by DOJ is ongoing, a mishap investigation shall not be initiated nor proceed without prior coordination with, and concurrence from, appropriate Department of Justice (DOJ) investigative and prosecutive agencies.

b. Collection of Evidence

(1) MIB investigations involve various procedures relating to the collection of evidence. The Investigation Procedures Guide contained in appendix A6-D is a helpful tool providing in-depth guidance on the investigative process.

(2) Evidence may include:

(a) Witness statements. A witness statement is an oral account of the circumstances surrounding a mishap. The oral statement is not obtained under oath or in writing and may include opinions, secondhand information, and speculation about the mishap. Some witness statements provided to the board are privileged information. The MIB shall question witnesses, but will not require signed statements or summaries. Results of the interview(s) shall be summarized and authenticated with a signature of a MIB member.

1. JAGMAN and other investigators may make their witnesses’ statements available to the board. The MIB can glean information from the statements, but should re-interview appropriate witnesses.

2. Advice to Witness forms are provided as attachment A6-A-1 and A6-A-2.

(b) Medical materials. Medical materials the board may use as evidence include laboratory results, medical records, hospital admission forms, diagrams of wounds, psychological profiles, autopsy reports, or physician's written opinions.

1. The medical department representative (MDR) shall collect the initial, particularly transient, medical evidence as directed by the commanding officer or higher authority. The transient evidence includes specimens to determine blood alcohol and drug levels.

2. Medical factors, such as physiological, social, behavioral, and psychological, may provide insight into the cause of the mishap.

3. The medical officer, when assigned, shall coordinate the analysis of medical evidence with all other aspects of the investigation.

(c) Wreckage or damaged equipment. Wreckage or damaged equipment is physical proof of a mishap. The physical proof includes the area or equipment directly affected by the mishap and the surrounding damaged areas.

1. Once a MIB is convened, only the senior member can authorize the disturbance of damaged areas or wreckage.

2. To determine the cost of repair or replacement of all DoD property involved in the mishap, use actual costs (if available), base estimates on the actual cost of materials and $56 for each hour for labor. When prepared in written form, all estimates shall conspicuously state:

NOTE:

> "This estimate is prepared solely for the purposes of chapter A6 of OPNAVINST 5100.19D. It is not intended to reflect, in any way, the extent of any party's damages or liability for purposes of administrative claims or litigation."

3. In all matters related, in any way, to damage to civilian or foreign ships on navigable water, to damage to any property or cargo on board such ships, or to injuries of persons on board such ships, refer to chapter XII of reference A6-1 and/or contact the Office of the Judge Advocate General (OJAG), Admiralty Division (Code 31).

c. Mishap Investigation Board Analysis of Findings. The board's analysis of findings are an assessment as to what caused the mishap. This will fall under four categories: human, procedural, equipment/material, and design factors. These are delineated with examples in appendix A6-D. In addition, the board will list those causes considered initially, but were determined invalid as a result of the investigation.

d. Mishap Investigation Report Elements

(1) Appendix A6-E contains the MIR reporting format.

(2) The MIR has two parts:

(a) Part Alpha - Contains nonprivileged information that, generally, is releasable to the public. However, the release of certain, selected portions of Part Alpha, such as personal information covered by the Freedom of Information and Privacy Acts, may be prohibited. Part Alpha only includes mishap facts. Commander, Naval Safety Center (COMNAVSAFECEN) may release Part Alpha information to the general public, except for information protected under exemption b(6) of the Freedom of Information Act.

(b) Part Bravo - Contains privileged information that is not releasable to the public. The SOLE USE is for safety purposes. Part Bravo includes a summary of the evidence collected, the sequence of events of the mishap, and the opinions and recommendations (and recommended action agency) of the board. COMNAVSAFECEN shall not release this information to the general public. Information pertaining to the release of privileged information is contained in appendix A6-A.

e. Writing and Sending the MIR

(1) The senior member shall prepare and send the MIR by naval message within 30 days of the convening of the MIB.

(a) If the MIB will not meet the 30-day deadline, the senior member shall request an extension from the appointing authority.

(b) The appointing authority shall advise the type commander and COMNAVSAFECEN of any extensions.

f. Classification and Handling of MIRs

(1) MIRs normally are unclassified. The senior member may submit a separate classified addendum(s) for an otherwise unclassified MIR.

(2) MIRs contain privileged information and require handling per appendix A6-D. All recipients and endorsers of a MIR shall prevent its uncontrolled release, which could result in unauthorized disclosure. Configure electronic message dissemination systems to ensure only those requiring knowledge of their content, for safety purposes, are included in the distribution parameters.

g. Distribution of MIRs

(1) The senior member should send the MIR after returning to his or her permanent command. However, there may be occasions when the MIR must be sent from the ship on which the mishap occurred. In this case the senior member shall ensure it is clear to all addressees that the MIR is from the senior member and not the “mishap” ship, such as using an office code following the ship's plain language address (PLA), using the appointing authority's PLA with an office code (//SENIOR-MEMBER//), or as a detachment of the appointing authority.

(2) Appendix A6-K contains the addressees for distribution of MIRs.

(3) Distribution of MIRs, together with their endorsements, outside the commands specified in this chapter or authorized by CNO (N09F), is strictly prohibited.

(4) Use Standard Subject Identification Code (SSIC) 05102 on all MIRs and endorsements so receiving commands can limit internal distribution to those requiring the report for safety purposes.

h. MIR Endorsements

(1) MIR endorsements are privileged and shall be made by message in the format of attachment A6-G

(a) Endorsers shall list each probable cause, rejected probable cause, and recommendation and recommended action agency from the MIR or previous endorsements and state their agreement or disagreement with each one. If the MIR, or a previous endorser, recommended action by the current endorser, state the action taken to date on that recommendation.

(b) If an endorser agrees with all conclusions and recommendations in the MIR, as modified by previous endorsements, then a brief statement of concurrence is sufficient.

(c) Since MIR endorsements become a part of the MIR, and fall under the concept of privileged information, endorsers shall provide complete and open information, opinions, and recommendations.

(d) Endorsements shall not be filed under any individual's name or other personal identifier; nor shall information be retrievable from MIR files by an individual's name or other personal identifier. Failure to follow these guidelines may result in the inadvertent disclosure of privileged information in response to a Privacy Act request.

(2) Endorsers may request any evidence from COMNAVSAFECEN. The endorser shall return the material to COMNAVSAFECEN for retention and disposition.

(3) Endorsement required deadlines are:

(a) The commanding officer of the ship involved in the mishap shall endorse the MIR within 7 days of receipt.

(b) The ISIC of the ship involved in the mishap shall endorse the MIR within 14 days of receipt of the previous endorsement.

(c) The type commander shall endorse the report within 14 days of receipt of the previous endorsement.

(d) Commander, Naval Sea Systems Command (COMNAVSEASYSCOM, PMS-377) shall endorse all MIRs involving LCACs. COMNAVSEASYSCOM (PMS-377) shall endorse the report within 14 days of receipt of the previous endorsement.

(e) The Commandant of the Marine Corps (CMC WASHINGTON DC//SD//) and other designated subordinate U.S. Marine Corps commands shall endorse all MIRs involving Marines and U.S. Marine Corps equipment. CMC WASHINGTON DC//SD// shall endorse the report within 14 days of receipt of the previous endorsement.

(f) Other system commanders (e.g., COMNAVSEASYSCOM or COMNAVAIRSYSCOM code(s)), if requested by the senior member of the MIB or any endorser, shall endorse the report within 14 days of receipt of the previous endorsement.

(g) Fleet commander in chief or numbered fleet commander (for mishaps involving more than one type commander) shall endorse the MIR within 14 days of receipt of the previous request.

(h) COMNAVSAFECEN shall prepare their endorsement and send a copy to all endorsers within 14 days of receipt of the previous endorsement.

1. Endorsers who cannot meet the above deadlines, shall request an extension from the type commander by message. The request shall describe specific reasons for the extension.

2. The fleet commander in chief or type commander can direct other commands (for example, numbered fleet commanders and administrative group or squadron commanders) to endorse the report, if desired. If directed, those commands shall send the endorsement within 14 days of receipt of the previous endorsement.

3. If the commanding officer of a ship involved in a mishap detaches from the command before writing the endorsement, the type commander may provide him or her with a copy of the MIR and give him or her the opportunity to write a statement about the contents of the MIR. The detached commanding officer shall send the statement by naval message to the type commander within 14 days of receiving the MIR. Based on the contents of the statement, the type commander will either:

(i) Readdress the statement to all endorsers of the MIR for their consideration.

(j) Provide the statement to COMNAVSAFECEN only for inclusion with the mishap file.

i. Dissemination of Safety Information as a Result of the MIR. COMNAVSAFECEN and the type commander, when appropriate, shall extract safety information and issue “better business practices” but shall avoid the disclosure of the source of privileged or personal information. When an MIR contains essential safety information based on privileged or personal information, and the information has not been adequately distributed to those in need of the information, COMNAVSAFECEN or the type commander shall take one or more of the following actions (listed in order of preference).

(1) Readdress. Readdress the entire MIR. COMNAVSAFECEN shall take this action immediately upon receipt of an MIR to ensure all fleet and type commanders and other appropriate senior Navy commanders are aware of the mishap investigation board's analysis of the mishap. (COMNAVSAFECEN only)

(2) Expunge. Scrub or sanitize identifying information from the report that could link the MIR with an individual, organization, or mishap, and disseminate the essential safety information remaining in the report. When appropriate, COMNAVSAFECEN shall take this action as soon as practical upon receipt of an MIR to ensure appropriate afloat commanding officers are aware of the details of the mishap. (COMNAVSAFECEN only)

(3) Extract. Extract the essential safety information from the report and disseminate it appropriately. (COMNAVSAFECEN or type commander)

(4) If the MIR provides insightful lessons which would be of value to the fleet, COMNAVSAFECEN will, as soon as possible, develop a message reflecting “better business practices,” (lessons learned for distribution to type commanders.

j. Release of Mishap Information. The release of MIR information shall be as specified in appendix A6-A unless otherwise authorized by CNO (N09F).

k. Retention and Disposition of Records

(1) Once the senior member forwards the MIR, the senior member shall transfer custody of all relevant documentary evidence to COMNAVSAFECEN. The senior member shall send an inventory itemizing all the evidence the board considered to COMNAVSAFECEN and all endorsers.

(a) The inventory message shall be divided into the following four parts:

1. Unclassified, nonprivileged evidence.

2. Unclassified, privileged evidence.

3. Classified, nonprivileged evidence.

4. Unclassified, nonprivileged documents not sent to COMNAVSAFECEN.

(2) Endorsers and other authorized recipients may retain custody of the MIR and its endorsements for 5 years from the date of the mishap, at which time they shall be destroyed.

(3) COMNAVSAFECEN shall:

(a) Turn over material (other than privileged information) to the JAG investigators for retention, if requested.

(b) Retain evidence requested by the type commander for use in “better business practices.”

(c) Send originals of any deck or engineering smooth logs, if received, to CNO as required by A6-6.

(d) Send original service record (USN) or service record book (USMC) entries, if received, for missing or killed naval personnel per NAVMILPERS Manual (Section 5030140) (NOTAL), or USMC Individual Record/ Administration Manual, MCO P-1070.12 (NOTAL).

(e) In any case where the United States or any other party has commenced litigation, no evidence shall be destroyed without permission of the attorney representing the interests of the United States in the litigation.

(f) Retain custody of hard copies of MIRs, their endorsements and evidence for five years, and electronic copies indefinitely.

(g) Unless otherwise directed by the JAG, dispose of or destroy summaries of witness’ statements, copies of logs, and other records and evidence, including privileged material.

A0605. Mishap Report (MR), Report Symbol OPNAV 5102-6, Appendix A6-I.

a. The analysis of findings in this report are an assessment as to what caused the mishap. This will fall under four categories: human, procedural, equipment/material and design factors. These are delineated with examples in

appendix A6-I. This report is submitted to the Naval Safety Center within 30 days by the command in the event of:

(1) Class B mishaps occurring on board ship that are not investigated by an MIB and reported by MIR.

(2) Reportable Class C mishaps occurring on board ship, to the ship’s (and embarked unit's and detachment's) on-duty personnel ashore, or involving damage to the ship's equipment located ashore.

(3) Afloat special case mishaps occurring on board ship or to the ship's (and embarked units and detachments) on-duty personnel ashore.

(4) Class A or B mishaps occurring to the ship's (and embarked unit's and detachment's) on-duty personnel while ashore or involving damage to the ship's equipment located ashore.

NOTE:

Class A mishaps ashore are reported under the guidelines prescribed in reference A6-3.

NOTE:

Commanding officers are encouraged to submit a MR with lessons learned for any otherwise non-reportable mishap where other ships could benefit from reading about a minor mishap or near mishap or if a design or material defect caused a mishap and should be highlighted.

b. Preparing MRs

(1) Appendix A6-I contains the MR reporting format.

(2) Reference any CASREPs, OPREP-3s, or UNIT SITREP messages submitted and any previous mishap reports in the MR.

(3) The MR contains privileged information but shall not include the sources of any information.

(4) If investigating personnel determine there is a need to obtain privileged witness information that may reveal valuable safety information, they shall advise the commanding officer, who shall then ascertain the need for a MIB and inform the ISIC.

(5) Omit any reference to legal or administrative action, or other performance-related administrative action in an MR to preclude association with disciplinary action.

(6) Provide as much information as is available. When the information available is not sufficient to complete a comprehensive MR within 30 days, submit the remaining details, when known.

c. Classification and Handling of MRs

(1) MRs are normally unclassified. If the commanding officer cannot complete an unclassified report, a separate classified addendum for an otherwise unclassified MR may be submitted.

(2) MRs contain personal information and other sensitive data protected by the Freedom of Information and Privacy Acts, as discussed in appendix A6-A.

Users shall protect MRs from unauthorized disclosure. MRs contain privileged information but shall not include the sources of any information.

(3) Recipients shall handle MRs as follows:

(a) MRs contain personal information protected by the Freedom of Information and Privacy Acts, and privileged information, and therefore require careful handling. Information pertaining to the Freedom of Information and Privacy Act is contained in appendix A6-A.

(b) Ensure MRs are distributed only to specific individuals requiring knowledge of their content.

d. Distribution of MRs

(1) The commanding officer shall address MRs to:

(a) COMNAVSAFECEN NORFOLK VA//30/50/054//.

(b) Superiors in the chain of command, as directed.

(c) Any other command, as desired.

(d) Commander, Naval Sea Systems Command (COMNAVSEASYSCOM WASHINGTON DC//PMS377//) and information to Naval Coastal Systems Center (NAVSURFWARCEN COASTALSTA PANAMA CITY FL//33//), CNO WASHINGTON DC//N86D/N866D//, and AIG ONE THREE EIGHT SIX ZERO (13860) for mishaps involving LCACs.

(e) Commandant of the Marine Corps (CMC WASHINGTON DC//SD//) for mishaps involving embarked Marines and Marine Corps equipment.

(2) Direct questions regarding distribution of MRs to COMNAVSAFECEN or your chain of command.

e. Dissemination of Safety Information-see section A0604i(2),(3),(4) and j.

A0606. Explosive Mishaps and Conventional Ordnance Deficiency Reports (EMRs/CODRs), Report Symbol DD-FM&P (AR)1020(5102), Appendix A6-J

Class B and C severity Explosive Mishap Reports (EMRs) and Conventional Ordnance Deficiency Reports (CODRs) are defined by reference A6-4. Reports of Class A explosive mishaps occurring afloat are submitted by the mishap investigation board (MIB). Modify the MIR to include the information required by the sample Explosive Mishap Report in appendix A6-J. MIRs of Class A explosive mishaps are used for safety purposes only and contain privileged information. The release, distribution, and control of the reports is limited to prevent unauthorized disclosure of report contents.

a. Reportable Mishaps and Deficiencies

(1) Explosive Mishaps. Report the following afloat events using the format in appendix A6-J. Use "Explosive Mishap Report" in the subject line. If you want an engineering investigation, add the request to the subject line. (Use "Explosive Mishap Report/Engineering Investigation Request" as the subject). Also, include your request for the engineering investigation in Part I ECHO (narrative) of the message report.

(a) Detonation, Deflagration, Burning, or Firing. An unintentional or inadvertent initiation, explosion, or reaction of an explosive material, component, or system. Accidental discharge of all guns, including small arms.

(b) Inadvertent Launch. An unintentional launching of a weapon.

(c) Chemical Agent Release. Any unintentional or uncontrolled release of a chemical agent when:

1. Damage occurs to property from contamination or costs are incurred for decontamination.

2. Individuals exhibit physiological symptoms of agent exposure.

3. The quantity released to the atmosphere creates a serious potential for exposure.

(d) Propellant Fuels and Oxidizers. Leaking or spilled propellant fuels and oxidizers less OTTO II fuel.

(e) All ordnance impacting off-range.

(2) Conventional Ordnance Deficiencies. Report the following afloat events as conventional ordnance deficiencies using the format in attachment 1 to this appendix. Use "Conventional Ordnance Deficiency Report" in the subject line. If you want an engineering investigation, add the request to the subject line. (Use "Conventional Ordnance Deficiency Report/Engineering Investigation Request" as the subject). Also, include your request for the engineering investigation in Part I ECHO (narrative) of the message report.

(a) Malfunctions. The failure of conventional ordnance, explosives, ammunition, small arms, weapons, or weapon system components that come in contact with the ordnance, to function properly. (For example, failure to launch, dud weapons, and gun fails to cycle).

(b) Improper Handling. Ordnance handling incidents attributed to human error. Examples include misuse of equipment, failure to follow established procedures, and violation of safety precautions resulting in dropped or damaged ordnance. Other examples include human error during processing, assembling, testing, loading, storing, and transporting ordnance.

(c) Inadvertent Arming. The unintentional arming of an explosive component or weapon.

(d) Defective Weapons Support Equipment. Deficiencies involving any equipment or device used in the manufacture, test, assembly, handling, or transportation (skids, trailers, or similar equipment) of any explosive system.

(e) Observed Defect. A discovered defective weapon or weapon system component that comes in direct contact with the ordnance, small arms, weapons, conventional ordnance, explosives, and ammunition (for example: protruding primers, cracked grains, damaged or broken breech bolts, missile radomes, and advanced corrosion).

(f) Other

1. An event which, except for chance, would have been an explosive mishap.

2. Any failure or malfunction of, or damage to, a launch device or associated hardware and software when handling or otherwise manipulating dummy, exercise, or explosive material.

3. Unusual or unexpected occurrences, unnatural phenomena, unfavorable environments, or instances of equipment failure which may damage or affect safety of an explosive material or system. This includes hazards of electromagnetic radiation to ordnance (HERO) sensitive explosive systems exposed to radiation hazard (RADHAZ) environments.

4. The failure of a missile or explosive system to test, calibrate, or otherwise meet pre-loading or pre-launch requirements. (For example, the failure of built-in-test (BIT).

5. Use of Explosive Ordnance Disposal (EOD) services involving military explosives for other than routine disposal of explosives.

6. OTTO II fuel spills.

(3) Exceptions

(a) OPNAVINST 8000.16 (The Naval Ordnance Maintenance Management Program (NOMMP) (NOTAL). Report mishaps or deficiencies occurring during airborne weapon systems and equipment operations, including armament supporting equipment (any equipment used in loading or unloading an explosive system or launch device on an aircraft), per OPNAVINST 8000.16.

(b) OPNAVINST 3100.6G [Special Incident Reporting (OPREP-3, Navy Blue and UNIT SITREP) Procedures] and JCS Publication 1-03.7. Report nuclear weapons mishaps and incidents per OPNAVINST 3100.6G and JCS Publication 1-03.7.

(c) OPNAVINST 5102.1C (Mishap Investigation and Reporting). Report explosive mishaps and conventional ordnance deficiencies occurring ashore per OPNAVINST 5102.1C.

(d) SW02-AG-SAF-010 (Navy Transportation Safety Handbook for Ammunition, Explosives and Related Hazardous Material) and NAVSEA INST 8020.13B. Weapons and ordnance stations report explosive mishaps and conventional ordnance deficiencies occurring while the explosive material or system is in the custody of a common (commercial) carrier per OP 2165 Volume I and NAVSEA INST 8020.13B.

b. Post-Mishap and Deficiency Action

(1) The activity experiencing the mishap or deficiency shall:

(a) Stop using the item, lot, or batch involved pending guidance from higher authority.

(b) Start the reporting procedures.

(c) Accurately and quickly respond to requests for additional information.

(2) Depending on the severity of the explosive mishap or deficiency, other U.S. Navy commands and activities shall assist in identifying the actual cause and take steps to ensure that similar mishaps or deficiencies do not occur. For example:

(a) The mishap may require an MIR for a Class A mishap.

(b) Commander, Naval Ordnance Center; Commander, Naval Air Systems Command; or Commandant, U.S. Marine Corps may designate all related explosive systems unserviceable, direct follow-up test and evaluation of various lots to identify defective hardware, or initiate procedural changes in the use of the weapons system.

(c) Officer in Charge, Naval Ordnance Center (Inventory Management and Systems Division), Mechanicsburg, PA (NAVORDCEN IMSD MECHANICSBURG PA); shall support the above command decisions regarding disposition and use of defective or questionable parts by issuing a Notice of Ammunition Reclassification (NAR).

(d) Commander, Naval Safety Center shall enter all relevant unclassified information into a data repository.

c. Reporting Requirements

(1) Appointing authorities shall require the investigation and reporting of all afloat Class A severity explosive mishaps occurring in their chain of command using the procedures in section A0605. The MIB shall submit an MIR in the format of appendix A6-D modified to include the information required by the sample Explosive Mishap Report in this appendix.

(2) Commanding officers, officers in charge, and masters shall require the investigation and reporting of all Class B and C severity reportable explosive mishaps and reportable conventional ordnance deficiencies occurring within their command.

(a) Explosive Special Cases. When a report under this chapter is required solely as the result of Explosive Ordnance Disposal (EOD) service, the responsibility for submitting the report rests with the following, in the order given:

1. The U.S. Navy activity requesting EOD services.

2. The U.S. Navy activity having operational control of the EOD personnel rendering the service.

3. In cases not covered by (a) or (b) above, the EOD group to which the EOD personnel are permanently attached.

4. If EOD units respond in an explosive mishap, ensure the appropriate EOD units are information addressees on all reports.

(3) Submission of Reports

(a) General. Reports are normally unclassified (FOR OFFICIAL USE ONLY). If the inclusion of classified material is essential, a separate classified addendum for an otherwise unclassified report may be submitted.

(b) Message Reports. The message report described in this appendix is required for all explosive mishaps and conventional ordnance deficiencies. The report shall be submitted in addition to any reports required by other directives.

(c) OPREP-3 Reports. The submission of an OPREP-3 report does not relieve the command from the requirement for submitting an explosive mishap or conventional ordnance deficiency report.

(d) Initial Message or Telephone Report. Make an initial Explosive Mishap Report for all Class A and B severity explosive mishaps by immediate message in the format provided in appendix A6-G, giving as much information you have available. When circumstances permit, also make a telephone report within 24 hours to the following (if they are action addressees on the message report):

1. During normal working hours (0800 -1630 Eastern time):

CNO (N411) - DSN: 225-7093 or commercial: (703) 695-7093

NAVORDCEN INDIAN HEAD (N71) - DSN: 354-6081 Ext. 107 or commercial: (301) 743-6081

COMNAVAIRSYSCOM (AIR-516C1) - DSN: 222-8702 or commercial: (703) 692-8702 (Explosive material/equipment)

COMNAVAIRSYSCOM (AIR-09F) - DSN: 222-1234 or commercial: (703) 692-1234 (Deaths and injuries)

COMNAVSAFECEN (Code 43) - DSN: 564-3343 or commercial: (757) 444-3343

2. Outside normal working hours (1630 - 0800 Eastern time):

CNO (Navy Department Duty Captain) - DSN: 225-0231 or commercial: (703) 695-0231

COMNAVSEASYSCOM (Watch Officer) - DSN: 332-7527 or commercial: (703) 602-7527

COMNAVAIRSYSCOM (Duty Officer) - DSN: 222-1666 or commercial: (703) 692-1666

COMNAVSAFECEN (Duty Officer) - DSN: 564-3520 or commercial: (757) 444-3520

(e) Upon completion of the preliminary mishap investigation of a Class B mishap, submit a supplementary report providing additional or changed information from the initial report. Send all supplementary reports within 7 days of the initial report.

(f) Submit an initial explosive mishap or conventional ordnance deficiency message report within 24 hours for all Class C explosive mishaps and in the following circumstances:

1. One or more individuals exhibiting physiological symptoms of agent exposure.

2. An unintentional or uncontrolled release of chemical agent where the agent quantity released to the atmosphere creates a serious potential for injury or death.

3. Injuries sustained as a result of an explosive mishap or conventional ordnance deficiency which meets the definition of a lost time case.

(g) Submit a message report within 30 days for all other explosive mishaps or conventional ordnance deficiencies. Do not submit letter reports instead of messages.

d. Reports to the Department of Defense Explosives Safety Board (DDESB). Reference A6-7 requires each DoD component to submit reports to the DDESB for mishaps involving ammunition, explosives, and chemical agents and systems. CNO (N411) is the central U.S. Navy office responsible for ensuring accomplishment of the required reporting and investigation and the point of contact between DDESB and U.S. Navy activities.

e. Dissemination of Information. Each Navy and Marine Corps command receiving an Explosive Mishap or Conventional Ordnance Deficiency Report from a Class B and C severity mishap may release the data to appropriate subordinate commands and personnel. Appendix A6-A discusses the restrictions on disseminating information in MIRs on Class A explosive mishaps. If there are any questions on the use of this report, call COMNAVSAFECEN (Code 43) at DSN: 564-3520 Ext. 7164 or commercial (757) 444-3520 Ext. 7164.

f. Addressees of Message Report. See Appendix A6-G

A0607. Motor Vehicle Safety Report (MVSR), Report Symbol OPNAV 5102-4(MV), Appendix A6-L

a. This report is submitted to the Naval Safety Center within 30 days by the command in the event of:

(1) Government Motor Vehicle (GMV) Mishap. A mishap involving the operation of a government-owned motor vehicle resulting in a collision with other vehicles, pedestrians (including joggers), bicyclists or other objects; personal injury or property damage due to cargo shifting in a moving vehicle; personal injury in moving vehicles or by falling from moving vehicles; towing or pushing mishaps; and other injury or property damage when there is one or more of the following:

(a) At least $2,000 property damage (total of all government- and privately-owned vehicles and property), or

(b) A fatality or an injury resulting in 5 (1 day for embarked Marines) or more lost workdays to military and Navy civilian personnel, or

(c) A civilian fatality while riding in, or caused by a government-owned motor vehicle.

(2) Private Motor Vehicle (PMV) Mishap. A traffic mishap, regardless of the identity of the operator, not involving a government-owned motor vehicle but resulting in:

(a) A fatality or injury resulting in 5 (1 day for embarked Marines) or more lost workdays to on- and off-duty assigned military and on-duty Navy civilian personnel, or

(b) $2,000 or more government property damage.

(c) A motor vehicle mishap causing death to any other person not otherwise defined occurring on a naval installation or as a result of military operations.

(3) Naval Reserve personnel on inactive duty for training (travel) (IDTT), who are involved in a motor vehicle mishap while traveling from their home directly to the drill site, or from the drill site directly home, shall be counted as an off-duty reportable motor vehicle mishap if they meet all other reporting requirements.

b. Exceptions

(1) The following mishaps, although reportable and accountable, are not motor vehicle mishaps. They are accountable under other categories and reported under the provisions of reference A6-3 or a Mishap Report (MR) for personnel assigned to afloat units.

(a) Personal injuries that occur while loading or unloading, mounting or dismounting a motor vehicle which is not moving.

(b) Damage to a properly parked GMV unless it is damaged by another GMV.

(c) Property damage resulting solely from acts of God are not reportable unless the activity did not adequately prepare for the extreme conditions.

(d) Damage to a GMV:

1. Being handled as a commodity and not being operated under its own power.

2. By objects thrown or propelled into it

3. By fire when no motor vehicle mishap occurred. Refer to OPNAVINST 11320.25B (NOTAL) for additional reporting requirements.

(e) Attempted or consummated suicide or other intentionally self-inflicted injuries when a motor vehicle is involved.

(f) Injuries or death caused by attempted or consummated homicide or other criminal act or altercations, attack, or assault using a PMV.

(g) Injuries or death to military or on-duty Navy civilians escaping from or eluding military custody or arrest in a vehicle.

(h) Injury or death due to natural causes. For example, a driver of a motor vehicle has a heart attack or other medical emergency while driving. If medical authorities can determine the medical condition caused the mishap, the resultant injury or death is not reportable. However, injuries to others or property damage as a result of the mishap are reportable, if they meet minimum reporting criteria.

(i) Damage to a GMV resulting from vandalism, riot, civil disorder, sabotage, terrorist activity, or a felonious act.

(j) Injuries or fatalities to military or on-duty Navy civilian personnel escaping from or eluding military or civilian custody or arrest.

c. Off-road and combat vehicles. Motor vehicle equipment designed primarily for off-the-highway operations such as tracked or half-tracked vehicles, forklifts, road graders, agricultural tractors, and aircraft tugs are special purpose or combat vehicle use and are reported according to reference A6-3 when ashore and paragraph A0605 or A0606 when embarked.

d. Reporting Requirements

(1) Responsibility. The commanding officer, officer in charge, or master of a ship shall ensure an investigation is conducted. When afloat personnel are involved in a reportable motor-vehicle mishap away from their duty station, the naval activity nearest the scene will notify the victim’s command. The two commands shall determine which one conducts the investigation. However, the final responsibility for ensuring that the report is submitted rests with the individual’s parent command. Establish contact between the ship's commanding officer, executive officer, or motor vehicle safety officer and the naval activity to ensure timely mishap investigation, reporting, and corrective actions.

(2) Submission of Reports. Within 30 days, the investigating command shall release an Motor Vehicle Safety Report (MVSR) in the format contained in the sample format in appendix A6-L by message to Commander, Naval Safety Center (COMNAVSAFECEN). Reporting activities shall include their chain of command as information addressees on mishaps meeting the reporting threshold for a Class A or B mishap.

(3) Preliminary Reports

(a) A preliminary, priority message report must be made to COMNAVSAFECEN NORFOLK VA//42/40/50/30B/70/054// within 24 hours of a parent command's notification when any of the following occurs:

1. Any on-duty motor vehicle mishap resulting in a fatality to one or more Navy military or Navy Federal, non-appropriated fund (NAF), or foreign civilian personnel up to 6 months after the date of occurrence.

2. Any on-duty motor vehicle mishap where three or more assigned military or Navy civilian personnel are admitted to the hospital.

(b) A preliminary, priority message report must be made to COMNAVSAFECEN NORFOLK VA//42/40/50/30B/70/054// within 48 hours of a parent command's notification when any of the following occurs:

1. Any off-duty motor vehicle mishap resulting in a fatality to one or more Navy military personnel up to 6 months after the date of occurrence.

2. Any off-duty motor vehicle mishap where three or more assigned military personnel are admitted to the hospital.

(c) For preliminary, priority reports, at a minimum, report the date and time of mishap; name and social security number of injured or dead people; location of mishap; description of the mishap; and extent of damage or injury. A preliminary, priority message report is not required if the required information has already been sent to COMNAVSAFECEN in an OPREP-3 or UNIT SITREP message. Submission of the preliminary, priority message report does not relieve the command from submitting a complete report within 30 calendar days of the mishap. Send information copies of the report to the appropriate chain of command.

e. Additional Information. If additional information becomes available, or information originally submitted changes, submit a follow-up report. Give the local time and date of the mishap and the name(s) of the injured or dead reported on the original MVSR Report. Then, give only the items to be added or changed. Mark the report, "Modified" and send it to the same addressees as the original report. COMNAVSAFECEN may also request additional information.

A0608. Diving Mishap/Hyperbaric Treatment/Death Report, Report Symbol OPNAV 5102-5, Appendix A6-M. (Appendix A6-N, provides guidance for diving mishaps not requiring hyperbaric treatment)

a. The analysis of findings in this report are an assessment of what caused the mishap. This will fall under four categories: human, procedural, equipment/material and design factors. These are delineated with examples in appendix A6-M. This report is submitted to the Naval Safety Center within 30 days by the command in the event of:

(1) Any Class B, reportable Class C, or special case diving mishap involving Navy when diving from the ship or submarine, ship's boat, or when diving from a shore command. Class A diving mishaps are reported using a Mishap Investigation Report (MIR) as described in paragraph A0604.

(2) Hyperbaric treatment or recompression therapy conducted as a result of a diving mishap in a recompression chamber. Humanitarian civilian treatments are not reportable.

(3) Any diving injury or illness preventing a diver from performing regularly established duty or work for 5 days (1 day for Marines) or more when diving from the ship or submarine, ship's boat, or when diving from a shore command. For civilian divers, report diving injury or illness preventing the employee from working for five full shifts or more. Begin counting the 5 days (1 day for Marines)or five full shifts at 2400 on the day of injury or illness.

(4) Any incident of central nervous system (CNS) oxygen toxicity and pulmonary over inflation syndrome(POIS), even if hyperbaric treatment was not required.

(5) Recreational diving mishaps resulting in a reportable injury to Navy military personnel require the submission of a RAHS report appendix A6-J.

(6) Report aviation bends cases per reference A6-8.

(7) USMC/USMCR personnel. These reports are in addition to any others required by Marine Corps regulations.

b. The DV contains privileged information but shall not state the sources of any information.

c. If mishap investigators determine there is a need to obtain privileged witness information that may reveal valuable safety information in diving mishap, they shall advise the commanding officer who shall then ascertain the need for a MIB and inform the ISIC.

d. Class A diving mishaps. In the event of a Class A diving mishap the following steps must be taken in addition to the requirements of paragraph A0604:

(1) Modify Part Alpha of the MIR to include the information required by appendix A6-M. MIRs of Class A diving mishaps are used for safety purposes only and contain privileged information. The release, distribution, and control of these reports are limited to prevent unauthorized disclosure of report contents.

(2) An autopsy is required for all on-duty diving deaths. Advise the servicing medical facility that the death was diving-related. Include a copy of the autopsy with the mishap investigation evidence and forward autopsy results to:

Chairman of Forensic Sciences
Armed Forces Institute of Pathology
6825 16th St., NW
Washington, DC 20306-6000

(3) Impound, seal, and send all diving equipment involved in diving mishaps resulting in a fatality or permanent total disability to:

Commanding Officer
Naval Experimental Diving Unit
Attn: Code 07 (Test and Evaluation)
321 Bullfinch Road
Panama City, FL 32407-7015

e. Reporting Procedures

(1) Responsibility. The immediate superior in command (ISIC), commanding officer, or officer in charge shall ensure that all diving mishaps are investigated and reported.

(2) Preliminary Reports. A preliminary, priority message report must be made to COMNAVSAFECEN NORFOLK VA//30/054//00// within 24 hours of a parent command's notification for any Class A diving mishap not previously reported by OPREP-3 or UNIT SITREP message.

(3) Submission of Reports

(a) Report all Class A diving mishaps by submitting an MIR by the MIB using the procedures in section A0604 and the MIR format in appendix A6-C. As modified by para A0608d(1).

(b) Report all Class B and C diving mishaps or hyperbaric treatment by message.

(c) Use the format in appendix A6-M to report Class B and C diving mishaps requiring hyperbaric treatment. Use the format in appendix A6-N to report Class B and C diving mishaps not requiring hyperbaric treatment. Submit reports within 10 days of the mishap. Include the diving information required in the Dive Reporting System for any dive resulting in a diving mishap reported. Keep diving mishap reports unclassified, if possible. If the commanding officer cannot complete a meaningful, unclassified diving mishap report, submit a separate classified addendum for an otherwise unclassified DV.

(d) When the mishap occurs away from the diver's parent command, the treating facility will submit the Diving Mishap Report. They must notify the parent command as soon as possible. Ultimate responsibility for reporting the mishap lies with the diver's parent command.

(e)Report uneventful dives using the Dive Reporting System (DRS).

A0609. Off-duty Recreation, Athletics and Home Safety Mishap Report, Report Symbol OPNAV 5102-10, Appendix A6-O.

a. This report is submitted to the Naval Safety Center within 30 days by the command in the event of:

(1) An off-duty recreation, athletic or home death or injury preventing Navy military personnel assigned to afloat units from performing regularly scheduled work for 5 days (1 day for embarked Marines) or more after 2400 on the day of injury.

(2) All non-operational, serious injuries or deaths occurring to anyone either on or off a naval installation using Navy-owned and managed property (for example: Morale, Welfare and Recreation (MWR) hobby shops, athletic facilities, and child development centers). Off-duty special case mishaps are reportable only if they involve negligence in the operation or maintenance of Navy property such as missing machine guards and damaged playground equipment. A serious injury is one comparable in severity to an injury or illness that would result in 5 or more lost work days.

(3) Recreation and athletic mishaps during compulsory physical training activities, where personnel are considered on-duty (including compulsory sports and command sponsored activities during working hours), require the submission of an MR as explained in paragraph A0605. Include the 72-hour pre-mishap profile (paragraph 1c(6) of the RAHS Mishap Report) for

Class A and B mishaps resulting from compulsory physical training or physical readiness tests.

(4) The RAHS Mishap Report shall not include privileged witness information. The RAHS Mishap Report shall not state the source of any information.

b. Reporting Requirements

(1) Responsibility. The commanding officer, officer in charge, or master shall require the investigation and reporting of all off-duty recreation, athletic, and home reportable mishaps occurring to personnel within the command. When a Sailor assigned to a ship is injured or killed away from the ship, the naval activity nearest the scene will notify the victim's command. Unless relieved by the victim’s command or higher authority, the naval activity nearest the scene of the mishap will investigate and report it as prescribed in appendix A6-O. However, the final responsibility for ensuring the report is submitted rests with victim's command. Establish contact between the ship's commanding officer, executive officer, or recreation, athletics, and home safety (RAHS) officer and the naval activity to ensure timely mishap investigation, reporting, and corrective actions.

(2) Submission of Reports. Commanding officers, officers in charge, and masters shall release Off-duty RAHS Mishap to COMNAVSAFECEN within 30 calendar days of a reportable mishap. Reporting activities shall include their chain of command as information addressees on Class A and B mishaps.

(3) Preliminary Message Reports. Make a preliminary, priority message report to COMNAVSAFECEN within 48 hours of notification of an off-duty mishap resulting in a fatality or the inpatient hospitalization of three or more Navy military personnel. An OPREP-3 or UNIT SITREP message satisfies this requirement.

(a) For preliminary reports, use the format in appendix A6-O to provide available information. As a minimum, include:

1. Date, time, and location of the mishap.

2. Name and location of the personnel involved.

3. Extent of their injuries.

4. Description of the mishap shall be furnished.

(b) Submitting a preliminary message or telephone report does not relieve the command from submitting a complete Off-duty RAHS Mishap Report. Send information copies to the appropriate chain of command.

(4) Additional Information. If additional information becomes available, or information originally submitted changes, submit a follow-up report. Give the LOCAL TIME and DATE of the mishap and the NAME(s) of injured or dead reported on the original Off-duty RAHS Mishap Report. Then, give only those items to be added or changed. Mark the report, "Modified" and send it to the same addressees as the original report. COMNAVSAFECEN may also request additional information.

c. Off-Duty Recreation, Athletics, and Home Mishap Records. Keep a file of injury reports for all off-duty recreation, athletics, and home mishaps.

A0610. The Safety Recommendation (SAFEREC)

a. The Safety Recommendation (SAFEREC) is designed to reduce injuries to personnel and damage to Navy property. SAFERECs should have broad application to material, equipment, or personnel. A suggested SAFEREC may be submitted by means of a naval message or letter, via the chain of command, or by e-mail to afloat@safetycenter.navy.mil.

(1) Suggested SAFERECs should be submitted to Commander, Naval Safety Center (COMNAVSAFECEN). COMNAVSAFECEN shall evaluate and, if appropriate, forward to the proper action authority.

(2) SAFERECs may be initiated by COMNAVSAFECEN based on MRs, MIRs, safety surveys results, or other correspondence.

b. SAFERECs are referred to the following action authorities:

(1) Systems Commands (SYSCOMs) (for example, COMNAVSEASYSCOM) for modification to equipment design or maintenance techniques.

(2) Bureau of Personnel (BUPERS) for manning needs.

(3) Chief, Naval Education and Training (CNET) for training needs.

(4) OPNAV Warfare Sponsors or the appropriate type commander(s) for ship alteration (SHIPALT) accomplishment or priority of funding.

(5) Chief, Bureau of Medicine and Surgery (BUMED) for industrial hygiene and occupational health support.

Responsibility for action on a SAFEREC may change as it moves from initial design to fleet or field installation.

c. For SAFERECs to be effective, the final or concluding action must be well-defined. A SAFEREC can typically involve one or more of the following:

(1) Personnel or Maintenance Procedure. Includes developing new or revised training or personnel qualification standards (PQS), operating or maintenance procedures, or safety precautions.

(2) Technical References or Specifications. Includes changes to basic requirements of any instructions, documents, specifications, technical manuals and warfare publications.

(3) Off-the-Shelf Systems or Non-Developmental Items (NDI). Includes suggestions or recommendations to consider the use of an existing item, product, or system readily available commercially or used by another service.

(4) Design Change to Existing Equipment or System. Includes specific engineering or design change or alteration to existing systems, subsystems, equipment, or components.

(5) New Equipment Development. Includes the development of a completely new system, subsystem, or component.

(6) Non-Developmental Items (NDI). Includes the purchase of equipment and other items directly from civilian sources for immediate use by the U.S. Navy or after slight modification for shipboard use.

d. A SAFEREC will be initiated by COMNAVSAFECEN notifying the appropriate action authority of a fleet or field input, MRs, MIRs, e-mail messages, or safety survey. COMNAVSAFECEN shall:

(1) Ensure the SAFEREC concisely states the problem and the recommended action.

(2) Assign a risk assessment code (based on Chapter A4).

(3) Provide a point of contact (SAFEREC manager).

(4) Contact the appropriate program sponsors to determine if corrective action exists.

(5) Provide a copy of the initial SAFEREC letter to the primary program or warfare sponsor and the originator.

(6) Provide a management system to assist in monitoring the progress of action being taken by action authorities.

(7) Track the progress of action from planning through implementation. Close out the SAFEREC upon completion of the recommended action or other solution.

e. Action Agencies shall:

(1) Assign a point of contact for SAFEREC management including reporting of progress and technical difficulties. Notify appropriate commands of changes in the point of contact.

(2) Provide copies of formal correspondence pertinent to the SAFEREC evaluation or final corrective action to appropriate commands.

(3) For all fiscal programming actions, where funding shortages prevent using current fiscal year funds, establish reprogramming action and budget identity with milestone date(s). This allows an assessment of probability of fund receipt and continuation of effort.

(4) Provide periodic SAFEREC progress reports to appropriate commands.

(5) When there are delays in projected scheduled accomplishments, provide explanatory documentation to appropriate commands.

f. The Director, Surface Warfare Division (N86), Director, Submarine Warfare Division (N87), Director, Air Warfare Division (N88), and Director, Environmental Protection, Safety and Occupational Health Division (N45) shall:

(1) Prioritize the funding and accomplishment of SAFERECs.

(2) Regularly review SAFERECs under their cognizance.

(3) Ensure SAFEREC action authorities are progressing toward due dates or milestones.

(4) Reassign all misdirected or erroneously assigned SAFERECs and act as negotiator for any impasse between COMNAVSAFECEN and action authorities of SAFERECs.

CHAPTER A6

REFERENCES

A6-1. JAG Instruction 5800.7C, "Manual of the Judge Advocate General"

A6-2. COMSCINST 5100.17C, "Afloat Safety and Occupational Health Manual" (NOTAL)

A6-3. OPNAVINST 5100.23E, "Navy Occupational Safety and Health Program Manual" (NOTAL)

A6-4. OPNAVINST 5102.1C, "Mishap Investigation and Reporting" (NOTAL)

A6-5. OPNAVINST 3100.6G, "Special Incident Reporting (OPREP-3, Navy Blue, and UNIT SITREP) Procedures"

A6-6. CINCUSNAVEUR/CINCLANTFLT/CINCPACFLT INST 3100.7, "Special Incident Reporting (OPREP-3/UNIT SITREP)" (NOTAL)

A6-7. DOD Instruction 6055.7, "Mishap Investigation, Reporting, and Recordkeeping" 10 April 1989 (NOTAL)

A6-8. OPNAVINST 3750.6Q, "Naval Aviation Safety Program" (NOTAL)

A6-9. SECNAVINST 5100.10H, Department of Navy Policy for Safety Mishap Prevention, and Occupational Health Programs (NOTAL)

Appendix A6-A

CONCEPT OF PRIVILEGE

1. Privileged information. That information voluntarily provided under a promise of confidentiality, or information which would not have been discovered but for information voluntarily provided under a promise of confidentiality. The deliberative analyses of findings, conclusions, and recommendations of the mishap investigation board (MIB) in the MIR are privileged. Also privileged are calculations and deductions the MIB makes that would reveal the board's deliberative process. Mishap investigation report endorsements (MIREs) are also part of the deliberative process and are similarly privileged against disclosure.

a. Authority. The concept of privilege applies to safety investigations. References A6-7 and A6-9 authorize the use of privileged information for flight mishaps and mishaps involving complex systems or military-unique items (such as ships and shipboard systems), or military-unique operations. The sole purpose of safety investigations is to prevent mishaps. Privileged safety information is restricted from disclosure outside DoD. For safety investigation reports, DoD treats privileged information confidentially to ensure commanders and safety officials quickly obtain accurate mishap information to promote safety and national defense.

b. Use. Individuals providing information to mishap investigators under a promise of confidentiality will be advised that the Navy will use its best efforts to ensure that the information is not released to any other agency or individual. Privileged safety information will not be used to support disciplinary or adverse administrative action, in determining misconduct or line-of-duty status of any personnel, or before any evaluation board.

2. Privileged information shall not be used:

a. In any determination affecting the witnesses' interests.

b. As evidence to obtain evidence in determining misconduct or line of duty status of killed or injured personnel.

c. As evidence to determine the witnesses' responsibility or that of other personnel from the standpoint of discipline.

d. As evidence to assert affirmative claims on behalf of the government.

e. As evidence to determine the liability of the government for property damage caused by the mishap.

f. As evidence before administrative bodies, such as Officer/Enlisted Separation Boards, Judge Advocate General Manual investigations/inquiries, Naval Aviator/Naval Flight Officer Evaluation Boards (FNAEB) or Marine Corps Field Flight Performance Boards (FFPB).

g. In any other punitive or administrative action taken by the Department of Navy.

h. In any other investigation or report of the mishap.

3. The Purpose of Designating Information as Privileged. The actions limiting the use of privileged information are taken to:

a. Overcome any reluctance of an individual to reveal complete and candid information about the events surrounding a mishap.

b. Encourage mishap investigators and the endorsers of MIRs to provide complete, open, and forthright information, opinions, causes, and recommendations about a mishap.

4. Rationale. If privileged information were allowed to be used for purposes other than safety, witnesses might withhold vital safety information.

a. Individuals may be reluctant to reveal information pertinent to a mishap because they believe certain uses of the information could be embarrassing or detrimental to themselves, their fellow service members, their command, their employer, or others. They also may elect to withhold information by exercising their constitutional right to avoid self-incrimination. Individual members of the armed forces must be assured that they may confide in others for the mutual benefit of fellow service members without incurring personal jeopardy in the process. Witnesses shall not provide statements to MIBs under oath or in writing, and requiring them to do so is prohibited. Mishap investigators must advise those witnesses selected to provide information under the concept of privilege, in writing, of the purpose for which they are providing a statement and of the limited use to be made of the statement. The witnesses' statements shall not be limited to matters they could testify about in court. They may be invited to express opinions and encouraged to speculate on the possible causes of the mishap.

b. If a mishap investigator, endorser of an MIR, or the ship's investigator believes the deliberations, opinions, and recommendations in preparing the MIR or MR could be used for other than safety purposes, they might be reluctant to develop or include vital safety information in their report and in the mishap investigation report endorsement (MIREs).

5. Protection of Privileged Information. To foster the submission of privileged information in afloat MIRs, some witnesses can be provided with assurances of confidentiality. The MIB should offer this option to those witnesses reluctant to otherwise provide needed information. Should the DON use privileged information for any purpose other than safety, the Navy would lose credibility of future assurances of privilege. To protect privileged information against unauthorized disclosure, the Navy must safeguard the entire reporting cycle: assurances of confidentiality given; privileged information obtained, developed, and reported; privileged information protected against misuse or public disclosure; credibility of assurances maintained; and assurances of confidentiality given again. If any segment of the cycle fails, vital safety information may be lost. Obtaining safety information is therefore dependent upon the protection of privileged information against use for other than safety purposes. Accordingly, the following safeguards protect privileged information:

a. Witness Statements. Witness statements to an MIB shall not be provided to any activity except as authorized in this chapter. Once the witness makes a privileged statement to the MIB, the contents of the statement become part of the MIB's privileged evidence.

b. Photographs. Photographs staged by the MIB (planned or posed to illustrate a specific condition or situation) are privileged because of the deliberative process. All captions or markings placed on photographs suggesting the mishap board's deliberative process also are privileged.

c. Investigations. Mishap investigators must thoroughly understand the distinction between afloat mishap investigations and other investigations. Only in cases of a joint, safety investigation (for example, a U.S. Army and U.S. Navy mishap), authorized by Commander, Naval Safety Center (COMNAVSAFECEN) or higher authority, shall any exchange of information and opinion outside the U.S. Navy MIB occur. In such cases, cooperation between safety investigators may include division of labor, joint review of evidence, exchange of witness statements, and joint deliberations.

d. Multiple/Concurrent Investigations. In all cases, afloat mishap investigations shall be independent and separate from JAGMAN and all other investigations. Safety investigators may only exchange the identity of witnesses and share nonprivileged evidence with JAGMAN and other investigators.

e. Outside Assistance. Afloat mishap investigations may require the assistance of other activities. Requests for such assistance are not privileged, and the senior member must meticulously review them to ensure they do not contain privileged information. Technical specialists providing assistance to MIBs are not members of the board and (except as authorized elsewhere in this chapter) shall not be given access to deliberations by the board or to the contents of Part Bravo or the endorsements on MIRs.

f. Investigators. Members of MIBs shall not, nor may they be requested to, divulge their opinions or any information they developed, or learned, as a member of the board. Members of MIBs shall not be assigned to any other investigation of the same mishap such as a JAGMAN investigation, an officer evaluation board (USN), or a Field Performance Board (USMC).

g. Independence of Mishap Investigation Reports

(1) MIRs consist of two parts. Part Alpha includes the nonprivileged data and Part Bravo, the privileged data. Part Bravo of an MIR, and extracts from Part Bravo, shall neither be appended to, nor included in, reports of JAGMAN investigations or any other report. The Office of the Navy Judge Advocate General shall not be an addressee on MIRs.

(2) To prevent any inference of association with disciplinary action, reports of JAGMAN investigations, officer evaluation boards (USN), or Field Performance Boards (USMC) shall not be appended to, nor made a part of, any MIR or endorsement.

h. Administrative Safeguards

(1) Since the material in Part Alpha of an MIR and parts Alpha, Bravo, and Charlie of an MR is not privileged information, COMNAVSAFECEN may disclose the information to the public consistent with exemption b(6) of the Freedom of Information Act. Since the material in Part Bravo of an MIR and part Delta of an MR is privileged information, COMNAVSAFECEN shall not release it to the general public.

(2) Only military electronic communications facilities shall transmit MRs, MIRs, and MIR endorsements.

(3) Distribution of Part Bravo of MIRs by themselves, or together with the endorsements, and part Delta of an MR outside the commands specified in this chapter, or authorized by CNO (09F), is strictly prohibited.

(4) Use Standard Subject Identification Code (SSIC) 05102 on all MRs, MIRs, and endorsements to aid the receiving commands in limiting internal distribution to people requiring MRs and MIRs for safety purposes. Internal command distribution of MRs and MIRs shall be strictly limited to people requiring knowledge of the report for safety purposes.

(5) Privileged reports and endorsements required by this chapter shall include the following narrative at the beginning of the MR, MIR, or endorsement:

"NARR/THIS REPORT IS FOR OFFICIAL USE ONLY. THIS IS A PRIVILEGED, LIMITED USE, CONTROLLED DISTRIBUTION SAFETY MISHAP INVESTIGATION REPORT. UNAUTHORIZED DISCLOSURE OF THE INFORMATION IN THIS REPORT BY MILITARY PERSONNEL IS A CRIMINAL OFFENSE PUNISHABLE UNDER ARTICLE 92, UNIFORM CODE OF MILITARY JUSTICE. UNAUTHORIZED DISCLOSURE OF THE INFORMATION IN THIS REPORT BY CIVILIAN PERSONNEL WILL SUBJECT THEM TO DISCIPLINARY ACTION UNDER CIVILIAN PERSONNEL INSTRUCTION 752. SEE CHAPTER A6 OF OPNAVINST 5100.19D FOR RESTRICTIONS."

(6) Only CNO, Commandant of the Marine Corps (CMC), or COMNAVSAFECEN can readdress MRs, MIRs, and MIR endorsements.

i. Special Handling. The term "special handling" means that the circulation of MRs and MIRs is restricted to ensure their use is limited to the furtherance of safety. Recipients must apply common sense to determine what handling actions are appropriate. For example:

(1) Uncontrolled disclosure of MRs and MIRs to those not requiring knowledge of their content for safety (such as placement in reading racks, message boards, or on bulletin boards) is not appropriate.

(2) Controlled passage of MIRs from individual to individual, or from office to office in file folders, to make sure only specific individuals requiring knowledge of their content for safety purposes see the MIR is appropriate. Configure electronic message dissemination systems to ensure only those individuals requiring knowledge of their content, for safety purposes, are included in the system parameters.

j. For Official Use Only. All reports required by this chapter are designated "For Official Use Only (FOUO)." SECNAVINST 5720.42F (NOTAL) contains guidelines regarding handling, release, safeguarding, and disposing of material designated "For Official Use Only (FOUO)."

6. Dissemination of Essential Safety Information. When appropriate, COMNAVSAFECEN and the type commanders may extract safety information and issue lessons learned based on MIRs or MRs submitted according to this chapter. The distribution of the lessons learned depends on the subject.

The privileged status of an MR, MIR, or endorsement shall not restrict the dissemination of essential safety information by COMNAVSAFECEN or the type commanders. When an MR or MIR contains essential safety information based on privileged or personal information, and the information has not been adequately distributed to those in need of the information, COMNAVSAFECEN or the type commanders shall take one or more of the following actions (listed in order of preference):

a. Readdress. Readdress the entire MR or MIR. (COMNAVSAFECEN only). COMNAVSAFECEN shall take this action immediately upon receipt of an MIR to ensure all fleet and type commanders and other appropriate senior Navy commanders are aware of the mishap investigation board's analysis of the mishap.

b. Expunge. Scrub or sanitize identifying information from the MR or MIR that could link the report with an individual, organization, or mishap, and disseminate the essential safety information remaining in the report. COMNAVSAFECEN shall take this action as soon as practical upon receipt of an MIR to ensure appropriate afloat commanding officers are aware of the details of the mishap. (COMNAVSAFECEN only)

c. Extract. Extract the essential safety information from the report and disseminate it appropriately. (COMNAVSAFECEN or type commanders)

7. Release of Program Information. The release of information in MIRs or MRs shall be as specified in this paragraph, unless otherwise authorized by CNO (N09F). The release of information on motor vehicle (MV) or off duty recreation, athletics, and home mishaps shall be per reference A6-4.

a. Protection of Privacy Information. To protect the privacy right of individuals, the names of individuals not involved in the mishaps and the social security numbers of all individuals in the report shall not be furnished under exemption (b)(6) of the Freedom of Information Act (FOIA). To protect the privacy rights of surviving family members, photographs of human remains included in the autopsy reports shall not be provided per exemption (b)(6).

b. Release Based on the Freedom of Information Act. Either expressed or implied requests for information made under the FOIA shall be sent to COMNAVSAFECEN, Attention: Code 03.

c. Release Based on the Privacy Act of 1974. Information in MIRs or MRs shall not be maintained in a system of records subject to the Privacy Act. Specifically, the information must not be retrievable by the name of an individual, or by social security number, or other identifying number, symbol, or unique identifier associated with an individual. Forward Privacy Act requests for information pertaining to an individual to COMNAVSAFECEN, Attention: Code 03.

d. Release by an Individual Having Knowledge of Mishap Investigation Reports and Mishap Reports. An individual having knowledge of the contents of an MIR or MR is prohibited from disclosing the information, except as authorized by this chapter. If anyone asks for information from any individual having knowledge of the contents of an MIR or MR, that individual should immediately contact COMNAVSAFECEN, Attention: Code 03.

e. Release to U.S. Navy, U.S. Marine Corps, and Other Department of the Navy Activities. Forward requests for mishap information from Navy, Marine Corps, and other DON activities to COMNAVSAFECEN, Attention: Code 03.

f. Release to Other U.S. Military Services and the U.S. Coast Guard. Exchange of safety program information among the military services and U.S. Coast Guard shall be limited to the respective safety centers, and shall be controlled to prevent disclosure of personal and privileged information.

g. Release to the News Media. DON Public Affairs Regulations, SECNAVINST 5720.44A (NOTAL) contains information on releasing mishap information to the media. The Navy shall, however, preserve the privileged information in MIRs or MRs which is not releasable to the media. Forward requests for MIRs or MRs to COMNAVSAFECEN, Attention: Code 03.

h. Release to Congress. Forward requests for information from Congress, congressional committees or subcommittees, or staff members to CNO or CMC, as appropriate. Send a copy of the request to COMNAVSAFECEN, Attention: Code 03.

i. Subpoenas for Information. Refer any subpoenas for mishap information for use in civil or criminal proceedings, anticipated litigation, or in administrative claims against the government, to the Judge Advocate General, Department of the Navy (Code 34).

j. Release to Technical Representatives, Defense Contract Administration Services (DCAS) Representatives, and Contractors. Forward requests for mishap information from technical representatives, manufacturers, DCAS representatives, and contractors or their agents to COMNAVSAFECEN via COMNAVSEASYSCOM (SEA-00L). The endorsement of COMNAVSEASYSCOM (SEA-00L) shall certify whether the requested information is required for safety purposes with respect to product design or improvement. Any response shall include a warning to ensure the recipient uses the information for safety purposes only. The recipient shall not disclose the information to any other individual or entity.

k. Release to North Atlantic Treaty Organization (NATO) Nations. If a maritime incident involves units or personnel of two or more NATO nations, the provisions of NATO Standardization Agreement (STANAG) 1179 (NOTAL), Combined Investigation of Maritime Incidents, become effective. Under the provisions of STANAG 1179, NATO nations agree to conduct either a combined court of inquiry, a national inquiry attended by witnesses and/or observers from other nations, or an independent national inquiry coordinated by the presidents of the inquiries. Any command receiving a request for information from an afloat mishap investigation from a NATO country shall forward the request immediately to COMNAVSAFECEN, Attention: Code 03.

l. Release to Other Foreign Nations. Forward requests for information on mishaps from foreign governments to COMNAVSAFECEN, Attention: Code 03.

m. Unspecified Cases. Forward requests not stipulated above to COMNAVSAFECEN, Attention: Code 03.

Appendix A6-B

Sample Message to Appointing Authority/Fleet/Type Commander

FM Type Commander/Fleet Commander/
TO Appointing Authority(ISIC)/Fleet/Type Commander

INFO All MIR endorsers (if known)
Mishap ship(s)
ISIC
COMNAVSAFECEN NORFOLK VA//30/054//
Other appropriate commands

UNCLAS //N05102//

MSGID/GENADMIN/originator//

SUBJ/CONVENING MISHAP INVESTIGATION BOARD//

REF/A/OPREP-3/Mishap ship/DTG//
REF/B/DOC/CNO/19JAN94//
NARR/REF B IS OPNAVINST 5100.19D, NAVOSH PROGRAM MANUAL FOR FORCES AFLOAT//
POC/name/rank/primary phone/-/Type Commander/secondary phone//
POC/S. V. SCUDDER/GS12/DSN 564-1562/NAVSAFECEN 30B/(757) 444-1562//

RMKS/1. REF A REPORTED A POSSIBLE CLASS A MISHAP INVOLVING USS SHIP. A MISHAP INVESTIGATION BOARD MAY BE REQUIRED IF THE MISHAP MEETS THE CRITERIA FOR A CLASS A MISHAP. THIS INCLUDES:

A. A DEATH, OR

B. AN INJURY RESULTING IN PERMANENT TOTAL DISABILITY, OR

C. THE TOTAL COST OF REPORTABLE DAMAGE IS $1,000,000 OR MORE.

2. IF YOU DETERMINE THE MISHAP MEETS CLASS A SEVERITY, ACCORDING TO REF B YOU MUST APPOINT A MISHAP INVESTIGATION BOARD. MEMBERS OF THE MISHAP INVESTIGATION BOARD CAN NOT BE ASSIGNED TO ANY OTHER INVESTIGATION (JAGMAN, BOARD OF INQUIRY) INTO THE MISHAP.

3. THE NAVAL SAFETY CENTER IS STANDING BY TO SEND AN ADVISOR TO ASSIST THE BOARD IN THE INVESTIGATION. THEY NEED TO KNOW WHEN AND WHERE THE BOARD WILL CONVENE.

4. IF THE BOARD NEEDS TECHNICAL ASSISTANCE, THE SENIOR MEMBER MUST REQUEST ASSISTANCE THROUGH THE TYCOM.

5. NOTIFY TYCOM AND NAVAL SAFETY CENTER IF DECISION IS MADE NOT TO COMMENCE AN MIB.
BT

Appendix A6-C

Sample Appointment Letter

FOR OFFICIAL USE ONLY (when filled in)

5100
Code
Date

From: (Commander, Commanding Officer)
To: (Rank, Name, SSN, Service)
Via: (Command of the appointed member, if different from the appointing authority)

Subj: APPOINTMENT AS MEMBER OF (ORGANIZATION) MISHAP INVESTIGATION BOARD

Ref: (a) OPNAVINST 5100.19D, NAVOSH Program Manual for Forces Afloat

1. Based on your professional experience and knowledge, I appoint you as (the senior member) (a member) of the (organization) mishap investigation board. You shall comply with reference (a) in the performance of your duties.

2. I direct your attention to the provisions of reference (a) concerning privileged information. You shall properly safeguard all privileged information available to you as a member of the board.

3. When investigating and reporting a shipboard mishap, your duties as a member of the board shall take precedence over all other duties. You will not be assigned to do a JAG Manual or other investigation of the same mishap.

4. The responsibility inherent in the appointment extends beyond any loyalties you may hold to the command. The afloat safety program depends on the efforts of mishap investigators to analyze mishaps to identify and remove potential causes of damage and injury. The sole objective of the board is mishap prevention. Therefore, your efforts should include complete, open, and forthright expressions of your views. Rest assured, the MIR shall be used within the command, and elsewhere within the Department of the Navy, for safety purposes only.

5. Should any circumstances arise which would prevent the proper performance of your duties as a member of the board, you shall immediately notify me.

6. Contact the Naval Safety Center if you experience any difficulties in properly conducting the investigation.

//Signed//

Copy to:
COMNAVSAFECEN (30)

Appendix A6-D

INVESTIGATION PROCEDURES GUIDE

This guide will help the afloat safety officer and mishap board members conduct a mishap investigation. It includes information on:

Responsibilities

Investigative Procedure

Collection of Evidence

Witness Statements

The Witness Interview

Medical Information and Materials

Protecting the Mishap Scene

Physical Evidence

Criminal Evidence

Photographs and Videotapes

Identifying Pictures

Privileged Photographs

Sketches and Diagrams

Logs and Written Records

Reconstructing/Re-Enacting the Mishap

RESPONSIBILITIES

The investigators' responsibilities include:

1. **Collecting, organizing, interpreting, and protecting** all physical and testimonial evidence.

2. Making sure photographs and videotapes **accurately** depict the mishap scene, whether taken before or after arrival of the mishap board.

3. **Interpreting** logs, records, blueprints, schematics, and written procedures.

4. **Taking statements** from witnesses, including advising all witnesses in writing of the restricted uses of their privileged testimony.

5. **Reconstructing** the sequence of events leading up to, and immediately following, the mishap.

INVESTIGATIVE PROCEDURE

The investigative procedure followed by the investigator should answer the following questions:

WHO? WHAT? WHERE? WHEN? WHY? HOW?

The investigation should start as soon as possible after the mishap occurs. The sooner an investigation starts, the better the result. Starting the investigation rapidly reduces the possibility of:

1. Witnesses leaving the ship.

2. The ship leaving port because of the schedule.

3. Witnesses forgetting important information.

4. Damaged equipment and materials being moved or repaired. Investigators can deduce more accurate information when equipment remains in the same position and condition as it was immediately following a mishap.

5. Demoralizing the crew because of the delay in returning the scene to its original condition.

6. Transient medical evidence breaking down and values returning to normal.

7. Logs, chart entries, and other information being erased or "cleaned up" and creating inaccurate records.

The circumstances and facts the investigators find at the mishap scene dictate the order and questions to ask witnesses or other interested people.

NOTE:

Don't confuse "interested people" with "interested parties" in a JAG Manual investigation.

Talk to everyone in the area of the mishap. This includes people there just before, during, or after the mishap. People involved in the rescue and cleanup can also provide valuable information. Do not overlook "outside witnesses."

EXAMPLE:

Ships alongside or across the pier, small craft in the vicinity, and people on the pier or in adjacent buildings.

COLLECTION OF EVIDENCE

Investigators normally start collecting evidence as soon as they arrive on the mishap scene. They may collect physical evidence and pieces of wreckage and take photographs and videotape the scene.

In investigating a mishap scene, the investigator could be exposed to health hazards such as soot, asbestos fibers in torn lagging, toxic chemicals, and other hazards like sharp metal. The following equipment may be useful during evidence collection and mishap scene evaluation:

Disposable Coveralls
Protective Gloves
Respirator, Disposable, (Organic vapor with HEPA filters)
Safety Glasses and Goggles
Safety Shoes
Blank labels or tags
Camera with flash (35mm disposable or single lens reflex, color print film, ASA 100, 200, & 400)
China Marking Pencils (red and black)
Envelopes, Manila
Felt Tip Markers (red and black)
Flashlight, 2-cell, Explosion-Proof (spare batteries)
Graph Paper
Hacksaw (Frame and Blades)
Inspection Mirror, 2 1/4 adjustable
Notebook
Plastic envelopes or small bags (zip-lock)
Pliers (regular, needle nose, and wire cutters)
Pocket knife
Polyethylene Rope (yellow)
Retrieving Tool, Magnetic
Ruler, 12-inch Wooden
Screwdriver, (flat and Phillips head)
Steel Measuring Tape, (12 foot and 100 foot)
Video camera (optional)
Voltage Tester
Wrench, adjustable (6- and 8-inch)
Yellow Lumber Crayon

Most of these items will be available on board the ship. If a respirator is necessary, the ship's respiratory protection officer can assist the investigators in getting their medical screening and fit-testing.

WITNESS STATEMENTS

Recent court cases and a forthcoming change to DoDINST 6055.7, Mishap Investigation, Reporting, and Recordkeeping (reference A6-7), have necessitated a change in how a mishap investigation board obtains witness statements.

Previously, all witness statements provided to a mishap investigation board have been given orally and taken under the concept of privilege. To protect the release of privileged information to the courts, DoD is limiting

the amount of privileged information gathered. Witnesses can make privileged statements to the MIB. However, it is not automatic.

If witnesses seem reluctant to discuss the events surrounding a mishap without being granted the protection provided under the concept of privilege, the mishap investigation board should explain the concept of privilege to the witness. If the witness desires, he or she may make a statement to the mishap investigation board under the concept of privilege; but, it must be at the specific request of the witness and not the MIB member.

In any safety investigation **NEVER TAKE ANY STATEMENTS UNDER OATH.** Any statement can include speculation, hearsay, rumors, or opinions of the witness.

If the witness elects to provide information under the concept of privilege, fill out an "Advice to Witnesses" form (attachment A6-A-1). Mishap board investigators should use it to inform witnesses their statement is for safety purposes only. The mishap board member gives the form to the witness to read, understand, and sign. The mishap board member also signs the statement. Then, the board member provides a copy to the witness.

In investigations conducted by a mishap investigation board, some witness statements provided to the board **are privileged information**. Whether the statement the witness makes is privileged or not, no one gives statements made to members of a mishap investigation board to an investigator from another investigation.

JAG, Naval Criminal Investigative Service (NAVCRIMINVSERV), and other investigators **may make their witnesses' statements available** to the mishap safety investigators. Let them! . . . However, the mishap board **never reciprocates**!

The mishap investigation board can glean valuable information from the statements. However, the mishap investigation board should **re-interview** appropriate witnesses. JAGMAN statements, taken under oath, may not contain as much information as statements made under the assurance of privilege and limited use.

A witness' statement is an account of the circumstances surrounding the mishap as he or she remembers them. The witness can write out the statement. The mishap investigation board member may tape record it or have the witness dictate it. The mishap investigation board member(s) can summarize the witness' statement. If the board member tape records the witness' statement, he or she should transcribe the summary as soon after the interview as possible and erase the tape.

WRITTEN STATEMENT - The witness **can** write out the statement in his or her own words.

NOTE:

For Internal Shipboard Mishap Investigations: A safety officer, conducting an shipboard mishap investigation, will not take written witness statements. An interview may be conducted, but the only written record should be the safety officer's notes. Do

not include the source of the information on the notes. A written witness statement should never be taken for an internal shipboard investigation.

TAPE RECORDED STATEMENT - If witnesses do not want to write out their statements, the interviewer may use a tape recorder. Witness should read, understand, and sign the "Advice to Witness" statement before starting to record the statement.

At the start of the tape, fully identify who is talking, about what mishap, when the interview is taking place, the information is for safety purposes only, and other identifying data. The interviewer should ask witnesses if they mind your recording their statement.

The interviewer should transcribe the statement as soon as possible and then erase the tape. This will avoid any controversy over whether the tape is physical evidence or not.

DICTATED STATEMENT - The witness should dictate his or her statement to the interviewer.

The witness should read, understand, and sign the "Advice to Witness" statement. The interviewer should avoid asking any questions until the witness is finished with the statement and can review the summary with the witness at the end of the interview. The witness should not sign the summary of the interview.

IF POSSIBLE, REPEAT EACH INTERVIEW A FEW DAYS AFTER THE INITIAL INTERVIEW. The witness may remember additional facts or the interviewer may have additional questions.

THE WITNESS INTERVIEW

Before the initial interview:

1. The **sooner you interview** witnesses after the mishap, the better their recollection of the events will be. However, **don't delay medical treatment** to interview witnesses.

2. **Keep witnesses separated** while waiting for you to interview them. That way they can't confer with other witnesses and mentally fill in parts of their observations based on what someone else may have seen or heard.

3. While the witnesses are waiting for the interview, keep them busy outlining the sequence of events or making a sketch of the mishap site. Both will **help the witnesses remember** important information about the mishap. Until you give the witness' the "Advice to Witnesses" form, the outline or sketch are not privileged.

4. **Avoid interruptions** during the interview. Find someone to keep people from knocking on the door. They can also answer the phone for you or you can turn it off.

5. If the witness is undergoing medical treatment, or in the hospital, avoid conducting an interview while relatives are present. Check with the witness's physician and conduct your interview at some time other than visiting hours. Be careful not to tire or upset the witness.

6. Don't delay your investigation if you can't interview a key witness or the victim due to hospitalization or non-availability. Interview other available witnesses immediately.

Initiating the interview:

1. Completely explain who you are and the purpose of the investigation. Display an attitude of concern over finding the mishap causes and preventing this "terrible thing" from ever happening again.

2. Let witnesses complete the "Advice to Witnesses" form (attachment A6-A-1) before starting the interview or taking their statement. Make sure witnesses fully understands the concept of privilege vs non-privileged and the limitations on the use of their statement. If they don't, go over the contents of appendix A6-A.

2. Give witnesses a chance to relax. Ask them some routine questions for basic information.

EXAMPLE:

Get the correct spelling of their names. (Is it K-E-L-L-Y or K-E-L-L-E-Y? S-M-I-T-H or S-M-Y-T-H-E? S-T-E-V-E-N or S-T-E-P-H-E-N? You can get the answers to the questions elsewhere, but people enjoy talking about themselves and it shows you want to get all the facts correct.

Ask about their current job and a brief job description? Any previous jobs having a bearing on the mishap? These can give you valuable information on the validity of their statement, too.

Chat with witnesses for a few minutes until you see them calm down and you build a little rapport.

Then, let witnesses tell you what happened without interruption.

After witnesses finish, explain to them that you would like them to recount the entire sequence.

Sit down with witnesses and review the summary you have written. Ask witnesses to fill in any details that come to mind while reviewing the statements.

Then, and only then, start asking questions. You may have written some key questions out ahead of time.

Considerations:

1. Do not dominate the witness.

2. If two or more investigators conduct the interview, be sure only one asks questions at a time. The second investigator should ask questions only after the first investigator is done.

a. Witnesses may be more open if only **one investigator** is present.

b. The exception to the rule is when the investigator and witness are of **opposite sexes**. Then, it is prudent to have a third person in the room.

3. Avoid **trick questions** or other tactics that would put the witness in an unfriendly attitude. Ask only one question at a time.

4. Do not ask **leading questions** or ones suggesting answers. Don't ask, "I assume the noise you heard was like a rifle shot?" Ask, "How would you describe the noise you heard?"

5. Use **open-ended questions**. Don't ask question requiring just a "yes or no" answer.

6. Do not use **derogatory comments** aimed at any person, piece of equipment, ship, or command to lure the witness into making a statement.

7. Let the witness **complete the answer** before you go to another question or topic.

8. Always **determine exactly who "they" are** when the witness is talking. If the witness brings up the name of someone new to the investigation, make sure you write down the name and interview him or her, too.

9. If the witness doesn't know peoples' names or jobs, ask for a **description**. If witnesses can, ask them to find out who "they" are. However, don't put the witness at risk.

10. At the end of the interview, ask witnesses to contact you **if they remember any more** details. Give them your phone number on a business or calling card.

11. Express **appreciation** to witnesses for the information given.

12. After witnesses leave, complete your **summary of the information**.

13. **Don't confuse your sources** of information. Use new note paper for each witness. Don't compare one witnesses' statement with what the witness is telling you during the interview.

14. Ensure you are **accurate**. When necessary, re-interview witnesses or ask additional questions to explain all areas completely. Witnesses frequently overestimate time, unless they are doing a familiar, repetitive event they can associate with the elapsed time.

Follow-up Interview:

Many mishap investigators prefer to conduct a follow-up interview of the witness at the scene of the mishap. This can be beneficial since the witness may be able to point out or remember more details because of the surroundings. It can also give the interviewer a better understanding of the sequence of events leading up to the mishap.

After the interview:

Review contents of the days interviews with the other members of the board. Ascertain if you have any **more questions** of those witnesses and determine if there are any additional witnesses discovered as a result of the interviews.

Put the statements and your notes in an envelope and put it in **a safe place** such as a safe or lockable file cabinet.

Nothing can destroy your effectiveness as a mishap investigator more quickly than for word to spread you are giving information to people you promised the witness you wouldn't.

MEDICAL INFORMATION AND MATERIALS

Medical materials you may have **available as evidence** include laboratory results, medical records, hospital admission forms, diagrams of wounds, autopsy reports, psychological profiles, or physician's written opinions. Most medical materials used as evidence do not fall under the concept of privilege. However, they may fall under the Freedom of Information Act exemption, Privacy Act, or doctor/patient confidentiality.

1. **Quick action** by the medical department representative (MDR) at the mishap scene is necessary because of the transitory nature of some medical evidence. The MDR collects the initial, particularly transient, medical evidence as directed by the commanding officer or higher authority. The transient evidence includes specimens to determine blood alcohol and drug levels.

2. The medical officer member, when assigned,

   a. **Coordinates** the analysis of medical evidence with all other aspects of the investigation.

   b. **Participates fully** in the investigation and deliberations of the board.

   c. **Protects** confidential medical information, such as medical records, from unauthorized disclosure, and advises board members on the use of medical evidence.

3. Medical factors, such as physiological, social, behavioral, and psychological, may provide insight into the cause of the mishap. If during the investigative or deliberative process a board member feels medical factors may have had an effect on the mishap, they should approach the medical member of the board to make these determinations.

PROTECTING THE MISHAP SCENE

If necessary, cordon off, secure, or guard mishap scenes to prevent disturbance of wreckage.

NOTE:

Operational requirements or damage control measures may require disturbing the mishap scene before the board arrives. In such cases, the commanding officer of the ship involved in the mishap protects the mishap site or damaged area from loss or further damage.

Before removing bodies from the mishap scene, take photographs of the victims in place, or make a sketch.

As soon a possible after the mishap:

MAKE AN ACCURATE PLOT OF THE SCENE.

TAKE PHOTOGRAPHS OR VIDEOTAPE RECORDINGS OF THE WRECKAGE, ITS DISTRIBUTION, AND THE SURROUNDING AREA.

MAKE A DIAGRAM OF ANY UNDERWATER DAMAGE.

Avoid the desire to repair or return the mishap scene to its original condition. Whenever possible, don't clean up or repaint the site until after the mishap investigators complete their collection of evidence. To reduce trauma and crew impact, cordon off or cover the scene.

Once a mishap investigation board convenes, **only the senior member** can authorize the disturbance of damaged areas or wreckage.

PHYSICAL EVIDENCE

Physical evidence may include wreckage or damaged equipment or any other physical proof of a mishap in the area directly affected by or surrounding the scene of the mishap.

A photo or sketch should accompany the item(s) to depict "as found" location and condition. Thoroughly photograph or sketch the mishap scene before moving or removing any wreckage or equipment.

Investigators must **carefully handle** all evidence, including pieces and parts of equipment or material, to make sure they don't alter or destroy it. Wear gloves or avoid handling the evidence with your hands.

1. Put all evidence in **plastic bags**, if possible, and seal them.

2. **Tag each item** with a full description and its relationship to the mishap. Use masking tape, index cards, or self-adhesive labels to identify each item of evidence. Include:

a. **Who** and **when** it was collected.

b. **Location**, including its relationship to other items.

c. **Identification**, such as NSN, model number, MILSPEC, and manufacturer.

3. If you need to send it to a laboratory for analysis, **package it carefully**.

4. **Remember**, physical evidence is not privileged. Other investigators may request the physical evidence. **Don't include** any privileged information on the label or inside the bags. If necessary, use a numbering, lettering, or other coding system to identify evidence.

CRIMINAL EVIDENCE

If, during the investigation, any investigator discovers **evidence of a criminal act** related to the mishap, the senior member or mishap investigator **immediately** informs the appointing authority. The appointing authority will then confer with legal counsel and advise the Naval Criminal Investigative Service (NAVCRIMINVSERV) and Commander, Naval Safety Center.

1. Some evidence gathered by the mishap investigation board may be releasable to other investigators. The senior member does not release information revealing the source of any physical evidence obtained because of privileged information, nor any testimony given under the assurance of privilege.

2. The senior member turns over all other nonprivileged physical evidence to the senior NAVCRIMINVSERV agent.

3. The senior member may continue the safety mishap investigation, if directed by the appointing authority. Valuable safety information may result from investigating a mishap that occurred after the criminal act.

EXAMPLE:

In an arson case, the NAVCRIMINVSERV would have to be informed. But, if during the fire fighting, two Oxygen Breathing Apparatuses (OBA) or Self Contained Breathing Apparatuses (SCBA) failed and caused two fatalities, we may wish to continue the mishap investigation. We can learn important information on the reliability of OBAs or SCBAs or other fire fighting equipment from the mishap investigation.

4. Before the appointing authority can direct the senior member to start or continue the investigation involving a criminal act, the appointing authority must comply with the 1984 Memorandum of Understanding Between the Departments of Justice and Defense Relating to the Investigation and Prosecution of Certain Crimes.

a. The 1984 Memorandum requires the appointing authority to coordinate, and get the concurrence from the Department of Justice before starting or continuing the safety mishap investigation.

b. If the appointing authority has any questions on whether or not to start, or continue the mishap investigation, consult the Judge Advocate General, Admiralty Division (Code 31). They will coordinate with other divisions within the Office of the Judge Advocate General and the Department of Justice.

5. If a mishap investigation is directed, the investigation will not use privileged information. The existence of privileged information can inhibit criminal prosecution. In this unusual case, the Office of the Judge Advocate General or the Naval Safety Center will give detailed instructions to the senior member.

PHOTOGRAPHS AND VIDEOTAPES

Good photographs and videotapes depicting conditions and situations are valuable evidence. **Color photos** give the best depictions. The Navy's photographic services and civilian developing companies develop color-print film. Therefore, it is convenient to use **color film** if you are planning on using the Naval Imaging Command or the aircraft carrier or tender photo lab.

You may find it convenient to invest in one or two disposable (point and shoot) 35mm cameras so you can take photographs immediately upon notification of a mishap. One camera with ASA 100 film (for indoor use) and another with ASA 400 film (for outdoor photographs) film should be sufficient. Make sure both cameras have a built-in flash.

Polaroid prints give you rapid feedback to be sure you get the desired result. However, they are difficult to reproduce and enlarge.

For better quality photographs, use a good 35mm, single lens reflex camera, with electronic flash. Zoom lenses, 50mm to macro and 35mm to 70mm, should be all you need.

Use your first picture on each roll to identify the film in case it gets misplaced. Include the following:

Command: _____
Roll _____
Date: _____ Time: _____
Photographer: _____
Type camera/lens: _____
Film type: _____
Brief description: _____

Use the Naval Imaging Command when the pictures are of a **sensitive nature**, such as in photographs of mishap victims or highly publicized mishaps. They use C-41 processing so any quality color-print film should be acceptable.

Have the imaging command make a 3" x 5" print of each view. Then, select the needed views for further analysis. After you select the views for study, request one 8" x 10" print of each view.

Videotaping a mishap scene immediately is a valuable investigative tool. Provide a narration of the details while taping. Use videotape to supplement, but not replace, still photographs.

IDENTIFYING PICTURES

Take photographs from at least **two angles**, if possible. Put a **scale or ruler** in photos to show size and dimensions. Use **arrows and pencil points** to draw attention to details in the photo.

It is critical to identify each photograph, either by listing the photograph number and location on a tablet or placing something in the photograph for identification. A piece of paper or a chalk slate with the location, time, date, and photograph number placed in the photograph scene can aid in identifying the photo.

Each photograph needs an explanation on the back explaining the

WHO? **WHAT?** **WHERE?** **WHEN?**

of the photograph. If you are using a videotape, make sure the narration provides the answers to the same questions.

Keep a log with the details of each photograph beside the photograph number to refresh your memory when you get the prints.

PRIVILEGED PHOTOGRAPHS

Photographs and videotapes may be privileged. If the mishap investigation board plans or poses the scene to illustrate a specific condition or situation as part of their deliberative process, then the photograph or videotape is privileged.

EXAMPLE:

> Mishap investigators take a photograph of the scene of the mishap including a person the same height as the victim. The investigators are using the photograph to show that the victim <u>could have</u> touched both the light switch and the sink at the same time.

All captions or markings placed on photographs suggesting the mishap board's deliberative process also are privileged.

EXAMPLE:

The paragraph on the back of the photograph of the demonstration described above showing the Sailor could touch both the light switch and the sink at the same time might state:

Taken 210900R December 99 by LCDR I. M. Investigator of the USS MISHAP SHIP mishap investigation board. This photograph is privileged. It shows the relationship between the light switch and the sink in the forward crews head on board USS MISHAP SHIP (compartment 2-158-0-L). The Sailor in the photograph is the same height as the victim (OS3 Radar) and clearly shows the victim could have touched both the switch and the sink at the same time.

It would be beneficial in this case to mark the front of the photograph with arrows showing the location of the light switch and the sink. If you are using a video camera, zoom in on the light switch then back off to show the relationship of the entire area then zoom in on the sink and back off again.

Photographs of human injuries/remains that are **not staged are not privileged**, but may be exempt from disclosure under exemption b(6) of the Freedom of Information Act.

EXAMPLE:

The ships corpsman took a photograph of the body of a Sailor on the deck. It shows the results of an attempted tracheotomy (blood draining from mouth, nose, and throat; shirt front covered with blood). The photograph is not privileged but is exempt from disclosure under the Freedom of Information Act. The photograph can be used as evidence with careful handling. The following illustrates the annotation on the back of the photograph:

Taken 211000R December 99 by LCDR I. M. Investigator of the USS MISHAP SHIP mishap investigation board. This photograph exempt from disclosure under exemption b(6) of the Freedom of Information Act. It shows the position of the body of SN Jones following lifesaving attempts by the ship's medical department.

The release of such a photograph, with an identifiable individual could cause distress among relatives. (If released to the newspapers and it showed up on the front page, for example.) Being not privileged means the same photo could be used by the JAG investigator, if he knew beforehand that it was available.

Upon completion of the investigation, include all copies of the photographs (3" x 5" and 8" x 10") with the evidence sent to the Naval Safety Center. Include all negatives and proof sheets.

SKETCHES AND DIAGRAMS

An important source of evidence or information for the investigator is the **position** of people, equipment, materials, and physical parts of the environment at the mishap site. Use diagrams and sketches to record the positions for use during analysis. You can use diagrams and sketches to facilitate and support the analysis and conclusions outlined in the mishap investigation.

Sketches, in addition to photos, give valuable information. For sketches, you can highlight significant items to give a more uncluttered rendition of the scene.

Investigators should start making sketches and diagrams as soon as possible after the mishap while most of the physical evidence is still in place.

1. Use **graph paper** to make the diagrams.

2. Pick four **points of reference** for measurements such as stanchions, large equipment, or frames.

3. Use compartment numbers and frame numbers to **orient** the diagram bow to stern and port and starboard.

4. **Label** or code key items.

5. Identify **height, length,** and **width** of objects.

Some items to record and measure include:

1. Location of injured and dead personnel.

2. Machines and equipment affected by the mishap.

3. Parts broken off or detached from the equipment.

4. Objects damaged, marked or struck against.

5. Gouges, scratches, dents, or paint smears.

6. Tracks, or similar indications of movement.

7. Defects or irregularities.

8. Accumulations of stains or fluids.

9. Spilled or contaminated substances.

10. Areas of debris.

11. Sources of distractions or adverse environmental conditions.

12. Safety devices and equipment.

13. Position of people and witnesses.

14. Possible movement of people, before, during, or after a mishap.

Look for things that are obviously missing. A key part of a machine may not have been replaced during maintenance.

LOGS AND WRITTEN RECORDS

Make exact copies of operating logs, records, directives, and other written documents. Ensure that all changes and modifications are up-to-date and incorporated according to current policies and procedures, as they existed at the time of the mishap.

EXAMPLE:

Do the blueprints show the current configuration of the ship?; Were jury-rigged equipment or structures a factor?; Was proper installation and testing accomplished?

If possible, reproduce documents by mechanical (copier) or photographic means for accuracy. Watch for obvious erasures, mark-overs, or other unauthorized corrections in logs that might not show up with some methods of reproduction. If you find any, make a note of it and try to find out who did it.

RECONSTRUCTING/RE-ENACTING THE MISHAP

After gathering the available real evidence and completing the interviews of available witnesses, reconstruct the event. The reconstruction can help to:

1. Establish a sequence of events, perhaps disclosing the cause factors for the mishap.

2. Identify where you need more information.

3. Identify circumstances that increased or decreased the effects of the mishap.

A technique that may help in reconstruction of the event, as well as get more information, is re-enacting the mishap with the involved parties. Base the decision to re-enact the mishap on:

1. Significant new information can be gained from re-enactment.

2. The sequence of events of the mishap cannot be developed in any other way.

3. The re-enactment can provide a key to prevent recurrence or verify the theories and opinions of the mishap investigation board.

In most mishaps, re-enactment is not necessary. Re-enactment is <u>not advisable</u> if the participants are emotionally upset, nervous, tense, or agitated. When re-enacting mishaps:

1. Ensure qualified supervisory personnel monitor the progress of the re-enactment.

2. Warn the participants not to repeat the act or unsafe practice that caused the mishap. Be prepared to stop the re-enactment if the participants are about to take an unnecessary risk or act unsafely in any way.

3. Ask the participants to demonstrate their actions slowly and deliberately, explaining as they demonstrate.

4. Before starting the re-enactment, brief the participant to proceed up to the point of the mishap. Beyond that point, use a talk-and-walk method of re-enactment.

Investigators observing the re-enactment should take notes, photographs, or videotape for further review and analysis.

Appendix A6-E

Sample Message Format
Mishap Investigation Report (MIR)
Report Symbol OPNAV 5102-7

Use the format and content below for reporting the results of the MIB. If a particular paragraph or line does not apply to this report, mark that section "N/A". Send the report as a naval message:

(Precedence - normally ROUTINE)

FM Releasing command (Normally the senior member's command)

TO Mishap ship(s)
ISIC
Group Commander (when required)
Type Commander
Other endorsers
COMNAVSEASYSCOM WASHINGTON DC//PMS377// (LCAC ONLY)
Systems Command//appropriate office code// (When determined by senior member or other endorser)
CMC WASHINGTON DC//SD// (When a Marine or U.S. Marine Corps equipment is involved)
COMSC WASHINGTON DC//N00/N00S/PM1/PM2/PM3// (When MSC personnel or equipment is involved)
Fleet Commander (when required)
All commands assigned action on a recommendation
COMNAVSAFECEN NORFOLK VA//30/054//

INFO NAVSURFWARCEN COASTALSTA PANAMA CITY FL//33// (LCAC ONLY)
CNO WASHINGTON DC//N8/N86D/N871D/N885/N889E1/N09/N45//
Fleet Commander (when not an action addressee)
Group Commander (when not an action addressee)

(If the mishap involves explosives or explosive systems or equipment, include addressees provided by COMNAVSAFECEN.)

FOUO //N05102//DISTRIBUTE ONLY TO THE COMMANDER OR OFFICE CODE(S) FOLLOWING EACH ADDRESSEE.

MSGID/GENADMIN/MSG ORIG/SER NO./MONTH//
SUBJ/(AFLOAT MISHAP INVESTIGATION REPORT (MIR))//
REF/A/(OPREP-3 or any other messages related to the mishap)//
REF/B/DOC/CNO/19JAN94//
REF/C/GENADMIN/ INVENTORY OF EVIDENCE MSG//
NARR/REF A IS THE INITIAL OPREP-3 CONCERNING THE MISHAP. REF B IS OPNAVINST 5100.19D, NAVOSH PROGRAM MANUAL FOR FORCES AFLOAT WITH CHANGE 2. REF C IS THE MIR INVENTORY OF EVIDENCE. THIS REPORT IS FOR OFFICIAL USE ONLY. THIS IS A PRIVILEGED, LIMITED USE, CONTROLLED DISTRIBUTION, SAFETY MISHAP INVESTIGATION REPORT. UNAUTHORIZED DISCLOSURE OF THE INFORMATION IN THIS REPORT BY MILITARY PERSONNEL IS A CRIMINAL OFFENSE PUNISHABLE UNDER ARTICLE 92, UNIFORM CODE OF MILITARY JUSTICE. UNAUTHORIZED DISCLOSURE OF THE INFORMATION IN THIS REPORT BY CIVILIAN PERSONNEL WILL SUBJECT THEM TO

DISCIPLINARY ACTION UNDER CIVILIAN PERSONNEL INSTRUCTION 752. SEE CHAPTER A6 OF OPNAVINST 5100.19D FOR RESTRICTIONS.//

POC/NAME/RANK/PRIMARY PHONE/PRIMARY FREQ/LOCATION/SECONDARY PHONE/SECONDARY FREQ//
RMKS/ALPHA: (NONPRIVILEGED)

1. UICs OF MISHAP COMMANDs

2. HULL NUMBER/SIDE NUMBER

3. TYPE OF MISHAP (For example, flooding, fire, injury, electric shock, death, collision, grounding, explosion, back injury, chemical or toxic exposure, or equipment damage.)

4. LOCAL TIME AND DATE OF MISHAP

5. GEOGRAPHIC LOCATION (Latitude/Longitude or Port. If classified, give general area.)

6. WEATHER CONDITIONS (For example, temperature, relative humidity, visibility, lighting, ventilation, air quality, wind speed, sea state, current, tide, wind direction, precipitation, lightning, ducting, hurricane, and other.)

7. LOCATION WHERE MISHAP OCCURRED (Give workcenter or description of the location. For example, torpedo room; main deck, compartment number, side and frame number, mess decks, flight deck, or 76mm gun magazine.)

8. SHIP OR CRAFT'S EVOLUTION AT THE TIME OF MISHAP (For example, underway replenishment, mooring, and on-cushion approach to beach.)

9. SEA STATE AND DIRECTION (EXAMPLE: SEA STATE 3, 340T)

10. SHIP'S EMPLOYMENT (For example, type training (TYT), refit, independent steaming exercises (ISE), maintenance availability, underway, anchored, submerged, or dry-docked.)

11. PAYLOAD (LCAC-ONLY) (For example, type cargo and load weight)

12. SENIOR MEMBER and COMMAND (Include telephone number, if available.)

13. EQUIPMENT OR CRAFT DAMAGED OR DESTROYED BY THE MISHAP (If applicable, include EIC, TEC, FGC (functional group code), or NSN (if applicable); describe damage. (EXAMPLE: STARBOARD FAIRWATER PLANE DAMAGED SHT DAMAGED STARBOARD SIDE, RUDDER DAMAGED, ONE AN/BRA-34 ANTENA DAMAGED.)

14. ESTIMATED COST TO REPAIR OR REPLACE DOD PROPERTY (Provide the total dollar value and UIC and name of command having custody of the property (if different from reporting activity) and RUC (reporting unit code) if USMC equipment is involved.) The cost includes $56 for each hour of labor plus the cost of material and equipment.)

15. ESTIMATED COST OF NON-DOD PROPERTY DAMAGE

16. NUMBER OF SCHEDULED OPERATING DAYS LOST

17. NAME/SSN/AGE/SEX/RACE/ (Repeat items 17 through 24 with designators 17A, 17B, etc.) if the mishap involves reportable injuries to more than one person.

18. RANK and DESIGNATOR or RATE and NEC, JOB AND EMPLOYMENT STATUS (Examples of employment status include USN, USNR, USNR-R, other Department of Defense personnel, Navy federal civil servants, contractors, foreign military exchange personnel, and foreign civilians.)

19. DUTY STATUS (On- or off-duty.) and UIC (if different from reporting activity), and RUC (reporting unit code) if Marines are involved. (If the mishap involves injuries to people from different commands, specify the UIC of each individual.) CREW POSITION - LCAC ONLY.

20. SPECIFIC JOB OR ACTIVITY INDIVIDUAL ENGAGED IN AT TIME OF MISHAP (For example, conducting PMS, standing watch, loading stores, training, and boat crew.)

21. NUMBER OF MONTHS EXPERIENCE AT THE JOB OR ACTIVITY (in paragraph 20)

22. MEDICAL DIAGNOSIS (Include parts of body and type of injury.)

23. FATALITY, EXTENT OF INJURIES, AND PROGNOSIS FOR DISABILITY (Specify fatality, missing, permanent total disability, permanent partial disability, or no disability likely. See paragraph A0601d for explanation of terms.)

24. ESTIMATE OF LOST TIME

A. TOTAL NUMBER OF DAYS AWAY FROM JOB (Lost work days)/DAYS LOST BEFORE PERMANENT LOSS TO COMMAND (If a loss to command-disposition)

B. DAYS IN HOSPITAL OR SICK BAY

C. DAYS OF LIGHT OR LIMITED DUTY

25. ACRONYMS. (Include a list of acronyms with meaning spelled out if required used in the MIR.) EXAMPLE: AAWC-ANTI-AIR WARFARE COORDINATOR.

BRAVO (PRIVILEGED) (Contains the MIB's deliberative evaluation.)

1. BRIEF DESCRIPTION OF THE MISHAP (Include an "executive summary" of the events leading up to, through, and after the mishap. Include which one of the causes in paragraph Bravo 5A (Probable Cause(s) of the Mishap) is the root (or primary) cause of this mishap.)

2. SUMMARY OF EVIDENCE AND TESTIMONY ANALYZED (Include the date and the registered number of evidence package sent to COMNAVSAFECEN and the date (if different) copies of the inventory were sent all endorsers), and DTG of Inventory Message.

3. DETAILED SEQUENCE OF EVENTS

4. OPINIONS OF THE MISHAP INVESTIGATION BOARD (AS APPLICABLE)

A. THE ADEQUACY AND USE OF APPROVED PROCEDURES

B. THE QUALIFICATIONS OF THE PEOPLE INVOLVED

C. THE STATE OF TRAINING OF THE PEOPLE INVOLVED AND OF THE CREW IN COMBATING THE MISHAP

D. THE EFFECTIVENESS OF DAMAGE CONTROL EFFORTS

E. ANY EXISTING MATERIAL DEFICIENCIES OR SHORTCOMING WHICH MAY HAVE CONTRIBUTED TO THE MISHAP

5. ANALYSIS OF FINDINGS

A. PROBABLE CAUSE(S) OF THE MISHAP (State each cause of damage and injury with a short (less than 100 characters) rationale. The rationale is critical to identifying the cause because it links it to "WHO" or "WHAT" was involved. Causes should be one of the four major categories listed below, with subcategories as listed. Omit those categories and subcategories that don't apply and include as many causes in each category you determine apply. In paragraph BRAVO 1, Brief Description of the Mishap, identify which of the causes you determine to be the root (or primary) cause of this mishap.)

(1) HUMAN FACTORS (PERSONNEL ERROR): Consider human involvement in the events leading up to a mishap, actions taken as the mishap is occurring, and actions taken after the mishap occurred. For mishaps involving human factors, state each cause with a brief explanation in one of the subcategories listed below.

(A) UNSAFE ACTS
((1)) ERRORS (Mistakes or unintentional acts):
((2)) VIOLATIONS (Deliberate behavior that breaks established rules):

(B) UNSAFE SUPERVISION
((1)) INADEQUATE (Unintentional mistakes or failures by supervisors including the supervisor's absence)
((2)) VIOLATIONS (Deliberate rule breaking or disregard of authority by supervisors)

(C) UNSAFE CREW CONDITIONS
((1)) ADVERSE PHYSIOLOGICAL STATE (For example, physical fatigue, illness, intoxication, and obesity)
((2)) ADVERSE MENTAL STATE (For example, overconfidence, complacency, sleep loss, mental fatigue, and stress)
((3)) CREW RESOURCE MANAGEMENT (For example, poor team coordination and ineffective communications)

(D) ORGANIZATIONAL INFLUENCE
((1)) EXTERNAL (Factors controlled by sources outside the ship)
((2)) INTERNAL (Factors controlled by the commanding officer (or below) such as watchbill assignments)

EXAMPLE: HUMAN FACTOR, UNSAFE ACT, ERROR. MS3 FAILED TO TAG OUT GRIDDLE.

(2) PROCEDURAL FACTORS: Consider the possible effect of regulations, operations, and processes from all levels in the chain of command. Remember, a person not following written procedures is a human factor, not a procedural factor.

Procedures and policies published by higher authority such as Preventive Maintenance System, technical manuals, Naval Warfare Publications (NWPs), Navy Tactical Publications (NTPs), U.S. Navy Diving Manual, operational orders (OPORDs), Ordnance Publications (OPs), the Safe Engineering and Operations of LCAC (SEAOPS) Manual, and the commanding officer's standing orders may contain procedural errors.

(A) TOO COMPLEX (For example, the average sailor can't follow the written procedures because he or she can't understand or follow them):

(B) NOT AVAILABLE (For example, written procedures don't exist or have not been received):

(C) INCORRECT
((1)) NOT VALIDATED FOR SHIP OR EQUIPMENT
((2)) NOT UPDATED (Although the written procedures were correct in the past, modifications or alterations to the ship or equipment require changes to the procedures)
((3)) STEP MISSING OR OUT OF SEQUENCE

EXAMPLE: PROCEDURAL FACTOR, INCORRECT, NOT UPDATED. DUE TO MODIFICATIONS, TECH MANUAL PROCEDURES FOR DISCONNECTING HYDRAULIC HOSES WERE INCORRECT.

(3) MATERIAL FACTORS: Consider all material failures and malfunctions thoroughly, despite whether the failures or malfunctions occurred because of normal or abnormal means. This category includes failure due to improper repair or normal wear and tear.

(A) UNAUTHORIZED (For example, alterations made to the ship or equipment without authority):

(B) SAFETIES/GUARDS FAILED:

(C) CONDITION (For example, rust or corrosion):

(D) INAPPROPRIATE FOR USE (For example, off-the-shelf purchases that don't work)

(E) INSTALLATION/REPAIR FAULTY

(F) DEFECTIVE

(G) NORMAL WEAR AND TEAR (Normally, wear and tear is not a reportable mishap. However, the investigation may lead to this cause and is worth reporting.):

EXAMPLE: MATERIAL/EQUIPMENT FACTOR, SAFETIES/GUARDS FAILED. LUBE OIL RELIEF VALVE FAILED TO OPEN.

(4) DESIGN FACTORS: Consider whether a design defect caused the mishap.

(A) HAZARD TO PERSONNEL (For example, anything involving design creating a hazard to personnel):

(B) HAZARD TO EQUIPMENT (For example, design that causes damage to equipment):

(C) MAINTAINABILITY (For example, the design makes it so difficult to accomplish the maintenance that it isn't completed or sailors are injured while doing the maintenance):
EXAMPLE: DESIGN FACTOR, MAINTAINABILITY. EYE WASH STATION WAS OOC BECAUSE ITS LOCATION PROHIBITED TIMELY PMS.

B. OTHER CAUSES CONSIDERED BUT REJECTED (State each possible cause of damage and injury rejected by the MIB with a short rationale.) EXAMPLE: VISIBILITY DUE TO RAIN SQUALLS CONTRIBUTED TO THE MISHAP. REJECTED BECAUSE WATCH STANDERS VERIFIED VISIBILITY WAS CLEAR THROUGHOUT THE WATCH.

6. RECOMMENDATIONS (State recommendations for changes in procedure, equipment, or training, to prevent the recurrence of the mishap. Include the MIB's recommended action agency for each recommendation and the proposed lessons learned.) EXAMPLE:

A. USS NEVERSAIL:

(1) INSTITUTE OPERATIONAL RISK MANAGEMENT AS A TOOL FOR SAFETY DURING ALL EVOLUTIONS.

(2) CONDUCTED REQUALIFICATION OF BRIDGE/CIC WATCHSTANDERS

B. COMNAVSEASYSCOM: DEVELOP OPTIONS AND PLANS FOR INSTALLATION OF VOICE ACTIVATED RECORDING SYSTEMS FOR VHF-FM RADIOS ON ALL SHIPS.

Appendix A6-F

Sample MIR Inventory Of Evidence

FM: RELEASING COMMAND

TO: MISHAP SHIP(2)
ISIC
OTHER ENDORSERS
COMNAVSEASYSCOM WASHINGTON DC//03L//OOT/03M/03P/03Z//
COMNAVSAFECEN NORFOLK VA//30//054//

UNCLAS FOUO//N05/00//
MSGID/GENADMIN/RELEASING COMMAND//
SUBJ/AFLOAT MISHAP INVESTIGATION REPORT (MIR)INVENTORY OF EVIDENCE//

REF/A/DOC/CNO/19JAN94
REF/B/GENADMIN/RELEASING CMD/DTG OF MIR//

NARR/REF A IS OPNAVINST 5100.19D NAVOSH PROGRAM MANUAL FOR FORCES AFLOAT W/CHANGE 2. REF B IS MISHAP INVESTIGATION REPORT//

RMKS// 1. ACCORDING TO REF A, THE MISHAP INVESTIGATION BOARD CONVENED ON (DATE) AND COMPLETED ITS DELIBRATIONS ON (DATE)

2. THE BOARD CONSIDERED THE EVIDENCE IN PARA 3 AND (NAME OF NAVSAFECEN ADVISOR), MIB NAVSAFECEN ADVISOR, HANDCARRIED THE EVIDENCE TO SAFETY CENTER ON (DATE), OR THE EVIDENCE WAS MAILED TO THE SAFETY CENTER ON (DATE).

3. THE EVIDENCE THE MISHAP INVESTIGATION CONSIDERED INCLUDED:
A. UNCLASSIFIED, NONPRIVILEGED EVIDENCE
(1) COPY OF OPREP-3, DTG
(2) COPY OF NCIS SUMMARY SHEET DTD
B. UNCLASSIFIED, PRIVILEGED EVIDENCE:
(1)MEMORANDUM FOR THE RECORD: SUMMARY OF INTERVIEW OF SHIP'S SAFETY OFFICER DTD
C. CLASSIFIED, NONPRIVILEGED EVIDENCE:
(1) COPY OF CIC SOP
D. CLASSIFIED, PRIVILEGED EVIDENCE:
(1)PHOTOGRAPH AND NEGATIVE OF STAGED INCIDENT IN NUCLEAR REACTOR ROOM//

BT

Appendix A6-G

Sample Message Format
Mishap Investigation Report Endorsements (MIREs)
Report Symbol OPNAV 5102-7A

Use the format and content below for endorsing the mishap investigation report (MIR). Send the endorsement as a naval message.

(Precedence - normally ROUTINE)

FM Endorsing command

TO Subsequent endorsers based on MIR addressees
COMNAVSAFECEN NORFOLK VA//30/054//

INFO NAVSURFWARCEN COASTALSTA PANAMA CITY FL//33// (LCAC ONLY)
CNO WASHINGTON DC//N8/N86D/N871/N885/N889E1/N09/N45//
All previous endorsers and other addresses from the MIR (or previous endorsements)
FOUO //NO5102//DISTRIBUTE ONLY TO THE COMMANDER OR OFFICE CODE(S) FOLLOWING EACH ADDRESSEE.

MSGID/GENADMIN/MSG ORIG/SER NO./MONTH//

SUBJ/PRIVILEGED FIRST/SECOND ENDORSEMENT ON (name of command involved in mishap) AFLOAT MISHAP INVESTIGATION REPORT (MIR) (REPORT SYMBOL OPNAV 5102-7A)//

REF/A/(Include the original MIR and all previous endorsements.)//
REF/B/DOC/CNO/19JAN94//
NARR/REF B IS OPNAVINST 5100.19d, NAVOSH PROGRAM MANUAL FOR FORCES AFLOAT. THIS REPORT IS FOR OFFICIAL USE ONLY. THIS IS A PRIVILEGED, LIMITED USE, CONTROLLED DISTRIBUTION, MISHAP INVESTIGATION REPORT ENDORSEMENT. UNAUTHORIZED DISCLOSURE OF THE INFORMATION IN THIS ENDORSEMENT BY MILITARY PERSONNEL IS A CRIMINAL OFFENSE PUNISHABLE UNDER ARTICLE 92, UNIFORM CODE OF MILITARY JUSTICE. UNAUTHORIZED DISCLOSURE OF THE INFORMATION IN THIS REPORT BY CIVILIAN PERSONNEL WILL SUBJECT THEM TO DISCIPLINARY ACTION UNDER CIVILIAN PERSONNEL INSTRUCTION 752. SEE CHAPTER A6 OF OPNAVINST 5100.19d FOR RESTRICTIONS.//

POC/NAME/RANK/PRIMARY PHONE/PRIMARY FREQ/LOCATION/SECONDARY PHONE/SECONDARY FREQ//

RMKS/1. Brief description of the mishap based on the MIR and previous endorsements. Include a general statement on the MIB findings and previous endorsements.

2. List each probable cause, rejected probable cause, and recommendation from the MIR and previous endorsements, and your agreement or disagreement with each. For each point of disagreement, identify alternative recommendations or actions and recommended action agency. For each recommendation under your cognizance, report the status and/or your plan of action and milestones for accomplishment.

3. Provide any amplifying information, additional comments, or action taken or intended by the endorser concerning the mishap.//

BT

Appendix A6-H

INTERNAL MISHAP/NEAR MISHAP INVESTIGATION REPORT

From: _____ Division Officer

To: Commanding Officer

Via: (1) _____ Department Head
(2) Safety Officer
(3) Executive Officer

Date/Time of Mishap:_____ Mishap Category:_____

Location of Mishap:_____

Brief Description of Mishap (Including extent of injury and property damage):

_____

_____

_____

Work/Task Supervisor (at time of mishap):_____

Witnesses:_____

Photos taken (circle one)? YES NO N/A

Cause of Mishap:

_____

_____

_____

Corrective Action Taken or Recommended:

_____

_____

_____

_____
Signature/Date

_____

1st Endorsement

_____

2nd Endorsement

_____

3rd Endorsement

Does Mishap Meet External Reporting Requirements (circle one)? YES NO

If yes, include the date-time-group of report:

_____

(Attach copy of report)

_____

Safety Officer

RETURN COMPLETED INVESTIGATION REPORT TO SAFETY OFFICER

INSTRUCTIONS FOR FILLING OUT INTERNAL MISHAP/NEAR MISHAP INVESTIGATION REPORT

1. Complete this report within 10 working days of the mishap/near mishap. If the report is not completed in 10 working days, annotate on the report the reason for delay.

2. Mishap category examples are: Collision, Flooding, Grounding, Electric Shock, Deck Seamanship, Man Overboard, Chemical/Toxic Exposure, Heat Injury, Aircraft/Aviation, Material Failure, Machinery Operation, Heavy Weather, Small Boats, Injury, Cargo Handling, Explosion, Ordnance.

3. Location description should be as thorough as possible. Give compartment number and location within compartment, if applicable. Give frame number, deck (or level), and side if topside. Give location on pier, drydock, or building if off ship. A drawing of location may be useful and should be attached, if appropriate.

4. Work/task supervisor is the name of the person who assigned the task or was overseeing the evolution when the mishap occurred. If not applicable, so state.

5. Reviewing officers shall either note the report or provide comments/ direction on the back or on a separate sheet. The completed report will be returned to the safety officer for filing.

Appendix A6-I

SAMPLE MESSAGE FORMAT
MISHAP REPORT (MR)
REPORT SYMBOL OPNAV 5102-6

Use the format and content below to report all reportable mishaps not investigated by an MIB. Submit as much information as is available. Submit supplementary reports as necessary to supply the missing information, when it becomes available. The MR contains privileged information but shall not include the sources of any information.

IF THE REQUESTED DATA DO NOT APPLY, IS NOT RELEVANT TO THE MISHAP, OR IS UNKNOWN, INSERT "NOT APPLICABLE" - "N/A" - or "UNKNOWN" - "UNK," AS APPROPRIATE.

(Precedence - normally ROUTINE)

FM REPORTING ACTIVITY

TO COMNAVSAFECEN NORFOLK VA//30/50/054//
COMNAVSEASYSCOM WASHINGTON DC//PMS377// (LCAC ONLY)

INFO As desired, directed, or requested by higher authority
NAVSURFWARCEN COASTALSTA PANAMA CITY FL//33// (LCAC ONLY)
AIG ONE THREE EIGHT SIX ZERO (LCAC ONLY)
CNO WASHINGTON DC//N86D/N866D// (LCAC ONLY)

FOUO //N05102//

MSGID/GENADMIN/MSG ORIG/SER NO./MONTH//

SUBJ/AFLOAT MISHAP REPORT (MR) (REPORT SYMBOL OPNAV 5102-6)//

REF/A/ (Reference any unit SITREP, CASREP, OPREP 3, concerning the mishap//
USE GENADMIN FORMAT PROCEDURES.

NARR/REF/A/ Is the CASREP concerning this mishap. FOR OFFICIAL USE ONLY. THIS IS A PRIVILEGED, CONTROLLED DISTRIBUTION, SAFETY MISHAP REPORT. UNAUTHORIZED DISCLOSURE OF THE INFORMATION IN THIS REPORT BY MILITARY PERSONNEL IS A CRIMINAL OFFENSE PUNISHABLE UNDER ARTICLE 92, UNIFORM CODE OF MILITARY JUSTICE. UNAUTHORIZED DISCLOSURE OF THE INFORMATION IN THIS REPORT BY CIVILIAN PERSONNEL WILL SUBJECT THEM TO DISCIPLINARY ACTION UNDER CIVILIAN PERSONNEL INSTRUCTION 752. SEE CHAPTER A6 OF OPNAVINST 5100.19D FOR RESTRICTIONS.//

POC/NAME/RANK/PRIMARY PHONE/PRIMARY FREQ/LOCATION/SECONDARY PHONE/SECONDARY FREQ//

RMKS/ALPHA (NON-PRIVILEGED):

1. UICs OF MISHAP COMMANDs

2. HULL NUMBER/SIDE NUMBER

3. TYPE OF MISHAP (For example, flooding, fire, injury, electric shock, collision, grounding, explosion, back injury, chemical or toxic exposure, or equipment damage).

4. LOCAL TIME AND DATE OF MISHAP

5. GEOGRAPHIC LOCATION (Latitude/Longitude or Port If classified, give general area).

6. WEATHER CONDITIONS (For example, temperature, relative humidity, visibility, lighting, ventilation, air quality, wind speed, sea state, current, tide, wind direction, precipitation, lightning, ducting, hurricane, and other).

7. LOCATION WHERE MISHAP OCCURRED (Give workcenter or description of the location. For example, torpedo room; main deck, compartment number, side and frame number, mess decks, flight deck, or 76mm gun magazine).

8. SHIP'S OR CRAFT'S EVOLUTION AT THE TIME OF MISHAP (For example, underway replenishment, mooring, or on-cushion approach to beach).

9. SEA STATE AND DIRECTION (Example: Sea State 3, 340T)

10. SHIP'S EMPLOYMENT (Example: type training (TYT), refit, independent steaming exercises (ISE), maintenance availability, underway, anchored, submerged, or dry-docked).

11. PAYLOAD (Type cargo and load weight) (LCAC ONLY)

BRAVO (NON-PRIVILEGED):

1. EQUIPMENT OR CRAFT DAMAGED OR DESTROYED BY THE MISHAP (If applicable, include EIC, TEC, FGC (functional group code), or NSN (if applicable); describe damage). (Example: Screw damage; ABT OOC)

2. ESTIMATED COST TO REPAIR OR REPLACE DOD PROPERTY (Provide the total dollar value and UIC and name of command having custody of property (if different from reporting activity and RUC (reporting unit code) if USMC equipment is involved). The cost includes $56 for each hour of labor plus the cost of material and equipment).

3. ESTIMATED COST OF NON-DOD PROPERTY DAMAGE

4. NUMBER OF SCHEDULED OPERATING DAYS LOST

CHARLIE (NON-PRIVILEGED):

1. NAME/SSN/AGE/SEX/RACE/ (Repeat items 1 through 8 with designators 1A,1B, etc, if the mishap involves reportable injuries to more than one person.

2. RANK and DESIGNATOR or RATE and NEC, JOB AND EMPLOYMENT STATUS (Examples of employment status include USN, USNR, USNR-R, other Department of Defense personnel, Navy Federal civil servants, contractors, Foreign Military Exchange personnel, and foreign civilians).

3. DUTY STATUS (On- or off-duty) and UIC (if different from reporting activity). (If the mishap involves injuries to people from different commands, specify the UIC of each individual), and RUC (reporting unit code) if Marines are involved). CREW POSITIONS - LCAC ONLY.

4. SPECIFIC JOB OR ACTIVITY INDIVIDUAL ENGAGED IN AT TIME OF MISHAP (For example, conducting planned maintenance (PMS), standing watch, loading stores, training, and boat crew).

5. NUMBER OF MONTHS EXPERIENCE AT THE JOB OR ACTIVITY (in paragraph 4)

6. MEDICAL DIAGNOSIS (Include parts of body and type of injury).

7. EXTENT OF INJURIES AND PROGNOSIS FOR DISABILITY (Specify extent of injuries and outlook; for example, permanent partial disability or no disability likely. See paragraph A0601).

8. ESTIMATE OF LOST TIME

A. TOTAL NUMBER OF DAYS AWAY FROM JOB (Lost work days)/DAYS LOST BEFORE PERMANENT LOSS TO COMMAND (If a loss to command-disposition)

B. DAYS IN HOSPITAL OR SICK BAY

C. DAYS OF LIGHT OR LIMITED DUTY

DELTA: NARRATIVE: (PRIVILEGED - CONTAINS THE COMMAND'S DELIBERATIVE EVALUATION).

1. CHAIN OF EVENTS LEADING UP TO, THROUGH, AND AFTER THE MISHAP (Explain the "<u>who</u>, <u>what,</u> <u>where</u>, <u>why</u>, <u>when</u>, and <u>how</u>" of the mishap. Give the class (A, B, C, or D) of any fires. Include the source and how the fire was extinguished. If a flooding mishap, give the source of the flooding and de-watering technique. If a collision, give estimates of damage and identify ships involved. If a chemical or toxic exposure, try to identify the chemical or material involved, the amount or concentration, and length of exposure. For LCACs, discuss other embarked personnel, injured non-occupants, craft mission and evolution leading to the mishap, and payload involvement. If an electric shock, give the primary and alternate power sources and the voltage (AC or DC). If personal protective equipment (PPE) was required, was it worn? Was it effective? Evaluate the effectiveness of damage control equipment and procedures.

Example: Chain of events leading up to, through, and after mishap: Mishap victim (MV) was conducting touch-up aerosol can spray painting on the overhead when a drop of paint fell into his left eye MV reported to medical where his eye was flushed and eye-drop solution was administered. MV was subsequently released fit for full-duty. Root cause of mishap: Human Factor, unsafe act error. Which one of the causes in paragraph Delta 2 (Causes of the Mishap) is the root (or primary) cause of this mishap.

2. CAUSES OF THE MISHAP (State each cause of damage and injury with a short (less than 100 characters) rationale. The rationale is critical to identifying the cause because it links it to "WHO" and "WHAT" was involved. Causes should be one of the four major categories listed below, with subcategories as listed. Omit those categories and subcategories that don’t

apply and include as many causes in each category you determine apply. In paragraph Delta 1, CHAIN OF EVENTS LEADING UP TO, THROUGH, AND AFTER THE MISHAP, identify which of the cause(s) you determine to be the root or primary causes.

A. HUMAN FACTORS (PERSONNEL ERROR): Consider human involvement in the events leading up to a mishap, actions taken as the mishap is occurring, and actions taken after the mishap occurred. For mishaps involving personnel error, state each cause with a brief explanation in one of the subcategories listed below.

(1) UNSAFE ACTS
(a) ERRORS (Mistakes or unintentional acts):
(b) VIOLATIONS (Deliberate behavior that breaks established rules):

(2) UNSAFE SUPERVISION
(a) INADEQUATE (Unintentional mistakes or failures by supervisors including the supervisor's absence)
(b) VIOLATIONS (Deliberate rule breaking or disregard of authority by supervisors)

(3) UNSAFE CREW CONDITIONS
(a) ADVERSE PHYSIOLOGICAL STATE (For example, physical fatigue, illness, intoxication, and obesity)
(b) ADVERSE MENTAL STATE (For example, overconfidence, complacency, sleep loss, mental fatigue, and stress)
(c) CREW RESOURCE MANAGEMENT (For example, poor team coordination and ineffective communications)

(4) ORGANIZATIONAL INFLUENCE
(a) EXTERNAL (Factors controlled by sources outside the ship)
(b) INTERNAL (Factors controlled by the commanding officer (or below) such as watchbill assignments)

Example: HUMAN FACTOR, UNSAFE ACT, ERROR. MS3 FAILED TO TAG OUT GRIDDLE.

b. PROCEDURAL FACTORS: Consider the possible effect of regulations, operations, and processes from all levels in the chain of command. Remember that a person not following written procedures is a human factor, not a procedural factor.

Procedures and policies published by higher authority such as PMS, technical manuals, Naval Warfare Publications (NWPs), Navy Tactical Publications (NTPs), U.S. Navy Diving Manual, Operational Orders (OPORDs), Ordnance Publications (OPs), the Safe Engineering and Operations of LCAC (SEAOPS) Manual, and the commanding officer's standing orders may contain procedural errors.

(1) TOO COMPLEX (For example, the average sailor can't follow the written procedures because he or she can't understand or follow them):

(2) NOT AVAILABLE (For example, written procedures don't exist or have not been received):

(3) INCORRECT
(a) NOT VALIDATED for ship or equipment

(b) NOT UPDATED (Although the written procedures were correct in the past, modifications or alterations to the ship or equipment require changes to the procedures)

(c) STEP MISSING OR OUT OF SEQUENCE

Example: PROCEDURAL FACTOR, INCORRECT, NOT UPDATED. DUE TO MODIFICATIONS, TECH MANUAL PROCEDURES FOR DISCONNECTING HYDRAULIC HOSES WERE INCORRECT.

c. MATERIAL FACTORS: Consider all material failures and malfunctions thoroughly, despite whether the failures or malfunctions occurred because of normal or abnormal means. This category includes failure due to improper repair or normal wear and tear.

(1) UNAUTHORIZED (For example, alterations made to the ship or equipment without authority):

(2) SAFETIES/GUARDS FAILED:

(3) CONDITION (For example, rust or corrosion):

(4) INAPPROPRIATE FOR USE (For example, off-the-shelf purchases that don't work)

(5) INSTALLATION/REPAIR FAULTY

(6) DEFECTIVE

(7) NORMAL WEAR AND TEAR (Normally, wear and tear is not a reportable mishap. However, the investigation may lead to this cause and is worth reporting).:

Example: MATERIAL/EQUIPMENT FACTOR, SAFETIES/GUARDS FAILED. LUBE OIL RELIEF VALVE FAILED TO OPEN.

d. DESIGN FACTORS: Consider whether a design defect caused the mishap.

(1) HAZARD TO PERSONNEL (For example, anything involving design creating a hazard to personnel):

(2) HAZARD TO EQUIPMENT (For example, design that causes damage to equipment):

(3) MAINTAINABILITY (For example, the design makes it so difficult to accomplish the maintenance that it isn't completed or sailors are injured while doing the maintenance):

Example: DESIGN FACTOR, MAINTAINABILITY. EYE WASH STATION WAS OOC BECAUSE ITS LOCATION PROHIBITED TIMELY PMS.

3 RECOMMENDATIONS OR ACTION TAKEN TO PREVENT RECURRENCE.
Example: MV and Supervisor training held to EMMPHASIZE USE OF MSDS AND CRITICAL SAFETY PRECAUTIONS.
BT

Appendix A6-J

SAMPLE MESSAGE
EXPLOSIVE MISHAP OR CONVENTIONAL ORDNANCE DEFICIENCY REPORT
(REPORT SYMBOL DD-A&T(AR) 1020 (5102)
(For Class B, C, and less severe reportable mishaps)

1. General. Use format and content below for explosive mishap and conventional ordnance deficiency reports. Submit as much information as is available. Submit supplementary reports as necessary to supply the missing information when available. OMIT ITEMS THAT DO NOT APPLY OR ARE NOT RELEVANT TO THE REPORT. Avoid using "unknown" unless you give the reason for not having the information.

2. Content and Format.

(Precedence - normally ROUTINE)

FM REPORTING ACTIVITY

TO AIG--------(See attachment A6-G-1)
CFA (Cognizant Field Activity)

INFO (See attachment A6-G-1)

UNCLAS FOUO //N08020//

MSGID/GENADMIN/MSG ORIG/SER NO./MONTH//

SUBJ/EXPLOSIVE MISHAP REPORT or CONVENTIONAL ORDNANCE DEFICIENCY (REPORT/SYMBOL DD-A&T(AR) 1020 (5102) (MIN: CONSIDERED)//

REF/A/DOC/CNO/19JAN94//

REF/(If this is a follow-up message, include the DTG of all previous reports).//

NARR/REF A IS OPNAVINST 5100.19D, NAVOSH PROGRAM MANUAL FOR FORCES AFLOAT. THIS REPORT IS FOR OFFICIAL USE ONLY. THIS IS A GENERAL USE MISHAP REPORT TO BE USED ONLY FOR SAFETY PURPOSES AS DEFINED IN CHAPTER A6 OF OPNAVINST 5100.19D.//

POC/NAME/RANK/PRIMARY PHONE/PRIMARY FREQ/LOCATION/SECONDARY PHONE/SECONDARY FREQ//

RMKS/PART I
ALPHA:

1. UIC OF REPORTING UNIT (Also list UIC of mishap activity if different from the reporting activity and RUC (reporting unit code) if USMC equipment is involved).

2. REPORT SERIAL NO. (Locally provided sequential number by calendar year).

3. LOCAL TIME AND DATE OF MISHAP OR DEFICIENCY

4. GEOGRAPHIC LOCATION (If classified give general area).

5. LOCATION WHERE OCCURRED (Location on ship or activity where mishap or deficiency occurred).

6. EVOLUTION AT TIME (For example, loading, unloading, handling, UNREP, MISSILEX, GUNEX, or routine maintenance).

7. SHIP STATUS (For example, underway, anchored, or normal in-port workday).

BRAVO: (MATERIAL/PROPERTY DAMAGE)

1. EQUIPMENT DAMAGED OR DESTROYED (Repeat following items for all systems involved).

A. EXPLOSIVE SYSTEMS INVOLVED (Repeat following items for all systems involved).

(1) NAME, MK, MOD, MODEL

(2) EIC, TEC

(3) DODIC or NALC (Mandatory)

(4) NATIONAL STOCK NUMBER

(5) LOT NO.

(6) SERIAL NO.

(7) DESCRIBE DAMAGE

(8) IF DEFECTIVE MATERIAL SUSPECTED, STATE NUMBER OF ITEMS REMAINING IN SAME LOT or BATCH

B. LAUNCH DEVICES (Repeat for all launch devices involved).

(1) NAME, MK, MOD, MODEL

(2) EIC, TEC, FGC (functional group code)

(3) NATIONAL STOCK NUMBER

(4) LOCATION (For example, mount or station).

(5) DESCRIBE DAMAGE

C. ASSOCIATED HARDWARE (For example, work stands, test sets, fuze setters or fire control director. Repeat for all associated hardware).

(1) NAME, MK, MOD, MODEL

(2) EIC, TEC, FGC (functional group code)

(3) NATIONAL STOCK NUMBER

(4) DESCRIBE DAMAGE

D. BULK or BATCH EXPLOSIVE MATERIAL INVOLVED (Normally applies to quantities of materials not specifically identifiable by weapon system).

(1) NAME OF EXPLOSIVES

(2) WEIGHT OF EXPLOSIVES

E. ALL OTHER DEPARTMENT OF DEFENSE PROPERTY

F. NON-DOD PROPERTY

2. ESTIMATED COST TO REPLACE or REPAIR (Provide a total cost to replace all hardware including $56 for each hour of labor. Do not list total cost of item unless it cannot be repaired).

A. EXPLOSIVE SYSTEM

B. LAUNCH DEVICE

C. ASSOCIATED HARDWARE

D. ALL OTHER DEPARTMENT OF DEFENSE PROPERTY

E. NON-DOD PROPERTY

F. TOTAL DOLLAR LOSS (Mandatory - Include in supplementary message if all dollar values not initially available).

CHARLIE: REPORTABLE INJURIES

1. EXTENT OF INJURIES OR OCCUPATIONAL ILLNESS (Specify if permanent partial disability or no disability likely. If the mishap involves more than one person, be specific in paragraph CHARLIE about which person is being described. Repeat items 1 through 8 for each person.

2. NAME/SSN/AGE/SEX/

3. RANK and DESIGNATOR or RATE and NEC, GRADE, JOB TITLE AND EMPLOYMENT STATUS (Examples of employment status include USN, USNR, USNR-R, other Department of Defense personnel, Navy Federal civil servants, contractors, foreign military exchange personnel, and foreign civilians).

4. DUTY STATUS (On- or off-duty) and UIC (if different from reporting activity). (If the mishap involves injuries to people from different commands, specify the UIC of each individual, and RUC (reporting unit code) if Marines are involved).

5. SPECIFIC JOB OR ACTIVITY INDIVIDUAL ENGAGED IN AT TIME OF MISHAP (For example, conducting planned maintenance (PMS), standing watch, handling ammunition, training, and weapons maintenance).

6. NUMBER OF MONTHS EXPERIENCE AT THE JOB OR ACTIVITY (This information is to determine the experience the injured person possessed for the job or activity).

7. MEDICAL DIAGNOSIS (Include part of body and type of injury).

8. ESTIMATE OF LOST TIME

A. TOTAL LOST WORKDAYS AWAY FROM JOB (Actual number of days, including workdays hospitalized).

B. DAYS ACTUALLY HOSPITALIZED (Actual number of days hospitalized, including weekends).

C. DAYS OF LIGHT OR LIMITED DUTY

DELTA: TYPE OF MISHAP

1. DETONATION

2. INADVERTENT LAUNCH

3. MALFUNCTION

4. OBSERVED DEFECT

5. CHEMICAL AGENT RELEASE

6. OTHER

ECHO: NARRATIVE (The chain of events leading up to, through, and subsequent to the mishap or deficiency. State if mishap or deficiency was "induced" (caused by the reporting activity), or "discovered" (not caused by the reporting activity but revealed during inspection or test). Include as much information as possible to provide a clear understanding of exactly what happened or might have happened including suspected or known causes. List secondary cause, if applicable.

FOXTROT: CAUSES

1. CAUSE OF MISHAP or DEFICIENCY (State appropriate type; for example, material failure, improper design, environment, human error, or supervisory error. If material or design, describe how equipment failed. If environment, state if not stored properly, corroded, etc. If human error, supervisory error, or improper procedure, complete items 2 through 4 below).

2. WHAT DID THE PERSON OR PERSONS FAIL TO DO? (For example, correctly operate controls; accomplish planned or corrective maintenance properly; recognize hazardous situations; use proper caution for known risk; use protective clothing or equipment; use proper tool or equipment; plan adequately, supervise progress of work; or other).

3. WHY DID THE PERSON OR PERSONS FAIL TO CARRY OUT ACTION OF PARAGRAPH FOXTROT TWO? (For example, lack of concern or interest; inadequate

supervision, distracted or inattentive; haste, overconfidence; emotionally aroused; inadequate knowledge; insufficient experience; fatigue; alcohol; drugs; illness; misunderstanding; design; or other).

4. WHO CAUSED THE MISHAP?

A. SUPERVISOR, OPERATOR, MAINTENANCE WORKER, OFF-DUTY MILITARY, OTHER, or UNKNOWN

B. RANK and DESIGNATOR, RATE and NEC, or GRADE and JOB TITLE

C. WAS A SUPERVISOR OR SAFETY OBSERVER PRESENT?

D. QUALIFICATION or CERTIFICATION HELD (Enter Yes, No, or Not Required). Indicate if each person involved in the mishap as a cause holds a current qualification or certification based on OPNAVINST 8020.14 or MCO P8020.11 off 1 Oct 1999 (NOTAL).

GOLF: RECOMMENDATIONS and LESSONS LEARNED: Based on the above causes for the mishap or deficiency, give a recommendation on how to avoid future mishaps or deficiencies of the same, or a related, type. If several factors are involved, be sure to list them. Paragraph GOLF is, perhaps, the most important part of the report. If good recommendations are implemented, future mishaps can be prevented. If caused by a material or design defect, suggest changes needed for safer equipment. If caused by personnel or supervisory error, suggest changes in standard operating procedures, if appropriate.

HOTEL: SUPPLEMENTAL DATA

1. TECHNICAL INVESTIGATION (NOT) REQUESTED (Mandatory)

2. ITEM or FRAGMENTS (NOT) AVAILABLE

3. PHOTOGRAPHS (NOT) AVAILABLE

4. SUPPLEMENTARY MSG WILL (NOT) BE SUBMITTED: If the cause, lessons learned, recommendations, or dollar loss of equipment damages are not determined before the initial reporting time requirements, include them and other missing information in a supplementary message.

PART II (Complete only if surface-launched guided missiles are involved)

ALPHA:

In case of misfire or duds, if ready-to-fire light was not illuminated, determine, if possible, which of the following interlocks were <u>not</u> present:

1. LAUNCHER SYSTEM BLAST DOOR CLOSED

2. LAUNCHER SYNC

3. FIRING RAIL LOADED

4. MLC EXTENDED

5. LAUNCHER POINT TO SAFE FIRING ZONE

BRAVO: INTENDED OFF-LOAD DATE OF ITEMS INVOLVED AND ACTIVITY, IF KNOWN//

BT

Appendix A6-K

Addressees of Message Report

a. For handling mishaps, also include appropriate additional addressees from lists headed Shipping Containers and Handling.

b. For all reports affecting research and development, make sure the following information addressees are included:
DEPT OF DEFENSE EXPLOSIVES SAFETY BD ALEXANDRIA VA//DDESB-IK//
CDR AMC ISA ROCK ISLAND IL//AMSMC-SF-P//
NAVORDCEN INDIAN HEAD MD//N71//
HQ AFSC KIRTLAND AFB NM//SEW//
DLA CAMERON STA VA//AQCOI//
* CDRMTMC FALLS CHURCH VA//MTCG//
* COMSC WASHINGTON DC//N00M/N33//
* HQ AMC SCOTT AFB IL//SE//

* - MISHAPS INVOLVING TOMAHAWK MISSILES ONLY

Surface Launched Rockets

TO AIG FOUR ZERO TWO
CFA (Cognizant Field Activity)
INFO COMNAVSURFLANT NORFOLK VA//N6/N82//
COMNAVSURFPAC SAN DIEGO CA//N811/N812/N813//
NAVSURFWARCENDIV INDIAN HEAD MD//044/570//
NAVSURFWARCEN DET LOUISVILLE KY//0671/50//
NAVSURFWARCENDIV CRANE IN//04/20//
MARCORSYSCOM WASHINGTON DC//AM-EES//
WPNSUPPFAC SEAL BEACH CA//04/20//
CDR AMC ISA ROCK ISLAND IL//AMSMC-QAS//
Receiving weapons station (turn-in items only)
Chain of Command

Air Launched Rockets

TO AIG FOUR TWO THREE
AIG SEVEN SIX TWO ZERO
CFA (Cognizant Field Activity)
INFO COMNAVAIRLANT NORFOLK VA//N85//
COMNAVAIRPAC SAN DIEGO CA//N85/N85E//
NAVSURFWARCENDIV INDIAN HEAD MD//044/570//
COMNAVAIRWARCENWPNDIV CHINA LAKE CA//C02A/C02B/C85/C0804//
WPNSUPPFAC SEAL BEACH CA//04/20//
CDR AMC ISA ROCK ISLAND IL//AMSMC-QAS//
Receiving weapons station (turn-in items only)
Chain of Command

Surface Launched Missiles

TO AIG FOUR ZERO TWO
CFA (Cognizant Field Activity)
INFO COMNAVAIRLANT NORFOLK VA//N85//
COMNAVAIRPAC SAN DIEGO CA//N85/N85E/N45//
COMNAVSURFLANT NORFOLK VA//N6/N8//

COMNAVSURFPAC SAN DIEGO CA//N812/N813//
NAVSURFWARCENDIV INDIAN HEAD MD//044/620//
NAVSURFWARCENDIV CRANE IN//20/067//
MARCORSYSCOM WASHINGTON DC//AM-EES//
WPNSTA YORKTOWN VA//04/16/30/20/30/35//
WPNSUPPFAC SEAL BEACH CA//04/20//
WPNSTA CONCORD CA//04/20/30//
NWASTA CORONA CA//QA40//
NAVSURFWARCENDIV PORT HUENEME CA//1G00//
* PEOCMPANDUAV WASHINGTON DC//PMA280/PMA282/PMA2805/PMA2811//
Receiving weapons station (turn-in items only)
Chain of Command
* - MISHAPS INVOLVING TOMAHAWK MISSILES ONLY

Air Launched Missiles
TO AIG FOUR TWO THREE
AIG SEVEN SIX TWO ZERO
CFA (Cognizant Field Activity)
INFO COMNAVAIRLANT NORFOLK VA//N85//
COMNAVAIRPAC SAN DIEGO CA//N85/N85E//
NAVSURFWARCENDIV INDIAN HEAD MD//044/580//
COMNAVAIRWARCENWPNDIV CHINA LAKE CA//C02A/C02B/C84/C0804//
WPNSUPPFAC SEAL BEACH CA//04/20//
* PEOCMPANDUAV WASHINGTON DC//PMA280/PMA282/PMA2805/PMA2811//
NWASTA CORONA CA//QA44//
Receiving weapons station (turn-in items only)
Chain of Command

* - MISHAPS INVOLVING TOMAHAWK MISSILES ONLY

Shipping Containers and Handling for NAVAIR Cognizance Items

TO AIG SEVEN SIX TWO ZERO
CFA (Cognizant Field Activity)

INFO COMNAVAIRLANT NORFOLK VA//N85//
COMNAVAIRPAC SAN DIEGO CA//N85/N85E//
COMNAVSURFLANT NORFOLK VA//N6/N8//
COMNAVSURFPAC SAN DIEGO CA//N42/N422/N814//
NAVSURFWARCENDIV INDIAN HEAD MD//044//
NWASTA CORONA CA//QA40/
NAVAIRWARCENACDIV LAKEHURST NJ//17//
WPNSTA EARLE COLTS NECK NJ//04/20/50//
Receiving weapons station (turn-in items only)
Chain of Command

Gun Ammunition 3-Inch 50 Cal. and Larger

TO AIG FOUR ZERO TWO
CFA (Cognizant Field Activity)

INFO COMNAVSURFLANT NORFOLK VA//N6/N8//
COMNAVSURFPAC SAN DIEGO CA//N432/N814//
COMNAVSEASYSCOM WASHINGTON DC//91W2//
NAVSURFWARCENDIV INDIAN HEAD MD//044/620//
MARCORSYSCOM WASHINGTON DC//AM-EES//

WPNSTA YORKTOWN VA//04/16/20/30/35//
WPNSUPPFAC SEAL BEACH CA//04/20/30//
WPNSTA CONCORD CA//04/20/30//
NAVSURFWARCENDIV CRANE IN//04/R67//
CDR AMC ISA ROCK ISLAND IL//AMSMC-QAS//
Receiving weapons station (turn-in items only)
Chain of Command

Gun Ammunition Smaller than 3-Inch 50 Cal.

TO AIG FOUR ZERO TWO
CFA (Cognizant Field Activity)

INFO COMNAVAIRLANT NORFOLK VA//N85//
COMNAVAIRPAC SAN DIEGO CA//N85/N85E//
COMNAVSURFLANT NORFOLK VA//N6/N8//
COMNAVSURFPAC SAN DIEGO CA//N432/N814//
COMNAVSEASYSCOM WASHINGTON DC//91W2//
NAVSURFWARCENDIV INDIAN HEAD MD//044/610//
NAVSURFWARCEN DET LOUISVILLE KY//0671/50//
COMNAVAIRWARCENWPNDIV CHINA LAKE CA//C02A/C02B/C85/C0804//
MARCORSYSCOM WASHINGTON DC//AM-EES//
WPNSTA YORKTOWN VA//04/16/20/30/35//
WPNSUPPFAC SEAL BEACH CA//04/20//
WPNSTA CONCORD CA//04/20/30//
NAVSURFWARCENDIV CRANE IN//20/067//
CDR AMC ISA ROCK ISLAND IL//AMSMC-QAS//
Receiving weapons station (turn-in items only)
Chain of Command

Free Fall Weapons Excluding Mines and Depth Charges

TO AIG SEVEN SIX TWO ZERO
CFA (Cognizant Field Activity)

INFO COMNAVAIRLANT NORFOLK VA//N85//
COMNAVAIRPAC SAN DIEGO CA//N85/N85E//
COMNAVSURFLANT NORFOLK VA//N6/N8//
COMNAVSURFPAC SAN DIEGO CA//N42/N442/N814//
NAVSURFWARCENDIV INDIAN HEAD MD//044//
COMNAVAIRWARCENWPNDIV CHINA LAKE CA//C02A/C02B/C85/C0804//
CDR AMC ISA ROCK ISLAND IL//AMSMC-QAS//
Receiving weapons station (turn-in items only)
Chain of Command

Small Arms and Landing Force Ammunition

TO AIG FOUR ZERO TWO
CFA (Cognizant Field Activity)
INFO COMNAVSURFLANT NORFOLK VA//N6/N8//
COMNAVSURFPAC SAN DIEGO CA//N42/N4221/N814//
COMNAVSEASYSCOM WASHINGTON DC//91WE//
NAVSURFWARCENDIV INDIAN HEAD MD//044/620//
NAVSURFWARCEN DET LOUISVILLE KY//0671/50//
NAVSURFWARCENDIV CRANE IN//20/067//
WPNSUPPFAC SEAL BEACH CA//04/20//

CDR AMC ISA ROCK ISLAND IL//AMSMC-QAS//
Receiving weapons station (turn-in items only)
Chain of Command

Torpedoes, Sonobuoys, and ASROC

TO AIG FOUR ZERO TWO
AIG FOUR TWO THREE
CFA (Cognizant Field Activity)

INFO COMNAVAIRLANT NORFOLK VA//N85//
COMNAVAIRPAC SAN DIEGO CA//N85/N85E//
COMSUBLANT NORFOLK VA//N7/N42/N43//
COMSUBPAC PEARL HARBOR HI//N7/N42//
COMNAVSURFLANT NORFOLK VA//N6/N8//
COMNAVSURFPAC SAN DIEGO CA//N432/N811//
NAVSURFWARCENDIV INDIAN HEAD MD//044/56//
WPNSTA YORKTOWN VA//04/16/30/20/35//
WPNSUPPFAC SEAL BEACH CA//04/20//
NAVUNSEAWARCENDIV KEYPORT WA//20/30/041/60//
NAVUNSEAWARCENDIV NEWPORT RI//0032/024/81//
NAVSURFWARCENDIV PORT HUENEME CA//1G00//
Receiving weapons station (turn-in items only)
Chain of Command

Demolition Material and Bulk Explosives
and Use of EOD Services

TO AIG FOUR ZERO TWO
CFA (Cognizant Field Activity)

INFO COMNAVSURFLANT NORFOLK VA//N6/N8//
COMNAVSURFPAC SAN DIEGO CA//N30M/N422/N4221/N814//
NAVSURFWARCENDIV INDIAN HEAD MD//044/630//
NAVSURFWARCENDIV CRANE IN//20/067//
WPNSTA YORKTOWN VA//04/16/30/20/35//
CDR AMC ISA ROCK ISLAND IL//AMSMC-QAS//
NAVEODTECHDIV INDIAN HEAD MD//6011//
Receiving weapons station (turn-in items only)
Chain of Command

Pyrotechnics and Chemicals

TO AIG FOUR ZERO TWO
CFA (Cognizant Field Activity)

INFO COMNAVAIRLANT NORFOLK VA//N85//
COMNAVAIRPAC SAN DIEGO CA//N85/N85E//
COMSUBLANT NORFOLK VA//N7/N42/N543//
COMSUBPAC PEARL HARBOR HI//N7/N42//
COMNAVSURFLANT NORFOLK VA//N6/N8//
COMNAVSURFPAC SAN DIEGO CA//N42/N814//
NAVSURFWARCENDIV INDIAN HEAD MD//044/56//
WPNSUPPFAC SEAL BEACH CA//04/20//
NAVSURFWARCENDIV CRANE IN//04/067//
CDR AMC ISA ROCK ISLAND IL//AMSMC-QAS//

Receiving weapons station (turn-in items only)
Chain of Command

Mines and Projector Charges

TO AIG FOUR ZERO TWO
CFA (Cognizant Field Activity)
INFO COMNAVAIRLANT NORFOLK VA//N85//
COMNAVAIRPAC SAN DIEGO CA//N85/N85E//
COMSUBLANT NORFOLK VA//N7/N42/N43//
COMSUBPAC PEARL HARBOR HI//N7/N42//
COMNAVSURFLANT NORFOLK VA//N6/N8//
COMNAVSURFPAC SAN DIEGO CA//N30M/N42/N814//
NAVSURFWARCENDIV INDIAN HEAD MD//044/630//
MARCORSYSCOM WASHINGTON DC//AM-EES//
WPNSUPPFAC SEAL BEACH CA//04/20//
WPNSTA YORKTOWN VA//04/16/20/30/35//
COMNAVAIRWARCENWPNDIV CHINA LAKE CA//C02A/C02B/C85/C0804//
NAVSURFWARCENDIV CRANE IN//20/067/4022/PM416//
COMINEWARCOM CORPUS CHRISTI TX//N3//
Receiving weapons station (turn-in items only)
Chain of Command

Cartridges and Cartridge Activated Devices

TO AIG SEVEN SIX TWO ZERO
CFA (Cognizant Field Activity)

INFO COMNAVAIRLANT NORFOLK VA//N85//
COMNAVAIRPAC SAN DIEGO CA//N85/N85E//
COMNAVSURFLANT NORFOLK VA//N6/N8//
COMNAVSURFPAC SAN DIEGO CA//N30M/N42/N814//
NAVSURFWARCENDIV INDIAN HEAD MD//044/50//
NAVSURFWARCENDIV CRANE IN//20/067/4022/PM416//
WPNSUPPFAC SEAL BEACH CA//04/20//
CDR AMC ISA ROCK ISLAND IL//AMSMC-QAS//
Receiving weapons station (turn-in items only)
Chain of Command

Shipping Containers and Handling for NAVSEA Cognizance Items

TO AIG FOUR ZERO TWO
AIG FOUR TWO THREE
CFA (Cognizant Field Activity)

INFO COMNAVAIRLANT NORFOLK VA//N85//
COMNAVAIRPAC SAN DIEGO CA//N85/N85E//
COMSUBLANT NORFOLK VA//N7/N42/N43//
COMSUBPAC PEARL HARBOR HI//N7/N42//
COMNAVSURFLANT NORFOLK VA//N6/N8//
COMNAVSURFPAC SAN DIEGO CA//N812/N814//
NAVSURFWARCENDIV INDIAN HEAD MD//044//
WPNSTA YORKTOWN VA//04/16/20/30/35///
WPNSUPPFAC SEAL BEACH CA//04/20//

INFO NCCOSC OPSUPCOM SAN DIEGO CA//038//

NAVUNSEAWARCENDIV KEYPORT WA//20/30/041/60//
NAVUNSEAWARCENDIV NEWPORT RI//0032/024/81//
NAVSURFWARCENDIV PORT HUENEME CA//1G00//
Receiving weapons station (turn-in items only)
Chain of Command

Address Indicating Group (AIG) Composition

AIG FOUR ZERO TWO

TO NAVORDCEN INDIAN HEAD MD//044/610//
NAVORDCEN IMSD MECHANICSBURG PA//60//

INFO CMC WASHINGTON DC//ASL301//
CNO WASHINGTON DC//N411E//
COMNAVAIRSYSCOM PATUXENT RIVER MD
COMNAVSEASYSCOM WASHINGTON DC
COMNAVAIRWARCENACDIV PATUXENT RIVER MD//CSDOPR//
COMNAVSAFECEN NORFOLK VA//43//
NAVSURFWARCENDIV DAHLGREN VA//C8105//
NAVAIRWARCENWPNDIV PT MUGU CA//2004/P2632//
COMMARFORLANT//ALD-D//
COMMARFORPAC//ALD-D//
CG FOURTH MAW//ALD-B//
NAVAVSCOLSCOM PENSACOLA FL//155//
SERVSCOLCOM GREAT LAKES IL//42//
FCTCLANT DAM NECK VA//305//

AIG FOUR TWO THREE

TO COMNAVAIRSYSCOM PATUXENT RIVER MD//5166Q//

INFO CNO WASHINGTON DC//N60T//
COMNAVSAFECEN NORFOLK VA//N43//
CG FOURTH MAW//ALD-B//
COMNAVAIRLANT NORFOLK VA//N85//
COMNAVAIRPAC SAN DIEGO CA//913/93//
COMNAVSURFLANT NORFOLK VA//N42//
COMNAVSURFPAC SAN DIEGO CA//N9812/N811//
NAVORDCEN ESSOLANT NORFOLK VA//004//
NAVORDCEN ESSOPAC SAN DIEGO CA//004//
SCOMMARFORLANT//ALD-D//
COMMARFORPAC//ALD-D//
NAVAIRWARCENACDIV LAKEHURST NJ//PM23//
COMNAVRESFOR NEW ORLEANS LA//57//
NAVAIRPRA DET OKINAWA JA//JJJ//
MARCORSYSCOM WASHINGTON DC//AM-EES//
NAVAVNDEPOT CHERRY PT NC//JJJ//
COMNAVAIRWARCENACDIV PATUXENT RIVER MD//SA-55//

AIG SEVEN SIX TWO ZERO

TO COMNAVAIRSYSYSOOM PATUXENT RIVER MD//4101B//
NAVORDCEN IMSD MECHANICSBURG PA//8522//
NAVORDCEN INDIAN HEAD MD//JJJ//

INFO CNO WASHINGTON DC//N411//
CMC WASHINGTON DC//ASL30//
COMNAVSAFECEN NORFOLK VA///43//
COMNAVSEASYSCOM WASHINGTON DC
NAVAIRWARCENACDIV PATUXENT RIVER MD//JJJ//
NAVORDCEN INDIAN HEAD MD//N71//
NAVSURFWARCENDIV DAHLGREN VA//C8105//
NAVAIRWARCENWPNDIV PT MUGU CA//2004//
COMMARFORLANT//ALD-D//
COMMARFORPAC//ALD-D//
CG FOURTH MAW//ALD-B//
NAVAVSCOLSCOM PENSACOLA FL//155//
NAVORDCEN ESSOLANT NORFOLK VA//004//
NAVORDCEN ESSOPAC SAN DIEGO CA//004//
MARCORSYSCOM WASHINGTON DC//AM-EES//
SERVSCOLCOM GREAT LAKES IL//42//
FCTCLANT DAM NECK VA//305//

Appendix A6-L

SAMPLE MESSAGE FORMAT
MOTOR VEHICLE SAFETY REPORT
REPORT SYMBOL OPNAV 5102-4 (MVSR)

1. General

Use the following format and content for reporting personnel injuries and deaths and material (property) damage resulting from motor vehicle mishaps. Submit as much information as you have available in the initial report. Submit supplementary reports to supply missing information. Where requested data do not apply, insert "NOT APPLICABLE." Avoid using "unknown" unless you give the reason for not having the information.

2. Content and Format

(Precedence - normally ROUTINE)

FM ACTIVITY SUBMITTING REPORT

TO COMNAVSAFECEN NORFOLK VA//42/40/50/30B/70/054//

INFO As desired, directed, or required by higher authority

UNCLAS FOUO //N05102//

MSGID/GENADMIN/MSG ORIG/SER NO./MONTH//

SUBJ/MOTOR VEHICLE SAFETY MISHAP REPORT (REPORT SYMBOL OPNAV 5102-4) (MV)//

REF/A/CNO/01MAY91//

REF/B/DOC/CNO/19JAN94//

REF/C/ (If follow-up message, refer to all previous reports).

NARR/REF A IS OPNAVINST 5100.12F, ISSUANCE OF NAVY TRAFFIC SAFETY PROGRAM. REF B IS OPNAVINST 5100.19C, NAVOSH PROGRAM MANUAL FOR FORCES AFLOAT. REF C IS (subject of follow-up message). THIS REPORT IS FOR OFFICIAL USE ONLY. THIS IS TO BE USED ONLY FOR SAFETY PURPOSES PER CHAPTER A6 OF OPNAVINST 5100.19D.//

POC/name/rank/primary phone/-/location/secondary phone//

RMKS/1. PER REFS A AND B, THE FOLLOWING INFORMATION IS SUBMITTED:

A. ALPHA. EVENT DATA:

(1) NAME AND UIC (and RUC (reporting unit code) if Marines are involved) OF REPORTING ACTIVITY

(2) LOCAL DATE, TIME, AND DAY OF WEEK MISHAP OCCURRED

(3) GEOGRAPHIC LOCATION (Include city and state and whether on or off Navy property. If on Navy property, give name and UIC of installation where

mishap occurred. If off base, provide the approximate distance (in miles) from the driver's duty station).

(4) ENVIRONMENTAL CONDITIONS (For example, weather and road conditions).

B. BRAVO: VEHICLE INVOLVEMENT. IDENTIFY ALL VEHICLES (Year, make, model, and whether government or privately owned. For motorcycles, mopeds, and all-terrain vehicles, include model and engine displacement. Was the motorcycle registered for operation on a Navy facility? If so, include the name and UIC of the command).

C. CHARLIE: REPORTABLE OPERATOR INVOLVEMENT. Items C(1)-(6) apply only to motor vehicle operators. If parked vehicle, so state.

(1) IDENTIFY ALL OPERATORS (By name, sex, age, race, and marital status.) State if operator is non-Department of Defense (DoD) civilian. For military and Navy civilian personnel, include duty status; social security number; officer designator; rank, rate, and NEC, or civil service grade and series; and driver's license number and issuing state. If a motorcyclist, indicate whether or not the driver's license was endorsed for motorcycle operation. Include the vehicle involvement (GMV/PMV) for each operator).

(2) NAME AND UIC and RUC (reporting unit code) if Marines are involved) OF DUTY STATION OF OPERATOR(s) (If not the same as the reporting activity).

(3) For military and Navy civilian operators only, give date and type of operator training completed (For example, AAA, MRC-RSS, EVOC, no training received, etc).

(4) DRUG/ALCOHOL/FATIGUE INVOLVEMENT AT TIME OF MISHAP. State specific drug name and whether prescription, non-prescription, or illegal; alcohol involvement and blood alcohol content for each operator; or whether fatigued, asleep, not drinking or taking drugs, or alert.

(5) FOR THE OPERATOR(s) INCLUDE DEGREE OF INJURY: Fatality, injury or no injury. (In fatality cases, include the cause of death. For example, head injury, internal injury, etc. In injury cases, include actual days hospitalized, and actual lost workdays (other than hospital days). If days are unknown, estimate. State if injury will result in a permanent total disability, permanent partial disability, or non-disabling injury. Include type(s) of injury. For example, head injury, internal injury, fractured arm or leg, etc).

(6) INCLUDE SAFETY DEVICES USED BY THE OPERATOR(s) (For example, safety belt, air bag deployed, motorcycle helmet, boots, reflective vest, etc. State if operator was totally ejected from the vehicle or motorcycle, partially ejected, or not ejected. FOR GMV OPERATORS - If a personal injury results from not using or the malfunctioning of a safety belt, explain why safety belts were not used, or in case of malfunction, what caused the malfunction, and what remedial actions have been taken to prevent recurrence).

D. DELTA: REPORTABLE NON-OPERATOR INJURIES. Items D(1)-(5) apply to all reportable "NON-MOTOR VEHICLE OPERATORS" Passengers, pedestrians, joggers, and bicyclists (when struck by a motor vehicle) injured or killed.

(1) IDENTIFY ALL NON-OPERATORS (By name, sex, age, race, and marital status. Also state if the individual is a civilian. For military and Navy civilian personnel give duty status; social security number; officer designator; rank, rate, NEC, or civil service grade and series. Include the vehicle involvement (GMV/PMV) for each person killed or injured. For passengers (vehicle or motorcycle), identify actual position in or on the vehicle. For example, right front passenger, center rear passenger, seated behind operator (motorcycles), etc. For pedestrians, joggers and bicyclists, identify location where struck. For example, in roadway, on shoulder, on sidewalk, etc).

(2) NAME AND THE UIC OF DUTY STATION OF NON-OPERATORS KILLED OR INJURED IF DIFFERENT FROM REPORTING ACTIVITY.

(3) DRUG/ALCOHOL/FATIGUE INVOLVEMENT AT TIME OF MISHAP. State the specific drug name and whether prescription, non-prescription, or illegal; alcohol involvement and blood alcohol content for each non-operator killed or injured; or whether fatigued, asleep, not drinking or taking drugs, alert, etc.

(4) IF GMV MISHAP - PROVIDE THE FOLLOWING INFORMATION FOR EACH NON-OPERATOR INJURED OR KILLED; OR, IF PMV MISHAP - PROVIDE THE FOLLOWING INFORMATION FOR EACH DoD NON-OPERATOR INJURED OR KILLED:

INCLUDE DEGREE OF INJURY: Fatality or injury. (In fatality cases, include the cause of death. For example, head injury, internal injury, etc. In injury cases, include actual days hospitalized, and actual lost workdays (other than hospital days). If days are unknown, estimate. State if injury will result in a permanent total disability, permanent partial disability, or non-disabling injury. Include type(s) of injury, for example, head injury, internal injury, and fractured arm or leg, etc).

(5) FOR EACH PASSENGER KILLED OR INJURED, GIVE SAFETY DEVICES USED (For example, safety belt, air bag deployed, motorcycle helmet, boots, reflective vest, etc. State if passenger was totally ejected from the vehicle or motorcycle, partially ejected, or not ejected). FOR EACH PEDESTRIAN, JOGGER, OR BICYCLIST KILLED OR INJURED, GIVE SAFETY DEVICES USED (For example, light or dark clothing, reflective clothing, bicycle helmet, etc). FOR GMV PASSENGERS - If a personal injury results from not using or the malfunction of a safety belt, explain why safety belts were not used by the injured person, or in cases of malfunction, what caused the malfunction, and what remedial actions have been taken to prevent recurrence).

E. ECHO: PROPERTY DAMAGE

(1) INCLUDE DoD PROPERTY DAMAGE (Government motor vehicle and other DoD property. Cost to repair or replace, and DoD work-hours to repair. If costs are unknown, give estimate).

(2) INCLUDE COST OF NON-DoD PROPERTY DAMAGE WHEN CAUSED BY GMV MISHAP (private vehicles and private property)

F. FOXTROT: 72-HOUR PROFILE. For each motor vehicle mishap involving a Class A or B injury or death include a 72-hour pre-mishap profile on the injured or dead person if that individual had an influence on the mishap occurrence or outcome (not a passive victim). If the person injured or killed was a passenger, provide the 72-hour pre-mishap profile on the driver(s) if military or on-duty civilian. COMNAVSAFECEN may request a 72 hour pre-mishap profile on other selected mishaps. The 72-hour profile includes:

(1) Travel completed during the 72 hours immediately preceding the mishap. Was individual commuting (by vehicle) from duty station to home daily or on weekends more than 100 miles one-way?

(2) Type of work performed and work schedule (hours) for the 72 hours immediately preceding the mishap.

(3) Periods of rest or sleep for 72 hours immediately preceding the mishap.

(4) Medications prescribed and were they taken.

(5) Alcohol and other drugs (prescription, nonprescription, and illegal) taken during the 72 hours immediately preceding the mishap.

(6) General physical condition, including illnesses.

(7) Individual's mental, emotional, and physical state including perceived stress and behavior changes (based on supervisor, next-of-kin (if available), co-workers, and friends.

(8) Other comments the supervisory, next-of-kin, co-workers, and friends wish to make related to the individual's condition or pre-mishap activities.

(9) Other factors prior to the mishap that could have effected the mishap occurrence or its outcome.

(10) Non-judicial punishment (NJP)/Uniform Code of Military Justice NJP/UCMJ record (military only) or any other behavior infractions for the past 3 years.

(11) Driver's experience or knowledge operating this particular type of vehicle.

G. GOLF: NARRATIVE OF THE MISHAP.

(1) Chain of events leading up to, through, and subsequent to the mishap. Elaborate with remarks so the who, what, when, where, how, and why are known. Be specific as to the major cause and contributing causes that lead up to the mishap.

(2) Corrective actions. Identify lessons learned and command follow-up information. Identify specific action(s) taken to prevent similar mishaps from occurring.//
BT

Appendix A6-M

MESSAGE FORMAT
DIVING MISHAP with HYPERBARIC TREATMENT
REPORT SYMBOL OPNAV 5102-5
(For on-duty Class B and C reportable mishaps requiring hyperbaric treatment.)

1. General

Use this format to report Class B or C diving mishaps involving lost-time cases with hyperbaric treatment. Submit as much of the information as available in the initial report. Submit supplementary reports to supply missing information. Where the requested data are not applicable or are not relevant to the analysis of the mishap, insert "Not Applicable" or "N/A." Avoid using "unknown" unless you give the reason for not having the information.

2. Content and Format

(Precedence - normally ROUTINE).

FM REPORTING ACTIVITY

TO COMNAVSAFECEN NORFOLK VA//30/37/054//

INFO COMNAVSEASYSCOM WASHINGTON DC//00C//
NAVXDIVINGU PANAMA CITY FL//01//
NAVMEDRSCHINSTITUTE BETHESDA MD//DBTFA//
BUMED WASHINGTON DC//21//
(Others as desired, directed, or requested, by higher authority)

UNCLAS FOUO //N05102//

MSGID/GENADMIN/MSG ORIG/SER NO./MONTH

SUBJ/DIVING MISHAP REPORT (REPORT SYMBOL 5102-5)//

REF/A/DOC/CNO/22MAR93//
REF/B/DOC/CNO/19JAN94//
REF/C/ (If this is a follow-up message, include the DTGs of all previous reports.)

NARR/REF A IS OPNAVINST 3150.27A, NAVY DIVING PROGRAM. REF B IS OPNAVINST 5100.19D, NAVOSH PROGRAM MANUAL FOR FORCES AFLOAT. THIS REPORT IS FOR OFFICIAL USE ONLY. THIS IS A PRIVILEGED, CONTROLLED DISTRIBUTION, SAFETY MISHAP REPORT. UNAUTHORIZED DISCLOSURE OF THE INFORMATION IN THIS REPORT BY MILITARY PERSONNEL IS A CRIMINAL OFFENSE PUNISHABLE UNDER ARTICLE 92, UNIFORM CODE OF MILITARY JUSTICE. UNAUTHORIZED DISCLOSURE OF THE INFORMATION IN THIS REPORT BY CIVILIAN PERSONNEL WILL SUBJECT THEM TO DISCIPLINARY ACTION UNDER CIVILIAN PERSONNEL INSTRUCTION 752. SEE CHAPTER A6 OF OPNAVINST 5100.19D FOR RESTRICTIONS.//

POC/name/rank/primary phone/-/location/secondary phone//

RMKS/1. PER REFS A AND B, THE FOLLOWING INFORMATION IS SUBMITTED:

A. ALPHA (NON-PRIVILEGED):

(1) UIC OF REPORTING ACTIVITY

(2) TYPE OF MISHAP (For example, hyperbaric treatment).

(3) LOCAL DATE AND TIME OF MISHAP

(4) UIC OF DIVER'S PARENT ACTIVITY

(5) EVOLUTION AT TIME OF MISHAP (Brief scenario of diving operation. If mishap occurred during formal Navy training, include the course identification number (CIN)).

B. BRAVO (NON-PRIVILEGED) DIVE DATA:

(1) DIVING SYSTEM USED (Include type of diving system employed and description of equipment malfunction, if applicable.)

(2) BREATHING GAS PERCENTAGE (For example: 79% N2/21% O2, 100% O2, and 87% HE/13% O2).

(3) LOCAL TIME LEFT SURFACE (Use 24-hour clock. For example, 0630 and 1800).

(4) MAXIMUM DEPTH OF DIVE IN FEET, SALT WATER (FSW)

(5) BOTTOM TIME AND SCHEDULE. IF REPETITIVE DIVE, LIST DEPTHS, BOTTOM TIMES, SURFACE INTERVALS AND SCHEDULES OF ALL DIVES.

(6) LOCAL TIME REACHED SURFACE (Use 24-hour clock. For example, 0800, 0930, and 1500).

(7) AIR TEMP/WATER TEMP/PURPOSE OF DIVE/DIVE PLATFORM

(8) SATURATION DIVE DATA: COMPRESSION RATES TO DEPTHS AS FEET PER MINUTE (FPM) TO FSW (For example, for a 700 FSW dive: 30 FPM TO 100 FSW/20 FPM TO 250 FSW/3 FPM TO 700 FSW)

(A) STORAGE ATMOSPHERE IN FSW

(B) CHAMBER ATMOSPHERE IN OXYGEN PARTIAL PRESSURE (MINIMUM AND MAXIMUM)

(C) MINIMUM EXCURSION DEPTH ATTAINED (IN FSW)

(D) MAXIMUM EXCURSION DEPTH ATTAINED (IN FSW)

C. CHARLIE (NON-PRIVILEGED): REPORTABLE INJURIES

(1) NAME/SSN/NOBC OR NEC/AGE/SEX/RACE/HEIGHT/WEIGHT

(2) RANK or RATE/DESIGNATOR/PAY GRADE/SERVICE and UIC (Include UIC if different from reporting activity and RUC (reporting unit code) if Marines are involved)

(3) ONSET OF SYMPTOMS (month/day/local time/depth) Use two digits for month and day, four digits for time (24-hour clock), and four digits for depth. (For example, 03/10/1525/0025).

(4) TYPE OF SYMPTOMS (For example, gas embolism, DCS Type I, or Type II)

(5) RECOMPRESSION STARTED (month/day/local time) Use two digits for month and day and four digits for time (24-hour clock). (For example, 03/10/1525).

(6) FIRST RELIEF (month/day/local time/depth) Use two digits for month and day, four digits for time (24-hour clock), and four digits for depth. (For example, 03/10/1525/0025).

(7) REACHED MAXIMUM TREATMENT DEPTH (month/day/local time/depth) Use two digits for month and day, four digits for time (24-hour clock), and four digits for depth. (For example, 03/10/1525/0025).

(8) TIME OF COMPLETE RELIEF (month/day/local time/depth) Use two digits for month and day, four digits for time (24-hour clock), and four digits for depth. (For example, 03/10/1525/0025).

(9) TIME LEFT MAX TREATMENT DEPTH (month/day/local time) Use two digits for month and day and four digits for time (24-hour clock). (For example, 03/10/1525).

(10) COMPLETION OF TREATMENT (month/day/local time) Use two digits for month and day and four digits for time (24-hour clock). (For example, 03/10/1525).

(11) RECURRENCE NUMBER (For example, 0 indicates no recurrence and 1 indicates first recurrence.)

(12) TREATMENT TABLE USED (For recurrences, state all tables used.)

(13) DIAGNOSIS

(14) DRUGS USED IN TREATMENT

(15) OXYGEN PARTIAL PRESSURE USED IN TREATMENT IN TENTHS OF ATMOSPHERES (numerically in two digits)

(16) TREATMENT OUTCOME (For example, complete relief, substantial relief, and no relief.)

(17) TREATED BY (For example, MDV, DMO, or DMT)

(18) TOTAL NUMBER OF DAYS AWAY FROM WORK (estimated)

(19) TOTAL NUMBER OF DAYS RESTRICTED FROM DIVING

D. DELTA: CAUSES OF MISHAP (PRIVILEGED - CONTAINS THE COMMAND'S DELIBERATIVE EVALUATION) (State each cause of damage and injury with a short rationale. Causes should be one of the four major categories listed below,

with subcategories as listed. Omit those categories and subcategories that don’t apply and include as many causes in each category you determine apply. In paragraph ECHO, identify which of the causes you determine to be the root (or primary) cause of this mishap).

(1) HUMAN FACTORS (PERSONNEL ERROR): Consider human involvement in the events leading up to a mishap, actions taken as the mishap is occurring, and actions taken after the mishap occurred. For mishaps involving personnel error, state each cause with a brief explanation in one of the subcategories listed below.

(A) UNSAFE ACTS
((1)) ERRORS (MISTAKES OR UNINTENTIONAL ACTS):
((2)) VIOLATIONS (DELIBERATE BEHAVIOR THAT BREAKS ESTABLISHED RULES):

(B) UNSAFE SUPERVISION
((1)) INADEQUATE (Unintentional mistakes or failures by supervisors including the supervisor's absence)
((2)) VIOLATIONS (Deliberate rule breaking or disregard of authority by supervisors)

(C) UNSAFE CREW CONDITIONS
((1)) ADVERSE PHYSIOLOGICAL STATE (For example, physical fatigue, illness, intoxication, and obesity)
((2)) ADVERSE MENTAL STATE (For example, overconfidence, complacency, sleep loss, mental fatigue, and stress)
((3)) CREW RESOURCE MANAGEMENT (For example, poor team coordination and ineffective communications)

(D) ORGANIZATIONAL INFLUENCE
((1)) EXTERNAL (Factors controlled by sources outside the ship)
((2)) INTERNAL (Factors controlled by the commanding officer (or below) such as watchbill assignments)

Example: HUMAN FACTOR, UNSAFE ACT, ERROR. MS3 FAILED TO TAG OUT GRIDDLE.

(2) PROCEDURAL FACTORS: Consider the possible effect of regulations, operations, and processes from all levels in the chain of command. Remember that a person not following written procedures is a human factor, not a procedural factor.

Procedures and policies published by higher authority such as PMS, technical manuals, Naval Warfare Publications (NWPs), Navy Tactical Publications (NTPs), U.S. Navy Diving Manual, Operational Orders (OPORDs), Ordnance Publications (OPs), the Safe Engineering and Operations of LCAC (SEAOPS) Manual, and the commanding officer's standing orders may contain procedural errors.

(A) TOO COMPLEX (For example, the average sailor can't follow the written procedures because he or she can't understand or follow them):

(B) NOT AVAILABLE (For example, written procedures don't exist or have not been received):

(C) INCORRECT

((1)) NOT VALIDATED FOR SHIP OR EQUIPMENT

((2)) NOT UPDATED (Although the written procedures were correct in the past, modifications or alterations to the ship or equipment require changes to the procedures)

((3)) STEP MISSING OR OUT OF SEQUENCE

Example: PROCEDURAL FACTOR, INCORRECT, NOT UPDATED. DUE TO MODIFICATIONS, TECH MANUAL PROCEDURES FOR DISCONNECTING HYDRAULIC HOSES WERE INCORRECT.

(3) MATERIAL FACTORS: Consider all material failures and malfunctions thoroughly, despite whether the failures or malfunctions occurred because of normal or abnormal means. This category includes failure due to improper repair or normal wear and tear.

(A) UNAUTHORIZED (For example, alterations made to the ship or equipment without authority):

(B) SAFETIES/GUARDS FAILED:

(C) CONDITION (For example, rust or corrosion):

(D) INAPPROPRIATE FOR USE (For example, off-the-shelf purchases that don't work)

(E) INSTALLATION/REPAIR FAULTY

(F) DEFECTIVE

(G) NORMAL WEAR AND TEAR (Normally, wear and tear is not a reportable mishap. However, the investigation may lead to this cause and is worth reporting.):

Example: MATERIAL/EQUIPMENT FACTOR, SAFETIES/GUARDS FAILED. LUBE OIL RELIEF VALVE FAILED TO OPEN.

(4) DESIGN FACTORS: Consider whether a design defect caused the mishap.

(A) HAZARD TO PERSONNEL (For example, anything involving design creating a hazard to personnel):

(B) HAZARD TO EQUIPMENT (For example, design that causes damage to equipment):

(C) MAINTAINABILITY (For example, the design makes it so difficult to accomplish the maintenance that it isn't completed or sailors are injured while doing the maintenance):

Example: DESIGN FACTOR, MAINTAINABILITY. EYE WASH STATION WAS OOC BECAUSE ITS LOCATION PROHIBITED TIMELY PMS.

E. ECHO (PRIVILEGED): NARRATIVE (Chain of events leading up to, through, and after the mishap. Explain how each cause in paragraph DELTA contributed to the mishap. Be specific. Identify which of the causes in paragraph DELTA you determine to be the root (or primary) cause of this mishap. Give recommendations and lessons learned. Give recommendations and lessons learned.//

Appendix A6-N

MESSAGE FORMAT
DIVING MISHAP (not requiring hyperbaric treatment)
REPORT SYMBOL OPNAV 5102-5

(For on-duty Class B and C reportable mishaps not requiring hyperbaric treatment.)

1. General

Use this format to report Class B or C diving mishaps involving damage and lost-time cases without hyperbaric treatment. Submit as much of the information as available in the initial report. Submit supplementary reports to supply missing information. Where the requested data are not applicable or are not relevant to the analysis of the mishap, insert "Not Applicable" or "N/A." Avoid using "unknown" unless you give the reason for not having the information.

2. Content and Format

(Precedence - normally ROUTINE).

FM REPORTING ACTIVITY

TO COMNAVSAFECEN NORFOLK VA//30/37/054//

INFO COMNAVSEASYSCOM WASHINGTON DC//00C//
NAVXDIVINGU PANAMA CITY FL//01//
NAVMEDRSCHINSTITUTE BETHESDA MD//DBTFA//
BUMED WASHINGTON DC//21//
(Others as desired, directed, or requested, by higher authority)

UNCLAS FOUO //N05102//

MSGID/GENADMIN/MSG ORIG/SER NO./MONTH

SUBJ/DIVING MISHAP REPORT (REPORT SYMBOL 5102-5)//

REF/A/DOC/CNO/22MAR93//
REF/B/DOC/CNO/19JAN94//
REF/C/ (If this is a follow-up message, include the DTGs of all previous reports.)

NARR/REF A IS OPNAVINST 3150.27A, NAVY DIVING PROGRAM. REF B IS OPNAVINST 5100.19D, NAVOSH PROGRAM MANUAL FOR FORCES AFLOAT. THIS REPORT IS FOR OFFICIAL USE ONLY. THIS IS A PRIVILEGED, CONTROLLED DISTRIBUTION, SAFETY MISHAP REPORT. UNAUTHORIZED DISCLOSURE OF THE INFORMATION IN THIS REPORT BY MILITARY PERSONNEL IS A CRIMINAL OFFENSE PUNISHABLE UNDER ARTICLE 92, UNIFORM CODE OF MILITARY JUSTICE. UNAUTHORIZED DISCLOSURE OF THE INFORMATION IN THIS REPORT BY CIVILIAN PERSONNEL WILL SUBJECT THEM TO DISCIPLINARY ACTION UNDER CIVILIAN PERSONNEL INSTRUCTION 752. SEE CHAPTER A6 OF OPNAVINST 5100.19D FOR RESTRICTIONS.//

POC/name/rank/primary phone/-/location/secondary phone//

RMKS/1. PER REFS A AND B, THE FOLLOWING INFORMATION IS SUBMITTED:

A. ALPHA (NON-PRIVILEGED):

(1) UIC OF REPORTING ACTIVITY

(2) TYPE OF MISHAP (For example, equipment damage or injury involving 5 days (1 day for embarked Marines) or more lost work time.)

(3) LOCAL DATE AND TIME OF MISHAP

(4) UIC OF DIVER'S PARENT ACTIVITY

(5) EVOLUTION AT TIME OF MISHAP (Brief scenario of diving operation. If mishap occurred during formal Navy training, include the course identification number (CIN).)

B. BRAVO (NON-PRIVILEGED) DIVE DATA:

(1) DIVING SYSTEM USED (Include type of diving system employed and description of equipment malfunction, if applicable.)

(2) BREATHING GAS PERCENTAGE (For example: 79% N2/21% O2, 100% O2, and 87% HE/13% O2).

(3) LOCAL TIME LEFT SURFACE (Use 24-hour clock. For example, 0630 and 1800).

(4) MAXIMUM DEPTH OF DIVE IN FEET, SALT WATER (FSW)

(5) BOTTOM TIME AND SCHEDULE. IF REPETITIVE DIVE, LIST DEPTHS, BOTTOM TIMES, SURFACE INTERVALS AND SCHEDULES OF ALL DIVES.

(6) LOCAL TIME REACHED SURFACE (Use 24-hour clock. For example, 0800, 0930, and 1500).

(7) AIR TEMP/WATER TEMP/PURPOSE OF DIVE/DIVE PLATFORM

(8) SATURATION DIVE DATA: COMPRESSION RATES TO DEPTHS AS FEET PER MINUTE (FPM) TO FSW (For example, for a 700 FSW dive: 30 FPM TO 100 FSW/20 FPM TO 250 FSW/3 FPM TO 700 FSW)

(A)STORAGE ATMOSPHERE IN FSW

(B)CHAMBER ATMOSPHERE IN OXYGEN PARTIAL PRESSURE (MINIMUM AND MAXIMUM)

(C) MINIMUM EXCURSION DEPTH ATTAINED (IN FSW)

(D) MAXIMUM EXCURSION DEPTH ATTAINED (IN FSW)

B1. BRAVO (NON-PRIVILEGED) EQUIPMENT DAMAGED, DESTROYED, or LOST:

(1) EQUIPMENT OR CRAFT DAMAGED OR DESTROYED BY THE MISHAP (include EIC, TEC, or NSN if applicable, describe damage)

(2) ESTIMATED COST TO REPAIR OR REPLACE DoD PROPERTY (Provide the total dollar value and UIC and name of command having custody of property (if different from reporting activity and RUC (reporting unit code) if U.S.M.C. equipment is involved). The cost includes $56.00 for each hour of labor plus the cost of material and equipment).

(3) ESTIMATED COST OF NON-DoD PROPERTY DAMAGE

(4) NUMBER OF OPERATING DAYS LOST

C. CHARLIE (NON-PRIVILEGED): REPORTABLE INJURIES

(1) NAME/SSN/NOBC OR NEC/AGE/SEX/RACE/HEIGHT/WEIGHT

(2) RANK or RATE/DESIGNATOR/PAY GRADE/SERVICE and UIC (Include UIC if different from reporting activity)

(3) ONSET OF SYMPTOMS (month/day/local time/depth) Use two digits for month and day, four digits for time (24 hour clock), and four digits for depth. (For example, 03/10/1525/0025).

(4) TYPE OF SYMPTOMS

(5) through (12) Not applicable

(6) DIAGNOSIS

(7) MEDICAL TREATMENT

(8) Not applicable

(9) TREATMENT OUTCOME

(10) TREATED BY (For example, MDV, DMO, or DMT)

(11) TOTAL NUMBER OF DAYS AWAY FROM WORK (estimated)

(12) TOTAL NUMBER OF DAYS RESTRICTED FROM DIVING

D. DELTA: CAUSES OF MISHAP (PRIVILEGED - CONTAINS THE COMMAND'S DELIBERATIVE EVALUATION) (State each cause of damage and injury with a short rationale. Causes should be one of the four major categories listed below, with subcategories as listed. Omit those categories and subcategories that don’t apply and include as many causes in each category you determine apply. In paragraph ECHO, identify which of the causes you determine to be the root (or primary) cause of this mishap.)

(1) HUMAN FACTORS (PERSONNEL ERROR): Consider human involvement in the events leading up to a mishap, actions taken as the mishap is occurring, and actions taken after the mishap occurred. For mishaps involving personnel error, state each cause with a brief explanation in one of the subcategories listed below.

(A) UNSAFE ACTS
((1)) ERRORS (MISTAKES OR UNINTENTIONAL ACTS):

((2)) VIOLATIONS (DELIBERATE BEHAVIOR THAT BREAKS ESTABLISHED RULES):

(B) UNSAFE SUPERVISION

((1)) INADEQUATE (Unintentional mistakes or failures by supervisors including the supervisor's absence)

((2)) VIOLATIONS (Deliberate rule breaking or disregard of authority by supervisors)

(C) UNSAFE CREW CONDITIONS

((1)) ADVERSE PHYSIOLOGICAL STATE (For example, physical fatigue, illness, intoxication, and obesity)

((2)) ADVERSE MENTAL STATE (For example, overconfidence, complacency, sleep loss, mental fatigue, and stress)

((3)) CREW RESOURCE MANAGEMENT (For example, poor team coordination and ineffective communications)

(D) ORGANIZATIONAL INFLUENCE

((1)) EXTERNAL (FACTORS CONTROLLED BY SOURCES OUTSIDE THE SHIP)

((2)) INTERNAL (FACTORS CONTROLLED BY THE COMMANDING OFFICER SUCH AS WATCHBILL ASSIGNMENTS)

Example: HUMAN FACTOR, UNSAFE ACT, ERROR. MS3 FAILED TO TAG OUT GRIDDLE.

(2) PROCEDURAL FACTORS: Consider the possible effect of regulations, operations, and processes from all levels in the chain of command. Remember that a person not following written procedures is a human factor, not a procedural factor.

Procedures and policies published by higher authority such as PMS, technical manuals, Naval Warfare Publications (NWPs), Navy Tactical Publications (NTPs), U.S. Navy Diving Manual, Operational Orders (OPORDs), Ordnance Publications (OPs), the Safe Engineering and Operations of LCAC (SEAOPS) Manual, and the commanding officer's standing orders may contain procedural errors.

(A) TOO COMPLEX (For example, the average sailor can't follow the written procedures because he or she can't understand or follow them):

(B) NOT AVAILABLE (For example, written procedures don't exist or have not been received):

(C) INCORRECT

((1)) NOT VALIDATED FOR SHIP OR EQUIPMENT

((2)) NOT UPDATED (Although the written procedures were correct in the past, modifications or alterations to the ship or equipment require changes to the procedures)

((3)) STEP MISSING OR OUT OF SEQUENCE

Example: PROCEDURAL FACTOR, INCORRECT, NOT UPDATED. DUE TO MODIFICATIONS, TECH MANUAL PROCEDURES FOR DISCONNECTING HYDRAULIC HOSES WERE INCORRECT.

(3) MATERIAL FACTORS: Consider all material failures and malfunctions thoroughly, despite whether the failures or malfunctions occurred because of

normal or abnormal means. This category includes failure due to improper repair or normal wear and tear.

(A) UNAUTHORIZED (For example, alterations made to the ship or equipment without authority):

(B) SAFETIES/GUARDS FAILED:

(C) CONDITION (For example, rust or corrosion):

(D) INAPPROPRIATE FOR USE (For example, off-the-shelf purchases that don't work)

(E) INSTALLATION/REPAIR FAULTY

(F) DEFECTIVE

(G) NORMAL WEAR AND TEAR (Normally, wear and tear is not a reportable mishap. However, the investigation may lead to this cause and is worth reporting.):

Example: MATERIAL/EQUIPMENT FACTOR, SAFETIES/GUARDS FAILED. LUBE OIL RELIEF VALVE FAILED TO OPEN.

(4) DESIGN FACTORS: Consider whether a design defect caused the mishap.

(A) HAZARD TO PERSONNEL (For example, anything involving design creating a hazard to personnel):

(B) HAZARD TO EQUIPMENT (For example, design that causes damage to equipment):

(C) MAINTAINABILITY (For example, the design makes it so difficult to accomplish the maintenance that it isn't completed or sailors are injured while doing the maintenance):

Example: DESIGN FACTOR, MAINTAINABILITY. EYE WASH STATION WAS OOC BECAUSE ITS LOCATION PROHIBITED TIMELY PMS.

E. ECHO (PRIVILEGED): NARRATIVE (Chain of events leading up to, through, and after the mishap. Be specific. Identify which of the causes in paragraph DELTA you determine to be the root (or primary) cause of this mishap. Give recommendations and lessons learned.//
BT

Appendix A6-O

SAMPLE MESSAGE FORMAT
OFF-DUTY RECREATION, ATHLETICS AND HOME SAFETY (RAHS) MISHAP REPORT
REPORT SYMBOL OPNAV 5102-10

1. General

Use the format shown below for reporting off-duty recreation, athletic and home injuries and deaths. Submit as much of the information as you have available. Submit follow-up reports to provide the missing information. OMIT ITEMS THAT DO NOT APPLY OR ARE NOT RELEVANT TO THE MISHAP. Avoid using "unknown" unless you give the reason for not having the information.

2. Content and Format

(Precedence - normally ROUTINE)

FM REPORTING ACTIVITY

TO COMNAVSAFECEN NORFOLK VA//46/30B/70/054//

INFO As desired, directed, or requested by higher authority

UNCLAS FOUO //N05102// (Or appropriate classification as necessary)

MSGID/GENADMIN/MSG ORIG/SER NO./MONTH//

SUBJ/OFF-DUTY MISHAP REPORT (REPORT SYMBOL OPNAV 5102-10)//

REF/A/DOC/OPNAV/25SEP90//
REF/B/DOC/OPNAV/19JAN94//
REF/C/(If this is a follow-up message, include the DTG of previous reports)

NARR/REF A IS OPNAVINST 5100.25A, NAVY RECREATION, ATHLETICS, AND HOME SAFETY PROGRAM. REF B IS OPNAVINST 5100.19D, NAVOSH PROGRAM MANUAL FOR FORCES AFLOAT. THIS REPORT IS FOR OFFICIAL USE ONLY. THIS IS TO BE USED ONLY FOR SAFETY PURPOSES PER CHAPTER A6 OF OPNAVINST 5100.19D//

POC/name/rank/primary phone/-/location/secondary phone//

RMKS/1. PER REFS A AND B, THE FOLLOWING INFORMATION IS SUBMITTED:

A. ALPHA:

(1) UIC OF REPORTING ACTIVITY

(2) LOCAL DTG OF MISHAP

(3) GEOGRAPHIC LOCATION (Include city and state and indicate if on- or off-base).

(4) LOCATION WHERE MISHAP OCCURRED (For example, home, ball field, or lake. Indicate if MWR facility).

B. BRAVO: REPORTABLE INJURIES

(1) NAME/SSN/AGE/SEX/RACE (If more than one person is injured, information in this section must be specific as to which individual is being described. Repeat items (1) through (8) for each individual).

(2) UIC of injured person's command

(3) RANK and DESIGNATOR, or RATE and NEC, JOB and EMPLOYMENT STATUS (Examples of employment status include USN, USNR, USNR-R, Navy dependent, or other special case).

(4) SPECIFIC ACTIVITY INDIVIDUAL ENGAGED IN AT TIME OF MISHAP (For example, woodworking, swimming, and engine tune-up)

(5) EXPERIENCE AT ACTIVITY

(A) NUMBER OF MONTHS EXPERIENCE

(B) QUALIFICATION/TRAINING (For a swimming mishap, include swimmer classification; for a diving mishap, include scuba diving certification, if applicable; for boating or hunting mishap, include completion of safe boating or hunting course.

(6) MEDICAL DIAGNOSIS (Include parts of body and type of injuries).

(7) FATALITY OR EXTENT OF INJURIES (Specify fatality, missing, permanent total disability, permanent partial disability, or no disability likely).

(8) ESTIMATE OF LOST TIME

(A) TOTAL LOST TIME (IN DAYS) AWAY FROM WORK (Include the actual number of regular workdays, including days hospitalized).

(B) DAYS ACTUALLY HOSPITALIZED (Actual number of days spent in the hospital, including weekends).

(C) DAYS OF LIGHT OR LIMITED DUTY

C. CHARLIE: CAUSE OF MISHAP

(1) Personnel error, material failure, environmental extremes, inadequate procedure/precaution.

(2) IMMEDIATE OR DIRECT CAUSE(S) OF MISHAP (For example, using defective/incorrect tools; working without safety guard; repairing equipment while energized; assuming unsafe posture; violating safe sport practices; equipment malfunction; unsafe walking or recreation surface; warnings inadequate or not posted; inadequate illumination or rough water. Cite safety standard or regulation violated, if appropriate).

(3) IF PERSONNEL ERROR, STATE CONTRIBUTING CAUSE(S) (For example, distraction or inattention, fatigue, haste, improper attitude or motivation, inexperience, lack of skill, inadequate physical conditioning, alcohol or drugs. Indicate blood alcohol or drug content when available).

(4) IF UNSAFE CONDITION, STATE CONTRIBUTING CAUSE(S) (For example, poor housekeeping, insufficient maintenance, defective design, overloaded boat, other - specify).

(5) PERSONAL PROTECTIVE CLOTHING or EQUIPMENT (State if required. Specify if available, used, effective, or misused. For example, Type III personal flotation device, ANSI-approved bicycle helmet, and AARA-approved sports goggles).

(6) 72-HOUR PRE-MISHAP PROFILE (Required for all Class A or B mishaps if the injured or dead off-duty military person had influence on the occurrence or outcome of the mishap (was not a passive victim)). Include the following information for that person:

(A) Leave or liberty status for the 72 hours immediately preceding the mishap.

(B) Type of work performed and work schedule (hours) for the 72 hours immediately preceding the mishap.

(C) Periods of rest and sleep for the 72 hours immediately preceding the mishap.

(D) Travel and recreational activities for the 72 hours immediately preceding the mishap.

(E) Medications prescribed and whether they were taken.

(F) Alcohol and other drugs (prescription, nonprescription, and illegal) taken during the 72 hours immediately preceding the mishap.

(G) General physical condition, including illnesses.

(H) Individual's mental, emotional, and physical state including perceived stress and behavior changes (based on supervisor, next-of-kin (if available), co-workers, and friends.

(I) Other comments the supervisor, next-of-kin, co-workers, and friends wish to make related to the individual's condition or pre-mishap activities.

(J) Other factors prior to the mishap that could have affected the mishap occurrence or its outcome.

(K) Non-judicial punishment (NJP)/Uniform Code of Military Justice (UCMJ) record (military only) or other behavior infraction for the past 3 years.

D. DELTA: NARRATIVE

(1) Chain of events leading up to, through, and subsequent to mishap. (Elaborate with remarks so the reader can determine the who, what, where, when and how of the mishap. Be specific. For swimming and boating mishaps, give the air and water temperature, wave height, wind speed, swimmer's qualification, and type of personal floatation device worn. For injuries associated with softball bases, state type (stationary, tie-down, or

breakaway). For bicycle injuries, specify if bicycle helmet was worn or not. For basketball injuries, include type of shoes worn and if ankle tape or supports were used).

(2) Corrective Actions/Lesson Learned or Recommendations
Specify actions taken to prevent similar mishaps from occurring in future.//
BT

SECTION B

MAJOR HAZARD-SPECIFIC PROGRAMS

This section outlines NAVOSH programs which address specific hazards such as asbestos control, heat stress, radiation protection, electrical safety, hazardous material control management, and gas free engineering as well as the tag-out program and personal protective equipment. The objective of this section is to reduce to a manageable degree, the basic NAVOSH management requirements applicable to shipboard personnel. This section is addressed to personnel who would assist the commanding officer in program management (e.g., safety officer, electrical safety officer, gas free engineer, HM coordinator, and medical department representative).

To execute these programs, it may be necessary to consult other Navy publications such as the Naval Ships Technical Manual (NSTM), General Specifications for Ships, technical/operating manuals, and equipment Planned Maintenance Systems (PMS) cards for complete safety precautions.

It must be recognized that there may be conditions that are not covered in this manual. If a NAVOSH standard does not exist, the Type Commander shall be notified via the chain of command. The Type Commander will determine, considering the chain of command input, if there is an applicable OSHA standard and how the OSHA standard shall apply considering if there are military unique requirements/design configurations that prevent compliance with the OSHA standard. The Type Commander or other commanders in the chain of command, if sufficiently knowledgeable, shall provide guidance to all ships under their command as to the standards to be followed.

CHAPTER B1

ASBESTOS CONTROL

B0101. CHAPTER ORGANIZATION

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

b. All U.S. Navy ships are required to have an asbestos control plan per B0102. The scope, requirement and responsibilities for each ship's plan are determined by the type of asbestos work that each ship's personnel are permitted to perform. The type of work performed, and therefore, the type of asbestos control plan required, is based on:

(1) The type of asbestos-containing materials (ACM) present aboard the ship (see B0103e(1) - (2))

(2) Whether the ship has a mission to provide asbestos repair and/or removal services to other afloat commands.

c. 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.

d. 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 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 control 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 (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 - either the protocol for Emergency Asbestos Response Team (EART) (paragraphs B0105b and B0108) or Intermediate Maintenance Activity (IMA) (paragraphs B0105c and B0109). No afloat command will be required to implement all three asbestos work protocols.

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, 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"**.

d. Any ship having Intermediate Maintenance Activity (IMA) capabilities and an embarked IHO is authorized to have its qualified personnel remove unlimited amounts of ACM, onboard or aboard other ships for which it is responsible to provide maintenance support. Repair and removal operations conducted at sea, >3nm of shore are not subject to Environmental Protection Agency (EPA) emission standards for asbestos. However, EPA standards for disposal of ACM apply upon return to port (B0104f). Any ship so capable (designated) shall implement and maintain both the ship's force (B0107) and (B0109) IMA asbestos control protocols.

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.

BO104. 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.

(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 such documentation is unavailable, unreliable, or questionable, a sample of the insulation material shall be obtained following the procedures of appendix 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 reliable documentation addressed in the preceding paragraph. Ships having asbestos identification capability can provide this laboratory service, to positively identify suspected asbestos-containing materials. 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. **Control 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, appendix B1-C for Emergency Asbestos Response Team, and appendix B1-D for IMAs).

(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 SOPs for EART work processes

(3) Appendix B1-D covers operating procedures for the IMA 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 (i.e. Garlock sheets) in double, heavy-duty (6 mil 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 (6 mil 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 OPNAVINST 5090.1B, appendix L.

e. **Asbestos Medical Surveillance Program (AMSP)**. The medical department representative (MDR) will determine placement of personnel into the AMSP per reference B1-4. 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-E

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

(c) Training matrix for IMAs is appendix B1-G

(2) In addition to the training requirements detailed in the specific protocols (B0107c, B0108c and B0109d), 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. Training should be conducted by the workcenter supervisor upon assignment. 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 which 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

(i) Posting signs and affixing labels.

(3) **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 B1-4 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.

(4) Training materials are available through NAVOSHENVTRACEN at www.norva.navy.mil/navosh.

B0105. TYPES OF ASBESTOS WORK PERFORMED ABOARD NAVY SHIPS

For the purposes of this chapter, all work involving ACM has been divided into three 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 3 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)).

c. **Intermediate Maintenance Activity Protocol**. This protocol details the requirements and procedures for major asbestos removals and repairs by ships having IMA capabilities and an embarked IHO assigned. Major asbestos removals and repairs are defined as any asbestos work that cannot be accomplished using a single glove bag (B0109). An IMA capable ship, with an embarked IHO, will not be required to maintain an EART.

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-H 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 (9 ft^2 maximum)

(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-I and appendix B1-J detail the personal protective equipment (PPE) and authorized equipage 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 B0104d(2) and appendix B1-B and properly stored while awaiting disposal ashore (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 B1-4 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-H. 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 B0109 and appendix B1-E.

(5) **Workcenter supervisors shall** train all hands who work in areas where asbestos-containing materials are present to recognize and report damaged ACM. Training materials are available through NAVOSHENVTRACEN at www.norva.navy.mil/navosh.

(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**

(1) 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.

(2) Training materials are available through NAVOSHENVTRACEN at www.norva.navy.mil/navosh.

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-I. A detailed list of all engineering equipment (AEL) is found in appendix B1-J.

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

BO108. 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 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 B01O2c NOTE

NOTE:

A ship that is designated as an IMA with asbestos removal capabilities, and an embarked IHO does not need to maintain an EART.

(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 (B0108b through B0108f).

(4) The EART may perform:

(a) All work described in the protocol for ship's force per BO107.

(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 3 linear feet of pipe insulation or less than 1 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-J.

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

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

(a) Ensure that a qualified 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-K.

(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-F.

(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 B0102.

(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-L).

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

c. **Training**

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

(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-K. A list of equipment and tools can be found in appendix B1-J.

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 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 B1-4, a list of EART personnel shall be submitted to the medical department for consideration for entry into the command's AMSP.

B0109. PROTOCOL FOR INTERMEDIATE MAINTENANCE ACTIVITY (IMA) ASBESTOS MAINTENANCE/REPAIR

a. This protocol details the requirements and procedures for major asbestos removals and repairs. Major asbestos removals and repairs are defined as any asbestos work that cannot be accomplished using a single glove bag. Work under this protocol will be accomplished by afloat commands that have been designated as an IMA, with an embarked IHO. Shore IMA facilities, and in some situations, private contractors, may be used to conduct asbestos insulation removal.

NOTE:

Do not use this protocol for IMAs without an embarked IHO

Work under this protocol may include:

(1) Any work described in the ship's force protocol (B0107)

(2) The removal and repair of unlimited quantities of ACM

(3) Work under this protocol will be performed using the provisions in appendix B1-D.

b. **Asbestos Control Plan Responsibilities**

(1) **The IHO shall:**

(a) Inspect each area where a repair or replacement operation involving friable asbestos is scheduled.

(b) When asbestos removal or repair operations are completed, approve access to work area using appendix B1-H.

(c) If asbestos work is scheduled to be provided to another afloat command, initiate, organize and participate in the pre-work brief, per B0102. The pre-work brief, located in appendix B1-L, may be used for this purpose.

(d) Provide area clearance air sampling and analysis, as well as asbestos identification for the ship and tended units per reference B1-1.

(e) Ensure that individual(s) trained to analyze bulk and air samples participate and are rated "proficient" in the NIOSH Proficiency Analytical Testing (PAT) program for asbestos air samples and the Navy's Research Triangle Institute (RTI) program for asbestos bulk identification.

(f) Maintain records and appropriate logs of asbestos air sampling, asbestos identification, equipment calibration and analysis per reference B1-5.

(g) Follow the guidance of appendix B1-D for defining (PPE) and engineering controls during asbestos removal operations. A summary of PPE required is provided in appendix B1-M. A detailed list of all equipment can be found in appendix B1-J.

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

(a) Provide personnel who work with asbestos, per this protocol, with the necessary equipment and protective clothing, per Appendices B1-D and B1-M.

(b) Identify and provide a list of all personnel involved in asbestos operations to the MDR for consideration for entry into the AMSP. Ensure personnel report for medical examinations as required.

(c) Ensure that all asbestos-containing waste materials are collected, stowed and disposed of as required by paragraph B0104d(2) and appendix B1-D and chapter B3.

(d) Ensure personnel are trained, and training is properly documented in the member's service record. Detailed training requirements for this protocol can be found in appendix B1-G.

(3) **The MDR shall:**

(a) Implement an AMSP, per reference B1-4.

(b) Provide training on the health and medical effects of asbestos, upon request. Training materials are available through NAVOSHENVTRACEN at www.norva.navy.mil/navosh.

c. **Asbestos Pre-Work Brief**

(1) Except for the afloat IMA, all other afloat commands are prohibited from conducting the removal and/or repair of unlimited quantities of ACM. Therefore, it is necessary that the afloat IMA provide services to other afloat commands who, under operational emergencies, require immediate repair or removal of ACM that is beyond the scope of their specific asbestos work protocol.

(2) Afloat commands that have been designated as IMAs, with an embarked IHO, will, from time-to-time, be asked to provide asbestos repair and/or removal services to other afloat commands. Prior to conducting asbestos operations onboard another ship, the IMA will conduct an asbestos pre-work brief with the receiving ship's engineering officer, safety officer, medical officer, division officer and the LPO of the space where the work will take place.

(3) A sample pre-work brief appears in appendix B1-L. The pre-work brief shall be signed by the engineer officer/repair department head from the ship receiving asbestos services, as well as by the IMA IHO. The completed and signed form shall be retained at the IMA.

d. **Training**

(1) All members of the IMA asbestos removal team shall be graduates of Asbestos Supervisor/Worker (CIN A-493-0069) prior to or at the time of their initial assignment. They shall attend Asbestos Supervisor/Worker Refresher (CIN A–493-0070) annually thereafter (See appendix B1-G).

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

e. **Personal Protective Equipment**. Personnel engaged in handling asbestos-containing material shall wear the provided protective clothing discussed in appendices B1-D and B1-M. A detailed list of all equipment and tools for work under this protocol can be found in appendix B1-J.

f. **Disposal of Asbestos Waste**. Dispose of asbestos waste per B0104d(2), appendix B1-D, and chapter B3.

g. **Medical Surveillance Requirements**. All designated IMA personnel will be enrolled in the command's AMSP per reference B1-4.

CHAPTER B1

REFERENCES

B1-1 Naval Ship's Technical Manual, chapter 635, Thermal Insulation (NOTAL)

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

B1-3 Title 29 Code of Federal Regulations (CFR) section 1910.1001 (As amended), NOTAL (Not required on board ship, but a pertinent reference) (NOTAL)

B1-4 NEHC Technical Manual, Medical Surveillance Procedures Manual and Medical Matrix (NOTAL)

B1-5 NEHC Technical Manual, Industrial Hygiene Field Operations Manual (NOTAL)

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 Hospital or Naval Medical Clinic, or to the IHO/safety officer aboard a tender or repair ship 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 4 by 4-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 4 by 4-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 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 B1-5.

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 and label as asbestos-containing material until needed for repair/replacement per B0104d(1). Similarly stow waste asbestos-containing materials for shore offload. Post storage areas with asbestos warning signs to advise personnel of asbestos presence per 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-E. Training shall be accomplished as follows:

For ships with no Emergency Asbestos Response Team (EART) or Intermediate Maintenance Activity (IMA), 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 engineer 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 SOPs in this appendix.

For ships with an IMA, this training shall be accomplished by the safety officer or engineering officer, or a member of the IMA that has successfully completed "Asbestos Supervisor/Worker", A-493-0069. This will be 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 9 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 and label as asbestos-containing material until needed for repair/replacement (see B0104d(1)). Post storage areas with asbestos warning signs to advise personnel of the presence of asbestos per 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 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 or IMA, 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 engineer 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 SOPs in this appendix.

For ships with an IMA, this training shall be accomplished by the safety officer or engineering officer, or a member of the IMA that has successfully completed "Asbestos Supervisor/Worker", A-493-0069. This will be 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 and label as ACM until needed for repair/replacement. 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 facepiece 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-H 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 or IMA, 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 engineer 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 SOPs in this appendix.

For ships with an IMA, this training shall be accomplished by the safety officer or engineering officer, or a member of the IMA that has successfully completed "Asbestos Supervisor/Worker", A-493-0069. This will be 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 face piece, 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 latex 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 2-day Shipboard Asbestos Response (A-760-2166) or Asbestos Supervisor/ Worker (A-493-0069) 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

STANDARD OPERATING PROCEDURES FOR THE INTERMEDIATE MAINTENANCE ACTIVITY ASBESTOS WORK PROTOCOL

This standard operating procedure (SOP) for the IMA is generated from the Asbestos Supervisor/Worker Course (CIN: A-493-0069).

1. **General**

This SOP covers large-scale repair and removal of Thermal System Insulation (TSI), surfacing Asbestos Containing Materials (ACM), or Presumed Asbestos Containing Materials (PACM) inside a negative pressure enclosure (NPE).

2. **Tools, Equipment and Materials**

a. **Personal Protective Equipment (PPE)**:

(1) Disposable impermeable coveralls (Tyvek® 1422A or equivalent), with integral head and foot coverings

(2) Rubber outer gloves and inner cotton gloves

(3) Cloth work coveralls may be worn under disposable coveralls during operations conducted in low temperatures

(4) Non-slip rubber overshoes.

(5) Respirator requirements shall be determined by the Respiratory Protection Manager (RPM). Minimum required respiratory protection shall consist of a half mask, negative pressure respirator equipped with HEPA (P100) cartridges.

NOTE:

The new OSHA Respiratory Protection Standard designates HEPA-equivalent cartridges as P100.

Detailed information regarding PPE required for this work is found in appendix B1-J.

b. **Ventilation**. HEPA filtered exhaust (local or general area) sufficient to place the NPE under at least - 0.02 inches of water (as measured on a magnehelic gauge) and at least four air changes per hour. The number of negative air machines required to meet this requirement is dependent upon the volume of the NPE.

c. **Tools and Equipment**:

(1) Spray bottle and/or other dispensing devices with amended water

(2) Smoke generator or smoke tubes for small enclosures, to test the integrity of the NPE

(3) Asbestos warning signs

(4) Asbestos labels

(5) Approved, HEPA filtered vacuum cleaners labeled "Asbestos Use Only"

(6) Impermeable asbestos waste bags at least 6 mil thick

(7) Duct tape or equivalent

(8) Varying amounts of 6-mil sheet poly material.

d. **Forms**:

(1) Asbestos Regulated Area Sign -In/Out Log

(2) Qualified persons training certificate

(3) Supervisors Certification of Cleanup Following Work

(4) Bridging encapsulant, if necessary.

3. Prerequisite Tasks. Prior to beginning the work covered by this SOP, consideration must be given to lockout/tagout requirements, confined space entry requirements and the provision of a safe work area.

a. 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. Prior to donning the PPE, personnel must be trained per B0121 and appendix B-G.

NOTE:

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

b. Secure all ventilation in the space. If ventilation cannot be secured, redirect it away from the NPE.

c. A minimum of Grade D breathing air is required when supplied air respirators are used.

4. Employee Briefing. Prior to beginning the work covered by this SOP, all personnel must be briefed on the following safety consideration:

a. Heat stress

b. Buddy System

5. IMA Asbestos Removal Work Procedures

a. **Obtain Background Samples**. An industrial hygienist, or other person qualified to perform asbestos sampling, shall take background air samples prior to starting set-up operations. If sample analysis is greater than 0.01 f/cc (fibers per cubic centimeter), then the space shall be isolated and placed under asbestos controls.

b. **Establish a Regulated Area**. (The regulated area does not need to be established until just prior to commencement of asbestos removal operations.).

(1) Isolate the work area by erecting a Negative Pressure Enclosure (NPE):

(a) Configure NPE in a manner to accommodate the material, equipment, and personnel needed for the removal project.

(b) Construct enclosure of 6-mil poly material.

(c) Lock out/tagout HVAC systems within the regulated area. Isolate HVAC systems and openings (duct, diffusers, etc.) within the regulated area by sealing with two layers of 6 mil poly or equivalent material. Cover other critical barriers with at least one (1) layer of 6 mil poly material.

(d) Lock out/tagout electrical systems within the NPE.

(e) Install all necessary services such as water, vacuum hose, negative air machine, staging, ventilation, breathing air, and exterior/ interior lights. All electrical equipment used in the NPE shall be connected to a ground fault circuit interrupter (GFCI).

(f) Post the regulated area, the entrance to the vestibule and the entrances to the decon area/buffer zone with asbestos warning signs, as well as other areas of potential access.

(2) Post a copy of the qualified persons training certificate at the regulated area.

(3) The qualified person shall supervise the construction of the NPE. Additionally, the qualified person shall be present for the entire time the boundary is established, associated services are established, during operation of the NPE, and during cleanup and disestablishment of the regulated area.

(4) Wrap all equipment and any object that cannot be readily removed from the NPE (e.g., all HVAC systems) in two layers of 6-mil poly material. Pre-clean with wet methods.

(5) Establish the asbestos decontamination area:

(a) Construct decontamination area of poly material adjacent to and connected to the NPE.

(b) The decontamination area shall consist of an equipment room, shower area, and clean room.

NOTE:

Showers may be omitted if demonstrated not to be feasible. However, every effort should be taken to establish an alternate location for showers.

(c) Provide impermeable, labeled bags and containers in the equipment room for the containment and disposal of contaminated clothing and other equipment.

c. Asbestos work operations cannot begin until demonstrated negative pressure has been established.

(1) HEPA filtered exhaust ventilation (local or general area) sufficient to place the area under negative pressure of at least - 0.02 inches of water (as measured on a magnehelic gauge) shall be maintained.

(2) The NPE shall be kept under negative pressure throughout the period of its use.

(3) The NPE will be smoke tested prior to operations and at the beginning of each work shift to ensure negative pressure is sustained during work.

(4) Air movement shall be directed away from employees performing asbestos work within the enclosure, and toward a HEPA filtration or a collection device.

(5) Maintain air movement at a minimum of four air changes per hour.

d. Initiate the Hazardous Area Sign-In/Out Log and ensure that personnel sign in and out.

e. The IHO shall monitor the work operation upon completion of setting up the regulated area. General area air sampling shall be collected at the boundary of the regulated area. Personal air sampling is also required.

6. <u>Work Practices Within the Regulated Area</u>

a. Install a drop cloth on the floor of the enclosure under the material to be removed. Secure with duct tape or equivalent.

b. Wet all asbestos material with amended water during all phases of the removal process. Ensure that power tools are not used during the removal process.

c. Personnel should start removal operations close to the decontamination area, and work toward the source of exhaust ventilation.

d. The qualified person shall inspect the job site at least once per work shift.

e. Encapsulate any exposed asbestos material prior to removal of NPE.

7. <u>Regulated Area Disestablishment</u>

a. Remove gross contamination from wall coverings or remove the inner contaminated layer of poly material.

b. Remove gross contamination from equipment in the work area. This includes the negative air machine, scaffolding, ladders, extension cords, hoses, and other equipment inside the work area. This can be accomplished using a combination of HEPA vacuuming and wet methods.

c. Remove the top layer of 6-mil poly material used to cover the floor area after appropriate cleaning. Carefully fold it inward into compact bundles for bagging and disposal.

d. Conduct a visual inspection of all surfaces and reclean if necessary. Flashlights and inspection mirrors are good for this process.

e. Perform a final wipe-down of equipment and remove from the work area.

f. HEPA vacuum any remaining hard-to-reach places such as crevices around doors and shelves.

g. Detach the poly material floor covering from the wall and carefully fold inward into a compact bundle for bagging and disposal.

h. After the floor is uncovered, clean corners and crevices with a HEPA vacuum.

i. Wet-wipe and/or vacuum the walls. Begin cleaning the areas farthest from the negative air machine, and work toward it using amended water to wet wipe all exposed surfaces.

j. Wet mop floors using amended water. Be sure to change water frequently.

k. The asbestos removal supervisor shall re-inspect the NPE to verify there is no visible asbestos debris present. If the area is clean, obtain supervisor's signature per appendix B1-H, Workplace Release Checklist.

l. Conduct final clearance monitoring prior to disestablishment of the NPE. Ensure the HEPA-filtered exhaust ventilation is operational during this process.

m. If samples pass final clearance, remove outer layer of poly material and all critical barriers, disconnect negative air machine(s), and allow for reoccupancy.

n. Clean up, decontaminate, and disassemble the decontamination unit.

o. Place all ACM, containment materials, scrap, debris, bags, containers, equipment which cannot be decontaminated, rags, and asbestos contaminated clothing into approved and appropriately labeled impermeable bags and "J" seal. Prior to placing in bag, wet the asbestos waste to reduce airborne concentrations. Prior to sealing the bags, evacuate all air from the disposal bag using a HEPA vacuum.

p. Upon receiving the sample results, complete appendix B1-H, Workplace Release Checklist. Forward this form along with the Hazardous Area Sign-In/Out Log to the Industrial Hygiene Officer.

Appendix B1-E

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 or IMA (**See NOTE** [1]) For ships with an EART (**See NOTE**[2]) For ships with an IMA (**See NOTE** [3])	TBD	On-the-job training
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 NAVOSH ETC website at http://www.norva.navy.mil/navosh

NOTE [1] **For ships with no Emergency Asbestos Response Team (EART) or Intermediate Maintenance Activity (IMA)**, 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 “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 [3] **For ships with an Intermediate Maintenance Activity (IMA)**, this training shall be accomplished by the safety officer or engineer officer, or a member of the IMA that has successfully “Asbestos Supervisor/Worker”, A-493-0069, as on-the-job training using the Standard Operating Procedures in appendix B1-B.

Appendix B1-F

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	"Shipboard Asbestos Response" A-760-2166	Mandatory	Formal Classroom	NAVOSHENVTRACEN	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 NAVOSH ETC website at http://www.norva.navy.mil/navosh

Appendix B1-G

TRAINING REQUIREMENT FOR ASBESTOS-RELATED WORK

Intermediate Maintenance Activity Personnel

Navy Personnel Training Requirement	Citation	Course Title/Training Required	Requirement	Formality	Resource for Training	Length of Training	Periodicity
Engineering/Repair IMA Personnel performing unlimited asbestos repair/removal	B0121a	Asbestos Supervisor/Worker A-493-0069	Mandatory	Classroom	NAVOSHENVTRACEN	5 days	Prior to performing any asbestos repair/removal operations.
Engineering/Repair IMA Personnel performing unlimited asbestos repair/removal	B0121a	Asbestos Supervisor/Worker Refresher, A-493-0070	Mandatory	Classroom	NAVOSHENVTRACEN	1 day	Annually (1 year from the successful completion of A-493-0069) for as long as personnel perform work under this protocol.
Engineering/Repair IMA Personnel performing unlimited asbestos repair/removal	Appendix B1-D, chapter B6	Respirator fit-testing, selection, and maintenance	Mandatory	Informal	RPM	TBD	Prior to donning a respirator, and annually thereafter
Other Related Training							
IHO	B0119a(4)	Analysis of Bulk ID Samples B-322-2334 or Equivalent	Mandatory	Classroom or Equivalent	EPMU or Equivalent	5 days	No refresher required. However, required to successfully participate in Proficiency Analytical Testing Program/RTI Program

Navy Personnel Training Requirement	Citation	Course Title/Training Required	Requirement	Formality	Resource for Training	Length of Training	Periodicity
IHO	B0119a(4)	Analysis of Airborne Asbestos Samples (B-322-2333) or 582 equivalent	Mandatory	Classroom or 582 equivalent	EPMU or Equivalent	5 days	No refresher required, However, required to successfully participate in Proficiency Analytical Testing Program

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

Detailed information regarding class schedules, quotas, etc. can be found on the NAVOSH ETC website at http://www.norva.navy.mil/navosh

Appendix B1-H

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 screw driver, 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:

IMA Protocol:	Safety Officer or IHO signature required
EART Protocol:	Safety Officer signature required
Ship's Force Protocol:	Department Head or Division Officer

Appendix B1-I

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-J

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

See appendix B1-J for Navy Stock Numbers (NSNs) for this and all associated PPE and equipment.

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 persons performing the asbestos work.

Appendix B1-J

AUTHORIZED EQUIPPAGE LIST FOR ASBESTOS WORK PROTOCOLS

AEL 2-330024045

NOMENCLATURE	NSN	U/I	SHIP'S FORCE	EART	IMA
Bag, Disposal Red Plastic 55 GAL Cap	8105-01-086-5053	BX	1	1	5
Cooling Assembly	4240-01-083-3399	KT	0	3	6
Ambient Air Breathing Apparatus, Electric	4310-01-106-4121	EA	0	0	2
Warning Signs	9905-01-345-4519	EA	OAR*	OAR*	OAR*
Coveralls, Disposable, sacksuit w/shoes and hood, Large	8415-01-092-7531	BX	0	1	2
Coveralls, Disposable, sacksuit w/shoes and hood, X-Large	8415-01-092-7532	BX	0	1	2
Glove Inserts, Surgeons	6515-01-354-3157	PG	10	20	100
Gloves, Clean Room, Medium		PG	10	20	100
Gloves, Clean Room, Large		PG	10	20	100
Overshoes, Rubber Medium	8430-00-421-7487	PR	0	6	18
Overshoes, Rubber Large	8430-00-421-7488	PR	0	6	18
Overshoes, Rubber X-Large	8430-00-421-7489	PR	0	6	18
Sprayer, Insecticide	3740-00-191-3677	EA	0	1	3
Spray Bottle, Plastic	8125-00-488-7952	EA	4	4	24
Duct Tape	5640-00-103-2254	RO	0	20	100
Plastic Sheeting, 6 mil	8135-00-579-6486	RO	0	2	10
Paper Towels, Absorbent	7920-00-823-9772	BX	1	2	5

NOMENCLATURE	NSN	U/I	SHIP'S FORCE	EART	IMA
Finger Grip Saw	5110-00-570-6896	EA	0	2	4
Keyhole Saw	5110-00-142-5010	EA	0	2	4
Nylon Brush	7920-00-324-2746	EA	0	2	4
Scouring Pad	7920-00-753-5242	EA	0	3	10
EAB Modification Kit for Submarines	4240-01-077-5994	EA	0	6	0
Ventilation Smoke Tube Kit (for glovebags)	MSA 458481	EA	0	1	2
Glass Smoke Tubes (10/PKG)	MSA 5645	PG	0	2	6
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	2
Magnehelic Gauge	6685-00-910-6964	EA	0	0	1
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 110001 HEPA Filter Replacement (105"/130" Water Lift) Filter	GSA Contract Number: GS-07F-8158B	EA	0	0	1

NOMENCLATURE	NSN	U/I	SHIP'S FORCE	EART	IMA
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 *017191 Container Polyliners (25/Pkg.) *Note: Items with an asterisk (*) are included as part of item number 01799350/375101.	GSA Contract Number: GS-07F-8356C	EA	0	0	1
HEPA Vacuum: Nilfisk GM80 HEPA-Filtered Vacuum System, 3-gallon capacity; *01790133/375102 Replacement Parts: *118274 Power Cord for Grounded Motor *115470 Detachable Trolley for GM80 Canister *01709600 Positive-Twist Safety Latches *120975 78-inch Tapered Plastic Hose with Curved Tube *111124 Straight Steel Wands	GSA Contract Number: GS-07F-8356C	EA	1	1	1

NOMENCLATURE	NSN	U/I	SHIP'S FORCE	EART	IMA
*120410 Combination Floor Nozzle *11276901 3-inch Round Dust Brush *811409 6-inch Crevice Nozzle *320437 5-inch Upholstery Nozzle *816200 2-Ply Disposable Paper Bags (5/Pkg.) *616821 Microfilter *01710440 HEPA Filter Assembly *017190 Container Poly Liners (25/Pkg.) **01702425 Variable Speed Control *Note: Items with an asterisk (*) are included as part of item number 01790133/375102. **Note: This item is optional, and is not included as part of item number 01790133/375102. However, it is recommended when performing glove bag operations.					

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

***OAR – Order As Required**

Appendix B1-K

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-J. Information contained in appendix B1-J is taken from AEL 2-330024045.

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

See appendix B1-J for the National Stock Numbers (NSNs) for this and all associated PPE and equipment.

Appendix B1-L

ASBESTOS REPAIR OR REMOVAL PREWORK 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 engineer officer, safety officer, division officer and/or workcenter 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.

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

Appendix B1-M

PERSONAL PROTECTIVE AND SPECIAL EQUIPMENT

Intermediate Maintenance Activity Performing Extensive Removal and Repair of ACM

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	Negative Air Unit	Magnehelic Gauge
Removal or repair of unlimited quantities of ACM	√	√**	√**	√	√*	√	√	√	√	√	√	√

* 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 is found in appendix B1-J. Information contained in appendix B1-J is taken from AEL 2-330024045.

See appendix B1-J for the National Stock Numbers (NSNs) for this and all associated PPE and equipment.

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

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.

CHAPTER B2

HEAT STRESS

B0201. DISCUSSION

a. Heat stress is any combination of air temperature, thermal radiation, humidity, airflow, and workload 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. Additionally, sufficient recovery time in a cool environment will help reverse the harmful effects of heat stress. Heat stress becomes excessive when the body's ability to adjust is exceeded, resulting in increased deep body temperature. This condition can produce fatigue, rash, cramps (particularly in the extremities and abdomen), profuse sweating, dehydration, tingling in the extremities, pallor, rapid heartbeat, severe headache, nausea, vomiting, and poor physical and mental performance in affected personnel. As body temperature continues to rise (due to prolonged exposure), heat injuries (e.g., heat exhaustion or heat stroke) may occur resulting in severe impairment of the body's temperature regulating ability and possible death. Recognizing personnel heat-stress symptoms and obtaining prompt medical attention for affected persons is an all hands responsibility.

b. 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 must also 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 WBGT data acquisition system to measure each of the above temperatures. Ships use dry bulb, wet-bulb, and globe temperature readings to calculate a single number, the WBGT index. They use the WBGT index, along with the individual's physical exertion level to calculate an individual's permissible heat exposure limit. Appendix B2-A presents this information in a columnar format by means of the Physiological Heat Exposure Limits (PHEL) tables.

c. While heat-stress conditions can occur in practically any space or area on board a ship, machinery spaces, laundries, sculleries, galleys, incinerator rooms, flight decks, and steam catapult rooms are the most likely to have the conditions that may cause heat stress. Causes of heat-stress conditions 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.

d. **Heat Acclimatization**. In most individuals, appropriate repeated exposure to heat stress causes a series of physiologic adaptations called acclimatization, whereby the body becomes more efficient in coping with the heat stress. An acclimatized individual can tolerate a greater heat stress before harmful level of heat strain occurs. Personnel acquire heat acclimatization only gradually, being fully achieved over a 3-to-4-week level of sustained physical activity. Therefore, unacclimated individuals may increase their risk of incurring acute adverse health effects from exposure to harmful levels of heat stress.

e. 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.

f. 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.

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 as prescribed in reference B2-1.

(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 installed, ensure at least two portable WBGT meters are maintained onboard.

b. **The medical department representative (MDR) shall:**

(1) If an automated heat-stress system is installed, the ship shall maintain and calibrate at least one portable WBGT for use in the event that the automated system should fail.

(2) 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.

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

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

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

c. **The engineer 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) If an automated WBGT system is installed, ensure at least one portable WBGT meter is maintained and calibrated for use in the event that the automated system should fail.

(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) 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 of departmental spaces. Qualification of personnel shall be trained as specified in paragraph B0206.b.

(3) Ensure the heat stress surveyor conducts heat-stress surveys per B0204(4) and B0204(5).

(4) 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.

(5) Record all heat-stress related deficiencies on 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) Record all heat-stress related deficiencies on Current Ship's Maintenance Project (CSMP) for their respective division.

f. **Heat-stress surveyors shall:**

(1) Be qualified per paragraph B0206b

(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.

B0203. HEAT-STRESS ELEMENTS

a. Monitoring and surveying of heat-stress conditions. (Paragraph B0204).

b. Establishing safe work schedules in heat-stress environments. (Paragraph B0205).

c. Investigating and reporting personnel heat injuries. (Paragraph B0204f and chapter A6).

d. Training. (Paragraph B0206).

e. Recordkeeping.

B0204. HEAT-STRESS MONITORING AND SURVEYING

a. **Definitions**:

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

(2) **Surveys**. Use of a WBGT meter or automated WBGT data acquisition system 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 can validate the WBGT index using the following formula:

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

(3) **Heat-stress Surveyor**. A trained person assigned to conduct 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. 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 2 feet from any supply ventilation terminal/opening. The temperature being measured must be representative of the heat-stress environment workers/watchstanders experience. Thermometers shall be hung with a non-heat conducting material such as plastic 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 5°F or greater at any watch or workstation, then the DB thermometer is not representative of the temperature at the workstation. The hanging DB must be relocated, replaced, or validated by aligning the etch mark with the freezing point (32°F). 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, (firerooms and enginerooms), 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 Monitoring System**. These automated meters 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. Automated meters shall be positioned so as to avoid interference with space activity. If ventilation is present at the workstation where an automated sensor 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.

(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, (firerooms 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 4 hours for manned spaces if DB temperatures do not exceed 85° F

(b) Every hour for manned spaces if DB temperatures exceed 85° F

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

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

(a) DB temperatures shall be recorded on a prepared log and reviewed by the space supervisor (e.g. machinist mate of the watch (MMOW), galley captain). If a DB temperature exceeds the temperature per paragraph B0204c(4)(a), the space supervisor shall circle (in red) the DB reading and immediately notify the watch supervisor (i.e. 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 automated system 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. engineering officer of-the-watch (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 an automated WBGT system that provides a direct readout to a centralized data acquisition system. 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:

WBGT meter values are not accurate below 65°F.

(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 5 minutes to enable it to equilibrate to the surrounding area. The heat-stress surveyor will wait 3 minutes at each subsequent watch or workstation to allow the meter to equilibrate before taking the reading.

(c) Where automated WBGT sensors 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°F on a Heat-Stress Survey Sheet similar to the ones found in appendix B2-D. 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 one found in appendix B2-D to record heat-stress information. Ships using a database or fitted with an automated system and installed WBGT sensors, 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. **WBGT Validation**. 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°F. The automated system does not require WBGT validation.

(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 5°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°F). This is not required with the automated system.

(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 appropriate department.

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

(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 4 hours or activity levels greater than PHEL III, a 100°F 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 4 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 3 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 watch standers using the ECC PHEL values in appendix B2-A.

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

NOTE:

Not applicable to submarines, which have air-conditioned engineering spaces.

(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**. Ships shall accomplish follow-on surveys, of heat-stress spaces, 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 5°F 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 5°F 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 5°F or more and/or WB temperature increases by 3°F 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 5°F or more and/or WB temperature increases by 3°F 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. 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 engineer officer assigns a 3 X 6 watch (3 hours watch in the space and 6 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 (4 hours watch in the space and 8 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).

Appendix B2-E provides heat-stress survey decision diagrams that outline heat-stress survey and follow-on requirements.

(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-F 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) 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 an optimum DB temperature of less than or equal to 80°F).

(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 4 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. 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® has proved very effective in helping to keep personnel hydrated especially in areas such as the Persian 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 6 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.

(8) 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 may be flammable and 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 prepare a Heat/Cold Case form (NAVMED 6500/1). Appendix B2-G is an example of this form. The senior MDR must sign the form and the commanding officer shall forward the form to: Commanding Officer, Navy Environmental Health Center (NAVENVIRHLTHCEN). This form is available under stock number 0105-LF-015-0800. Submission of this form to NAVENVIRHLTHCEN will assist BUMED in identifying both personnel and material areas that require assistance in achieving better heat-stress control.

NOTE:

If a heat-stress case results in 5 or more lost workdays, a Mishap Report shall be submitted per chapter A-6 in addition to the submission of the Heat/Cold Case form.

(2) NAVENVIRHLTHCEN shall provide a fiscal year-end summary of shipboard heat-stress cases from their database by type of operation, and ship class to CNO (N454), COMNAVSEASYSCOM (SEA 03L5), and the Fleet Commanders in Chief.

B0205. PHEL DETERMINATION

a. The WBGT index provides a measure of environmental conditions. In order to determine the permissible exposure limit in these conditions, an additional piece of information is required the degree of effort entailed by the particular job. The more strenuous the job, the shorter the allowable expo-

sure limit. The Navy has developed six physiological heat exposure limit (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 personnel who have had adequate rest, (6 hours continuous sleep in the last 24 hours), adequate water intake, and adequate recovery time from previous heat-stress exposure (2 hours recover for every 1 hour exposure or 4 hours maximum). Personnel are assumed to be wearing clothing consisting of a least 35 percent 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 in a tabular format for the presence of fuel combustion gases.

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 6 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°F would be rounded to 86°F and 89.9°F would be rounded to 90°F; but 92.0°F would remain 92°F. 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°F or 85.8°F the stay time for PHEL Curve III is 5 hours and 55 minutes.

(5) The current WBGT/PHEL index for each watch stander can be read from any of the ICAS or PC connected stations.

(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 4 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 in breathing normally

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 4 hours, then the exposure limit with stack gas and or fuel vapors present would be reduced to 1 hour and 20 minutes. Prompt removal of affected personnel to fresh air is essential. Article 3-1l 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), or by using the heat stress Lesson Training Guide available through the Navy Occupational Safety and Health and Environmental Training Center (NAVOSHENVTRACEN) website at http://www.norva.navy.mil/navosh 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

(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.

CHAPTER B2

REFERENCES

B2-1 Manual of the Judge Advocate General (JAG Manual)

B2-2 NAVMED P-5010-3, Manual of Naval Preventive Medicine, chapter 3: Ventilation and Thermal Stress Ashore and Afloat (NOTAL)

Appendix B2-A

Table B2-A-1

PHEL CURVE GENERAL APPLICABILITY SELECTION

PERSONNEL	**PHEL CURVE** Routine Watch	Casualty Control Drills
I. Steam Propelled Ships		
A. Propulsion Spaces		
1. BTOW	II	III
2. Console Operator	I	I
3. Upper Levelman (checkman)	II	III
4. Lower Levelman	II	III
5. MFP Watch	II	III
6. Burnerman	II	III
7. EOOW	I	I
8. MMOW	II	III
9. Throttleman	I	I
10. EMOW	I	I
11. Upper Levelman(SSTG)	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. EOOW	I	I
B. POOW	II	III
C. EMOW	I	I
D. Throttleman	I	I
E. Repair Electrician	I	I
F. SSDG Watch	I	I
G. Boiler Watch	I	I
H. Evaporator Watch	II	II
I. Oiler/Messenger	III	IV

III. Gas Turbine Propelled Ships		
A. FFG-7, DD-963, and CG 47 Class Ships		
1. All Engineering Watch Personnel	I	II
B. DDG-51 Class Ships		
1. ERO	II	II
2. PSM/ERM	II	III
3. ASM	II	III
4. AS/VCDO	II	III
5. Sounding and Security Watch	III	III
6. OD Box Watch	NA	*II

*Includes restricted maneuvering and casualty control drills

C. AOE Class Ships		
1. PSM	II	II
2. ASM	II	III
3. Auxiliary Rover	III	III
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

PHEL CHART
(Curves I - VI)

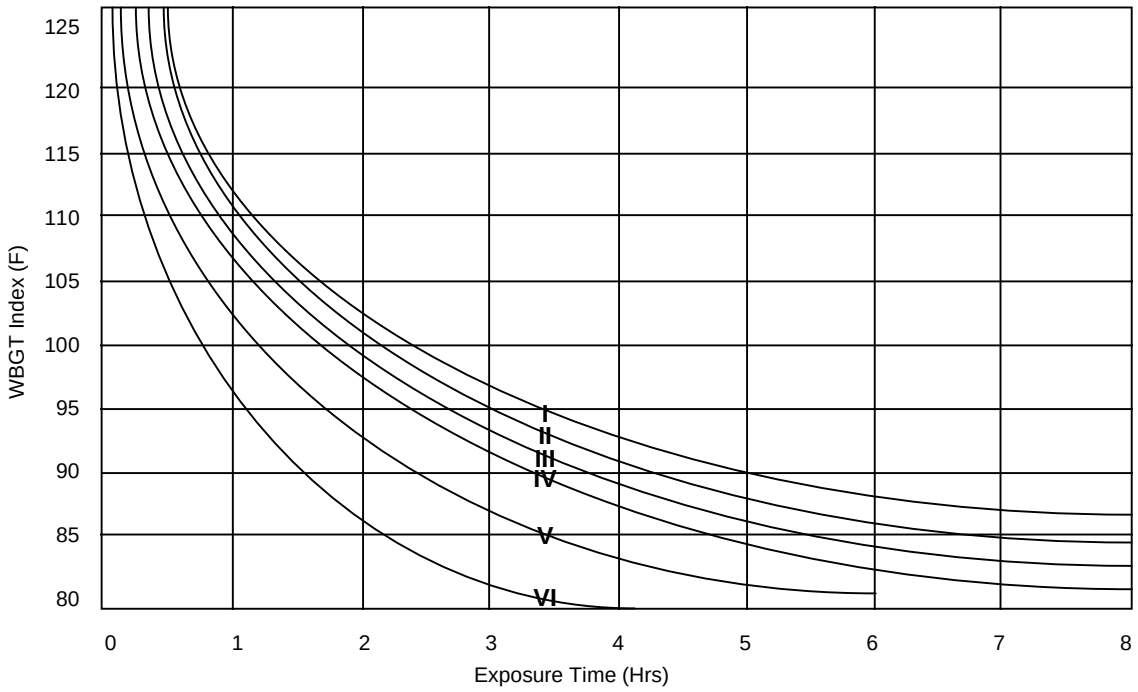


Table B2-A-2

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)

WBGT Index (F)	Six PHEL Curves (Total Exposure Time in Hours:Minutes) 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°F over the outside DB temperature, then a ventilation supply problem may be indicated. A reading of 2 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
(2) Flow (continued)		Supply terminal obstructed	Clean the terminal
		Terminal inoperable or missing	Replace terminal
		Supply fan not working properly:	Repair

STANDARDS	HOW TO MEASURE DISCREPANCIES	CAUSES	RECOMMENDED ACTION
		-Motor speed low (single phase or miswired)	Repair
		-Controller defective	Repair/Replace
		-Improper speed with exhaust fan	Repair fan interlock
		-Failed motor bearings	
		Supply air short circuited by exhaust terminal	Repair
			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 ventila-	Anemometer	Exhaust fan not working properly:	
		-Motor speed low (single phase or miswired)	Repair
		-Controller defective	Repair
		-Improper speed with ex-	Repair fan interlock

STANDARDS	HOW TO MEASURE DISCREPANCIES	CAUSES	RECOMMENDED ACTION
tion is to be:		haust fan	
-125% of supply ventilation for 1200 psi steam ships.		-Failed motor bearings	Repair
-115% of supply ventilation for other ships except CPS ships			
-equal to supply ventilation on CPS ships plus sweep air from Type II airlocks			
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.	Remove obstructions.
		Dirty screens.	Clean Screens.
		Wrong screen mesh (1-1/2 inches required.	Replace with proper size mesh.
	Feel/visual	Vent duct pressure losses due to dirty ductwork, leaks, unauthorized openings or missing access covers.	Clean, repair or replace
		Toxic Gas Vent Dampers closed	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

STANDARDS	HOW TO MEASURE DISCREPANCIES	CAUSES	RECOMMENDED ACTION
	Wet (water, oil, etc.)	Frequently occurring external leak	Replace and cover with metal lagging/shielding
		Internal/ external one-time leak	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 hand-gun/ pyrometer-Note 1 Surface temp too high.	Insulation deteriorated/ compacted.	Increase insulation thickness.
		Insulation too thin.	Paint surface with aluminum paint.
3. STEAM/WATER LEAKS			
a. Turbine Shaft Seals			
NSTM 231Propulsion 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 shaftseals 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	

STANDARDS	HOW TO MEASURE DISCREPANCIES	CAUSES	RECOMMENDED ACTION
		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 Check all areas of boiler casings for leakage	Visual	Dirt on matting surfaces	Clean Surfaces
	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			

STANDARDS	HOW TO MEASURE DISCREPANCIES	CAUSES	RECOMMENDED ACTION
NSTM 505 Piping Check for stained and wet lagging ***Notes 3, 4**	Visual	Pipe, valve or flange leaking	Repair or replace as necessary
		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**

(1) WBGT Meter. NSN 7G-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 5 minutes for the initial reading (DB). Wait 3 minutes for subsequent readings. Each position will give a display reading of 100.0 $\pm$ 0.2^{o}F, 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^{o}F 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^{o}F digit of the display. When the 0.1^{o}F 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, 1 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.

(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 5 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. **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^{o}F 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.

6. **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

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 SURVEY SHEET

HEAT STRESS SURVEY SHEET
DATE: _____

STATION	TIME	DB HANGING	DB	WB	GT	WBGT	ROUTINE (2) CURVE/LIMIT	NON-ROUTINE CURVE/LIMIT	DRILLS CURVE/LIMIT	HEAVY WORK CURVE/LIMIT
BTOW							II =	III =	III =	VI =
Upper Level (Checks)							II =	III =	III =	VI =
Lower Level							II =	III =	II =	VI =
MFP Watch							II =	III =	III =	VI =
Burnerman							II =	III =	III =	VI =
Messenger (1)							III =	IV =	IV =	VI =
Engineroom Console Booth 2)							I =	I =	1 =	VI =
Throttle							I =	I =	I =	VI =
EMOW							I =	I =	I =	VI
Evaporators							I =	II =	II =	VI =
Upper Level							II =	III =	III =	VI =
Lower Level							II =	III =	III =	VI =
Messenger (1) 3)							III =	IV =	IV =	VI =
3)										
Laundry Press Area							III =	NA =	NA	VI =
Driers							III =	NA =	NA	VI =
Scullery							V =	NA =	NA	VI =
Galley							II =	NA =	NA	VI =
Serving Line							II =	NA =	NA	VI =

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NOTE: (1) Messenger stay times should be determined by taking the average of all WBGT Index values for the space not including the console booth.
NOTE: (2) 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).

FOLLOW-ON SURVEY SHEET

NEXT REPORTING:

REQUIRED TIME: _____ LOCATION: _____
WATCH DURATION: _____

SURVEY COMPLETE: _____ MONITORING DB AND/OR WB: _____

MANUAL WBGT CALCULATION:

WBGT = (0.1 X _____) + (0.7 X _____) + (0.2 X _____)
LOCATION: _____
DB WB GT

WBGT (CALCULATED): _____ METER READING: _____ SAT/UNSAT
(Standard of comparison 0.2°F)

COOL DRINKING WATER AVAILABLE AT WATCH/WORK STATIONS? YES / NO

DISCREPANCIES NOTED:

SURVEYOR'S SIGNATURE: _____

REVIEWED: _____ TIME/DATE: _____
(SPACE SUPERVISOR/EOOW)

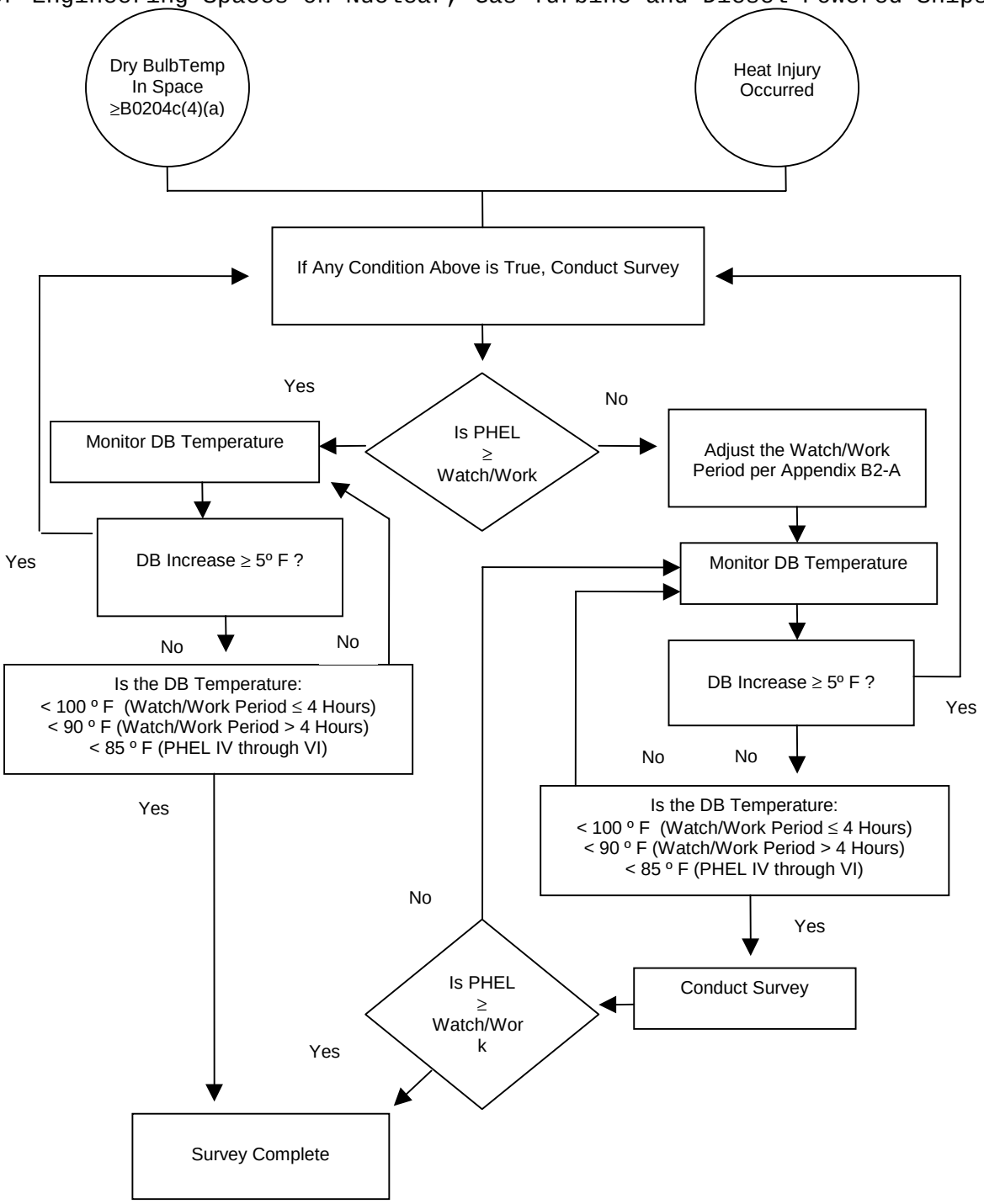
DEPT HEAD: _____ MDR: _____ XO: _____ CO: _____

COMMENTS:

Appendix B2-E

HEAT STRESS DECISION DIAGRAM

For Engineering Spaces on Nuclear, Gas Turbine and Diesel Powered Ships

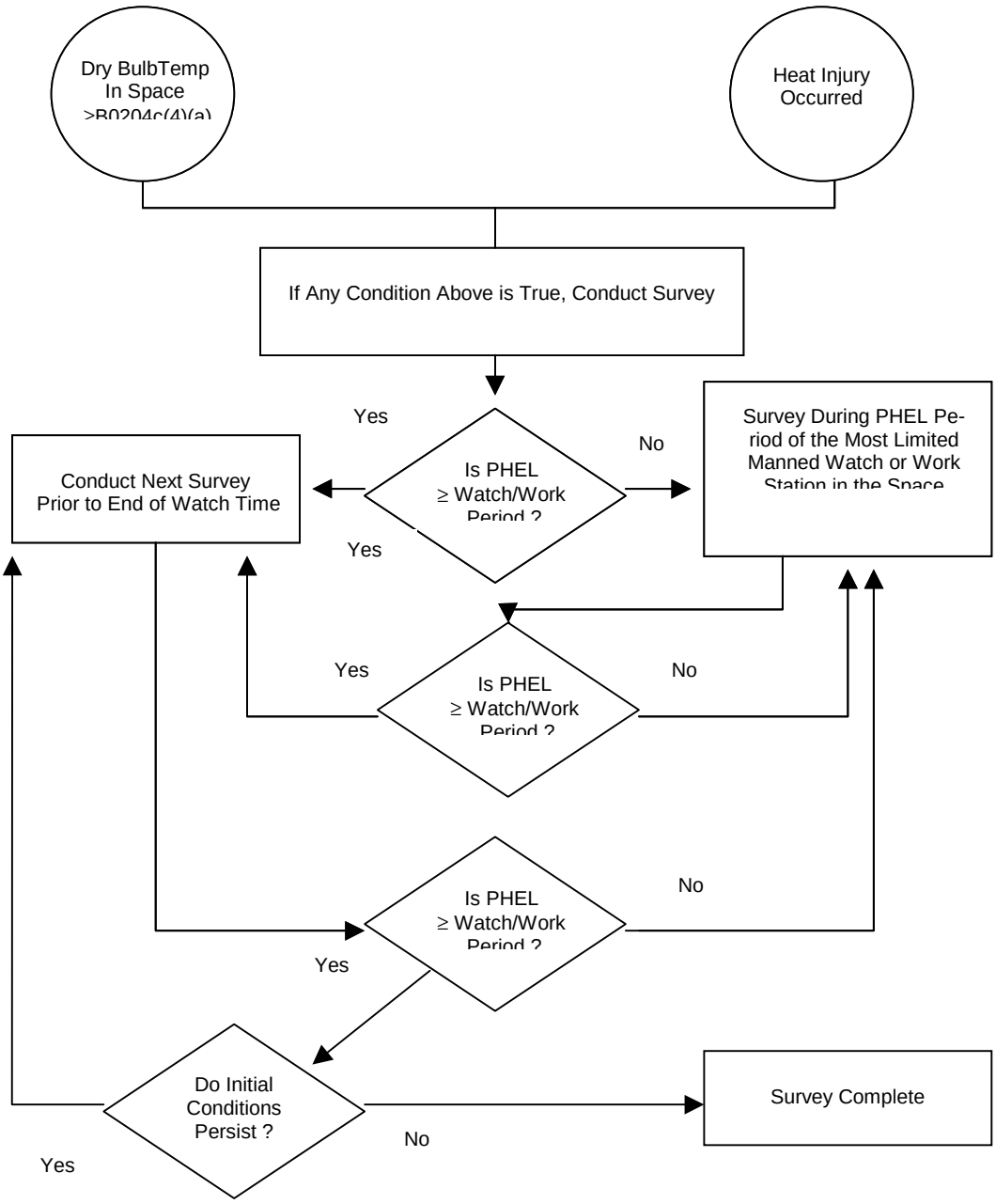


Appendix B2-E

HEAT STRESS SURVEY DECISION DIAGRAM

For Engineering Spaces on Steam Powered Ships and for Laundries, Sculleries, Galleys, Steam Catapult Spaces and Arresting Gear Spaces

NOTE: Follow-on surveys where WB and DB temperatures are **NOT** monitored and recorded each hour

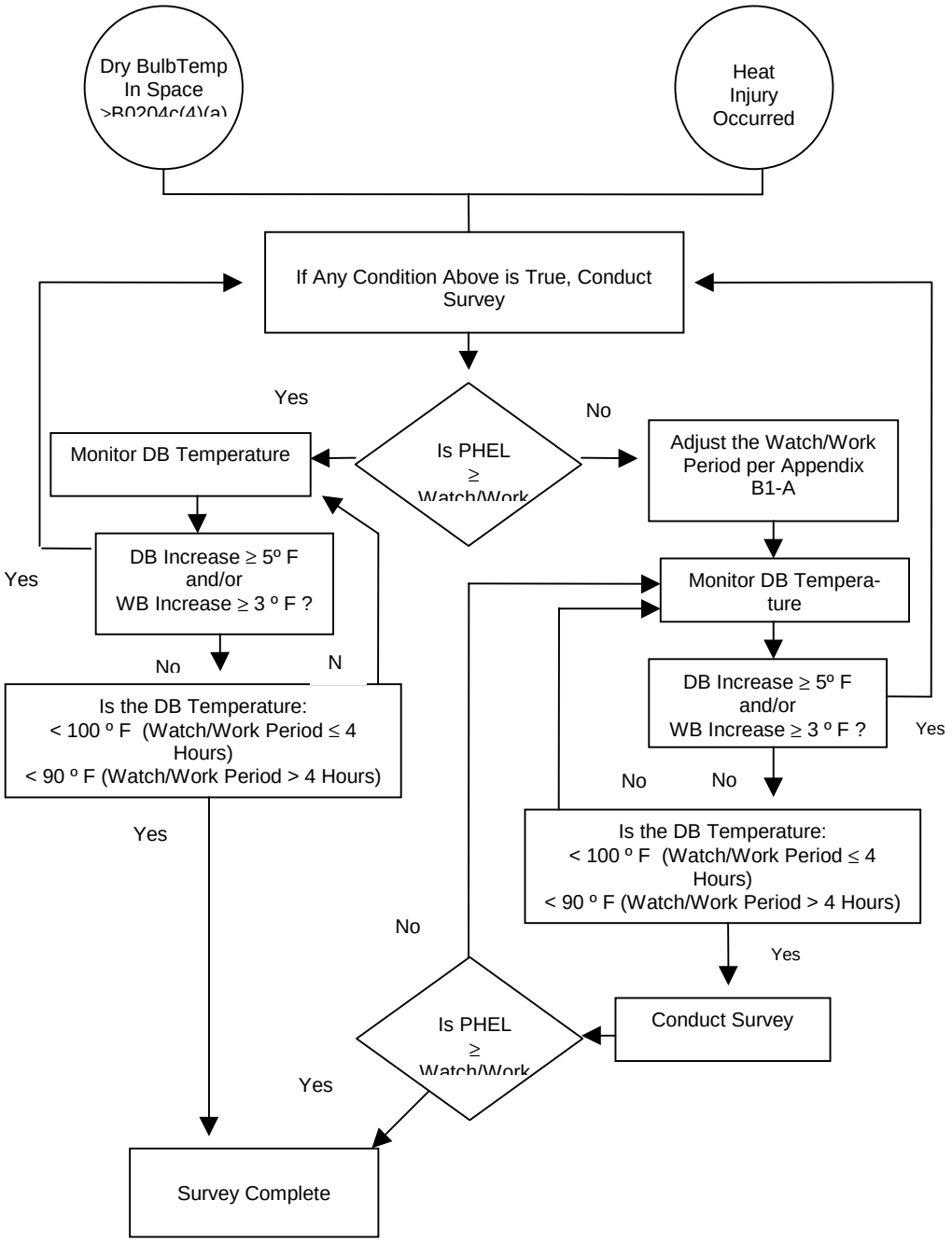


Appendix B2-E

HEAT STRESS SURVEY DECISION DIAGRAM

For Engineering Spaces on Steam Powered Ships and for Laundries, Sculleries, Galleys, Steam Catapult Spaces, Arresting Gear Spaces

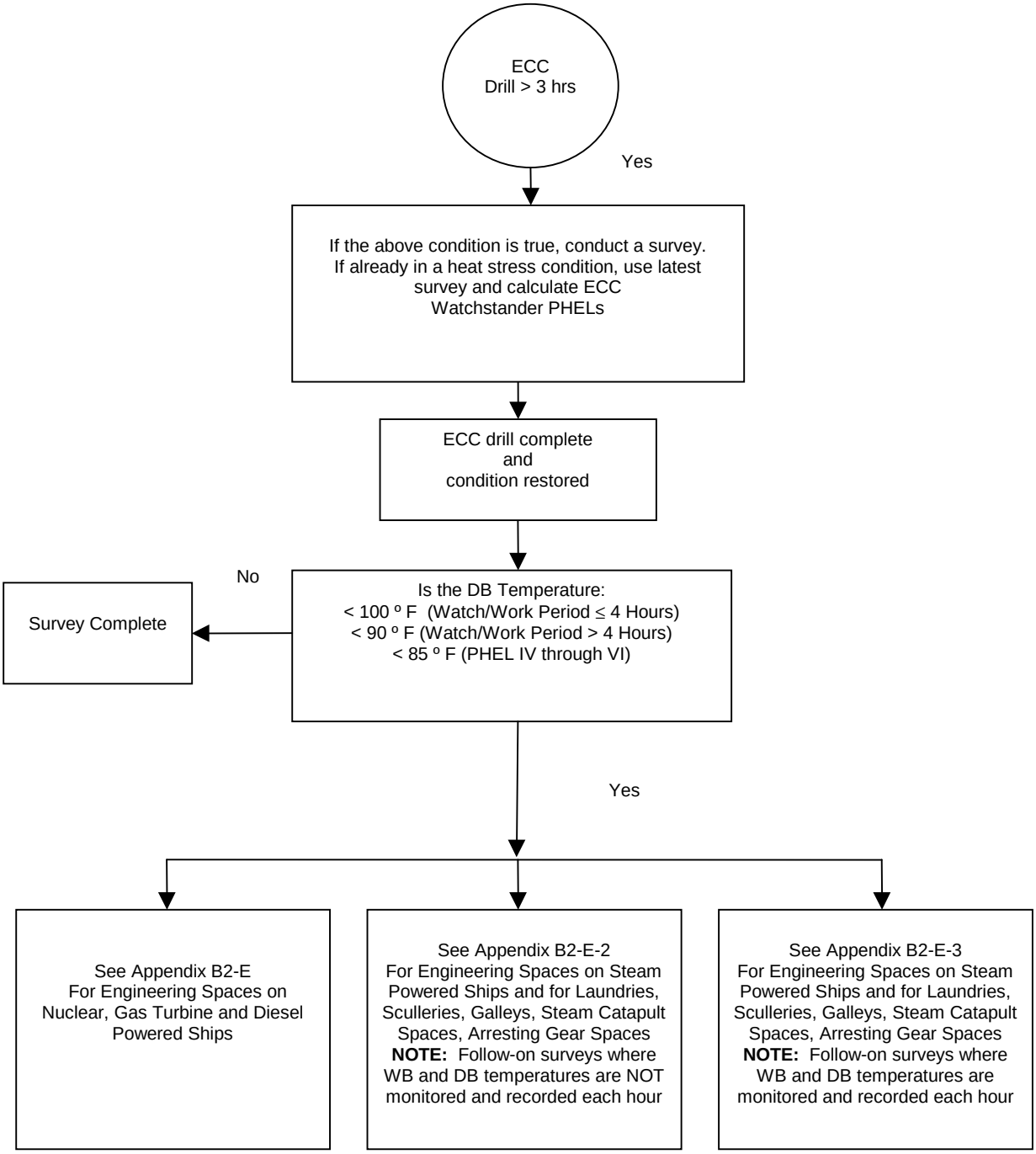
NOTE: Follow-on surveys where WB & DB temperatures are monitored and recorded each hour



Appendix B2-E

HEAT STRESS SURVEY DECISION DIAGRAM FOR ECC DRILLS

NOTE: Not required in spaces not affected by the drill or in areas that are unmanned



Appendix B2-F

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 watch standers. 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 4-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	WBGT = 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 4 hours while other watch stations have stay times that are equal to greater than 4 hours. The engineer office decides to incorporate a TWM WBGT for the lower levelman to maintain a 4-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 4-hour stay time (90 WBGT = stay time of 4 hours) and does the calculation. The time that the lower levelman must spend in the cool booth each hour to achieve a 4-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.

Appendix B2-G
FOR OFFICIAL USE ONLY (when filled in)
HEAT/COLD CASE

HEAT/COLD CASE

FROM: (Reporting Activity)
DATE_____

TO
Navy Environmental Health Center
NEHC-OEM Directorate
2510 Walmer Avenue
Norfolk, VA 23513-2617

NAME

SSN

GRADE	RATE	RACE	SEX	AGE

BIRTHPLACE

DATE AND TIME OF EXAMINATION

UNIT TO WHICH ATTACHED

DATE REPORTED TO PRESENT STATION

PRESENT ILLNESS (Onset Date and Time)

WBGT

DIAGNOSIS (check one)
- ☐ HEAT CRAMPS
- ☐ HEAT EXHAUSTION
- ☐ HEAT STROKE
- ☐ DEHYDRATION
- ☐ CHILBLAIN
- ☐ FROSTBITE
- ☐ HYPOTHERMIA

TIME ON ACTIVE DUTY (Months)

DESCRIBE BRIEFLY WHAT PATIENT WAS DOING AT TIME OF INJURY. INCLUDE DESCRIPTION OF CLOTHING

NOTE:
(1) ALL HEAT-STRESS INJURIES SHOULD HAVE RECTAL TEMPERATURES.
(2) ALL HEAT-STRESS INJURIES WITH RECTAL TEMPERATURES GREATER THAN 104°F SHOULD HAVE SERUM SGOT DRAWN 24 HOURS AFTER THE INJURY

LAB FINDINGS

SYMPTOMS (Check all applicable)
- ☐ UNCONSCIOUSNESS
- ☐ DIZZY
- ☐ CONFUSED
- ☐ NUMBNESS
- ☐ VISUAL DISTURBANCES (Specify)
- ☐ WEAK
- ☐ NAUSEA (Specify)
- ☐ CRAMPS
- ☐ VOMITING
- ☐ OTHER
- ☐ PALE
- ☐ IV REQUIRED
- ☐ DRY
- ☐ RASH
- ☐ RED
- ☐ OTHER
- ☐ WET
- ☐ NORMAL

TEMP (R) RESP.

PULSE

HEIGHT

WEIGHT

HOURS OF SLEEP (Last 24 Hours)

LAST MEAL (Date and time)

AMOUNT ☐ LIGHT ☐ MODERATE ☐ HEAVY

BLOOD PRESSURE

SYSTOLIC_____ DIASTOLIC_____

AMOUNT OF WATER IN QTS. (Last 12 Hours)

SWEATING (Check one)
☐ EXCESS ☐ MODERATE ☐ NONE ☐ SLIGHT

LAST HISTORY OF HEAT/COLD ILLNESS (Specify type)

DATE (MONTH AND DAY) DIAGNOSIS NONE

RECENT ILLNESS OR IMMUNIZATION

DATE DIAGNOSIS NONE

DISPOSITION PRESENT ILLNESS

☐ CLINIC ☐ HOSPITAL (Admitted)

☐ BINNACLE LIST/SIQ (NUMBER OF DAYS) _____

☐ LIGHT DUTY (NUMBER OF DAYS) _____

REMARKS (Initial treatment, long-term treatment potential, extent of injury, remission)

SIGNATURE

PREPARED

SUBMITTED
COMMANDING OFFICER

NAVMED 6500/1 (REV.5-99)
S/N0105-LF-015-080

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, special precautions and an effective program to manage HM are both 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. This chapter addresses general management requirements for HM. **Chapters C23 for surface ships and D15 for submarines contain specific management guidance and safety precautions** for the HM subcategories contained in the definition that follows. Commands having dental facilities shall refer to BUMEDINST 6260.30 for direction in implementing mercury control in affected spaces.

c. **For submarines**. This chapter and chapter D15 provide guidance for all HM, including HM that contains atmosphere contaminants per reference B3-1. 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.

d. 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 substantial hazard to human health or the environment when incorrectly used, purposefully released, or accidentally spilled. Subcategories of HM include:

(a) Flammable/combustible materials

(b) Toxic materials

(c) Corrosive materials (including acids and bases)

(d) Oxidizing materials

(e) Aerosol containers

(f) Compressed gases

Not included in this definition are ammunition, weapons, explosives, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, pharmaceutical supplies (if not considered hazardous based on composition, physical form, and review of procedures which may involve the handling/dispensing of the materials), medical waste and infectious materials, bulk fuels, and radioactive materials. Even though the above items may not be considered HM, submarine atmosphere control requirements in chapter D15 may apply. Asbestos and lead require special guidance for handling and control, which are addressed in chapter B1 and B10 respectively.

(2) **Hazardous Waste (HW)**. Any discarded material (liquid, solid, or gas) which meets the definition of HM and/or is designated as a hazardous waste by the Environmental Protection Agency or a State authority.

NOTE:

The Federal Facilities Compliance Act of 1992 states that any HW aboard an operational Navy ship is not subject to the storage, manifest, inspection, or recordkeeping requirements of the Resource Conservation and Recovery Act unless such waste is transferred to the ship within territorial waters of the U.S. and is stored on that ship for more than 90 days.

(3) **Used or Excess Hazardous Material (Used/Excess HM)**. HM for which there is no further, immediate use on board the ship possessing the material. Used HM is material that has been used in a shipboard process. Excess HM is unused material in full, properly sealed containers. Such material may ultimately be used on another ship, within the shore establishment, for a purpose other than that for which it was initially manufactured, or by commercial industry. Ships are required to transfer used or excess HM to a Navy shore activity for determination of suitability for further use. Navy shore activities possess trained personnel who can determine, working with ship's personnel, whether shipboard HM is usable, reusable, or should be disposed of as HW. The shore activity will act as the HW generator if it determines that the material has no further use and dispose of it as required by Federal, State, and local regulations.

B0302. SURFACE SHIP HMC&M

a. **Responsibilities**

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

(a) 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 within restricted waters per reference B3-2 and applicable Operations Orders (OPORDs).

(b) Appoint a commissioned officer within the supply department as HM coordinator. On surface ships smaller than a frigate, appoint a commissioned officer as HM coordinator. 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.

(2) **Division officers shall**:

(a) Ensure that NAVSEA-approved, in-space storage lockers are used.

(b) Ensure that HM retained within their workcenters is specific to the operations and maintenance of assigned equipment. If a hazardous material minimization center (HAZMINCEN) is in operation, no more than a 7-day supply of HM issued by the HAZMINCEN to the workcenter may be retained in workcenter spaces.

(c) Ensure used or excess HM issued by the HAZMINCEN is properly returned to the HM supervisor/HAZMINCEN.

(d) 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.

(e) Make personnel available to receive required HM training as detailed in section B0302e.

(f) Mark any PCB-containing electrical or electronic components per reference B3-3 and associated NAVSEASYSCOM-issued PCB advisories.

(3) **The safety officer shall** report all HM mishaps as required by chapter A6.

(4) **The afloat environmental protection coordinator (AEPC) shall** perform the functions described in reference B3-2.

(5) **The damage control assistant (DCA) shall**:

(a) Implement a spill contingency plan (SCP) per paragraph B0302c.

(b) Train and supervise ship's damage control teams (and fire department, if used aboard) in combating spills of HM.

(c) Provide training to divisions regarding reporting, initial handling, and cleanup of HM spills, as requested.

(d) Maintain the Hazardous Material Spill Response Kits (AEL 2-550024007).

(e) Ensure that HM spills are handled per appendix B3-A.

(6) **The supply officer/HM coordinator shall**:

(a) Ensure a Material Safety Data Sheet (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.

(b) 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.

(c) If an O-4 or below, obtain commanding officer’s (or designated O-5's) written authorization prior to open purchasing any HM and that an SFR is promptly submitted.

(7) **The HM supervisor shall**:

(a) Provide control and inventory management of designated ship’s HM. For ships FFG and larger, manage the operation of the ship’s HM minimization center (HAZMINCEN).

(b) Maintain the Hazardous Material Information System (HMIS) which contains MSDS information (see paragraph B0302d(2)). Retain hard copy MSDSs for locally purchased material and for materials not covered in the HMIS. Forward copies of MSDSs which are not on this system to: Commanding Officer, Navy Environmental Health Center, Attn: HMIS (Code 341), 2510 Walmer Avenue, Norfolk, VA 23513-2617.

(c) Ensure receipt and consolidation (as appropriate) of all used HM normally issued by the HAZMINCEN. Supervise document preparation for off-load of used/excess HM. Prior to the ship getting underway, ensure that no HM remains on the pier.

(d) Ensure personnel assigned to the HAZMINCEN (HAZMINCEN operator(s)) are trained on duties and responsibilities prior to assuming these duties.

(e) Ensure that when HM is transferred into other containers, the new containers are properly marked with the information specified in paragraph C2302e. The requirement to transfer HM into other containers shall be limited to HM which is specific to the division. Where possible, HM shall be obtained from the HAZMINCEN in containers sized to the user's need.

(8) **The MDR shall**:

(a) Assist the 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 HMIS on CD-ROM or hardcopy.

(9) **Division supply petty officers (when there is no HAZMINCEN aboard or for HM specific to the division) shall** order only authorized material. Standard stock HM shall be used whenever possible to avoid procurement of open purchased HM. Submit an SFR whenever ordering HM not authorized by the SHML or during open purchase.

(10) **Workcenter supervisors shall**:

(a) Ensure that approved personal protective clothing and equipment are maintained and used.

(b) Ensure that prior to initial use or handling any HM, workcenter 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. Learning resources for this training are available at http://www.norva.navy.mil/navosh.

(11) **All hands shall**:

(a) Return HM to approved stowage or the HAZMINCEN upon completion of use or at the end of the workday.

(b) Properly use and handle HM.

(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) Properly stow or return to the HAZMINCEN/supply department any HM found improperly stowed in work or berthing spaces.

(f) Report any violation of HM use, storage, and handling precautions to the supervisor.

(g) Ensure that when HM is transferred into other containers, the new containers are properly marked with the information specified in paragraph C2302e. The requirement to transfer HM into other containers shall be limited to HM specific to the division. Where possible, HM shall be obtained from the HAZMINCEN in containers sized to the user's need.

b. **Hazardous Material Control and Management Elements**. The following elements are essential for effective surface ship HM control and management:

(1) Designation of adequate storage for HM (see chapter C23)

(2) Controlling HM purchase (including type and quantity of material required), receipt, and issue to avoid accumulation of excessive HM (see chapter C23)

(3) Following approved safety standards for the use of HM (see chapters B1, B8, B10, and C23 for specific HM use requirements)

(4) Reutilization of HM to reduce the amount of used HM generated (see chapter C23)

(5) Collecting, segregating, and disposing of used or excess HM (see chapter C23)

(6) Responding to HM emergencies (see B0302c)

(7) Obtaining and providing MSDSs for on board HM (see chapter C23)

(8) Training (see B0302e)

(9) Proper labeling of HM (see chapter C23).

c. **HM Emergency Response**. The DCA shall use appendices B3-A and B3-B as HM spill response procedures in preparation for possible HM spills or releases to the environment. 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. Reporting requirements for a HM spill which goes over the side are found in reference B3-2, chapter 19. Appendix B3-B is specific to mercury.

d. **HM Information**

(1) **MSDS**. MSDSs are technical bulletins containing information about materials, such as composition, chemical, and physical characteristics, health and safety hazards, and precautions for safe handling and use. MSDSs shall be maintained for every item of HM aboard either through the HMIS (see paragraph B0302d(2)) or by hard copy for open purchased items. They shall be readily accessible to supervisors and personnel who actually use or handle HM. Supervisors are required to provide instruction in MSDS understanding and use. All personnel using HM shall be trained on the dangers and precautions contained within the MSDS before they actually use those materials.

(2) **Hazardous Material Control and Management (HMC&M) Compact Disc-Read Only Memory (CD-ROM)**. The HMC&M CD-ROM is a Navy data application which contains the HMIS, Ships' Hazardous Material List (SHML), and the Shipboard Safety Equipment Shopping Guide. The HMIS is a compilation of MSDS data applicable to DOD. If a MSDS is not available for material provided to the ship for use, the HMIS shall be scanned to determine if such data are resident within it. Chapter C23 contains storage requirements and coding found on some items listed in HMIS. The HM supervisor shall maintain the HMIS. Ensure that only the most current version is used.

(3) **Shipboard Safety Equipment Shopping Guide (NAVSAFECEN Publication)**. This publication consolidates standard stock numbers for safety equipment and personal protective equipment.

(4) **Federal Logistics Data on Compact Disc (FEDLOG)**. This disc contains the Management List, Navy (MLN), which includes additional information on HM. The Special Material Content Code (SMCC) for NSNs used by the Navy can be found in the Management Control (MGT CTL) field. The SMCC Code is in the seventh position of that field.

(5) **Hazardous Material Inventory Control System (HICS)**. HICS is a menu-driven inventory control system. It assists the operator in the systematic, positive control and issue of hazardous material. It has the following capabilities:

(a) Prints bar-code control numbers for each item of HM issued.

(b) Lists master HM inventory by type and location for use in determining HM on hand.

(c) Tracks HM usage and containers issued to the department, division, workcenter, or individual level.

(d) Produces receipts, inventory reports, and other customized reports.

(e) Tracks inventory high and low stock level limits.

(f) In conjunction with a scanner, allows remote site recording/tracking of returned containers or site inventory.

(6) **CNO Policy Guide for Shipboard Hazardous Material Container Disposal (OPNAV Publication P-45-114-95)**. This publication provides guidance on the disposal of containers that formerly held HM. The guidance document provides a simple decision flow chart to assist the user in rapidly determining whether a HM container is an "empty container" and if it is, whether it may be disposed of as trash or as used HM.

e. **HM Training**

(1) The HM coordinator shall normally receive en route training at the Navy Supply Corps School 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 6 months of, being assigned this duty.

(2) The HM supervisor, 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). If the ship has a HAZMINCEN, at a minimum the HM supervisor shall also be a graduate of the CHRIMP/HICS Technician course. Both courses are taught by the NAVOSHENVTRACEN.

(3) 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 Damage Control Assistant shall ensure adequate training is provided and supervise ship's damage control efforts to combat HM spills. HM spill response drills shall be conducted as often as the DCA considers necessary.

(4) Audiovisual materials applicable to HM can be found in appendix A7-F.

B0303. SUBMARINE HMC&M

a. **Responsibilities**

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

(a) Report all HM mishaps as required by chapter A6.

(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 within restricted waters per reference B3-2 and applicable Operations Orders (OPORDs).

(c) Ensure that spills of HM are handled per the Ships System Manual (SSM) Toxic Gas Bill.

(2) **The executive officer shall:**

(a) Grant written permission to carry or use on board any restricted HM during an underway period. Refer to chapter D15 and reference B3-1 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.

(c) Review 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.

(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 items found with a restricted (R), limited (L), or prohibited (X) use code (not in the Submarine Material Control Log) to the supply officer for logging, labeling, assignment of approved storage location, or disposal.

(d) Obtain written permission from the executive officer to retain on board or use restricted items during underway operations.

(e) Ensure that restricted items authorized for in port use only are removed from the submarine as soon as the need for them no longer exists. Inform the supply officer of their removal to allow documentation in the Submarine Material Control Log.

(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 HMIS and SMCL which contains MSDS information (see paragraph B0303d(1)).

(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 onboard by the Submarine Material Control List (SMCL). Affix an Atmosphere Contaminant Tag for any material that is a restricted or limited HM.

(f) Initiate an investigation of any item suspected of being an atmosphere contaminant per the procedures of reference B3-1 and submit a SMCL feedback report per chapter D-15.

(g) Ensure that all restricted (R) and limited (L) items are inventoried every 6 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 MDR 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 SMCL provided by 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 B0303e.

(d) Mark any PCB-containing electrical or electronic components per chapter D15.

(7) **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 HM emergencies.

(d) Hazardous material emergency response shall be conducted per the Toxic Gas Bill. 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 B3-2, chapter 19.

(8) R**epair 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) **Workcenter 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, workcenter 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.

(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 onboard storage and use of restricted material during underway operations without prior approval/authorization from XO. 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 adequate storage for HM (see chapter D15)

(3) Controlling HM purchase (including type and quantity of material required), receipt, and issue to avoid accumulation of excessive 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 B0303c)

(9) Obtaining and providing MSDSs for on board HM (see chapter D15)

(10) Training (see B0303e)

(11) Proper HM labeling (see chapter D15)

c. **HM Emergency Response**. Hazardous material emergency response shall be conducted per the Toxic Gas Bill. 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 B3-2, chapter 19.

d. **HM Information**

(1) **MSDS**. MSDSs are technical bulletins containing information about materials, such as composition, chemical, and physical characteristics, health and safety hazards, and precautions for safe handling and use. MSDSs shall be maintained for every HM item aboard either through the SMCL (see paragraph B0303d(4)) or by hard copy for open purchased items. They shall be readily accessible to supervisors and personnel who actually use or handle HM. Supervisors are required to provide instruction in MSDS understanding and use. All personnel using HM shall be trained on the dangers and precautions contained within the MSDS before they actually use those materials.

(2) **Hazardous Material Control and Management (HMC&M) Compact Disc-Read Only Memory (CD-ROM)**. The HMC&M CD-ROM is a Navy data application which contains the HMIS, SHML, and the Shipboard Safety Equipment Shopping Guide. The HMIS is a compilation of MSDS data applicable to DOD. If a MSDS is not available for material provided to the ship for use, the HMIS shall be scanned to determine if such data are resident within it. The supply officer shall maintain the HMIS. Ensure that only the most current version is used.

(3) **CNO Policy Guide for Shipboard Hazardous Material Container Disposal (OPNAV Publication P-45-114-95)**. This publication provides guidance on the disposal of containers that formerly held HM. The guidance document provides a simple decision flow chart to assist the user in rapidly determining whether a HM container is an "empty container" and if it is, whether it may be disposed of as trash or as used HM.

(4) **The Submarine Material Control List (SMCL)**. The SMCL is a Navy data application that lists the authorized HM for use on submarines as established by reference B3-1.

e. **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.

(4) Audiovisual materials applicable to HM can be found in appendix A5-D.

CHAPTER B3

REFERENCES

B3-1 NAVSEA Manual S9510-AB-ATM-010(U), Nuclear Submarine Atmosphere Control Manual (NOTAL)

B3-2 OPNAVINST 5090.1B, Environmental and Natural Resources Program Manual (NOTAL)

B3-3 NAVSEA S593-A1-MAN-010, Shipboard Management Guide to PCBs (NOTAL)

Appendix B3-A

HAZARDOUS MATERIAL 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) spill. Personnel shall be trained by division officers or supervisory personnel to clean up small spills of 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 Naval Warfare Publication (NWP) 62-1, Surface Ship Survivability for repair party responsibilities. See Naval Ships Technical Manual (NSTM) 555 for shipboard HM fire fighting procedures; NSTM chapter 079, Volume 2 for HM damage control procedures; and NSTM chapter 077 for personal protective equipment guidance. See NAVAIR 00-80-R-14 for aircraft HM fire fighting procedures. These spill procedures apply to on board HM spills. Response for HM and oil spills over-the-side is contained in reference B3-2.

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.

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 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).

(9) Labeling or placarding information (copy data from spilled container only after exposure to spill is eliminated).

b. Overboard spills of reportable quantities of HM shall be reported per reference B3-2.

3. **Initiation of Action**. Coordination and direction of spill response efforts at the scene of an 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. Fire fighting procedures are provided in NSTM chapter 555, "Fire Fighting, Ships."

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, upholstery, 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 methods recommended on the MSDS or, in the case of a mercury spill, those outlined in appendix B3-B. 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**. 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:

a. Date spill occurred.

b. Spill location.

c. Identity of spilled material.

d. Cause(s) of spill.

e. Damage or injuries resulting from the spill.

f. Response and cleanup measures taken.

g. Any problems encountered.

h. Method of disposing of contaminated material.

i. Action taken to prevent the repeat of a similar spill.

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 spill.

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 decontaminant from mercury spill 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 mercury spill kit to spilled mercury and dispose as HM.

(4) Wipe down spill area with HgX solution from 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 mercury spill team.

(4) Use a mercury vapor meter to determine mercury vapor and degree of hazard, if possible.

(5) Apply absorbent material from mercury spill kit to spilled mercury and dispose as HM.

(6) Wipe down spill area with HgX solution from 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 mg/m3.

(9) Use the mercury vapor meter after 24 hours to determine mercury vapor concentration. An allowable concentration of <0.01 mg/m3 must be attained in any space to be continually occupied by an individual for 8 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.

CHAPTER B4

HEARING CONSERVATION

B0401. DISCUSSION

The goal of Hearing Conservation (HC) is to prevent occupational hearing loss and assure auditory fitness for duty of all Navy personnel.

Noise-induced hearing loss is the Fleet's number one occupational health hazard. High intensity noise exposure results from a wide variety of shipboard operations, including gun or missile fire, aircraft noise, and ship's propulsion systems. Operational risk assessment has shown that Fleet costs in terms of man hours, personal hearing protector purchases, and noise abatement operations are readily offset by the preservation of effective communication, maintained quality of life, and reduction in disability expense which accompany an effective HC process. As such, it is incumbent upon leadership to set the right example in their personal protective practices, to enforce compliance, and to ensure HC receives their full support.

B0402. HEARING CONSERVATION RESPONSIBILITIES

a. **The commanding officer shall** ensure that HC is established and maintained within the command.

b. **The safety officer shall**:

(1) Request assistance from an industrial hygienist or occupational audiologist to conduct noise measurement and exposure analysis (survey) of areas and equipment per paragraph B0404.

(2) Maintain a record of noise hazardous areas and equipment. The baseline or subsequent industrial hygiene surveys, where available, shall serve as documentation. Ensure that noise hazardous spaces/equipment are posted and labeled accordingly.

(3) Ensure that all permanent threshold shifts reported by medical department are logged. This log shall be periodically reviewed to determine any trends that could indicate inadequate use of hearing protection or uncontrolled overexposure to excessive noise levels.

c. **Industrial hygiene officers shall**:

(1) Maintain and ensure proper calibration of sound level measuring equipment.

(2) Annually, certify audiometric testing booths installed aboard the ships.

d. **Division officers shall**:

(1) Ensure personnel exposed to hazardous noise have and properly use hearing protection devices.

(2) Ensure that a space or piece of equipment that is designated as noise hazardous is properly posted and labeled.

(3) Ensure all personnel required to wear personal hearing protection are trained in the use and maintenance of that protective equipment, regardless of whether they require enrollment in HC.

(4) Ensure personnel report for scheduled audiometric testing and training.

(5) Ensure that personnel who require hearing retests are excluded from hazardous noise for at least 14 hours before the scheduled test date/time. Per appendix B4-A, hearing protective devices may not be used to meet this requirement.

(6) Coordinate with the medical department representative to identify personnel routinely exposed to hazardous levels of occupational noise.

e. **The Medical Department Representative (MDR) shall**:

(1) Coordinate with division officers to identify and maintain a current roster of personnel routinely exposed to hazardous levels of occupational noise, as guided by the baseline or other industrial hygiene surveys. In the absence of an appropriate industrial hygiene survey, or when it is clear that personnel have some level of exposure to hazardous noise, but on an infrequent or short-term basis, consult an industrial hygienist, occupational audiologist, or occupational medicine physician to determine the need for enrollment. The consultation may be informal (example, by email) as long as a printed record of the request and reply are available for retention by both parties. Convenience shall not be a criteria to determine inclusion in HC.

(2) Conduct orientation to HC and personal hearing protection for all hands during indoctrination.

(3) Ensure annual refresher training, per B0408b for the HC-enrolled personnel is performed. Reference B4-1 identifies suitable training materials and provides additional guidance.

(4) Consult the command industrial hygiene survey, or an occupational health professional to determine the type of required hearing protective devices required for personnel. Maintain an adequate stock and fit all sized, non-disposable hearing protective devices.

(5) Schedule personnel in HC for annual audiometric testing. Ensure that monitoring results have been entered into each individual’s health record, and that any necessary follow-up actions are completed.

(6) Ensure supervisors are notified that personnel who require hearing re-tests are excluded from hazardous noise duties for at least 14 hours prior to the scheduled test date/time. Hearing protective devices may not be used to meet this requirement.

(7) If audiometric testing is performed within the MDR’s command, ensure calibration of audiometers, certification of the test chamber, and training of audiometric technicians.

NOTE:

Reference B4-1 is available for additional information.

(8) Report all permanent threshold shifts toward deteriorated hearing, which have been determined to be consistent with occupational origin, to the safety officer. Report must include name, rate or rank, workcenter and time onboard.

f. **All hands shall**:

(1) Comply with hazardous noise labels wherever they appear, either in spaces or on equipment, and properly wear assigned hearing protective devices.

(2) Undergo hearing testing when designated.

B0403. HEARING CONSERVATION ELEMENTS

Hearing conservation includes the following elements:

a. Noise measurement and exposure analysis to identify hazardous noise areas or sources and the personnel exposed

b. Application of engineering controls to reduce hazardous noise to the maximum extent feasible

c. Use of hearing protective devices as an interim measure where engineering controls are not feasible (paragraph B0406)

d. Periodic hearing testing of all personnel at risk to monitor the effectiveness of the process, and timely audiologic and medical evaluation of those personnel who demonstrate significant hearing loss or threshold shift (paragraph B0407)

e. Training regarding potentially hazardous noise areas and sources, use and care of hearing protective devices, the effects of noise on hearing, and the command's HC process (paragraph B0408).

B0404. NOISE MEASUREMENT AND EXPOSURE ASSESSMENT

To effectively control noise, it is necessary that the noise be accurately measured according to standard procedures and that the measurements be properly evaluated against accepted criteria.

a. **Noise Measurements**. Noise measurements shall be taken as part of the industrial hygiene survey described in chapter A3 of this instruction. A noise survey is required if one has not been performed, if the ship has completed a repair availability with significant work done on engineering systems, or if new equipment has been installed. These measurements shall be taken by an industrial hygienist, occupational audiologist or by other trained personnel under the supervision of an industrial hygienist or occupational audiologist. Detailed information on noise measurements may be found in appendix B4-A. The safety officer shall retain a copy of noise measurement data per B0409.

b. **Exposure Assessment**

(1) The analysis of noise measurements to assess the hazard potential is a complex task that shall be performed by an industrial hygienist or occupational audiologist. The exposure assessment shall be accomplished per reference B4-2.

(2) The criteria outlined in appendices B4-A and B4-B shall also be used to determine the degree of compliance with applicable standards.

(3) In the absence of an industrial hygienist's or occupational audiologist's assessment to the contrary, personnel who routinely work in noise hazardous areas or with equipment that produces hazardous noise as defined in appendix B4-A, shall be included in HC. Implementation of all available measures may not be necessary in every case. For example, visitors to a noise

hazardous area should be required to wear hearing protective equipment, but would not be required to have their hearing tested or be included on a roster of noise-exposed personnel. See appendix B4-A for additional information.

(4) Information regarding removal of personnel from HC is provided in Appendix B4-A.

c. Labeling of Hazardous Noise Areas and Equipment

(1) Designated hazardous noise areas and equipment that produce hazardous sound levels (see appendix B4-A) shall be appropriately labeled. NAVMED 6260/2, Hazardous Noise Warning Decal (8" x 10") NSN 0105-LF-004-7200 and the NAVMED 6260/2A, Hazardous Noise Labels (2" x 2") NSN 0105-LF-004-7800, or their equivalents, are approved for marking hazardous noise areas and equipment.

(2) Normally the outside of doors/hatches leading into a noise hazardous area shall be posted. However, weather surfaces of a ship shall not be posted. In the event that a particular area is a noise hazardous area and has an entrance from a weather deck, the inside of the weather deck door/hatch shall be posted.

(3) Exteriors of military combatant equipment are excluded from this labeling requirement. However, personnel operating and maintaining combat equipment must be made fully aware of hazardous noise exposure conditions.

B0405. NOISE ABATEMENT

a. Reduction of noise at the source is in the best interests of the Navy and its personnel. Areas and equipment that contain or produce potentially hazardous noise should be modified to reduce noise levels to within acceptable limits wherever it is technologically and operationally feasible.

b. Noise abatement actions will normally be accomplished during ship or equipment design, construction or testing. Hazardous noise areas/equipment not identified during construction or post overhaul noise surveys are most likely due to malfunctioning equipment. Noise abatement actions recommended by the industrial hygienist or resulting from Board of Inspection and Survey (INSURV) inspections shall be documented as required in chapter A4 of this instruction, and implemented as soon as possible.

c. Additional information on noise abatement is available in appendix B4-C.

B0406. PERSONAL HEARING PROTECTIVE DEVICES

a. Personnel working in or entering designated hazardous noise areas or utilizing noise hazardous tools or equipment shall have hearing protective devices available at all times, and wear them without consideration of the duration of the exposure. Exceptions to this requirement must be documented by a qualified professional.

b. A combination of insert type and circumaural (muff) type hearing protective devices (double protection) shall be worn:

(1) In all areas where sound levels exceed 104 dB(A), unless an occupational audiologist, industrial hygienist, or occupational medicine physician has determined that single protection is adequate for the anticipated duration of the exposure.

(2) When a medical officer or audiologist determines that double protection is required.

c. All personnel exposed to gunfire in a training situation or to noise from large caliber gun or missile firing, under any circumstances, shall wear sufficient hearing protective devices to reduce noise at the ear to safe exposure levels.

d. Assistance in the determination of which hearing protective device, or combination of devices, suitable for use in each situation, is available from an occupational audiologist, industrial hygienist, or occupational medicine physician. Every effort shall be made to issue personal hearing protective devices suited to the location and duration of usage following the guidance contained in Appendix B4-D. Appendix B4-D identifies standard stock hearing protective devices. Alternative hearing protective devices that have been evaluated and approved by one of the Military Services are identified on the Navy Environmental Health Center (NEHC) homepage at http://www.nehc.med.-navy.mil.

e. For situations requiring unique hearing protection devices, guidance and approval shall be requested from Chief, Bureau of Medicine and Surgery (BUMED).

f. In cases where an industrial hygienist, occupational medicine physician or occupational audiologist determines that hearing protective devices do not provide sufficient attenuation to reduce the individual's effective exposure level to below 84 dB(A), administrative controls as discussed in appendices B4-B and B4-C will be required.

B0407. HEARING TESTING AND MEDICAL EVALUATION

Personnel who are routinely required to work in designated noise hazardous areas or with labeled noise hazardous equipment shall be entered into HC. Appendix B4-A provides detailed information on hearing testing.

a. **Reference (Baseline) Hearing Tests**. All personnel shall receive a baseline hearing test upon entry into naval service recorded on a Reference Audiogram (DD Form 2215). Hearing tests performed at Military Entrance Processing Stations (MEPS) shall not be used as a baseline hearing test.

b. **Monitoring Hearing Tests**. All personnel assigned to duties in designated noise hazardous areas or operating noise hazardous equipment shall be included in HC. These persons shall receive a hearing test annually, unless their exposure has been found to be of insufficient intensity and/or duration to require enrollment, based on a noise survey or the written opinion of an appropriate occupational health professional. Test results shall be recorded on a Hearing Conservation Data Form (Form DD 2216). Placement in HC and annual hearing tests shall continue for as long as the person remains in a noise hazardous environment.

c. **Termination Hearing Tests**. Personnel shall receive a hearing test upon termination of service.

d. **Other Hearing Tests**. Hearing tests performed for reasons other than hearing conservation or routine physicals, such as complaints of hearing difficulties, difficulty understanding conversational speech or a sensation of ringing or fullness in the ear(s), shall be performed as indicated by a Medical Provider. The results of these tests should be recorded on a Standard Form (SF 600) and maintained in the health record.

B0408. TRAINING

a. All personnel included in HC shall receive training relative to HC prior to working in noise hazardous areas or with noise hazardous equipment and annually thereafter. Initial training topics shall include:

(1) The elements and rationale for HC including the effects of noise on hearing

(2) Designated noise hazardous areas and equipment

(3) Proper use and maintenance of hearing protective devices, including the advantages and disadvantages of each type of device

(4) The necessity for periodic hearing testing, and a description of test procedures

(5) Mandatory requirement to wear assigned protective equipment, and administrative actions that may result from failure to comply

(6) Off-duty hearing health hazards

(7) The effects of hearing loss on career longevity, promotion and retention.

b. Refresher training for the HC-enrolled personnel will be performed in conjunction with the annual audiogram. Reference B4-1 identifies suitable training materials and provides additional guidance.

B0409. RECORDKEEPING

a. Results of hearing tests performed for hearing conservation purposes and the results of exposure assessments shall be permanently recorded and retained in the member's health record. Baseline and reference audiograms which have been superceded as a result of the follow-up process shall be retained in the individual's health record along with relevant evaluation, disposition and referral notations.

b. Activities using the Defense Occupational Health Readiness System-Hearing Conservation (DOHRS-HC) will upload their data to the warehouse as directed by the regional occupational audiologist. Activities that do not use DOHRS-HC should contact NAVENVIRHLTHCEN for guidance in including test data in the Hearing Conservation Database.

c. The MDR shall maintain a current roster of personnel who routinely work in designated noise hazardous areas and shall update this roster semi-annually. The MDR shall maintain a "tickler file" for scheduling annual audiometric examinations of these personnel. The MDR shall update the "tickler file" monthly with the results of the audiometric exams.

CHAPTER B4

REFERENCES

B4-1 NEHC Technical Manual, TM-6260.51.99-1, Navy Medical Department Hearing Conservation Program Procedures (NOTAL)

B4-2 NEHC Technical Manual, TM-6290.91-2, Rev. B (1999), Industrial Hygiene Field Operations Manual (NOTAL)

B4-3 American National Standard Specification for Sound Level Meters, S1.4A-1985, American National Standards Institute (NOTAL -- Should be held by commands with sound level meters).

B4-4 American National Standard Specification for Personal Noise Dosimeters, S1.25-1991, American National Standards Institute (NOTAL -- Should be held by commands with personal noise dosimeters).

B4-5 DODINST 6055.12 of 22 April 1996, “DOD Hearing Conservation Program (HCP)” (NOTAL)

B4-6 American National Standard Specification for Audiometers, S3.6-1989, American National Standards Institute (NOTAL -- Should be held by commands with audiometers).

B4-7 OPNAVINST 4720.2G, "Fleet Modernization Program Policy".

Appendix B4-A

HEARING CONSERVATION DETAILED INFORMATION

This appendix provides detailed information regarding hearing conservation that will be of value to the ship's Medical and Safety Departments.

1. **Navy Occupational Exposure Level (NOEL)**. The NOEL for occupational exposure to noise is listed below:

a. For an 8-hour time-weighted average (TWA) in any 24-hour period: 84 dB(A)

b. For periods of less than 16 hours in any 24-hour period, the NOEL can be determined from the following equation:

$$T = 16/2\ [(L - 80)/4]$$

Where: T = time in hours (decimal)

L = effective sound level in dB(A)

NOTE:

When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect must be considered. If the sum of the following expression exceeds unity, then the mixed exposure exceeds the NOEL:

$$C1/T1 + C2/T2 + \ldots Cn/Tn$$

Where C indicates the total time of exposure at a specified noise level and T represents the time of exposure permitted at that level.

c. For impact or impulse noise - 140 dB(A) peak sound pressure level.

d. When TWA exposures are likely to exceed 84 dB(A), then personnel shall be included in Hearing Conservation.

2. **Noise Measurements and Exposure Assessments**. To effectively control noise it is necessary to accurately measure noise according to standard procedures and properly evaluate the measurements against accepted criteria.

a. **Noise Measurements**. Noise measurements shall be taken as a part of the industrial hygiene survey described in chapter A3.

(1) Sound level meters shall conform, at a minimum, to the Type II requirements cited in reference B4-3. An acoustical calibrator, accurate to within plus or minus one decibel, shall be used to calibrate the instrument before each survey and to revalidate the calibration at the conclusion of the survey. The sound level meter and acoustical calibrator will be electroacoustically calibrated annually. Contact NAVENVIRHLTHCEN Norfolk to schedule the calibration of this equipment.

(a) Continuous or intermittent steady state noise shall be measured in dB(A) with a sound level meter set for slow response. Whenever levels in excess of 84 dB(A) are recorded, C-weighted measurements, dB(C) shall also be taken to permit more accurate determination of hearing protector attenuation requirements.

(b) Impact or impulse noise shall be measured as dB peak sound pressure level (reference: 20 µPa) with an instrument capable of accurate impact noise measurement. Reference B4-3 provides specific details.

(2) In cases where high worker mobility, significant variations in sound levels, or a significant component of impulse noise make area monitoring generally inappropriate, personal dosimetry shall be conducted. Personal noise dosimeters shall meet the class 2A-84/80-4 requirements of reference B4-4 and have an operating range of at least 80 dB(A) to 130 dB(A).

(3) Work environments found to have noise levels greater than 84 dB(A) (continuous or intermittent), or 140 dB peak sound pressure level for impact or impulse noise shall be analyzed to determine the potential hazard and shall be resurveyed within 30 days of any significant modifications or changes in work routine which could impact/alter the noise intensity/exposure level.

(4) All noise measurements taken to determine an individual's exposure shall be conducted with the microphone of the measuring instrument placed at a height which most closely approximates the position/location of the worker's ear during normal working conditions. Repeated measurements may be required during a single day and/or on different days of the week to account for the variations in noise levels produced by changes in operational schedules and procedures.

(5) The record of noise measurements shall be kept by the measuring activity for a period of 50 years. If measurements are made by a ship's IHO, the records shall be turned over to a supporting shore medical activity for retention. The shore activity will establish a file for each ship. Records shall include, as a minimum the number, type, and location of the noise sources; number and identification of personnel in the work area and their daily noise exposure and duration; type, model, serial number of test equipment, and calibration data; location, date, and time of noise measurements; noise levels measured and hazard radius; and the name and signature of the person(s) who made the survey. Noise survey data may be recorded on NEHC 5100/17 and 5100/18 or DD 2214 as applicable.

b. **Exposure Assessment.** The specialized equipment to be used by an industrial hygienist or occupational audiologist may include octave band analyzers, recorders and personal noise dosimeters.

(1) The criteria outlined in paragraph 1, Navy Occupational Exposure Limits (NOEL) shall be used to determine the degree of compliance with applicable standards.

(2) A noise hazardous area is defined as:

(a) Any work area where the A-weighted sound level (continuous or intermittent) is routinely greater than 84 dB(A).

(b) Any work area where the peak sound pressure level (impulse or impact noise) routinely exceeds 140 dB.

NOTE:

Routinely is defined as those areas/equipment where the noise is of sufficient intensity and duration that it can reasonably be expected exposure will result in a loss of hearing sensitivity.

(3) Noise hazardous equipment is that which produces sound levels greater than 84 dB(A) or 140 dB peak sound pressure level.

(4) Per reference B4-5, 8-hour time-weighted average (TWA) noise levels shall be determined for all personnel working in noise hazardous areas at least once during assignment and within 30 days of any change in operations affecting noise levels.

(5) A risk assessment code (RAC) shall be assigned to all potentially hazardous noise areas and operations (see chapter A4). This will normally be accomplished as part of the Industrial Hygiene Surveys described in chapter A3.

(6) Since there are a wide variety of noise measuring instruments in use, any one of the following methods should be used. In each case, it is necessary to take a sufficient number of measurements to achieve a representative noise sample.

(a) When using a dosimeter that is capable of C-weighted measurements:

1. Obtain the C-weighted dose for the entire workshift, and convert to TWA sound level (see dosimeter instruction manual for conversion table).

2. Subtract the NRR from the C-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

(b) When using a dosimeter that is not capable of C-weighted measurements, the following method may be used:

1. Convert the A-weighted dose to TWA (see dosimeter instruction manual).

2. Subtract 7 dB from the NRR value.

3. Subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

(c) When using a sound level meter set to the A-weighting network:

1. Obtain the A-weighted TWA.

2. Subtract 7 dB from the NRR and subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

(d) When using a sound level meter set on the C-weighting network:

1. Obtain a representative sample of the C-weighted sound levels in the environment.

2. Subtract the NRR from the C-weighted average sound level to obtain the estimated A-weighted TWA under the ear protector.

The effective reduction of any combination of insert plugs with circumaural muffs (double protection) is considered to be approximately 30 dB. If the result of subtracting the estimated reduction value of a particular device or combination of devices from the measured workplace sound level is determined

to be below 84 dB(A) or 140 dB peak, the protection is considered to be adequate. However, should the 8-hour (protected) TWA exceed 84 dB(A), administrative controls shall be instituted to reduce personnel exposure to acceptable levels.

c. **Removal of Personnel from Hearing Conservation**. A conservative approach will be taken in making a decision to remove personnel from hearing conservation.

(1) Judgments shall be based on repeated and representative measurements that indicate that the individual is exposed to less than 70 percent noise dose or has an 8-hour time-weighted average (TWA) of less than 82 dB(A). This ensures, with an approximate 95 percent confidence level, that individuals will not be overexposed.

(2) Recommendations for removal of individuals who are already included in the hearing conservation will be made only by professionals qualified to perform or evaluate noise exposure assessments. In no case will individuals already included in hearing conservation be disenrolled based upon exposure assessment alone without concurrence from an audiologist or qualified physician. Such concurrence is necessary to avoid exclusion of personnel who are noise susceptible or at exceptional risk due to pre-existing hearing loss. See paragraph 4d for hearing tests for personnel being removed from hearing conservation.

3. **Personal Hearing Protective Devices**. In cases where personal hearing protection devices do not sufficiently reduce personnel effective exposure levels to less than 84 dB(A) administrative control of exposure time will be necessary. A table of noise exposure limits is found in appendix B4-B.

4. **Hearing Testing and Medical Evaluation**

a. **Hearing Test**. Audiometers used in the performance of hearing tests shall conform to the standards defined in the most current edition of reference B4-6. Hearing tests shall be pure tone, air conduction hearing threshold examinations to include, as a minimum, test frequencies of 500, 1,000, 2,000, 3,000, 4,000 and 6,000 Hz and shall be taken separately for each ear. Tests shall be performed by an audiologist, otolaryngologist, qualified physician or by a person certified by the NAVENVIRHLTHCEN Norfolk or the equivalent organization of another U.S. military service. Hearing tests shall be conducted in an audiometric chamber with internal ambient sound levels not exceeding those prescribed in reference B4-5.

(1) Audiometric booths must be certified annually by an industrial hygienist, audiologist or other qualified personnel under their direct supervision.

(2) The use of noise excluding audiometric earphones is not permitted to augment the performance of a deficient (e.g., non-certifiable) audiometric test room. Their use for minimizing ambient noise masking effects during testing is allowed within a certified room.

b. **Reference (Baseline) Hearing Tests**

(1) All personnel included in hearing conservation shall have a reference hearing test (form DD 2215) in their medical record.

(2) All reference hearing tests shall be preceded by at least 14 hours without exposure to workplace noise. This requirement may not be met by wear-

ing hearing protective devices. Reference (baseline) hearing tests will not be conducted if there is evidence of a transient medical condition that would affect hearing threshold.

(3) Personnel who do not have a reference audiogram filed in their health record shall not be assigned to duty in a designated hazardous noise area involving exposure to hazardous noise until a reference hearing test has been performed. In these cases, hearing threshold levels in either ear in the excess of an average of 25 dB for the frequencies of 500 - 3000Hz or 45dB at any frequency greater than 4000Hz must be evaluated by an audiologist.

c. **Monitoring Hearing Test**. All personnel included in hearing conservation will receive annual monitoring hearing tests for as long as they remain enrolled, unless otherwise indicated in the following paragraphs. Additional hearing tests may also be conducted when there are individual complaints of hearing difficulties, i.e., difficulty in understanding speech or a sensation of ringing or fullness in the ear(s). At the discretion of an audiologist or medical officer, evaluation and medical record entries will be necessary to discover and document the existence of occupational versus non-occupational etiology.

NOTE:

All personnel shall bring their personal hearing protective devices with them when they report for monitoring audiometry.

(1) Consult reference B4-1 for detailed Medical Department guidance for the provision of monitoring audiometry, follow-up testing, and case management of personnel with noise-induced hearing loss.

(2) The monitoring audiogram shall be compared to the most current reference audiogram to determine if a significant threshold shift (STS) has occurred.

(a) Significant threshold shift (STS) is defined as a change of 15 dB or greater at any test frequency from 1000 to 4000 Hz in either ear or a change in hearing averaging 10 dB or more at 2000, 3000 and 4000 Hz in either ear.

(b) When an STS is identified, additional monitoring hearing tests shall be performed to determine if the threshold shift is temporary or permanent in nature. The member's division officer or MDR will be informed of the time and place for follow-up testing.

(c) A significant threshold shift will be considered permanent when so determined by an audiologist or appropriately trained physician. Individuals will be informed in writing within 21 days of any permanent threshold shift toward deteriorated hearing. When the permanent threshold shift results from exposure to hazardous noise levels, the hearing loss shall be reported to the safety officer and department head by memo that a possible breach in the Hearing Conservation control procedures has occurred, resulting in a hearing loss.

(3) Any individual who has hearing loss in both ears in which the sum of thresholds at the frequencies of 3000, 4000 and 6000 Hz exceeds a total of 270 dB or has their reference hearing test (form DD 2215) re-established three times will not be assigned to duties involving exposure to hazardous noise until evaluated and waived by an audiologist, otologist, or occupational medicine physician.

d. **Removal Hearing Tests.** Individuals who are removed from hearing conservation will be given a hearing test to document auditory status at the time of removal from noise hazardous duties. Results of this test will be recorded on DD 2216.

e. **Disposition Following Monitoring Hearing Tests.** Pure tone air conduction monitoring hearing tests are designed to detect small changes in hearing and identify problems before the individual suffers hearing loss that interferes with verbal communications. Detection is made by comparing the current monitoring audiogram with the reference audiogram to determine STS.

(1) Annual

(a) If the annual audiogram shows no significant threshold shift, the individual shall be returned to duty and recalled for hearing testing in 1 year.

(b) If the annual audiogram shows STS toward improved hearing, then the individual should be re-tested immediately to determine if the baseline/reference test was in error, hearing has actually improved, or the annual test was invalid. If the repeat audiogram continues to show STS and is plus or minus 5dB from the annual test, re-establish the reference based on the first follow-up test and repeat the test in 1 year. Nothing else is required.

(c) If the annual audiogram shows a significant threshold shift toward deteriorated hearing, then the individual must be re-tested following at least 14 hours of exclusion from noise levels in excess of 80 dB(A). Because the presence of a STS implies that hearing protective equipment used may be inadequate, physical exclusion from noise may not be accomplished by the use of hearing protective equipment. The physical exclusion period is referred to as "auditory rest." The required 14 hours of "auditory rest" is usually sufficient to allow a temporary STS to return to pre-exposure levels.

(2) Follow-up No. 1

(a) If the first follow-up audiogram shows no significant threshold shift relative to the reference audiogram (ie. STS has resolved), personnel shall have their hearing protective devices refitted, be re-indoctrinated in their use, and returned to duty to be recalled for a hearing test in 1 year.

(b) If the first follow-up supports the existence of STS, then a possible conductive or mechanical basis for the shift must be ruled out before proceeding with follow-up. The preferred method to rule out conductive hearing loss is through screening tympanometry and otoscopy, provided by the audiometric technician or MDR. Subjects who demonstrate normal otoscopy and tympanometry should have that fact noted on a SF 600, and may then immediately receive their second follow-up hearing test. If tympanometry is unavailable, then any health care provider can provide examination and clearance to continue the audiometric test sequence. Otoscopic/tympanometric anomaly requires medical evaluation prior to resuming the test sequence. Again, the second follow-up may be given on the same day as the first follow-up if middle ear function is normal.

(c) At any point in the monitoring process, a health care provider has the option of discontinuing the sequence and referring the patient to an audiologist for further evaluation, if results appear invalid or a severe condition is suspected.

(3) Follow-up No. 2

(a) If the second follow-up test shows no STS relative to the reference audiogram, personnel shall have their hearing protective devices refitted, be re-trained in their use, and be returned to duty.

(b) If the second follow-up test continues to show STS relative to the reference audiogram, the health care provider will refer the individual for diagnostic evaluation or consultation with an audiologist. However, for personnel who continue to demonstrate essentially normal hearing sensitivity despite their threshold shift, the audiologist or suitably trained physician who would otherwise receive the referral may elect to provide a written protocol for case management. The protocol may include the option of shipboard counseling and revision of the reference audiogram without additional testing or review.

f. **Termination Hearing Tests**. Personnel shall receive a hearing test upon termination of service.

Appendix B4-B

ADMINISTRATIVE CONTROL OF NOISE EXPOSURE WITH HEARING PROTECTIVE DEVICES (STAY TIME)

Sound level	Limiting time (hr:min per 24 hour day) Hearing protector noise reduction (dB)			
dB(A)	10	20	30	40
90	16	--	--	--
94	8	--	--	--
98	4	--	--	--
102	2	11:18	--	--
106	1	5:39	--	--
110	0:30	2:49	16	--
114	0:15	1:25	8	--
118	--	0:42	4	--
122	--	0:21	2	11:18
126	--	--	1	5:39
130	--	--	0:30	2:49
134	--	--	0:15	1:25
138	--	--	--	0:42

NOTE: Values other than those given above may be calculated using the formula:

$$T = 16/2\ [(L-80)/4]$$

Where: T = Time in hours (decimal)
L = Effective sound level, (dB(A))

Intermediate values may be interpolated by adding or subtracting the decibel difference to the appropriate column.

Appendix B4-C

ADDITIONAL NOISE ABATEMENT INFORMATION

1. **Introduction.** The primary means of protecting Navy personnel from hazardous noise levels shall be through the application of engineering controls. Administrative controls (e.g., the adjustment of work schedules to limit exposure) are also effective but often result in some loss in productivity. Personal protective equipment (earplugs or muffs) shall be the permanent solution only when engineering or administrative controls are considered to be infeasible or cost prohibitive. General hazard (including noise) control techniques are discussed in more detail in chapter A3; therefore, this chapter will address only specific concepts.

2. **Preventive Measures.** It is much less costly to eliminate potential noise problems in the design or procurement stage for new processes, equipment, and facilities than it is to make retrofits or modifications after the fact. The following guidance is provided to meet this objective.

a. **Procurement specifications** for all new machinery and equipment to be located in spaces where personnel are required to perform work shall prescribe the lowest noise emission level that is technologically and economically feasible. The objective is to ensure, if feasible, an A-weighted sound level of 84 dB or less at all locations in which personnel are required to work.

b. **New ship design**

(1) Low noise emitting equipment and acoustical treatment shall be incorporated during the various design stages for all new construction ships so that the equivalent noise level at watchstander stations is less than 84 dB(A) under full power operating conditions where economically and technologically feasible. In any case, watchstander stations will not exceed a maximum, equivalent noise level of 90 dB(A) at the sustained speed operating conditions.

(2) Procurement specifications for all new machinery and equipment to be located in spaces where personnel are required to perform work shall prescribe the lowest noise emission level that is technologically and economically feasible. The objective is to ensure, if feasible, an A-weighted sound level of less than 84 dB at all locations in which personnel are required to work.

c. **Repeat ship design.** The policy cited above shall apply and incorporate the noise control technology learned from previous ship designs.

d. **Ship alteration.** Ship alteration prioritization policy established in reference B4-7 shall form the basis of selecting ships for noise control. All watchstander stations in machinery spaces will not exceed a maximum, equivalent noise level of 90 dB(A) under full power operation conditions where economically and technologically feasible. In any case, watchstander stations will not exceed a maximum, equivalent noise level of 90 dB(A) at sustained speed operating conditions.

e. The policy stated in paragraphs 2b, c, and d does not apply to high performance ships, experimental ships or special purpose ships for which noise reduction technology application is not feasible. In these uniquely military situations, COMNAVSEASYSCOM, in conjunction with BUMED, will study and develop suitable noise requirements, engineering controls, and hearing protective de-

vices to protect personnel from hazardous noise levels based on ship operating requirements and personnel rest-duty cycles.

3. **Abatement of Existing Noise Hazards**

a. Abatement of hazardous noise levels shall be undertaken, to the extent possible or practicable, by one or more of the following methods:

(1) By engineering design to eliminate or reduce the noise level of machinery, equipment, and other operating devices/facilities to acceptable levels

(2) By damping the noise by means of lamination, mufflers, mountings, couplings, supports, insulation or application of acoustic materials

(3) By acoustical enclosure of the noise producer

(4) By isolation of the noise producer to a point where the noise will affect fewer personnel

(5) By substitution of less noisy operations (e.g., welding in lieu of riveting)

(6) By administrative controls which limit exposure (e.g., control of work schedules).

Appendix B4-D

HEARING PROTECTIVE DEVICES

	Manufacturers Nomenclature/NSN	Type of Protector	Federal Nomenclature
1	Ear Defender V-51R 6515-00-442-4765	Insert Earplug (sized)	Plug, Ear, Noise Protection 24's (X-Small) (White)
2	Ear Defender V-51R 6515-00-467-0085	Insert Earplug (sized)	Plug, Ear, Noise Protection 24's (Small) (Green)
3	Ear Defender V-51R 6515-00-467-0089	Insert Earplug (sized)	Plug, Ear, Noise Protection 24's (Medium) (Intl. Orange)
4	Ear Defender V-51R 6515-00-442-4807	Insert Earplug (sized)	Plug, Ear, Noise Protection 24's (Large) (Blue)
5	Ear Defender V-51R 6515-00-442-4813	Insert Earplug (sized)	Plug, Ear, Noise Protection 24's (X-Large) (Red)
6	Comfit, Triple Flange 6515-00-442-4821	Insert Earplug (sized)	Plug, Ear, Noise Protection 24's (Small) (Green)
7	Comfit, Triple Flange 6515-00-442-4818	Insert Earplug (sized)	Plug, Ear, Noise Protection 24's (Medium) (Intl. Orange)
8	Comfit, Triple Flange 6515-00-467-0092	Insert Earplug (sized)	Plug, Ear, Noise Protection 24's (Large)(Blue)
9	Silaflex (Blister Pack) 6515-00-133-5416	Non-Hardening Silicone	Plug, Ear, Noise Protection, Cylindrical, Disposable 200's
10	EAR or Deci-Damp 6515-00-137-6345	Foam Plastic Insert	Plug, Ear, Noise Universal Size, Yellow 200 pr
11	Sound-Ban 6515-00-392-0726 6515-00-181-8058	Headband, Earcaps	Plug, Ear, Hearing Protection Universal Size
12	Straightaway Muffs 4240-00-759-3290 4240-00-674-5379 4240-00-979-4040	High Performance Circumaural Muffs For 9 AN/2 For 9 AN/2	Aural Protector Sound 372-9 AN/2 Replacement Filler, Dome Replacement Seal, Dome

	Manufacturers Nomenclature/NSN	Type of Protector	Federal Nomenclature
13	Ear Plug Cases 6515-01-100-1674	--	Case, Earplug
14	Circumaural Muff 4240-00-22-2946	Type II Headband/Napeband	Aural Protector, Sound

POSITIVE AND NEGATIVE FEATURES OF HEARING PROTECTIVE DEVICES

Type Wear	Positive	Negative	Length of Wear
Earplug (V-51R or Triple Flange)	After adaptation can be used for long periods. Relatively inexpensive	Individual fitting by medical personnel. May cause initial soreness/irritation	Long term (3-4 hours)
Headband Ear Caps (Sound-Ban)	Quickly fitted without touching	Uncomfortable after 1 hour	Short term. Easily carried
Disposable Plugs (Silaflex, E.A.R., or Decidamp)	Comfortable. Universal fit. Effective if properly used	Easily soiled. Relatively expensive. Often poorly inserted, reducing effectiveness	Typically short term, but comfortable for extended wear
Circumaural Muffs	Comfortable. May be worn over plugs. Most universal fit for most users	Expensive. Heavy. Difficult to carry. Fit may be compromised by long hair or eyeglasses	Long or short-term

One single type of hearing protective device will not meet the needs of all noise-exposed personnel. The appropriate type of hearing protective device should be selected based upon a consideration of the factors listed above in addition to the degree of attenuation required in a particular situation. The most convenient method of making this determination is the Noise Reduction Rating (NRR) developed by the Environmental Protection Agency (EPA). The NRR is usually shown on the hearing protector package. The NRR is then related to an individual worker's noise environment in order to assess the adequacy of the attenuation of a given hearing protector.

CHAPTER B5

SIGHT CONSERVATION

B0501. DISCUSSION

a. Navy policy requires personnel working in eye-hazard areas or operations be provided adequate eye protection at government expense. Examples of potentially eye hazardous operations are: cutting and welding, drilling, grinding, milling, chipping, sand blasting, or other dust and particle producing operations and pouring or handling molten metals or corrosive liquids and solids. Personnel in the immediate vicinity of such operations or entering a posted eye hazard area shall wear eye protective equipment.

b. Devices for eye protection, such as safety glasses, chipper's goggles, welder's goggles, chemical goggles, and face shields, shall be selected using the guidance provided in appendix B5-A. This appendix complies with references B5-1, B5-2, and B5-3. As a minimum, the protective devices provided shall be approved by the American National Standards Institute (ANSI), labeled "Z-87", and adequate for the hazards specified.

c. Refer to specific chapters for eye protection guidance.

B0502. PROGRAM RESPONSIBILITIES

a. **The safety officer shall**:

(1) Evaluate areas, processes, and equipment for sight hazards if not previously evaluated or modifications have been made. Determine appropriate sight protective equipment per the baseline industrial hygiene survey, or appendix B5-A. Assistance may be requested from an industrial hygienist if difficulty in making such a determination is experienced.

(2) Maintain a current listing of all areas and processes that require eye protection and those areas that require eye wash or deluge shower facilities. A list of eye hazardous areas and processes is provided in the baseline industrial hygiene survey, and shall be updated as needed.

b. **Division officers shall**:

(1) Ensure that areas identified as eye hazardous are properly marked and labeled.

(2) Ensure personnel use proper eye protective devices when required.

(3) Ensure that personnel who work in eye hazard areas or operations are trained on the need for and proper use of protective eyewear and on the location and use of eyewash facilities.

(4) Refer personnel who wear corrective eyewear and work in eye hazard areas to obtain prescriptive safety eyewear from the medical department.

c. **The MDR shall** provide personnel who require corrective lenses and work in eye hazard areas, with prescription eyewear with side shields that meet the requirements of ANSI Z-87.1.

d. **All hands shall**:

(1) Comply with posted eye hazard warning labels.

(2) Properly wear required eye protective equipment.

B0503. SIGHT CONSERVATION ELEMENTS

a. List of Eye Hazard Areas/Processes

b. Medical Screening

c. Issue and maintenance of sight protection equipment (paragraph B0506)

d. Procedures for the use and issue of temporary eyewear (paragraph B0507)

e. Establishment of emergency eyewash facilities (paragraph B0508)

f. Training (Paragraph B0509)

B0504. DETERMINATION AND DESIGNATION OF EYE-HAZARDOUS AREAS/PROCESSES

a. **Determination**. The baseline industrial hygiene survey will make an initial determination of eye-hazardous areas/processes and list them in the survey report. The safety officer will maintain and ensure that this list(s) remains current. The safety officer shall evaluate subsequent equipment/work processes introduced into the workplace to determine if they present an eye hazardous condition. The safety officer will request the assistance of an industrial hygienist, to assist in this determination, as needed.

b. **Designation**. The ship (or construction/repair yard) shall mark permanently installed equipment and processes that are eye-hazard areas with 3-inch deck striping and a CAUTION sign. The deck around an immediate eye hazard shall be marked with a 3-inch black and yellow striped or checkerboard tape. This tape is available under NSN 9Q/9905-01-342-5934 (checkerboard) or 9Q/9905-01-342-5933 (striped). Mount the sign directly above the hazard, component, machinery, boundary bulkhead, or door in a conspicuous location. The CAUTION sign shall conform to NSN 9Q/9905-01-100-8203, "CAUTION, Eye Protection Required In This Area". Eye hazard signs or labels are also available through open purchase.

B0505. MEDICAL SURVEILLANCE

Medical surveillance is required only for personnel covered by chapter B9.

B0506. ISSUE AND MAINTENANCE OF SIGHT PROTECTION EQUIPMENT

a. **Issue**. The ship shall provide and issue appropriate eye protection at government expense. The list of eye hazards the safety officer maintains identifies required eye protective equipment. All eye and face protection including safety glasses (frames), chemical splash goggles, welding and chipping goggles, welding helmets, and face shields shall be labeled "Z-87", indicating compliance with American National Standards Institute (ANSI) Standard Z-87. Such eye and face protection equipment is available through the supply system. Appendix B5-A contains information that describes the types of protective eyewear frequently used on board ships.

NOTE:

Flight deck goggles are not ANSI-approved and, therefore, not authorized for use other than for flight operations.

b. **Prescription Protective Eyewear**. Prescription protective eyewear shall be obtained through the medical department. Open purchase procedures may be used to obtain refractive services and prescription safety lenses. The Eyewear Prescription Form, DD 771, will be used in all services and equipment procurement. The prescription and procurement forms shall be entered into the crew member's medical record.

c. **Maintenance of Protective Eyewear.** Personnel shall maintain personal protective eyewear in a clean and fully operational condition. Before re-issue, non-corrective eye protection shall be sanitized with hot, soapy water and rinsed of all traces of soap or detergent. Eye protection equipment should then be immersed for 10 minutes in a disinfectant, rinsed, and air-dried. Personnel shall immediately report damage to protective eyewear to their work center supervisor.

B0507. TEMPORARY PROTECTIVE EYEWEAR

Where protective corrective eyewear is necessary, the command shall provide planos or goggles to visitors and others who must enter or pass through eye hazardous areas. In addition, the command shall provide them to personnel awaiting corrective/protective eyewear.

B0508. EMERGENCY EYEWASH FACILITIES

a. The ship shall have an adequate number of properly maintained and inspected eyewash facilities, installed in appropriate locations, and properly posted with signs identifying their locations. Approved emergency eyewash equipment shall be capable of flushing the eyes with potable water at a minimum flow rate of 0.4 gallons per minute for 15 continuous minutes. The velocity of the water shall be low enough not to be injurious to the user's eyes. All emergency eyewash and shower equipment must be maintained through the Planned Maintenance System (PMS). Potable water valves to eyewash stations and deluge showers shall be locked open and marked as a "W" fitting.

b. For propulsion plant spaces of nuclear powered submarines, eyewash bottles may be used in lieu of permanent or portable eyewash stations and shall be readily available in nucleonics/water chemistry rooms and secondary analysis stations. Approved eyewash bottles are available through the standard stock system under NSN 6515-01-393-0728 or 6540-01-353-9946.

c. Clearly mark eyewash stations with a green sign with white lettering stating “EMERGENCY EYEWASH STATION”. These signs are available through the standard stock system under NSN 9905-01-345-4521. Post signs in a visible location close to the eyewash unit.

d. The MDR shall examine crew members following the emergency use of an eyewash or shower equipment.

e. **Combination Shower/Eyewash Units.** As specified in reference B5-1, a combination of emergency shower with eyewash or eye/face wash unit with drain and stay-open valve shall be available in all areas where the eyes of crew members may be exposed to corrosive materials. These locations include:

(1) Oxygen-nitrogen producer room

(2) Battery shop

(3) Battery locker

(4) Boiler repair shop

(5) Rubber and plastic shop

(6) Composite material repair shop

(7) Non-destructive test and inspection shop

(8) Other ship non-weapon spaces the safety officer determines.

f. **Eye/Face Wash Units**. On surface ships an eye/face wash unit shall be installed in:

(1) Main and auxiliary machinery spaces

(2) Medical

(3) Chemical laboratories

(4) Darkrooms if liquid chemicals are used

(5) Hazardous material issue/storerooms

(6) Paint Mixing and Issue Rooms

(7) Other areas the safety officer determines.

All units shall be available in easily accessible, unobstructed locations situated as close as possible to the hazard. In no instance shall the unit be located in an area that requires more than 10 seconds to reach and is no more than 100 travel feet from the hazard. Adjacent spaces may share a single emergency shower or eye/face wash unit, provided it meets the time and distance criteria discussed above.

g. **Portable Eyewash Stations**. For those spaces that require an emergency shower, eyewash, or eye/face wash, but where potable water and drainage is not provided, the ship shall properly install a self-contained eyewash . They may order the gravity-fed eyewash stations under NSNs 4240-01-258-1245 and 4240-01-234-1796.

h. The MDR shall examine crew members in sick bay following the emergency use of an eyewash unit or deluge shower.

i. **Remotely Located Eyewash Facilities**. Permanently plumbed emergency showers, eyewashes, and eye/face washes located in remote or minimally manned areas shall be provided with a visual and audible alarm interlocking with the activation device of the unit. The alarm shall be located in one of the following appropriate areas: outside of the protected area or shop, in the associated Enclosed Operating Station (EOS), in a nearby manned space, or in Damage Control Central.

NOTE:

For remotely located eyewash facilities without a visible and audible alarm, the two-man rule shall be observed when eye-hazard operations are being performed until the alarm system is installed. A label plate shall be placed at eye level in the immediate vicinity of the visual alarm and shall be inscribed:

WARNING

WHEN THE EMERGENCY SHOWER (EYEWASH, EYE/FACE WASH) IN (SHOP OR SPACE LOCATION) HAS BEEN ACTIVATED, PROVIDE IMMEDIATE PERSONNEL ASSISTANCE AND NOTIFY SICK BAY.

B0509. TRAINING

The division officer or workcenter supervisor shall perform training for personnel assigned to workcenters with eye hazard areas/processes at the time that protective eyewear is issued. Training materials are available through the NAVOSHENVTRACEN at www.norva.navy.mil/navosh. Topics they shall cover in the training program include:

a. Types of eye hazards

b. Types of eye protection

c. Eyewash location and proper use (particularly personnel working with corrosive materials)

NOTE:

No attempt should be made to remove a particle lodged in the eyeball, or wash an eye that has been cut in any way. Contact the medical department immediately.

CHAPTER B5

REFERENCES

B5-1 General Specification 644c (NOTAL)

B5-2 Military Specification DOD-G-51510: "Goggles, Industrial, Eyecup and Lenses; Goggles, Industrial (Metric)" (NOTAL)

B5-3 Military Standard 1434: "Goggles, Industrial, Safety" (NOTAL)

Appendix B5-A

TYPES OF PROTECTIVE EYEWEAR

Appropriate eye and face protection is required in all areas that are designated as eye hazardous. A selection chart for eye and face protection for different work operations, and a welding filter shade protection chart, are shown in tables B5-A-1 and -2. The following is a short description of the various types of protective eyewear:

a. **Safety Glasses/Spectacles**. Safety glasses are to be worn in those areas where there is a possibility of flying objects, particulates, mists, or vapors entering the eye. Those spectacles with suitable filter lenses are permitted for use with gas welding operations on light work and for inspections. Spectacle-type goggles are made both with and without metal side-shields and may have either a rigid nonadjustable or adjustable metallic bridge.

b. **Chemical Goggles**. Chemical goggles provide the eyes and eye area with protection from liquids, splashes, mists, and spray. Goggles may consist of a flexible frame or a rigid frame with a separate, cushioned fitting surface, and are held in place with a supporting band. Chemical goggles with ventilation must be splash resistant.

c. **Welding Goggles**. Welding goggles provide protection against glare and injurious radiation, as well as from flying objects, chips, and metal splashes. Eyecup-type goggles are designed to be worn alone, while cover-type goggles are designed to fit over corrective spectacles. The lens filter of welding goggles is shaded to protect the eyes from ultraviolet, infrared, and visible rays generated by the work operations.

d. **Chipping Goggles**. Chipping goggles protect the eyes from relatively large flying objects generated by such operations as chipping, lathing, grinding, and chiseling. Eyecup-type goggles may be worn alone, or cover-type goggles may be fitted over corrective spectacles.

e. **Welding Helmets**. Welding helmets are made up of a bowl-shaped or modified bowl-shaped device equipped with a Shade 14 or greater filter. These helmets are designed for use during various kinds of arc welding and heavy gas cutting and provide the welder's eyes, face, ears, and neck with protection against intense radiation and weld spatter.

f. **Face Shields**. Face shields provide protection to the face and neck from flying particles, liquids, or sprays. Face shields alone do not provide adequate protection against these hazards and must be worn with protective eyewear.

TABLE B5-A-1. EYE AND FACE PROTECTION SELECTION CHART

APPLICATIONS		
OPERATION	**HAZARDS**	**PROTECTORS**
ACETYLENE-BURNING ACETYLENE-CUTTING ACETYLENE-WELDING	SPARKS, HARMFUL RAYS, MOLTEN METAL, FLYING PARTICLES	7, 8, 9
CHEMICAL HANDLING	SPLASH, ACID BURNS, FUMES	2 (For severe exposure add 10)
CHIPPING	FLYING PARTICLES	1, 3, 4, 5, 6, 7A, 8A
ELECTRIC (ARC) WELDING	SPARKS, INTENSE RAYS, MOLTEN METAL	11 (In combination with 4, 5, 6, in tinted lenses, advisable)
FURNACE OPERATIONS	GLARE, HEAT, MOLTEN METAL	7, 8, 9, (For severe exposure add 10)
GRINDING-LIGHT	FLYING PARTICLES	1, 3, 5, 6 (For severe exposure add 10)
LABORATORY	CHEMICAL SPLASH, GLASS BREAKAGE	2 (10 when in combination with 5, 6)
MACHINING	FLYING PARTICLES	1, 3, 5, 6 (For severe exposure add 10)
MOLTEN METALS	HEAT, GLARE, SPARKS	7, 8, (10 in combination with 5, 6, in tinted lenses)
SPOT WELDING	FLYING PARTICLES, SPARKS	1, 3, 4, 5, 6 (Tinted lenses advisable, for severe exposure add 10)

Eye and Face Protectors Key:

1 – Goggles, flexible fitting, regular ventilation
2 - Goggles, flexible fitting, hooded ventilation; or goggles, chemical
3 – Goggles, cushioned fitting, rigid body
4 – Spectacles, without sideshields
5 – Spectacles, with eyecup type sideshields

6 – Spectacles, semi/flat fold sideshields
7 – Welding goggles, eyecup type, tinted lenses
7A – Chipping goggles, eyecup type, clear safety lenses
8 – Welding goggles, coverspec type, tinted lenses, , various shade numbers
8A – Chipping goggles, coverspec type, clear safety lenses
9 – Welding goggles, coverspec type, tinted plate lens
10 – Face shield, plastic or mesh window
11 – Welding helmet, various lenses

TABLE B5-A-2. WELDING FILTER SHADE PROTECTION CHART

WELDING OPERATION	SUGGESTED SHADE NUMBER*
Shielded Metal-Arc Welding, up to 5/32 in (4 mm) electrodes	10
Shielded Metal-Arc Welding, 3/16 to 1/4 in (4.8 to 6.4 mm) electrodes	12
Shielded Metal-Arc Welding, over 1/4 in (6.4 mm) electrodes	14
Gas Metal-Arc Welding (Nonferrous)	11
Gas Metal-Arc Welding (Ferrous)	12
Gas Tungsten-Arc Welding	12
Atomic Hydrogen Welding	12
Carbon Arc Welding	14
Torch Soldering	2
Torch Brazing	3 or 4
Light Cutting, up to 1 in (25 mm)	3 or 4
Medium Cutting, 1 to 6 in (25 to 150 mm)	4 or 5
Heavy Cutting, over 6 in (150 mm)	5 or 6
Gas Welding (Light) up to 1/8 in (3.2 mm)	4 or 5
Gas Welding (Medium) 1/8 to 1/2 in (3.2 to 12.7 mm)	5 or 6
Gas Welding (Heavy) over 1/2 in (12.7 mm)	6 or 8
Fire Watch For Any Welding or Cutting Operation	6 (minimum)

*The choice of a filter shade may be made on the basis of visual acuity and may therefore vary widely from one individual to another, particularly under different current densities, materials, and welding processes. However, the degree of protection from radiant energy afforded by the filter plate or lens when chosen to allow visual acuity will still remain in excess of the needs of eye filter protection. Filter plate shades as low as shade 8 have proven suitably radiation-absorbent for protection from the arc-welding processes.

NOTE

In gas welding or oxygen cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the operation (spectrum).

CHAPTER B6

RESPIRATORY PROTECTION

B0601. DISCUSSION

a. Many repair and maintenance operations generate air contaminants that are dangerous if inhaled. Engineering controls (e.g., local exhaust ventilation) are the most effective methods of protecting personnel against such contaminants. However, when engineering controls are not practical or feasible, respirators are necessary to assure the protection of personnel.

b. This chapter establishes respiratory protection requirements and applies to all personnel and visitors who enter an area where respiratory protective equipment is necessary. Many of the procedures contained herein are derived from or are similar to the ones detailed in reference B6-1. This chapter does not address damage control, gas free engineering, or underwater protection.

c. The provisions of this chapter do not apply to personnel wearing respiratory protection for the sole purpose of protection against airborne radioactive contamination. The provisions for protection against airborne radioactive contamination are found in reference B6-2.

c. **For submarines.** Responsibilities and procedures for respiratory protection aboard submarines are contained in paragraph B0615.

B0602. RESPONSIBILITIES

a. **The commanding officer shall** appoint a respiratory protection manager (RPM).

b. **The respiratory protection manager shall**:

(1) Qualify per B0612 within 3 months of assuming the position.

(2) Ensure a sufficient supply of NIOSH or NIOSH/MSHA-approved respirators, spare parts, and expendable supplies (e.g. cartridges and filters) is maintained to conduct routine and emergency operations. There should be at least three sizes of elastomeric face pieces and associated supplies of at least two manufacturers.

NOTE:

Respirator parts and filters are not interchangeable. Ensure that all components are of the same manufacturer (e.g. Brand X facepieces must have Brand X filters).

(3) Base the selection of the class of respirators on the type and degree of hazards to which workers are exposed.

(4) Maintain a roster of personnel enrolled in Respiratory Protection.

(5) Conduct respirator fit testing per paragraph B0608.

(6) Establish central control points for issuing and maintaining respiratory protection equipment. Divisions that frequently use respirators and personnel who are assigned individual respirators may maintain custody of

their own respiratory protection equipment and are responsible for its proper case and storage.

(7) Inspect, clean, disinfect, store, maintain and repair respirators per paragraph B0609.

(8) Ensure breathing air meets the requirements of paragraph B0611.

c. **Division officers shall**:

(1) Ensure that personnel performing work requiring respirators are assigned and qualified prior to use of respiratory protective equipment. Use the form in appendix B6-A to request medical qualification.

(2) Ensure that personnel have a current fit test and training prior to donning a respirator.

(3) Provide personnel with the required respiratory protective equipment.

d. **The medical department representative (MDR) shall**:

(1) Conduct or schedule necessary preplacement and periodic medical evaluation of personnel identified by the RPM as respirator users per paragraph B0614.

(2) Certify to the cognizant division officer and the RPM whether an individual is medically qualified to use a particular respirator. Use the form in appendix B6-A for this purpose.

(3) Enter results of all respirator user medical evaluations into the individual's medical records.

(4) Assist the RPM in identifying and evaluating hazards and selecting appropriate respirators.

e. **Personnel issuing respiratory protective equipment shall** issue respirators only to personnel who are trained, medically qualified and successfully fit-tested for the respirator(s) requested.

f. **All hands shall**:

(1) Inspect the respirator before and after each use per paragraph B0609a.

(2) Perform a positive and negative respirator facepiece seal check prior to each use per paragraph B0607b.

(3) Report any malfunction of the respirator to their immediate supervisor.

(4) Prevent damage to or loss of respiratory protective equipment.

B0603. RESPIRATORY PROTECTION ELEMENTS

a. Respiratory protection management

b. The industrial hygiene survey

c. Respirator selection

d. Respirator availability

e. Personnel roster

f. Medical evaluations

g. Initial and annual fit testing and training

h. Respirator issue

i. Respirator maintenance

j. Breathing air requirements

B0604. TYPES OF RESPIRATORS AND THEIR APPLICATIONS

The two basic types of respirators are air-purifying and atmosphere-supplying. Illustrations of typical respirators are provided in appendix B6-B.

a. Air-purifying respirators remove air contaminants by filtering, or absorbing them as the air passes through the cartridge. In all cases when using air-purifying respirators, adequate oxygen (19.5 percent by volume) must be present. They are available with quarter-, half-, and full-facepieces with the full-facepiece respirator providing a higher degree of protection than either of the others. Air-purifying respirators are available as single-use (e.g., disposable) respirators, with the filter or cartridge built-in as an integral part of the respirator, or as reusable facepieces with replaceable cartridges, filters, and pre-filters of many types. They are effective only when used with the appropriate cartridges, filters, and pre-filters for the air contaminants present. Air-purifying respirators may be either non-powered or powered. The non-powered type depends on the user's lungs to draw air through the purifying element during inhalation; therefore, the non-powered type has the greatest breathing resistance. The powered type is equipped with a battery-powered fan that forces air through the purifying element, thus reducing the breathing resistance and ensuring a positive pressure inside the facepiece. Whether powered or non-powered, air-purifying respirators may be subdivided by the type of contaminant they protect against as described below.

(1) Particulate air-purifying respirators use cartridges, filters, and pre-filters designed to protect against inhalation of aerosols, i.e., solid or liquid particles dispersed in air. The cartridges, filters, and pre-filters remove nuisance (e.g. non-toxic) and toxic dusts, fogs, fumes, mists, smokes and sprays either singly or in combination. Their construction varies according to the intended use that is specified in each device's approval. SURGICAL MASKS (blue or green) do not provide protection against air contaminants. They are for **MEDICAL/DENTAL USE ONLY** and must **NEVER** be used as an air-purifying respirator.

(2) Gas and vapor air-purifying respirators use cartridges and canisters that remove contaminants through absorption and adsorption. Typically, a cartridge removes a specific type of gas or vapor, i.e., organic vapors or acid gases.

(3) Combination cartridges and canisters are available which combine the removal capabilities of two or more type cartridges in a single cartridge, i.e., organic vapor and particulate removal, acid gas and organic vapor removal, or acid gas, ammonia, and organic vapor removal. Some manufacturers allow users to create their own combination cartridges by screwing two car-

tridges together; however, always follow the manufacturer's recommendations when doing this since there may be some limitations.

(4) **Prefilters**. All manufacturers allow the user to combine different degrees of particulate removal with any cartridge by attaching a pre-filter to the cartridge by means of a retainer ring. Such systems are commonly used to protect against an aerosol containing a volatile organic solvent.

(5) **Color Coding**. By Federal regulation, each type of respirator cartridge/canister is color coded to identify its intended use. The color-coding may be achieved by coloring all or part of the cartridge/canister case or by affixing a colored label.

(6) **Labeling**. Each cartridge/canister is labeled with the contaminant(s) it protects against and the NIOSH/MSHA approval number. Some labels may provide more information about the cartridge's capabilities and limitations.

(7) Military gas masks (e.g., Mark V, M17) are military-unique air-purifying respirators that are only to be used for chemical-biological-radiological (CBR) warfare. MILITARY GAS MASKS MUST NEVER BE USED IN PLACE OF AN AIR-PURIFYING RESPIRATOR. This chapter does not apply to the use and maintenance of military gas masks.

b. Atmosphere-supplying respirators are used when the contaminant has no warning property (e.g., no odor), the contaminant's concentration is too high to use an air-purifying respirator, or the environment is immediately dangerous to life or health (IDLH). The two types are supplied-air respirators and self-contained breathing apparatuses.

(1) Supplied-air respirators are further subdivided into hose mask and air-line respirators.

(a) Hose mask respirators consist of a facepiece, breathing tube, harness, and large-diameter, thick-wall, non-kinking, air-supply hose. A blower, either motor or hand driven, may supply the air, or the user, unaided, may simply draw the air into the hose with each breath. This respirator offers no advantages over the air-line respirator and is being removed from the fleet.

(b) Air-line respirators consist of a facepiece, hood, helmet, or suit; breathing tube; regulator; and small-diameter hose provided with some means to attach the hose to the user. A compressor, ambient air breathing apparatus (AABA), or compressed air cylinder(s) provides the air. The maximum length of hose allowed from a compressor or air fitting to the respirator shall be 300 feet unless a shorter maximum length is specified on the NIOSH/MSHA approval. The NIOSH/MSHA approval for each air-line respirator applies to the combination of the respirator and air supply hose as a unit and specifically to the part numbers listed on the approval. Any use of another manufacturer's respirator or hose automatically invalidates the approval. Air-line respirators can be subdivided into three types as follows:

1. Demand. Available only with a facepiece, it supplies air to the user on demand (inhalation) which creates a negative pressure within the facepiece. Leakage into the facepiece may occur if there is a poor seal between the respirator and the user's face.

2. Pressure Demand. Available only with a facepiece, it maintains a continuous positive pressure within the facepiece, thus preventing contaminant leakage into the facepiece.

3. Continuous Flow. Available with a facepiece, hood, helmet, or suit, it provides a continuous positive pressure and flow of air within any of the breathing zone containments, thus preventing contaminant leakage into the containment.

(2) Self-contained breathing apparatuses (SCBAs) consist of a facepiece, helmet, or hood; a breathing tube; and a source of air or oxygen, all of which is carried by the wearer. They may be subdivided into two categories.

(a) **Closed-circuit (Rebreathing) SCBAs.** There are two types of this respirator. In both types carbon dioxide (CO_2) in the exhaled breath is removed by a chemical canister prior to rebreathing. The difference between the two is the source of oxygen. In one type, the oxygen is provided by either high-pressure gaseous oxygen or gaseous oxygen converted from liquid oxygen. In the other type, of which the Navy "oxygen breathing apparatus" (OBA) is an example, the water vapor in the exhaled breath reacts with a chemical in the canister to release oxygen. The OBA is not approved by NIOSH/MSHA for commercial use, and its only authorized uses aboard ship are for damage control, fire-fighting operations, and fixed flooding systems PMS. Even in emergencies, OBAs must not be used in flammable atmospheres due to the heat generated by the canister.

(b) **Open-circuit SCBAs.** In this type of SCBA, the exhaled air is expelled to the atmosphere and air is provided to the user from a compressed air cylinder. This type of respirator is available in either a demand (negative facepiece pressure) or pressure-demand (positive facepiece pressure) model.

(c) **Emergency Escape Breathing Device (EEBD).** This is a special type of SCBA developed for the Navy specifically for emergency escape from shipboard fires. They have a very short duration air supply. **THEY MUST NEVER BE USED FOR ENTRY INTO A HAZARDOUS ATMOSPHERE; THEY ARE FOR ESCAPE ONLY**! This chapter does not apply to the use and maintenance of the EEBD.

(d) **Supplemental Emergency Escape Device (SEED).** This is another special type of SCBA developed for main propulsion space watch standers ONLY. They have a very short duration air supply. **THEY MUST NEVER BE USED FOR ENTRY INTO A HAZARDOUS ATMOSPHERE; THEY ARE FOR ESCAPE ONLY**!

B0605. RESPIRATOR SELECTION

a. **Approval.** Only respirators which are approved by NIOSH shall be used. If there is any doubt as to the respirator required to protect against a particular contaminant, an industrial hygienist should be consulted.

b. **Hazard Assessment.** Determining the type of contaminant and its concentration is the most important consideration in the selection of respirators. This determination shall be provided as part of the most current industrial hygiene survey or by an industrial hygienist upon request. The industrial hygiene survey report of the industrial hygienist shall identify and evaluate the respiratory hazard(s) in the workplace; this evaluation shall include a reasonable estimate of employee exposures to respiratory hazard(s). Where the employee’s exposure to respiratory hazard(s) cannot be identified or reasonable estimated by the industrial hygienist, the atmosphere shall be considered “Immediately Dangerous to Life or Health” (IDLH). The following are some chemical, physical and toxicological properties that should be considered in the selection of a respirator:

(1) Warning properties of the contaminant gas or vapor (smell, eye irritation or respiratory irritation). Some contaminants lack sufficient warning properties to alert the wearer of respirator failure. Vapor- and gas-removing respirators are not approved for these contaminants, which include carbon monoxide, hydrogen cyanide, isocyanates and methyl alcohol.

(2) Whether the contaminant is absorbed through the skin.

(3) Whether any of the contaminants are "Immediately Dangerous to Life or Health" (IDLH) or whether injurious effects would be produced after prolonged exposure.

(4) Concentration of the contaminant in the atmosphere.

(5) NAVOSH standard for the contaminant(s). See chapters B1 and B10 for standards for lead and asbestos.

(6) Whether an oxygen-deficient or oxygen-rich atmosphere exists or may be created.

(7) The nature, extent and frequency of the duties to be performed by personnel (e.g., welding or painting) in the work area.

(8) Degree of protection provided by the particular respirator.

B0606. LIMITATIONS OF RESPIRATORS

Sections B0604 and B0605 mention some general limitations; however, the following provides more specific information.

a. **Protection Factor.** Each type of respirator provides protection against a contaminant up to a concentration that is a multiple (e.g., 10 times, 50 times, etc.) of that contaminant's permissible exposure limit or action level (see chapters B1 and B10 for some examples). Protection factors are described in detail in reference B6-3, but certain Federal standards may assign a lower protection factor for use against a specific contaminant. Since a full-facepiece is less likely to have its facepiece seal broken due to movement, talking, etc., a full-facepiece respirator usually has a higher protection factor than a quarter- or half-facepiece respirator.

b. **Oxygen-deficient Atmospheres.** All air-purifying respirators require that sufficient oxygen be present in the atmosphere where they will be used. Sufficient oxygen is defined as at least 19.5 percent oxygen for use at essentially sea level.

c. **Hose Length/Configuration and Air Pressure Requirements for Air-line Respirators.** The approval specifies the maximum length of air supply hose that may be used with each respirator and this is a function of the pressure of the supplied air.

NOTE:

The allowed hose length for supplied-air respirators is specified on the NIOSH approval certificate, but in no case shall the length exceed 300 feet maximum. Supplied-air respirators shall be operated at the conditions of pressure and hose length specified in the NIOSH approval. Only those hoses supplied by the respirator manufacturer shall be used. Air-line couplings shall be incompatible with outlet

couplings for other gas systems to prevent inadvertent servicing with non-respirable gases or oxygen.

d. **Environmental Temperature Operating Ranges.** Atmosphere-supplying respirators have specific temperature ranges for which they are approved. Consult the manufacturer's specifications before use in extreme temperatures.

e. **Maximum Use Concentrations.** Regardless of the protection factor, some air-purifying cartridges and canisters are limited to use at or below a specific contaminant concentration. This is generally due to the capacity (e.g., size or removal efficiency) of the cartridge or canister to remove certain contaminants. The approval certificate should always be consulted before use to determine what additional use restrictions apply.

B0607. USE OF RESPIRATORS

a. Prior to using a respirator to perform work that requires respiratory protection, the following requirements shall be met:

(1) The user shall be certified by the MDR as medically qualified to use each type of respirator required per Section B0614, unless the user is to wear a SCBA. SCBAs are exempt from the requirement for medical qualification.

(2) The user shall pass a fit-test with each type of respirator to be used per Section B0608, unless the user is to wear a SCBA. SCBAs are exempt from the requirement to fit test.

(3) The user shall be trained per Section B0612.

(4) Gas permeable and soft contact lenses are permitted to be worn with all respiratory protection.

(5) Tight fitting respirators shall not be worn when conditions such as facial hair, facial scars, or prescription eyeglasses prevent a good respirator seal.

b. **User Seal Checks.** Prior to each use, perform a positive and negative user seal check prior to each use.

(1) **Positive Pressure User Seal Check.** Place your palm or thumb over the exhalation valve and press lightly. Exhale gently. The respirator is properly sealed if no air leaks around the edges and a slight positive pressure is felt inside the facepiece.

(2) **Negative Pressure User Seal Check.** Place your palm(s) over the cartridge(s) or canister inlet. Inhale gently. The respirator is properly sealed if no air leaks around the edges and a slight negative pressure is felt inside the facepiece as it collapses slightly towards the face.

c. **Warning Signs of Respirator Failure**

(1) **Particulate Air-purifying Respirator.** When breathing difficulty is encountered with a particulate air-purifying respirator (increased resistance due to partial clogging), the filter(s) must be replaced. If the respirator is a single-use (e.g., disposable) respirator then the respirator must be discarded.

(2) **Vapor or Gas Air-purifying Respirator.** When using a vapor or gas air-purifying respirator, if the user notices any of the warning properties,

(e.g., odor, taste, eye irritation (with a full facepiece respirator)), or respiratory irritation, he/she should promptly leave the area and replace the cartridge or canister before returning.

(3) **Service Life of Air-purifying Respirator Filters, Canisters, and Cartridges.** Filters, canisters, and cartridges for air-purifying respirators are intended to be used until filter resistance precludes further use, or the chemical sorbent is expended as signaled by the detection of a specific warning property (e.g., odor, taste, and/or irritation).

(a) Change end-of-service-life indicator cartridges and canisters when indicated by the appropriate color change. End-of-service-life indicator cartridges and canisters must be worn belt mounted or chest mounted, respectively, so that the end-of-service-life indicator can be seen.

(b) Air purifying cartridges shall be replaced whenever the user can detect contaminant warning properties, such as, odor, taste, or irritation. Cartridges shall also be replaced if the user has difficulty inhaling air through the cartridge which indicates filter overloading. The Respiratory Protection Manager may impose time limitations for cartridge use not to exceed 8 hours. When in doubt about the previous use of the respirator, replace the filter, canister, or cartridge.

(4) **Air-line Respirator.** Leave the area immediately when the compressor failure alarm is activated or if an air pressure drop is sensed.

(5) **Self-contained Breathing Apparatus.** Leave the area as soon as the air pressure alarm activates.

B0608. RESPIRATOR FIT TESTING

Each individual who is required to use a respirator shall be qualitatively or quantitatively fit tested before being issued a respirator and annually thereafter unless the user is to wear a SCBA. SCBAs are exempt from the requirement to fit test. When conditions, such as facial hair, can reasonably be expected to interfere with the proper fit of respiratory protective equipment, the user shall not be permitted to do work requiring a respirator until satisfactory fit testing can be accomplished. For all ships, anyone trained to fit test via training detailed in B0612 can perform fit testing. Fit testing can also be obtained via the supporting tender, local NEPMUs, the cognizant MTF, or other sources.

a. **Qualitative Fit Testing.** Qualitative fit testing may be performed using irritant smoke, isoamyl acetate (banana oil), saccharin mist, or the Bitrex method. Fit testing shall conform to the procedures in appendix B6-C

b. **Quantitative Fit Testing.** Personnel using respirators to protect against asbestos and lead exposure may require quantitative fit testing, per Federal regulations. This type of fit testing can only be performed by, and shall be requested from, shore activities.

B0609. INSPECTION, CLEANING, STORAGE AND MAINTENANCE OF RESPIRATORS

To ensure adequate performance and proper sanitation, respirators shall be maintained as follows:

a. **Inspections.** All respirators shall be inspected routinely before and after each use. Emergency use respirators shall be inspected after each use and at least monthly. SCBAs shall be inspected periodically to ensure proper

function during an emergency response and after each use and at least monthly. Inspect the following items for at least the listed defects:

(1) **Head Straps or Head Harness**. Breaks, loss of elasticity, broken or malfunctioning buckles and attachments (full-facepiece only), excessively worn serrations on the head harness which might permit slippage.

(2) **Facepiece**. Excessive dirt; cracks, tears, holes, or distortion from improper storage; inflexibility (stretch and massage to restore flexibility); cracked or badly scratched lenses in full-facepieces; incorrectly mounted full-facepiece lens or broken or missing mounting clips; cracked or broken air-purifying element holder(s), badly worn threads, or missing gasket(s) (if required).

(3) **Inhalation and Exhalation Valves**. Foreign material, such as detergent residue, dust particles, or human hair under the valve seat; cracks, tears, or distortion in the valve material; improper insertion of the valve body in the facepiece; cracks, breaks, or chips in the valve body, particularly in the sealing surface; missing or defective exhalation valve cover; improper installation of the valve in the valve body.

(4) **Cartridge, Canister, or Filter**. Incorrect cartridge, canister, or filter for the hazard; incorrect installation, loose connections, missing or worn gaskets, or cross-threading in holder; expired shelf-life date on cartridge or canister; evidence of prior use of sorbent cartridge or canister, indicated by absence of sealing material, tape, foil, etc., over inlet.

(5) **Corrugated Breathing Tubes**. Broken or missing end connectors; missing or loose hose clamps; deterioration, determined by stretching the tube and looking for cracks.

(6) **Harness of a Front- or Back-mounted Gas Mask**. Damage or wear to the canister holder which may prevent its being held securely in place; broken harness straps or fastening.

(7) **Hoods, Helmets, Blouses, or Full Suits**. Examine for rips and tears and seam integrity; examine the protective headgear, if required, for general condition, with emphasis on the suspension inside the headgear; examine the protective faceshield, if any, for cracks or breaks or impaired vision due to rebounding abrasive particles; ensure the protective screen is intact and secured correctly over the faceshield of abrasive blasting hoods and blouses.

(8) **Air Supply Systems**. Examine for integrity and good condition of the air supply lines and hoses, including attachments and end fittings; correct operation and condition of all regulators, valves, or other air-flow regulators.

b. **Cleaning, Sanitizing, and Storage**. Respirators shall be cleaned and sanitized according to manufacturer’s instructions or as follows:

(1) Remove and discard all used cartridges and filters.

(2) Disassemble and hand wash the facepiece and parts in a warm water and mild dishwashing detergent solution. Strong cleaning agents can damage respirator parts. Temperatures above 43°C (110°F) and vigorous mechanical agitation shall be avoided. Solvents (e.g., paint removers), that can affect rubber and other parts, shall not be used. Ultrasonic or other suitable washers may be used per manufacturer's instructions.

(3) Sanitize the facepiece using one of the following methods:

(a) Immerse the facepiece for 2 minutes in a warm water (43° C or 110° F) solution of hypochlorite solution (approximately one milliliter of liquid laundry bleach to one liter of water); or

(b) Immerse the facepiece for 2 minutes in a warm water (43° C or 110° F) solution of iodine (add 0.8 milliliters of tincture of iodine to one liter of water); or

(c) Immerse the facepiece for 2 minutes in a warm water (43 °C or 110° F) solution of approved commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.

(4) Rinse in clean warm water at a temperature of about 110°F. Do not exceed 122°F (50°C).

(5) Air-dry in a clean uncontaminated area in such a way as to prevent distortion of the facepiece. If drying cabinets are used, the drying temperature shall not exceed 122°F (50°C).

(6) Reassemble and reinspect respirator. If replacement parts are necessary, they shall be obtained and installed or the respirator shall be removed from service until the unserviceable parts are replaced. If parts are not available and cannot be replaced, discard the entire facepiece as it cannot be used without all parts in place. Interchange of parts is prohibited.

(7) Place respirator in a clean plastic bag or other container and seal. Zip-lock plastic bags are preferred. Ensure the respirator is completely dry before sealing to prevent mildew.

(8) Store flat in a clean, dry, uncontaminated area without crowding which may distort the respirator facepiece.

c. **Repair and Maintenance**

(1) Personnel shall not service/repair any respirators for which they have not been specifically trained.

(2) No work shall be performed on reducing valves, regulators or alarms of atmosphere-supplying respirators (e.g., air-line respirators and SCBAs). These items shall be returned to the manufacturer for all repairs and adjustments.

B0610. ENTRY INTO IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) ATMOSPHERES

a. **Respirators.** Should it become necessary to enter an IDLH atmosphere, only the following two types of respirators shall be used:

(1) A full facepiece, self-contained breathing apparatus (SCBA) operated in the pressure-demand mode.

(2) A full facepiece air-line respirator (operated in the pressure demand mode) equipped with an auxiliary self-contained air supply having a minimum rated service life of 15 minutes. The self-contained air supply of 15 minutes must be sufficient to ensure escape from the IDLH area. These may only be used to enter an IDLH atmosphere when connected to the supplied air

source (air-line). The auxiliary self-contained air supply may only be used for egress purposes. If the self-contained air supply (15-minute supply) is insufficient to ensure escape, then a SCBA must be used.

NOTE:

Although specified by chapter 074, Volume 3 of the Naval Ships Technical Manual, Gas Free Engineering, the equipment required in paragraphs B0610a(1) and (2) is not on the allowance lists of many ships. If the respirators required are not carried aboard ship, an Oxygen Breathing Apparatus (OBA) may be used for entry into atmospheres which are or are potentially IDLH if the following three conditions are met: underway, required by an emergency or for operational readiness reasons, and approved by the commanding officer. For situations which are not an emergency or operational readiness, entry shall be delayed until the ship returns to port and the entry may be made by an activity which has proper respiratory protection equipment. The above requirements do not apply to use of an OBA for damage control or fire fighting.

b. **Standby Personnel**. At least one trained standby person, with a suitable respirator per paragraph B0610a, shall be present in the nearest uncontaminated area. If the standby person enters the IDLH atmosphere, there shall be a second standby person with a suitable respirator in the uncontaminated area.

c. **Communications**. The standby person and those persons working in the IDLH atmosphere shall be able to communicate continuously with each other, i.e., visually, by telephone or radio or signal line.

d. **Rescue Equipment**. Persons who enter any IDLH atmosphere shall also be equipped with safety harnesses and lines that can be used to rescue them should they lose consciousness. A hoist shall be present for removing personnel from the IDLH atmosphere. For more information on rescue operations and gas free engineering, refer to chapter B8.

CAUTION

Tanks, voids, compartments and other confined spaces may contain atmospheres that are hazardous to life or health. This may be due to the presence of flammable or toxic air contaminants or the absence of sufficient oxygen to sustain life. No one shall be permitted to enter any such area until tests of the atmosphere are completed by a qualified gas free engineer and entry by personnel is authorized by competent authority.

CAUTION

Eductors located in remote spaces, if activated, can remove all breathing air. Ensure sufficient make-up air is provided and the space has adequate oxygen prior to entry in all educator equipped remote spaces.

B0611. BREATHING AIR REQUIREMENTS

a. **Air Quality**. Breathing air or the air output of pumps or compressors which are sources of breathing air for air-line respirators or SCBAs shall meet at least the minimum requirements for Grade D breathing air per reference B6-4.

b. **Ship's Low Pressure (LP) Air Compressors.** Ship's LP air is not suitable for use as breathing air unless specifically tested and certified to meet the purity standards in paragraph B0611a.

c. **Ambient Air Breathing Apparatus (AABA).** Air intakes for portable pumps such as the AABA shall be placed in an area free of contaminants. Periodic testing of the air quality from an AABA is not required. AABAs shall not be used for entry into IDLH atmospheres.

d. **Frequency of Testing.** The air output of compressors used by breathing air shall be tested quarterly. Quarterly testing of breathing air does not apply to the Navy Diving Program. Reference B6-5 addresses diving air requirements.

B0612. RESPIRATORY PROTECTION TRAINING

a. Proper respirator training is essential for personnel required to wear respirators and for supervisors of those wearing respirators. Documented training shall be given prior to respirator use and annually thereafter, and shall include the following topics:

(1) Proper fitting and wearing of the respirator, including how to perform user seal checks. Each person shall demonstrate the capability to don and wear each type of respirator to be worn in the performance of normal and emergency duties including situations in which the respirator malfunctions.

(2) Respirator capabilities and limitations

(3) Nature and degree of respiratory hazards and the effects from exposure to the hazardous atmosphere

(4) Proper respirator selection according to intended use

(5) Respirator care, cleaning, maintenance and storage

(6) Prohibition against facial hair and the proper use of contact lenses when wearing respirators

(7) How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.

b. Respiratory protection managers (RPM) on submarine tenders (AS), aircraft carriers (CV and CVN), amphibious assault ships (LHA and LHD), and selected combat logistics ships (AOE) shall attend Respiratory Protection Program Manager's course (CIN A-493-0072 or the latest course identification number). All other RPMs shall attend RPM course (CIN A-4J-0082). Courses are available from the Naval Occupational Safety and Health and Environmental Training Center.

c. Personnel assigned to issue respiratory protective equipment shall be trained on respirator selection, and care and maintenance prior to assignment and annually thereafter. The facility RPM should give the training.

d. See chapter A7 for training aids to assist in respiratory protection training.

B0613. RESPIRATORY PROTECTION EVALUATION

The industrial hygiene survey shall evaluate the need for the use of respirators.

B0614. MEDICAL EVALUATIONS

a. **Frequency.** The frequency of the evaluation shall be at least every 5 years below age 35, every 2 years from age 35 to 45, and changing to annually starting at age 45. Special evaluations shall be performed after prolonged absences from work for medical reasons or whenever a functional disability has been identified.

b. **Examiner.** A physician or a registered/occupational health nurse, physician's assistant, preventive medicine technician, or a hospital corpsman (independent duty technician, NEC 8425 or submarine medical technician, NEC 8402 only) under the supervision of a physician may conduct the medical evaluation. If all answers to the medical history questionnaire in appendix B6-D are negative and the examiner's consideration of the respirator to be used, frequency of respirator use, and type of work performed by the individual raises no other concerns, the examiner may certify that the individual is medically qualified to use that respirator. A "Yes" answer to any of these questions requires a referral to a physician if the condition is not stable and has not been previously evaluated. If the examiner's consideration of the respirator to be used, frequency of respirator use, and type of work performed by the individual raises other concerns, the individual must be referred to a physician for examination and disposition. Medical evaluation reports that restrict or do not permit respirator use should be signed by a physician. If the examiner's supervisory physician is not on site, the examiner's consultation with the supervising physician shall be annotated in the medical record. All examiners shall be guided by the information in this section when evaluating an individual for respirator use.

c. **Medical History.** A medical history shall be obtained initially and the information should be reviewed and updated during subsequent examinations. A medical history questionnaire should be used to identify the following:

(1) Previously diagnosed disease, particularly stressing cardiovascular, respiratory, or neurological diseases

(2) Physiological problems or symptoms including claustrophobia

(3) Problems associated with breathing during normal work activities

(4) Past problems with respirator use

(5) Past and current usage of medication

(6) Any known physical deformities or abnormalities, including those that may interfere with respirator use

(7) Previous occupations

(8) Tolerance to tachycardia produced by inhalation of heated air.

As a minimum, the medical history questionnaire shall collect all the information requested in the model questionnaire in appendix B6-D Respirator User’s Request Form, which may be adapted onto a SF-600 for medical record entry.

d. **Medical Examination**

(1) **General Considerations**. The examiner's evaluation of suitability of the individual for respirator use shall be based on his/her perception of the individual's work ability and not specifically on a diagnosis.

(2) **Specific Disqualifying Conditions**. Appendix B6-E contains disqualifying conditions for respirator use.

(3) **Work Restrictions**. To ensure the safety of the service member, the examiner shall designate work restrictions that are based on the person's medical history or current health condition and are not related specifically to respirator use. Conditions that might require special restrictions or replacement shall include history of heat stroke or heat exhaustion and skin conditions in cases where occlusive materials may result in symptoms or aggravation of the preexisting dermatitis.

(4) **Spirometry**. When properly performed by trained personnel on calibrated equipment, spirometry may be indicated for individuals when the examiner needs additional information as a result of medical history or clinical examination.

B0615. SUBMARINE RESPIRATORY PROTECTION

Respiratory protection is applicable to submarine operations in port. When respiratory protection is required at sea, the installed Emergency Air Breathing (EAB) System is the primary protection. Nuclear system welders may use metal fume respirators with their welding goggles.

Typically, respiratory protection is not used on submarines. If it is determined that a shipboard respiratory protection program is necessary, then comply with the following requirements:

a. Proper respirator training is essential for personnel required to wear respirators and for supervisors of those wearing respirators. Documented training shall be given prior to respirator use and annually thereafter, and shall include the following topics:

(1) Proper fitting and wearing of the respirator, including how to perform user seal checks. Each person shall demonstrate the capability to don and wear each type of respirator to be worn in the performance of normal and emergency duties including situations in which the respirator malfunctions.

(2) Respirator capabilities and limitations

(3) Nature and degree of respiratory hazards and the effects from exposure to the hazardous atmosphere

(4) Proper respirator selection according to intended use

(5) Respirator care, cleaning, maintenance and storage

(6) Prohibition against facial hair and the proper use of contact lenses when wearing respirators

(7) How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.

b. Respiratory protection managers (RPM) on submarines shall attend RPM course (CIN A-4J-0082). Courses are available from the Naval Occupational Safety and Health and Environmental Training Center.

c. Personnel assigned to issue respiratory protective equipment shall be trained on respirator selection, and care and maintenance prior to assignment and annually thereafter. The training should be given by the facility RPM.

d. See chapter A7 for training aids to assist in respiratory protection training.

e. **Responsibilities**

(1) **The commanding officer shall** appoint a respiratory protection manager(RPM).

(2) **The RPM shall**:

(a) Ensure that up-to-date command guidance exists on respiratory protection. Such guidance will normally be issued in this chapter; however, information unique to the command may be written into a command directive.

(b) Develop and maintain a roster of personnel in the respiratory protection.

(c) For respirators needed while underway (e.g., nuclear welders), provide guidance to the supply officer on the selection of proper types and stock levels of respiratory protective equipment. Sufficient respirators, spare parts, and expendable supplies (e.g., cartridges and filters) shall be stocked to conduct all operations.

(d) Ensure all respirators retained on board are properly maintained and stored.

(e) Ensure respirator users and supervisors of those wearing respirators are trained on respiratory protection requirements. This training shall be repeated annually. Recordkeeping for respirator fit-testing shall include type of respirator, brand name and model, method of test, test results, test date, and name of the instructor/tester and of the individual tested.

(f) Ensure appropriate fit testing is performed by the supporting IMA.

(g) Issue respirator user cards that will contain as a minimum:

1. Name/Social Security Number

2. Last respirator training date

3. Date medically qualified

4. Respirator successfully fit tested (brand, model, size)

5. Signature of fit tester/date/command.

This card will be needed for the supporting submarine Intermediate Maintenance Activity (IMA) to issue respirators. Submarine tenders or IMAs will print respirator user cards upon receipt of a work request.

(h) Coordinate with the supporting submarine IMA to determine what respirators (brand, model, and size) are available for issue.

(3) **Division officers shall**:

(a) Ensure that personnel performing work requiring respirators are assigned and qualified prior to use of respiratory protective equipment. Use the form in appendix B6-A to request medical qualification.

(b) Ensure that personnel have a current fit test and training prior to donning a respirator.

(c) For respirators needed while in port, ensure personnel obtain required respirator from the supporting submarine IMA.

(d) Ensure non-disposable respirators are returned to supporting submarine IMA when work is completed.

(e) Provide respirators needed while underway (e.g., nuclear systems welders).

(4) **The MDR shall**:

(a) Conduct or schedule the necessary preplacement medical clearance screening and periodic medical examinations of personnel required to use respirators (see paragraph B0614; the MDR is qualified to do these screening and medical evaluations.)

(b) Ensure that all exposure records and the results of all respirator user medical evaluations are entered into the individual's medical record

(c) Assist department heads/division officers in identifying in port work requiring respiratory protection.

(5) **Supporting submarine IMAs shall**:

(a) Upon request, schedule/provide initial or refresher training for the submarine RPM.

(b) Provide a standard submarine respiratory protection lesson plan to submarine RPMs for use in training their crews.

(c) Provide appropriate respirator fit-testing for the submarine respirator users while in port.

(d) Provide only the respirators needed by submarines in port. Respirators will only be issued to personnel with respirator user cards described in paragraph B0615a(2)(h).

(6) **Personnel required to wear a respirator to perform in-port work shall**:

(a) Wear the provided respirator when required and in a proper manner.

(b) Inspect the respirator before and after each use per paragraph B0609a.

(c) Perform a positive and negative respirator facepiece seal check prior to each use per paragraph B0607b.

(d) Report any malfunction of the respirator to their immediate supervisor.

(e) Prevent damage or loss of respiratory protective equipment.

b. **Procedures**

(1) Upon determination that planned work will require respiratory protection, supervisors shall assign personnel to perform the work. Those personnel who have not been previously assigned to work requiring respirator use shall be sent to the MDR for medical clearance qualification.

(2) The MDR shall complete the medical qualification using appendix B6-A or shall send the individual to the squadron medical officer for such qualification. Appendix B6-A and B6-D can be adapted onto a SF-600 for inclusion in the health record.

(3) Medically qualified personnel shall report to the tender/ submarine base for respirator issue. Those personnel who do not have a current (within 1 year) record of fit testing/training shall be fit-tested and trained by the respirator issuing facility according to the guidelines of paragraph B0612, prior to such issue. All personnel shall receive the following training prior to each issue:

(a) Respirator inspection procedures

(b) Positive and negative facepiece seal checks

(c) Respirator/cartridge service life

(d) Warning signs of respirator failure.

Respirators/cartridges shall be issued for the duration of the job.

(4) Upon completion of work, disposable respirators shall be disposed of; non-disposable respirators shall be returned to the supplying activity.

c. **Training**. Department heads, division officers, leading petty officers, and the MDR shall be trained annually on the recognition of work requiring respirators, respiratory protection procedures, and the proper use of respirators.

CHAPTER B6

REFERENCES

B6-1 29 Code of Federal regulations (CFR) 1910.134, Respiratory Protection (NOTAL)

B6-2 NAVSEA S9213-33-MMA-000/V, Radiological Controls for Ships.

B6-3 American National Standards Institute (ANSI) Z88.2-1992, Practices for Respiratory Protection. (Adopted by the Department of Defense and available from the Department of Defense Single Stock Point (DoD SSP) in

Philadelphia, PA) (Not required on board ship but listed as a pertinent reference) (NOTAL)

B6-4 American National Standards Institute/Compressed Gas Association, Inc., Commodity Specification for Air, ANSI/CGA G-7.1-1997 (NOTAL)

B6-5 OPNAVINST 3150.27A, Navy Diving Program

Appendix B6-A

MEDICAL CLEARANCE REQUEST

FOR OFFICIAL USE ONLY (when filled in)

From: _____ Division Officer

To: Medical Department Representative

Subj: REQUEST FOR MEDICAL CLEARANCE FOR RESPIRATOR USE

1. The following individual is referred to you for subject clearance:

Name _____ SSN _____ - ____ - _____

Supervisor _____ Date of Birth _____

Circle type(s) of respirator(s) to be used:

Air-purifying (non-powered) Air-purifying (powered)

Hose mask (with blower) Hose mask (without blower)

Air-line (demand) Air-line (pressure-demand)

Air-line (continuous flow) SCBA (closed circuit)

SCBA (open-circuit, demand) SCBA (open-circuit, pressure-demand)

Level of Work Effort (Circle one): Light Moderate Heavy Strenuous

Extent of usage (Circle one):

Daily Occasionally but more than once a week Rarely or emergency only

Length of time of anticipated effort (hours per day) _____

Special work considerations (e.g., high places, elevated temperatures, hazardous material, protective clothing required, etc.)

_____

_____

_____

_____
Division Officer Signature and Date

FOR OFFICIAL USE ONLY (when filled in)

From: Medical Department Representative
To: _____ Division Officer

_____ is: (Circle one)

Medically qualified to use the above respirator with no restrictions.

Medically qualified to use the above respirator subject to the restrictions specified below.

Not medically qualified to use the above respirator.

Restrictions _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____
MDR Signature and Date

Copy to:
Respiratory Protection Officer

Appendix B6-B

TYPES OF RESPIRATORS

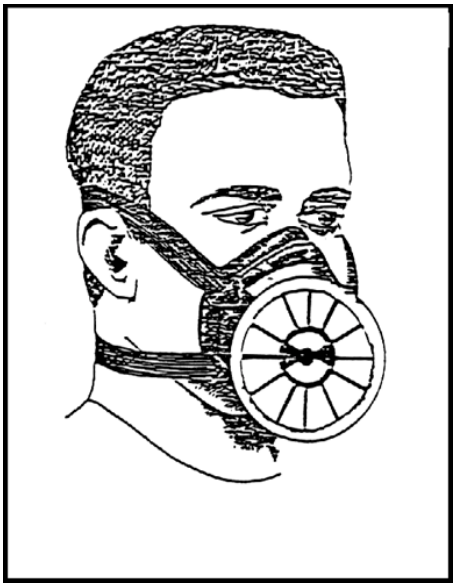


Illustration I – Reusable Facepiece/Replaceable Filter

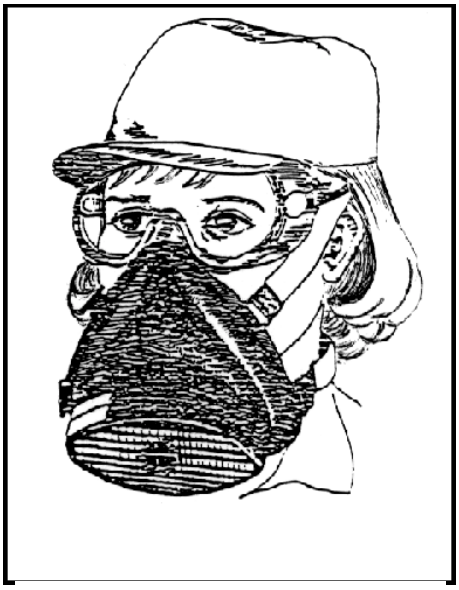


Illustration II – Disposable Respirator

Illustration III – Reusable Facepiece/Replaceable Cartridge

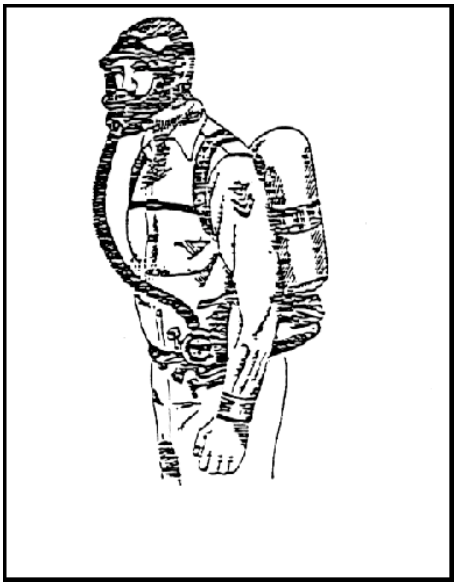


Illustration IV – Self-Contained Breathing Apparatus

Appendix B6-C

Qualitative Respirator Fit Test Protocols

I. Isoamyl Acetate Fit Test

a. The fit test chamber shall be a clear 55-gallon drum liner suspended inverted over a 2-foot diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.

b. Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.

c. After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

d. A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.

e. Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 ml of pure isoamyl acetate (IAA). The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.

f. Allow 2 minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.

g. If at any time during the test, the subject detects the banana-like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

h. If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in Ia through g above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait at least 5 minutes before retesting. Odor sensitivity will usually have returned by this time.

i. If the subject passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.

j. When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent

tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

II. **Saccharin Solution Aerosol Protocol.** The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. **Taste threshold screening.** The saccharin taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of saccharin.

1. During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches tall with at least the front portion clear and that allows free movements of the head when a respirator is worn.

2. The test enclosure shall have a 3/4 -inch (1.9 cm) hole in front of the test subject’s nose and mouth area to accommodate the nebulizer nozzle.

3. The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his/her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a sweet taste.

4. Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. The nozzle is directed away from the nose and mouth of the person. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

5. The threshold check solution is prepared by dissolving 0.83 gram of sodium saccharin USP in 100 ml of warm water. It can be prepared by putting 1 ml of the fit test solution (see (b)(5) below) in 100 ml of distilled water.

6. To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.

7. Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted. If the test subject reports tasting the sweet taste during the 10 squeezes, the screening test is completed. The taste threshold is noted as 10 regardless of the number of squeezes actually completed.

8. If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the second 10 squeezes, the screening test is completed. The taste threshold is noted as 20 regardless of the number of squeezes actually completed.

9. If the second response is negative, 10 more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the third set of 10 squeezes, the screening test is completed. The taste threshold is noted as 30 regardless of the number of squeezes actually completed.

10. The test conductor will take note of the number of squeezes required to solicit a taste response.

11. If the saccharin is not tasted after 30 squeezes (step 10), the test subject is unable to taste saccharin and may not perform the saccharin fit test. Note to paragraph 3. (a): If the test subject eats or drinks something sweet before the screening test, he/she may be unable to taste the weak saccharin solution.

12. If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

13. Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

14. The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon or at least every 4 hours.

b. **Saccharin solution aerosol fit test procedure**

1. The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

2. The fit test uses the same enclosure described in IIb1 above.

3. The test subject shall don the enclosure while wearing the respirator selected in section Ib of this appendix. The respirator shall be properly adjusted and equipped with a particulate filter(s).

4. A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

5. The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 ml of warm water.

6. As before, the test subject shall breathe through the slightly open mouth with tongue extended, and report if he/she tastes the sweet taste of saccharin.

7. The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of saccharin fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test. A minimum of 10 squeezes is required.

8. After generating the aerosol, the test subject shall be instructed to perform the exercises in section Ie of this appendix.

9. Every 30 seconds the aerosol concentration shall be replenished using one half the original number of squeezes used initially (e.g., 5, 10 or 15).

10. The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected. If the test subject does not report tasting the saccharin, the test is passed.

11. If the taste of saccharin is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

12. Since the nebulizer has a tendency to clog during use, the test operator must make periodic checks of the nebulizer to ensure that it is not clogged. If clogging is found at the end of the test session, the test is invalid.

III. **Bitrex TM (Denatonium Benzoate) Solution Aerosol Qualitative Fit Test Protocol.** The Bitrex TM (Denatonium benzoate) solution aerosol QLFT protocol uses the published saccharin test protocol because that protocol is widely accepted. Bitrex is routinely used as a taste aversion agent in household liquids which children should not be drinking and is endorsed by the American Medical Association, the National Safety Council, and the American Association of Poison Control Centers. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. **Taste Threshold Screening.** The Bitrex taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of Bitrex.

1. During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches (30.5 cm) in diameter by 14 inches (35.6 cm) tall. The front portion of the enclosure shall be clear from the respirator and allow free movement of the head when a respirator is worn.

2. The test enclosure shall have a 3/4 inch (1.9 cm) hole in front of the test subject’s nose and mouth area to accommodate the nebulizer nozzle.

3. The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his or her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a bitter taste.

4. Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the Threshold Check Solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

5. The Threshold Check Solution is prepared by adding 13.5 milligrams of Bitrex to 100 ml of 5% salt (NaCl) solution in distilled water.

6. To produce the aerosol, the nebulizer bulb is firmly squeezed so that the bulb collapses completely, and is then released and allowed to fully expand.

7. An initial 10 squeezes are repeated rapidly and then the test subject is asked whether the Bitrex can be tasted. If the test subject reports tasting the bitter taste during the 10 squeezes, the screening test is completed. The taste threshold is noted as 10 regardless of the number of squeezes actually completed.

8. If the first response is negative, 10 more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the second 10 squeezes, the screening test is completed. The taste threshold is noted as 20 regardless of the number of squeezes actually completed.

9. If the second response is negative, 10 more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the third set of 10

squeezes, the screening test is completed. The taste threshold is noted as 30 regardless of the number of squeezes actually completed.

10. The test conductor will take note of the number of squeezes required to solicit a taste response.

11. If the Bitrex is not tasted after 30 squeezes (step 10), the test subject is unable to taste Bitrex and may not perform the Bitrex fit test.

12. If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

13. Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

14. The nebulizer shall be thoroughly rinsed in water, shaken to dry, and refilled at least each morning and afternoon or at least every 4 hours.

b. **Bitrex Solution Aerosol Fit Test Procedure**

1. The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

2. The fit test uses the same enclosure as that described in IIIa(1) above.

3. The test subject shall don the enclosure while wearing the respirator selected according to section Ib of this appendix. The respirator shall be properly adjusted and equipped with any type particulate filter(s).

4. A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

5. The fit test solution is prepared by adding 337.5 mg of Bitrex to 200 ml of a 5 percent salt (NaCl) solution in warm water.

6. As before, the test subject shall breathe through his or her slightly open mouth with tongue extended, and be instructed to report if he/she tastes the bitter taste of Bitrex.

7. The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of the fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test.

8. After generating the aerosol, the test subject shall be instructed to perform the exercises in section Ie of this appendix.

9. Every 30 seconds the aerosol concentration shall be replenished using one half the number of squeezes used initially (e.g., 5, 10 or 15).

10. The test subject shall indicate to the test conductor if at any time during the fit test the taste of Bitrex is detected. If the test subject does not report tasting the Bitrex, the test is passed.

11. If the taste of Bitrex is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

IV. **Irritant Smoke (Stannic Chloride) Protocol.** This qualitative fit test uses a person's response to the irritating chemicals released in the smoke produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

a. **General Requirements and Precautions**

1. The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).

2. Only stannic chloride smoke tubes shall be used for this protocol.

3. No form of test enclosure or hood for the test subject shall be used.

4. The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.

5. The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.

b. **Sensitivity Screening Check.** The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

1. The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.

2. The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.

3. The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he/she can detect it.

b. **Irritant Smoke Fit Test Procedure**

1. The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).

2. The test subject shall be instructed to keep his/her eyes closed.

3. The test operator shall direct the stream of irritant smoke from the smoke tube toward the faceseal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the facepiece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within 6 inches of the respirator.

4. If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.

5. The exercises identified in section Ie of this appendix shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of 6 inches.

6. If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.

7. Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.

8. If a response is produced during this second sensitivity check, then the fit test is passed.

Appendix B6-D

MEDICAL QUESTIONNAIRE FOR POTENTIAL RESPIRATOR USERS

Part 1

1. Today's date: _____

2. Your name: _____

3. Your age (to nearest year): _____

4. Your sex (circle one): Male/Female

5. Your height (Feet and Inches): _____

6. Your weight (Pounds): _____

7. Your job title/rate: _____

8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code):
_____

9. Circle the type of respirator you will use (you can check more than one category):

a. N, R, or P disposable respirator (filter-mask, non-cartridge type only)

b. N, R, or P non-disposable respirator (filter-mask, with cartridges)

c. Other type of cartridge respirators (for example, dust, fume , mist, or organic vapor respirators)

d. Other types of respirators (for example, powered-air purifying, supplied-air, or self-contained breathing apparatus).

10. Have you ever/previously worn a respirator (circle one): Yes/No
If yes, what type(s):

Part 2

Questions 1 through 9 below must be answered by every person who has been selected to use any type of respirator (please circle yes or no).

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month: Yes/No

2. Have you ever had any of the following conditions?

a. Seizures (fits): Yes/No

b. Diabetes (sugar disease): Yes/No

c. Allergic reactions that interfere with your breathing: Yes/No

d. Claustrophobia (fear of closed-in places): Yes/No

e. Trouble smelling odors: Yes/No

3. Have you ever had any of the following pulmonary or lung problems?

a. Asbestosis: Yes/No

b. Asthma: Yes/No

c. Chronic bronchitis: Yes/No

d. Emphysema: Yes/No

e. Pneumonia: Yes/No

f. Tuberculosis: Yes/No

g. Silicosis: Yes/No

h. Pneumothorax (collapsed lung): Yes/No

i. Lung cancer: Yes/No

j. Broken ribs: Yes/No

k. Any chest injuries or surgeries: Yes/No

l. Any other lung problem that you've been told about: Yes/No

4. Do you currently have any of the following symptoms of pulmonary or lung illness?

a. Shortness of breath: Yes/No

b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No

c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No

d. Have to stop for breath when walking at your own pace on level ground: Yes/No

e. Shortness of breath when washing or dressing yourself: Yes/No

f. Shortness of breath that interferes with your job: Yes/No

g. Coughing that produces phlegm (thick sputum): Yes/No

h. Coughing that wakes you early in the morning: Yes/No

i. Coughing that occurs mostly when you are lying down: Yes/No

j. Coughing up blood in the last month: Yes/No

k. Wheezing: Yes/No

l. Wheezing that interferes with your job: Yes/No

m. Chest pain when you breathe deeply: Yes/No

n. Any other symptoms that you think may be related to lung problems: Yes/No

5. Have you ever had any of the following cardiovascular or heart problems?

a. Heart attack: Yes/No

b. Stroke: Yes/No

c. Angina: Yes/No

d. Heart failure: Yes/No

e. Swelling in your legs or feet (not caused by walking): Yes/No

f. Heart arrhythmia (heart beating irregularly): Yes/No

g. High blood pressure: Yes/No

h. Any other heart problem that you've been told about: Yes/No

6. Have you ever had any of the following cardiovascular or heart symptoms?

a. Frequent pain or tightness in your chest: Yes/No

b. Pain or tightness in your chest during physical activity: Yes/No

c. Pain or tightness in your chest that interferes with your job: Yes/No

d. In the past 2 years, have you noticed your heart skipping or missing a beat: Yes/No

e. Heartburn or indigestion that is not related to eating: Yes/No

f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No

7. Do you currently take medication for any of the following problems?

a. Breathing or lung problems: Yes/No

b. Heart trouble: Yes/No

c. Blood pressure: Yes/No

d. Seizures (fits): Yes/No

8. If you've used a respirator, have you ever had any of the following problems? (If you've never used a respirator, check the following space and go to question 9:)

a. Eye irritation: Yes/No

b. Skin allergies or rashes: Yes/No

c. Anxiety: Yes/No

d. General weakness or fatigue: Yes/No

e. Any other problem that interferes with your use of a respirator: Yes/No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes/No

Part 3

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you ever lost vision in either eye (temporarily or permanently): Yes/No

11. Do you currently have any of the following vision problems?

a. Wear contact lenses: Yes/No

b. Wear glasses: Yes/No

c. Color blind: Yes/No

d. Any other eye or vision problem: Yes/No

e. Any other eye or vision problem: Yes/No

12. Have you ever had an injury to your ears, including a broken ear drum: Yes/No

13. Do you currently have any of the following hearing problems?

a. Difficulty hearing: Yes/No

b. Wear a hearing aid: Yes/No

c. Any other hearing or ear problem: Yes/No

14. Have you ever had a back injury: Yes/No

15. Do you currently have any of the following musculoskeletal problems?

a. Weakness in any of your arms, hands, legs, or feet: Yes/No

b. Back pain: Yes/No

c. Difficulty fully moving your arms and legs: Yes/No

d. Pain or stiffness when you lean forward or backward at the waist: Yes/No

e. Difficulty fully moving your head up or down: Yes/No

f. Difficulty fully moving your head side to side: Yes/No

g. Difficulty bending at your knees: Yes/No

h. Difficulty squatting to the ground: Yes/No

i. Climbing a flight of stairs or a ladder carrying more than 25 lbs.: Yes/No

j. Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

Part 4

(Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire)

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes/No

If yes, do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes/No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes/No

If yes, name the chemicals if you know them:

3. Have you ever been a member of a HAZMAT spill response team, or a member of a HAZMINCEN: Yes/No

4. Have you ever worked with any of the materials, or under any of the conditions, listed below:

a. Asbestos: Yes/No

b. Silica (e.g., in sandblasting): Yes/No

c. Tungsten/cobalt (e.g., grinding or welding this material): Yes/No

d. Beryllium: Yes/No

e. Aluminum: Yes/No

f. Coal (for example, mining): Yes/No

g. Iron: Yes/No

h. Tin: Yes/No

i. Dusty environments: Yes/No

j. Any other hazardous exposures: Yes/No

If yes, describe these exposures:

5. List any second jobs or side businesses you have:

6. List your previous occupations:

7. List your current and previous hobbies:

8. Have you been in other military services? Yes/No

Do you suspect that you were you exposed to biological or chemical agents while in the military or in a military operation: Yes/No

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes/No

If yes, name the medications if you know them:

10. Will you be using any of the following items with your respirator(s)?

a. HEPA Filters: Yes/No

b. Canisters (for example, gas masks): Yes/No

c. Cartridges: Yes/No

11. How often are you expected to use the respirator(s) (circle yes or no for all answers that apply to you)?:

a. Escape only (no rescue): Yes/No

b. Emergency rescue only: Yes/No

c. Less than 5 hours per week: Yes/No

d. Less than 2 hours per day: Yes/No

e. 2 to 4 hours per day: Yes/No

f. Over 4 hours per day: Yes/No

12. During the period you are using the respirator(s), is your work effort (circle):

a. Light: Yes/No Examples of a light work effort are sitting while writing, typing, drafting, or performing light assembly work; or standing while operating a drill press (1-3 lbs..) or controlling machines.

If yes, how long does this period last during the average shift (number of hours):

b. Moderate: Yes/No Examples of moderate work effort are sitting while nailing or filing; driving a truck or bus in urban traffic; standing while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs..) at trunk level; walking on a level surface about 2 mph or down a 5-degree grade about 3 mph; or pushing a wheelbarrow with a heavy load (about 100 lbs..) on a level surface.

If yes, how long does this period last during the average shift (number of hours):

c. Heavy: Yes/No Examples of heavy work are lifting a heavy load (about 50 lbs..) from the floor to your waist or shoulder; working on a loading dock; shoveling; standing while bricklaying or chipping castings; walking up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

If yes, how long does this period last during the average shift (number of hours):

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes/No

If ``yes,'' describe this protective clothing and/or equipment:

14. Will you be working under hot conditions (temperature exceeding 90 deg. F: Yes/No

15. Will you be working under humid conditions: Yes/No

16. Describe the work you'll be doing while you're using your respirator(s):

17. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance:

Estimated maximum exposure level per shift:

Duration of exposure per shift

Name of the second toxic substance:

Estimated maximum exposure level per shift:

Duration of exposure per shift:

Name of the third toxic substance:

Estimated maximum exposure level per shift:

Duration of exposure per shift:

The name of any other toxic substances that you'll be exposed to while using your respirator:

18. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

Appendix B6-E

SPECIFIC RESPIRATOR DISQUALIFYING CONDITIONS

1. **Facial Deformities and Facial Hair.** Facial deformities or presence of excessive hair or other conditions that interfere with proper sealing of the respirator shall disqualify the applicant. Questionably disqualifying conditions shall be evaluated by fit testing.

2. **Use of Prescription Eyeglasses or Contact Lenses.** Individuals with prescription eyeglasses who are required to wear a full-facepiece respirator shall use special frames, purchased by the Navy, for their glasses that do not interfere with the facepiece seal. Special visual acuity and visual field requirements shall depend upon the nature of the work to be performed. Respirator users may wear soft contact lenses while using a respirator.

3. **Hearing Requirements.** These requirements shall be dependent upon the nature of the work to be performed. The service member's hearing shall be adequate to ensure communication and response to instructions and alarm systems. Individuals with perforated tympanic membranes cannot wear respirators in hazardous areas where inhalation or absorption of toxic materials or vapors through the perforation may occur. Existence of perforation by itself shall not immediately disqualify the individual from respirator use, but the examiner shall consider both the environmental conditions of the job and possible specific safety controls before reaching a final decision. Possible specific safety controls may also be recommended by the safety officer.

4. **Respiratory Diseases.** Disease affecting pulmonary functions may prevent respirator use. Significant restrictive or obstructive disease or perfusion disorders may preclude approval for use. Assessment as to the degree of disability shall depend upon the patient's history and clinical findings of X-ray and spirometry, where indicated. Special analysis shall be required when perfusion disorders are suspected.

5. **Cardiovascular Diseases.** Symptomatic coronary artery disease, significant arrhythmias, or history of recent myocardial infarction shall disqualify the service member from respirator use. Occurrence of frequent premature ventricular contractions (PVCs) with elevated pulse rates shall be considered disqualifying. The examiner, using clinical judgment, shall decide if individuals with uncontrolled hypertension or related symptoms and individuals on blood pressure or cardiovascular medications may wear respirators.

6. **Endocrinal Disorder.** General work limitations and restrictions identified for other work activities also apply for respirator use. If the service member may suffer sudden loss of consciousness or response capability, the examiner shall determine if the service member may use a respirator.

7. **Neurological Disability.** Inability to perform coordinated movement and conditions affecting response and consciousness shall disqualify the service member. Epilepsy, controlled on medication, should not be disqualifying if the patient has been seizure-free for 1 year and has no significant side effects from medication.

8. **Medications.** The examiner shall use clinical judgment to determine if an individual should be denied use of a respirator due to a history of excessive use or problems related to prescription and non-prescription drugs, including alcohol, that affect judgment, performance, or reliability or alter the state of awareness or consciousness.

9. **Psychological Condition**. The examiner shall decide if a service member with a psychological condition that results in poor judgment or reliability should be disqualified. A history of claustrophobia may disqualify the service member. The examiner shall consider the severity of the individual's claustrophobia, and may recommend field-testing for the individual, prior to approving or denying use of the respirator. Clinical history or indication of severe anxiety shall also be considered by the examiner in determining an individual's ability to use respirators.

CHAPTER B7

ELECTRICAL SAFETY

B0701. DISCUSSION

This chapter provides guidance to assist in the identification of electrical hazards, and to prevent mishaps that could cause injuries and extensive damage to shipboard equipment and may compromise the ship's mission capabilities. Reference B7-1, chapter 300 is the primary reference for detailed technical guidance on electrical hazards and the potential for electric shock. Work involving electric tools, equipment and systems is inherently dangerous. Always use the principles of operational risk management (ORM) when dealing with electricity. Details of ORM are found in reference B7-2.

B0702. RESPONSIBILITIES

a. **The commanding officer shall** authorize all work on energized equipment per reference B7-1.

b. **The safety officer shall**:

(1) Ensure electrical/electronic indoctrination training is provided for all newly reporting personnel per paragraph B0708. Coordinate with the electrical officer/electronics material officer to provide this training.

(2) Complete training per B0708d.

c. **The electrical officer/electronic maintenance officer shall**:

(1) Establish an electrical tool issue room per B0707.

(2) Ensure that applicable maintenance and repair is conducted per reference B7-3.

(3) Ensure that the on-board CPR instructor is certified per B0708.

(4) Ensure that all electrical tools/equipment received on board are authorized for shipboard use. Reference B7-1 contains guidance on determining suitability for shipboard use.

d. **The supply officer shall** ensure that all electrical tools/equipment received on board are turned over to the electrical tool issue room (electrical division for submarines) for a safety inspection prior to issue.

e. **Division officers shall**:

(1) Ensure that assigned personnel are trained per paragraph B0708.

(2) Ensure that all portable electrical equipment is visually inspected prior to use, and is electrically safety checked quarterly. Reference B7-1 (paragraph 300-2.7) contains detailed technical guidance on portable electric equipment.

(3) Ensure that all personal electrical/electronic equipment is authorized for shipboard use. Reference B7-1 contains guidance on

determining suitability for shipboard use. The electrical safety checks for personal electrical/electronic equipment are not required.

(4) Ensure that required personnel receive CPR training per paragraph B0708.

(5) Ensure that items open purchased or received from Navy supply are authorized for shipboard use and electrically safety checked prior to use. Reference B7-1 contains guidance on determining suitability for shipboard use.

(6) Ensure that all personnel experiencing electrical shock report to medical.

f. **All hands shall**:

(1) Request permission from their division officer prior to bringing personal electrical/electronic equipment aboard. This requirement does not apply to battery-operated equipment incapable of being plugged into ships' electrical service.

(2) Report any condition, equipment or material that is believed to be unsafe.

(3) Report any electrical shock to their division officer.

B0703. ELECTRICAL SAFETY ELEMENTS

a. Working on de-energized equipment. (B0704)

b. Working on energized equipment. (B0705)

c. Personal protective equipment (PPE). (B0706)

d. Portable electrical tool issue. (B0707)

e. General precautions for portable electrical equipment. (Chapters C9 and D5)

f. Training. (B0708)

g. Safety standards implementation. (Chapters C9 and D5 list the Electrical Safety Standards).

B0704. WORKING ON DE-ENERGIZED EQUIPMENT

Completely de-energizing equipment will ensure safety from electrical hazards. Opening the power supply circuit breaker or switch and/or removing the fuses should de-energize electrical equipment. Some equipment has more than one source of power that requires opening multiple breakers or switches and/or removing multiple fuses. Tag out the circuit breaker switches and fuses. Check the equipment with a voltmeter to ensure that it is completely de-energized before maintenance begins.

a. For technical requirements concerning work on de-energized equipment, see reference B7-1, paragraph 300-2.4.

b. For tag out procedures, see reference B7-3.

B0705. WORKING ON ENERGIZED EQUIPMENT

a. **Approval Procedures**. Do not disassemble or maintain energized electrical equipment without approval of such action by the commanding officer, or in his/her absence, the command duty officer (CDO). Exceptions to this policy are those cases where approved instructions issued by higher authority (equipment technical manuals, Planned Maintenance System (PMS), or an established troubleshooting procedure) permit opening or inspecting equipment in the course of performing maintenance, routine testing, taking measurements, or making adjustments that require equipment to be energized. Commanding officer permission is not required when checking equipment or circuits to verify de-energization.

b. **Energized Circuit Working Procedures**. Reference B7-1, paragraph 300-2.5.2 contains technical procedures for working on energized equipment.

c. Damaged equipment shall be considered energized.

B0706. PERSONAL PROTECTIVE EQUIPMENT (PPE)

a. Use only gloves marked with a colored label indicating the usage limitations. Reference B7-1, Table 300-2-1 contains further information on stock numbers, maximum safe voltage usage, and label colors.

b. Stow rubber insulating gloves in the box in which they came. Perform PMS on the gloves prior to stowage. Stow other rubber electrical safety protection equipment in a clean, dry, oil-free location. Take care not to fold the gloves, as folding will frequently result in cracks that will greatly reduce insulating capability of the material. For further information on glove damage causes, inspection, and maintenance refer to reference B7-1, paragraph 300-2.5.3.

B0707. PORTABLE ELECTRICAL TOOL ISSUE (Not applicable to submarines)

a. Surface ships shall establish a centralized portable electrical tool issue room for issue of portable electrical tools. Larger ships may have more than one tool issue room.

b. Personnel assigned to issue portable electric tools shall perform visual inspections and quarterly safety testing of equipment per reference B7-1 (paragraph 300-2.7.5) prior to issue to personnel. Reference B7-1 (paragraph 300-2.7) contains additional technical guidance on portable electric equipment.

c. Prior to issue of portable electric tools, the personnel assigned to issue tools shall brief the tool users on general precautions for portable electrical equipment per B0708, as well as issue any required personal protective equipment.

d. Certain divisions or work centers (those that contain electrical/ electronic ratings) may retain selected electrical tools or equipment in their permanent custody. These divisions will perform safety checks on their equipment at the required frequency. These divisions shall not issue portable electrical tools to other divisions or work centers.

e. Housekeeping items such as vacuum cleaners and floor buffers need not be retained in the electrical tool issue room.

f. Unsafe electrical tools should be clearly marked "OOC", be rendered incapable of being energized, and be kept in locked storage separate from the other tools. The only exceptions should be for those tools in which immediate repair is to be accomplished.

B0708. TRAINING

a. All personnel, when reporting aboard, shall receive indoctrination on basic electrical safety, including the requirements regarding use of personal protective equipment. Reference B7-1 may be used as a source of training material. The training shall also include recognizing symptoms of electrical shock, electrical shock trauma, and emergency first aid responder techniques.

b. Each ship shall have a certified American Red Cross/American Heart Association CPR instructor on board. At least 50 percent of all electrical/ electronics associated ratings shall be certified in basic life support.

c. Personnel who man the portable electrical tool issue room shall complete the Electrical Tool Issue Room Watchstation 302 in the Safety Programs Afloat Personal Qualifications Standard (PQS), NAVEDTRA 43460-4A.

d. The safety officer shall complete watchstation 304 of the Safety Programs Afloat PQS within 16 weeks of assignment.

CHAPTER B7

REFERENCES

B7-1 Naval Ship's Technical Manual (NSTM) chapters 300, 302, 310, 313, 320, 330 and 400 (NOTAL)

B7-2 OPNAVINST 3500.39, Operational Risk Management (NOTAL)

B7-3 OPNAVINST 3120.32C, Standard Organization and Regulation of the U.S. Navy

Appendix B7-A

ELECTRICAL SAFETY PROGRAM CHECKLIST

Indicate by an X, the answer to each of the questions below. If a question is not applicable to the command, indicate by NA in the YES block. Explain or describe the condition warranting any NO answer on the space provided at the end of the checklist or on additional sheets, if necessary.

The location of the NAVOSH Manual reference for any question is provided at the end of the question.

PROGRAM RESPONSIBILITIES	YES	NO
1. Is an electrical safety officer assigned? (B0702a)		
2. Has an electrical safety instruction been issued? (B0702c)		
3. Are copies of the command's electrical safety instructions available to all departments and divisions? (B0702c)		
4. Is an electrical safety instruction available in the electrical tool issue room and electronics shop? (B0702c)		
5. Does the supply officer ensure that all electrical tools are turned over to the electrical tool issue room for safety inspection prior to issue? (B0702d)		
6. Has the ship established an electrical tool issue room separate from the electrical shop? (Not applicable to submarines). (B0704(a))		
PROPER INSTALLATION, MAINTENANCE AND REPAIR OF ELECTRICAL EQUIPMENT		
7. Are safety precautions, operating instructions, wiring diagrams, and high voltage signs posted on or in the vicinity of switchgear? (NSTM 300)		
8. Is there a sufficient supply of rubber insulating gloves and are they free of cracks and tears? (NSTM 300)		
9. Observe pre-use Planned Maintenance System (PMS) conducted on one pair of gloves from each work center. Were proper procedures followed? (NSTM 300)		

PROGRAM RESPONSIBILITIES	YES	NO
10. Have a qualified electrician's mate check the fuses and circuit breakers installed against posted ratings on at least five components. Are proper fuses installed? (NSTM 320)		
11. Are rubber mats in the vicinity of switchgear, properly secured in required places and undamaged? (NSTM 320)		
12. Are all switchgear meters operative and indicating correctly within tolerances? (NSTM 320)		
13. Has PMS been satisfactorily performed on deep fat fryers and donut machines at proper time intervals? (NSTM 300)		
14. SPOT CHECK small electrical appliances (particularly in food preparation spaces and work shops). Are all on/off switches shielded to prevent inadvertent starting? (NSTM 300)		
15. Are battery lockers properly ventilated? (NSTM 313)		
16. Do battery lockers have properly stored safety equipment and an equipment list? (NSTM 313)		
17. Are batteries properly secured? (NSTM 313)		
18. CHECK three electrical work benches (at least one in Engineering Department and one belonging to EMO). Are they properly insulated and grounded? (NSTM 300)		
19. Has electrical equipment been painted only as necessary for proper preservation (not excessively)? (NSTM 320)		
20. Are main power circuits ground free? (NSTM 320)		
21. Are megger test holes on manual bus transfer circuit breakers free of plugs? (NSTM 320)		
22. Are circuit breakers free of broken handles? (NSTM 320)		
23. Are wooden grab rails installed on switchgear where required? (NSTM 320)		
24. Are all circuits free of jury rigs? (NSTM 320)		

PROGRAM RESPONSIBILITIES	YES	NO
25. Have dead-end cables been properly identified and isolated (NSTM 320)		
26. SPOT CHECK three sets of casualty power cables and associated terminals. Are they in satisfactory condition (cables are not cracked or painted, terminals are covered and a cable securing tool is available), properly labeled, and normally energized terminals have warning signs posted? (NSTM 320)		
27. Are shore power cables free from cracks and improperly secured connectors? (NSTM 320)		
28. Are shore power cables properly stowed? (NSTM 320)		
29. CHECK two sections of main switchgear. Are the following evident: (NSTM 320) a. Clean?		
b. Are openings blanked off where breakers or other devices were removed?		
c. Ventilation directed away from switchgear?		
d. Adequate lighting, emergency lights, and battle lanterns?		
e. Absence of bypassing of interlocks or safety devices?		
30. Randomly CHECK 10 controllers and automatic bus transfer devices. Are the following evident: (NSTM 320) a. Clean, dry and clear of loose gear?		
b. Panel enclosures are in good condition and properly secured with all securing devices present?		
c. Rubber covers on start and stop buttons are in good condition?		
d. ABT's operate properly (CAUTION--obtain proper supervisory permission before cycling any ABT)?		
31. Are incandescent lights properly shielded? (NSTM 330)		

PROGRAM RESPONSIBILITIES	YES	NO
32. Spot CHECK 20 relay operated battle lanterns. Are they mounted upright? (NSTM 330)		
33. Are batteries only charged in authorized spaces? (NSTM 313)		
34.Visually SPOT CHECK lighting systems. Are the following evident: (NSTM 330) a. Lighting fixtures and housing are grounded?		
b. Multi-purpose signal lights have shields installed?		
c. Ground detector indicator lights are operational?		
d. Dress ship lights are of the proper type and are in good condition?		
e. Fixtures and lenses are clean?		
f. Systems are operable?		
35. Visually spot check receptacles. Are they of the grounded type? (NSTM 300)		
ROUTINE AND PERIODIC TESTING TO DETECT AND CORRECT UNSAFE EQUIPMENT/CONDITIONS 36. Do division officers ensure that all assigned portable electrical equipment get electrically checked at proper time intervals? (B0702e(2))		
37. Do division officers ensure that personal electrical/electronic equipment has been registered and checked in accordance with electrical safety instructions during routine inspections of work centers and assigned berthing areas? (B0702e(3))		
38. Are portable extension lights the explosion proof vice open type? (NSTM 330)		
PORTABLE ELECTRICAL TOOL ISSUE (E Division on submarines) 39. Are adequate safety precautions briefings given to tool users upon request for issue? (B0704b)		

PROGRAM RESPONSIBILITIES	YES	NO
40. CHECK electrical safety check record of portable electrical tools. Are tools properly checked prior to each issue? (B0704c)		
41. Are issued tools returned daily unless overnight use is approved by the Division officer? (B0702(e)) and (B0704)		
42. Does the tool issue room (E Division on submarines) have an inventory of portable electrical equipment or tools in permanent custody to specified divisions? (B0704d)		
43. Are the actual tools for divisions which have permanent custody the same as listed on the tool issue room Electrical Division on submarines) inventory? (B0704d)		
TRAINING		
44. Do all personnel receive training on electrical safety and first aid associated with electric shock upon reporting aboard and/or within the past year? (B0705b)		
45. Has the film "Shipboard Electrical Safety" been shown to all hands within the past year? (B0705b)		
46. Have at least 50 percent of all electrical/ electronics associated ratings received CPR training annually?(B0705c		
47. Are periodic electrical safety reminders included in the Plan of the Day? (B0705d)		
ELECTRICAL SAFETY		
48. Are electrical gloves issued with metal cased portable electrical tools? (C0902m)		
49. Are no more than two 25-foot extension cords joined together to do work? (C0902n)		
50. Are electrical tools not in use stored in a clean, dry place with the cord loosely coiled? (C0902y)		
51. Are warning placards available to be placed at a battery compartment access when charging is in progress? (C0903b)		
52. Are motors and generators air filters clean?		

PROGRAM RESPONSIBILITIES	YES	NO
(C0904d(4))		
53. Are special safety precautions in effect to prevent personnel from electrocuting themselves when working aloft? (C0905h)		
54. Is segregated storage provided for unsafe electrical tools? Is the storage area locked, and are tools clearly marked "OOC" and rendered incapable of being energized (unless immediate repair is to be accomplished)? (B0704(f))		

CHAPTER B8

GAS FREE ENGINEERING

B0801. DISCUSSION

a. No routine hazard, with the exception of ordnance, is as dangerous as the presence of potentially lethal atmospheres in ship's spaces. In many instances, potentially harmful gases or vapors are present in such a low concentration (parts per million (ppm)) that no adverse conditions are created. By design a ship has many confined spaces (especially tanks and voids) in which a multitude of both toxic and non-toxic gas or vapor creating substances and operations are used in the normal operation of the ship. Hazardous atmospheres may be created that can explode or cause asphyxiation. Compounding the problem is that many gases or vapors are not detected by the human ability of smell, and personnel attempting to save a fallen shipmate may themselves be overcome and killed by undetected vapors. It is for these reasons that every confined space shall be considered hazardous and entry into or work in or on such spaces is prohibited until the space has been gas free tested by qualified gas free engineering personnel. This is known as Gas Free Engineering (GFE).

b. Consult reference B8-1 (Gas Free Engineering) for further details concerning specific procedures and related safety precautions.

B0802. PRECAUTIONS

a. All hands shall:

(1) Notify workcenter supervisor prior to entering any unventilated, non-occupied space designated to store hazardous or toxic materials or any sealed space, verify that such a space was gas free tested and certified safe for entry and/or work by the appropriate gas free engineering personnel prior to entry, and comply with the requirements of the gas free engineering certificates posted outside the space.

(2) Notify the workcenter supervisor before any new space is used to store hazardous or toxic material or of any spill of hazardous or toxic material.

(3) When working in any confined space, always work with an observer or an attendant monitoring the work from outside the space. Maintain communication with personnel outside the space. The type and frequency of communication shall be specified by the GFE based on the nature of the space, the operation, and the degree of hazard.

b. Workcenter supervisor shall notify chain of command and gas free engineer (GFE) to obtain approval:

(1) prior to entering any unventilated, non-occupied space designated to store hazardous or toxic materials or any sealed space and

(2) before any new space is used to store hazardous or toxic material or of any spill of hazardous or toxic material.

c. If a person is seen unconscious in any space, no one is to enter that space without appropriate respiratory protective equipment and a backup assistant.

B0803. Gas Free Engineering Subsections

The following subsections apply to gas free engineering:

a. Confined space entry procedures, including testing. (reference B8-1, paragraphs 074-19.4 through 19.15)

b. Personal protective equipment. (reference B8-1, paragraphs 074-19.7 through 19.9)

c. Ventilation requirements. (reference B8-1, section 074-21)

d. Emergency and rescue procedures. (reference B8-1, section 074-25)

e. Instrumentation, including calibration and maintenance. (reference B8-1, appendix K and L)

f. Training of ship's force and gas free engineering personnel. (reference B8-1, paragraph 074-18.7 through 18.9)

CHAPTER B8

REFERENCES

B8-1 Naval Ship's Technical Manual, NAVSEA S9086-CH-STM-030/CH-074 V3, "Gas Free Engineering"

CHAPTER B9

RADIATION SAFETY

B0901. DISCUSSION

a. This chapter outlines policies and procedures designed to minimize personnel exposure to radiation from sources other than nuclear power systems and nuclear weapons that have their own radiation protection and control programs. Per paragraph A0103b, the Director, Naval Nuclear Propulsion Program is responsible for the control of radiation and radioactivity associated with naval nuclear propulsion plants. As such, the requirements of this chapter do not apply to the Naval Nuclear Propulsion Program. Issues concerning radiation and radioactivity associated with naval nuclear propulsion plants should be addressed via the chain of command. This chapter also excludes those individuals, who as patients, must undergo diagnostic or therapeutic procedures

b. Radiation is commonly divided into two categories that are indicative of the energy of the wave or particle. Radiation, with sufficient energy to strip electrons from atoms in the media through which it passes, is known as ionizing radiation. Less energetic radiation incapable of such electron stripping is termed non-ionizing radiation. Potentially hazardous sources of radiation exist aboard Navy ships. Ionizing radiation sources include radioactive material and x-ray generating equipment, while lasers, radar, and communications equipment emit non-ionizing radiation.

B0902. RESPONSIBILITIES

a. **The commanding officer shall**:

(1) Appoint laser systems safety and radiological systems safety officers (LASSO), as needed, and ensure that they are properly trained per references B9-1 and B9-2.

(2) Request a radiation hazard (RADHAZ) survey when:

(a) Emitter systems have been added, relocated, or upgraded as a result of scheduled SHIPALT or ALT installation since the last RADHAZ survey.

(b) Watchstations or work areas are moved or established in the proximity of emitter systems.

(c) Gasoline storage or transfer stations are relocated in the proximity of emitter systems.

(d) Personnel are injured as a result of exposure to radio frequency radiation (RFR) and the command requires assistance in re-evaluating the current RADHAZ survey.

(e) The current RADHAZ survey was conducted prior to 1995.

(3) Submit a confirmation letter to COMNAVSEASYSCOM (Code SEA 05K2B), stating that the recommended control measures provided in the Hazards of Electromagnetic Radiation to Personnel (HERP) survey report have been implemented to obtain a NAVSEASYSCOM letter of certification, per reference B9-3.

(4) Ensure mishaps and incidents involving radiation are investigated and reported per the governing references listed in paragraph B0903. If a mishap report is required, use chapter A6 for guidance.

b. **Division officers responsible for workcenters and areas with identified radiation hazards shall**:

(1) Ensure radiation (ionizing, RF, and laser) hazard areas are posted with the appropriate warning signs and deck markings.

(2) Ensure that personnel receive medical surveillance as identified in the baseline industrial hygiene.

c. **Leading petty officers and duty section leaders shall** provide awareness and hazard recognition training for all personnel assigned to work or stand duty in RADHAZ areas to prevent accidental exposure.

B0903. GUIDANCE

a. **Ionizing Radiation**

(1) **Industrial Radiography**. Tender and aircraft carrier non-destructive test (NDT) personnel and shipyard workers use X-ray machines and ionizing radiation sources for industrial radiography. The ship's radiological safety officer (RSO) is responsible for all aspects of the program described in the governing instructions.

(a) **Governing Instructions**. NAVSEA S0420-AA-RAD-010 (Reference B9-2)

(b) **POC**. NAVSEADET Radiological Affairs Support Office (RASO). COMM: (757) 887-4692 DSN: 953-4692 FAX: (757) 887-3235

(2) **Medical Radiography**. Medical and dental x-ray facilities must have a survey every 2 years by a radiation health officer (RHO). The medical officer shall request the survey from the nearest medical activity with a RHO or contact Bureau of Medicine and Surgery (BUMED) (MED-212).

(a) **Governing Instructions**. BUMEDINST 6470.22 (Reference B9-1)

(b) **POC**. BUMED (MED-212), Washington, DC 20372, DSN: 294-1182/1185, commercial: (202) 653-1182/1185.

b. **Non-Ionizing Radiation**

(1) **Radiofrequency (RF) and Microwave Radiation**. Radar and communications equipment (transmitters) and RF heat sealers may emit hazardous levels of RF/microwave radiation. In addition to causing biological changes, RF/microwave radiation can induce electrical currents/voltages that may cause shocks and burns, premature activation of electro-explosive devices (EEDs) in ordnance, and arcs, which may ignite flammable materials.

(a) **Radar and Communications**. Information on the hazards of electromagnetic radiation to personnel, fuels, and ordnance is available in reference B9-4, Volume I for Hazards of Electromagnetic Radiation to

Personnel (HERP) and Fuels (HERF) and Volume II for Ordnance (HERO). Per reference B9-1, surveys are generally provided at the completion of acceptance trials or upon ship requests (e.g., following topside changes or changes to the ships RFR emitters). Surveys are performed to determine if the permissible exposure limits (PELs) are exceeded in normally occupied areas, particularly with respect to the established guidelines identified in B9-7. Following a survey, a complete set of RADHAZ control measures (See appendix B9-A for description) is provided to mitigate RADHAZ and to obtain a NAVSEASYSCOM letter of certification. For information and technical assistance, contact COMNAVSEASYSCOM (Code SEA 05K2B) or NAVSURFWARCENDIV Dahlgren (Code J52).

(b) **Heat Sealers**. Heat sealers are used to seal layers of plastic together using RF radiation and are usually found in shops that make containments and enclosures (i.e. nuclear control facilities and lagging shops).

(2) **Governing Instructions**

(a) NAVSEA OP 3565/NAVAIR 16-1-529/NAVELEX 0967-LP-624-6010 Volume I, Fifth Revision (Reference B9-4; specific to radar and communications)

(b) DODINST 6055.11 (Reference B9-5; all RFR sources)

(3) **POCs**

(a) **Radar and Communications**

1. **Technical Assistance and Reporting Authority**. Naval Sea Systems Command (SEA 05K2B), Commander, Naval Sea Systems Command Headquarters, Washington, D.C., 20362, DSN 222-3825, Commercial: (202) 692-3825

2. **RADHAZ Surveys and Technical Assistance**. Naval Surface Warfare Center, Dahlgren Division (Code J52), Commander, Dahlgren Division, Naval Surface Warfare Center, 17320 Dahlgren Road, Dahlgren, VA 22448-5100, DSN 249-3444/3446 or commercial (540) 653-3444/3446.

(b) **For All Other RFR Health Hazards and Surveys, Medical Examination, and Medical Surveillance Information**. Bureau of Medicine and Surgery (BUMED) (MED-212), Washington, DC 20372, DSN: 294-1182/1185, commercial: (202) 653-1182/1185 or Navy Environmental Health Center (NAVENVIRHLTHCEN), 2510 Walmer Avenue, Norfolk, Virginia, 23513-2617, DSN 564-4657, Commercial: (804) 444-4657.

c. **Lasers (IIIb, IV, and Military Exempt Lasers Only)**. Military applications of laser systems are increasing rapidly. Common shipboard sources include laser range finders, laser guided munitions, communications equipment, fiber optics, scoring systems, landing systems and training aids. Eye injury is the prime exposure hazard with using lasers. Eye injury can occur by direct viewing or reflecting off surfaces. Users shall read and understand hazard label warnings on equipment, inclusive of visual aid pointer.

(1) **Governing Instructions**. SPAWARINST 5100.12B (Reference B9-6) and SECNAVINST 5100.14C (Reference B9-7)

(2) **POC**

(a) **Laser Related Weapons Systems and Certification of Laser Firing Ranges**. Naval Surface Warfare Center, Dahlgren, Virginia, 22448, DSN: 249-8171, Commercial: (703) 663-8171.

(b) **For Medical and Industrial Laser Operations**. NAVENVIRHLTHCEN, 2510 Walmer Avenue, Norfolk, Virginia, 23513-2617, DSN: 564-4657, Commercial: (804) 444-4657.

d. **Radioactive Materials, Not Otherwise Classified**

(1) The small quantities, specific activity, and physical form of radioactive materials used aboard ships usually make them non-hazardous. However, breakage and spread of even small quantities of some radioactive materials can lead to internal contamination (by ingestion, inhalation or wound contamination) in excess of allowable limits. Therefore, report all incidents of suspected or real contamination through the cognizant MDR per reference B9-8.

(2) Luminous markers, clocks, smoke detectors, compasses, depth gauges, and electron tubes may contain small quantities of radioactive material. The evaluation of such items shall consist of a simple inspection for physical damage.

(3) Some aircraft and missile construction material contains magnesium-thorium alloys. Altering this material through cutting or grinding by ship crewmembers is prohibited. Thorium containing welding rods are exempt from radioactive material permitting.

NOTE:

Tenders holding a Navy Radioactive Materials Permit may alter these materials per reference B9-9.

(4) Depleted uranium is used as penetrators in some munitions. All warship classes, which stow depleted uranium munitions, has been evaluated by COMNAVSEASYSCOM to ensure that personnel occupying spaces immediately adjacent to the munitions storage compartment are not exposed to radiation levels exceeding that allowed for the general population.

B0904. RADIATION HAZARD AREAS

a. **Ionizing Radiation**. This chapter provides specific guidance for delineating ionizing radiation hazard areas for weapons and radiographic sources. The type and wording of each sign is dependent upon the type of radiation area. Reference B9-8, section 7-4 provides specific guidance for posting ionizing radiation hazard areas. Medical x-ray units will be posted per reference B9-8.

b. **RFR Hazard Areas**. RFR hazard warning signs are required at all access points to areas where the RFR levels may exceed the PEL. Obtain NAVSEA-approved warning signs and labels through the standard stock system (see appendix B9-A). When military operational considerations prevent the posting of such signs, a waiver must be obtained from cognizant occupational health and safety professionals depending upon the RFR source. Where the RFR levels may exceed 10 times the PEL, additional warning devices and controls such as

flashing lights, audible signals, barriers, and interlocks may be required, depending on the potential risk for exposure. These areas will be noted in the ship's RADHAZ and baseline industrial hygiene survey reports.

(1) **Radar and Communications.** The ship's RADHAZ Report provides detailed posting and deck marking information for radar and communications RFR hazard areas. These are also described in appendix B9-A.

(2) **Heat Sealers and Other RFR Sources.** The baseline industrial hygiene survey will provide posting requirements for other RFR hazard areas.

c. **Lasers (IIIb, IV, and Military Exempt Lasers Only).** The LSSO is responsible for labeling lasers and posting laser hazard areas.

B0905. MEDICAL SURVEILLANCE

The baseline industrial hygiene survey identifies those work centers that require medical surveillance for exposure to radiation.

a. **Ionizing Radiation.** Medical surveillance of personnel exposed to ionizing radiation shall follow reference B9-8.

b. **Lasers.** The medical surveillance for lasers is specified in reference B9-10 and is limited to those personnel at risk to laser radiation. The nature of the risk is associated with accidental, acute injuries, not chronic exposure.

B0906. RADIATION INCIDENTS

a. In the event of a radiation incident involving ionizing radiation, reference B9-12 and chapter A6 require investigation and reporting.

b. **Radiofrequency Radiation.** Investigate and report RFR mishaps as directed in reference B9-12.

(1) Investigation of incidents involving alleged or actual RFR exposures that are five times the PEL or greater shall include, as a minimum:

(a) A listing of all involved personnel.

(b) Measurements of RFR exposure levels.

(c) Results of appropriate medical examination.

(d) A detailed description of the circumstances surrounding the incident.

(e) Recommendations for more detailed medical follow-up if necessary.

(f) Recommendations to prevent any future occurrence of the incident.

(2) Using the format listed in the previous paragraph, the commanding officer shall submit a message report to BUMED, Washington, D.C. (MED-212) within 48 hours for any of the following situations:

(a) For each exposure incident which is five times the PEL or greater.

(b) There is injury to personnel or personnel demonstrate physical symptoms believed associated with RF exposure.

(c) Inadvertent exposure occurred to members of the general public or to other noninvolved personnel as a result of naval operations that exceeded the appropriate controlled PEL.

c. **Laser Radiation (Specific Actions Described in Reference B9-11)**

(1) If an eye injury is suspected or observed from exposure to laser radiation, medical examination by an ophthalmologist or optometrist is required within 24 hours of the exposure if operational requirements allow or as soon as possible.

(2) Submit a report of the exposure incident to the BUMED (MED-212) within 30 days of the incident, with the following information as a minimum:

(a) List of personnel involved

(b) Estimation of exposure(s) as related to the applicable PEL

(c) Details of immediate and subsequent medical findings

(d) Narrative account/summary of exposure incident—to include wavelength, mode of operation(s) and energy/power output

(e) Details regarding safety procedures and equipment used.

CHAPTER B9

REFERENCES

B9-1 BUMEDINST 6470.22. Navy Radiological Systems Performance Evaluation Program, 18 Apr 00

B9-2 NAVSEA S0420-AA-RAD-010. Radiological Affairs Support Program (RASP) Manual, 01 Oct 91 (NOTAL)

B9-3 NAVSEA S9040-AA-GTP-010/SSCR, Shipboard systems Certification Requirements for Surface Ship Industrial Periods (Non-Nuclear), Revision 3 of Jun 90 (NOTAL)

B9-4 NAVSEA OP 3565/NAVAIR 16-1-529/NAVELEX 0967-LP-624-6010. “Electromagnetic Radiation Hazards (Hazards to Personnel, Fuel, and other Flammable Material)” (NOTAL)

B9-5 DoD Instruction 6055.11. Protection of DoD Personnel from Exposure to Radiofrequency Radiation of 20 August 86 (NOTAL)

B9-6 SPAWARINST 5100.12B. Navy Laser Radiation Hazards Prevention Program NOTAL)

B9-7 SECNAVINST 5100.14C. Military Exempt Lasers (NOTAL)

B9-8 NAVMED P-5055. “Radiation Health Protection Manual” (NOTAL)

B9-9 OPNAVINST 6470.3. Navy Radiation Safety Committee (NOTAL)

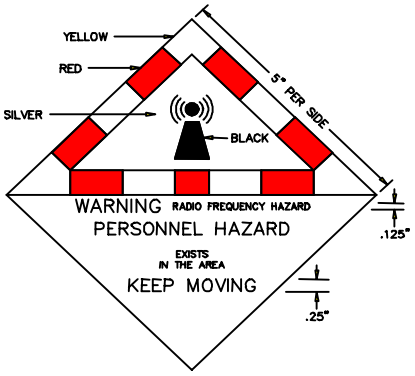
B9-10 DODINST 6055.5-M, “Occupational Health Surveillance Manual”, Authorized by DoD Instruction 6055.5, 10 Jan 89 (NOTAL)

B9-11 BUMEDINST 6470.23, “Medical Management of Non-Ionizing Radiation Casualties”.

B9-12 OPNAVINST 6470.2A. Occupational Radiation Protection Program (NOTAL)

Appendix B9-A

SIGNS AND STOCK NUMBERS



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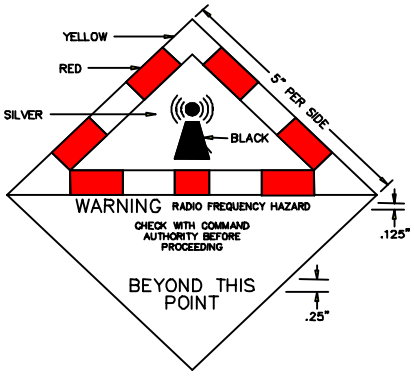

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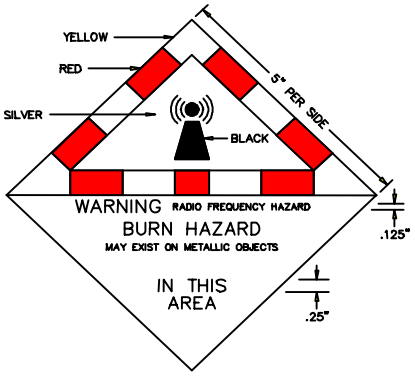
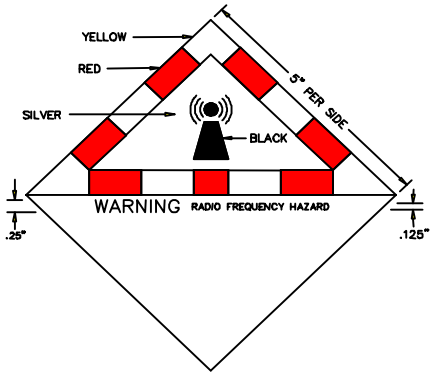


TYPE 3



TYPE 5

a. Illustration page describing the warning sign formats (See next page).

b. Description of types of RADHAZ control measures and deck marking information (See following text).

National Stock Numbers (NSNs):
Type 1 - 7690-01-377-5893
Type 2 - 7690-01-377-5895
Type 3 - 7690-01-377-5896
Type 5 - 7690-01-377-5374

RADHAZ WARNING SIGN FORMATS

CONTROL MEASURES AND DECK MARKINGS:

RADHAZ Warning Signs

RADHAZ warning signs have been developed to advise personnel of the hazards of electromagnetic radiation. The format of these signs conforms with national and international standards. The RADHAZ warning sign formats are provided along with the National Stock Numbers (NSNs) in the above figure.

Type 1 Warning Sign

The Type 1 warning sign advises personnel not to linger in the area surrounding HF antennas where the PEL can be exceeded. The sign informs personnel of an RF hazard in the area and to keep moving. This sign is posted at a boundary of an area where the PEL can be exceeded. Personnel may pass through this area, but must not linger. If personnel are required to remain in the area, they must contact appropriate personnel who will ensure that operational procedures are implemented to limit RF exposure to a level below the PEL.

Type 2 Warning Sign

The Type 2 warning sign excludes personnel from proceeding past a designated point. The sign informs personnel to check with command authority before proceeding beyond this point. This sign is normally posted at access points to high-power antenna systems, such as the access to the mast or high-power HF communication antennas which are often located in the vicinity of normally occupied areas.

Type 3 Warning Sign

The Type 3 warning sign informs personnel that an RF burn hazard may exist on metallic objects in this area. The Type 3 sign is used to denote RF hazards due to contact with metallic objects in the area and is normally posted on the metallic object that presents the worst hazard. Personnel should be aware that this hazard may also exist on other metallic objects in the area. An RF burn hazard may exist when either the RF voltage or contact current PEL is exceeded. Additional RADHAZ control measures may be required to ensure that this hazard is limited to levels that do not exceed PELs on metallic objects that personnel must grasp, such as signal lights and binoculars.

Type 5 Warning Sign

The Type 5 warning sign provides a blank area in which special instructions necessary for safe operations can be typed. Often this sign provides operators and maintenance personnel with specific frequency and/or power limitation information for the safe operation of the antenna systems associated with the RF transmit equipment. The Type 5 sign may also be used

to inform personnel to contact command authority prior to operation of equipment to prevent an RF hazard to the operator or other personnel. The Type 5 sign should be posted in clear view of system operators.

PEL line

A PEL line is used to mark a deck area where precautionary measures are required to minimize the possibility that personnel can be exposed to RFR in excess of the PEL. The PEL line is a 4-inch wide, red line (usually a circle or semicircle) painted on the deck to mark the boundary of an area surrounding an antenna where the PEL can be exceeded. When a PEL line is used, a Type 1 RADHAZ warning sign is posted to advise personnel that a hazard may exist and that they must keep moving. Personnel outside the PEL line need not take precautionary measures; however, when it is necessary for personnel to be within the marked areas, they must contact appropriate personnel who will ensure that operational procedures are implemented to limit RF exposure to a level below the PEL.

Red Warning Bands

A red warning band is used to mark a safety rail where precautionary measures are required to minimize the possibility of personnel exposure to contact currents in excess of the PEL. The red warning band is a 4-inch wide, red line painted on the top of the safety rail to mark the boundary of an area in proximity to an antenna where the PEL can be exceeded. Where a red warning band is used, a Type 3 RADHAZ warning sign is posted to advise personnel that an RF burn hazard may exist.

Personnel Barriers

Personnel barriers are any devices that restrict personnel access to an antenna or area where the PEL can be exceeded. The personnel barrier may be a fixed barrier, such as a permanent fenced area around an antenna. If no access to the antenna is provided, RADHAZ warning signs are not required. If there is an access opening, a temporary barrier (i.e., nylon rope) may be used to restrict personnel access. In this case, a Type 2 warning sign is also posted on a placard which is normally attached to the nylon rope.

Frequency and/or Power Management

Frequency and/or power restrictions may be utilized to limit RF levels in excess of the PEL to an acceptable level. This management technique may be used to limit RF levels within a RADHAZ area defined by PEL lines or to limit RF contact current on items that personnel are required to grasp while performing their assigned task. The HERP/HERF test report provides specific guidance for operating procedures. These procedures may include one or more of the following:

a. Refrain from using the antenna,
b. Reduce power for the frequencies at which the PEL is exceeded, and
c. Refrain from using frequencies at which the PEL is exceeded.

Type 5 warning signs are used to provide operator or maintenance personnel with the frequency and/or power management requirements.

CHAPTER B10

LEAD CONTROL

B1001. DISCUSSION

a. The purpose of this chapter is to prevent lead intoxication and related injuries during the use, handling, removal and melting of materials containing lead.

b. In this chapter, “lead” means metallic lead, all inorganic lead compounds, and organic lead soaps. Lead's low melting point, high molecular weight, high density and malleability make it useful structural material. When added to resins, grease, or rubber, lead compounds act as antioxidants. Common uses for lead and lead compounds include ballast, radiation shielding, paint filler and hardener, rubber and pipe joints, high voltage cable shielding, small arms ammunition, batteries and weights. While not an absolute indicator, red, forest green, chrome yellow and "school bus" yellow color paints typically contain lead compounds. Lead may also be found in polyurethane and water based paints.

c. Significant lead exposures can occur during: lead and babbitt melting and casting; ballast handling; spraying, sanding, grinding, burning, and abrasive blasting of lead-containing materials and lead-containing paint; brazing with torches; high voltage cable repair; abrasive blasting with smelting slag; lead-acid battery reclaiming; machining lead; disassembly of gasoline engine components (which have used leaded gasoline); and handling of contaminated personal clothing.

d. Lead is a recognized health hazard. Lead may adversely affect the peripheral and central nervous systems, as well as the red blood cells, kidneys, reproductive and endocrine systems.

e. In recognition of the serious health hazards associated with lead and the numerous sources of potential lead exposure, the Navy has established strict controls to limit both occupational and environmental exposures. Standards and controls discussed in this chapter shall be applicable to all Navy personnel.

B1002. PERMISSIBLE EXPOSURE LIMIT AND ACTION LEVEL TRIGGERING REQUIREMENTS

a. **Permissible Exposure Limit (PEL)**. The PEL for an 8-hour time-weighted average (TWA) exposure to airborne lead is 50 micrograms per cubic meter (ug/m^3) of air.

b. **Action Level (AL)**. The AL for an 8-hour TWA exposure to airborne lead is 30 ug/m^3 (without regard to respirator use).

c. **Biological monitoring and medical surveillance** shall be initiated when an employee’s exposure exceeds the AL for more than 30 days per year.

d. **Engineering and administrative controls** shall be initiated when an individual's exposure exceeds the PEL for more than 30 days per year. When a person's exposure is greater than the AL, but less than the PEL, engineering controls shall be initiated to reduce the workplace environmental level to a maximum of 200 ug/m^3. Thereafter, any combination of engineering and administrative controls may be used to maintain exposure at or below the PEL.

B1003. LEAD CONTROL RESPONSIBILITIES

a. **Commanding Officers shall** not authorize paint removal for cosmetic reasons or due to excessive paint thickness. They may only authorize paint removal to protect the ship from corrosion, when incidental to hot work, and when bare metal is required for an inspection.

b. **The safety officer shall**:

(1) When applicable, as determined by the baseline industrial hygiene survey, establish effective shipboard lead control practices that include as a minimum those elements in paragraph B1004.

(2) Verify that the ship has the proper clothing and equipment aboard to protect personnel during shipboard lead work.

(3) Notify the commanding officer when sufficient funds are unavailable to obtain mandatory protective clothing and equipment to protect ship's force personnel during shipboard lead work.

(4) If specified in the baseline industrial hygiene survey, ensure a written compliance plan to comply with lead control requirements is available. The supporting industrial hygiene officer/industrial hygienist shall prepare this plan.

(5) Implement lead hazard training for all personnel identified in the baseline industrial hygiene survey as potentially exposed to lead at or above the AL.

(6) Request industrial hygiene assistance for the evaluation of new potential lead hazards.

c. **Division officers shall**:

(1) Ensure that personnel required to perform work involving lead exposure are provided with proper clothing and equipment and trained in its use.

(2) Ensure that personnel who work with lead or who work in areas where the potential exists for lead exposure at or above the AL are properly trained.

(3) Identify to the medical department representative (MDR), personnel who work with lead or who work in areas where the potential exists for lead exposure at or above the AL.

d. **The MDR shall**:

(1) Assist the safety officer with conducting lead hazard training upon request.

(2) Schedule personnel for blood lead analysis and physical examinations at shore medical activities as required for medical surveillance.

e. **All hands shall**:

(1) Obtain and properly use protective equipment and use safe work practices as trained when working with lead.

(2) Report for medical surveillance tests and examinations, when scheduled.

B1004. LEAD CONTROL ELEMENTS

The following elements, as a minimum, are necessary to carry out effective lead control:

a. Industrial hygiene survey (paragraph B1005)

b. Control of lead in the workplace environment (paragraph B1006)

c. Waste disposal procedures (paragraph B1007)

d. Medical surveillance (paragraph B1008)

e. Written compliance plan (paragraph B1009)

f. Worker and supervisor training (paragraph B1010)

B1005. INDUSTRIAL HYGIENE SURVEY

a. An industrial hygienist shall evaluate all workplaces in which lead is used. This evaluation shall be accomplished during the baseline industrial hygiene survey specified per chapter A3. Where a potential for exposure from inhalation of airborne lead particulate or personnel contamination is found, the industrial hygienist shall establish an exposure monitoring plan to characterize personnel exposures. When personnel lead exposures warrant, the industrial hygiene survey shall identify the need for the command to have a written lead hazard compliance plan and provide the specific content for the plan.

b. Within 5 working days after the receipt of exposure monitoring results, the command shall notify affected personnel in writing of results that represent their exposure. Whenever the results indicate that the individual was exposed above the PEL, without regard to respirator use, the written statement shall include that fact and a description of the corrective action(s) taken to reduce the individual’s exposure.

c. If the safety officer or any supervisor has a question regarding the potential lead hazards and appropriate controls involving an operation which includes or potentially includes lead, the safety officer shall request industrial hygiene officer assistance from a tender, staff or local medical treatment facility or Navy Environmental and Preventive Medicine Unit (NAVENPVNTMEDU).

B1006. CONTROL OF LEAD IN THE WORKPLACE ENVIRONMENT

There are seven basic principles to be used when working with lead or materials that contain lead:

a. **General Workplace Control Practices**

(1) Use non-lead paint.

(2) Keep mechanical grinding and sanding to the absolute minimum with primary reliance on impact tools and authorized chemical strippers for paint removal. Mechanical tools equipped with high efficiency particulate air (HEPA) filtered exhaust for removal and reclamation of lead dust are preferred.

(3) When feasible, minimize the heating of lead and leaded materials by using thermostatically-controlled heating (below 600°F) or removing the lead-containing surface coatings or contaminants prior to heating.

(4) Establish procedures to maintain work surfaces as free of lead dust as is practical. Clean up lead dust with a HEPA filtered vacuum cleaner. Wet sweeping, wet brushing and wiping down with wet rags may be effective in removing lead dust. Rags used for wiping down shall be disposed of as lead waste.

(5) Lead-containing waste, scrap, debris, containers, equipment and clothing consigned for disposal shall be collected, sealed, and labeled in impermeable containers. Transportation shall be conducted in a manner that does not release airborne dust or pollute surrounding waterways. Dispose of lead waste per the procedures of chapter B3.

(6) To minimize exposure potential, isolate hot work on lead and abrasive lead removal operations from other operations.

b. **Ventilation**

(1) If deemed necessary by the cognizant industrial hygienist, provide fixed local exhaust ventilation connected to high efficiency particulate air filters at the point of particulate generation.

(2) Do not exhaust emissions to another workspace.

c. **Personal Protective Clothing and Related Control Facilities**

(1) Personnel engaged in the handling of lead or in situations where the concentration of airborne particulate lead is likely to exceed the PEL, or

where the possibility of skin or eye irritation exists shall remove uniform clothing and wear protective clothing. Consult the command's industrial hygiene officer, industrial hygiene survey, or contact the local BUMED industrial hygienist for specific clothing requirements. Clothing shall be waterproof when wet lead is handled.

(2) Personnel shall remove protective clothing before leaving the work area.

(3) Provide change rooms as close as practical to the lead work area(s) for personnel who work where the airborne lead exposure is above the PEL (without regard to the use of respirators). When possible, locate shower facilities between the "clean" and "dirty" change rooms. Consult the command's industrial hygiene officer, industrial hygiene survey, or contact the local BUMED industrial hygienist for specific decontamination facility requirements.

(4) Launder lead-contaminated clothing to prevent release of lead dust in excess of the AL. Transport lead-contaminated clothing in sealed containers to which are affixed the standard "caution label" (see paragraph B1006e). Notify persons who clean or launder protective clothing or equipment in writing of the potentially harmful effects of exposure to lead and monitor these persons for exposure to lead as required by paragraph B1005.

d. **Respiratory Protection**

(1) Respirators are required where the concentration of airborne, particulate lead is likely to exceed the PEL.

(2) Consult the command's Respiratory Protection Program Manager, industrial hygiene survey, or contact the local BUMED industrial hygienist for specific respirator requirements.

e. **Warning Signs and Caution Labels**

(1) **Warning signs** shall be provided and displayed at each location where airborne lead concentrations may exceed the PEL. Signs shall state, as a minimum, the following:

WARNING

LEAD WORK AREA

POISON

NO SMOKING, EATING OR DRINKING

(2) **Caution labels** shall be affixed to containers of lead-contaminated clothing and equipment, raw materials, waste, debris, or other products containing lead. These caution labels shall state:

CAUTION

CLOTHING CONTAMINATED WITH LEAD

DO NOT REMOVE DUST BY BLOWING OR SHAKING

DISPOSE OF LEAD CONTAMINATED WASH WATER ACCORDING TO

APPLICABLE LOCAL, STATE OR FEDERAL REGULATIONS

f. **Housekeeping**

(1) Where lead containing materials are routinely melted, ground or cut, maintain all surfaces as free as practical of lead accumulation. Clean surfaces at least once per shift to prevent accumulation of lead dust.

(2) All cleaning shall use methods such as vacuuming with HEPA filtered vacuum cleaners or washing down where feasible, observing water pollution regulations as they pertain to lead-contaminated wastewater. Only use wet sweeping, shoveling or brushing shall when other methods have been tried and found to be ineffective or infeasible.

(3) Do not use compressed air to clean work surfaces.

(4) When wash down procedures are used to clean surfaces or wetting is used to control dust, treat floor surfaces with a non-skid agent and drain the floor so that excess water is collected in a holding tank for disposal per chapter B3.

g. **Personal Hygiene**

(1) Prohibit eating, drinking, smoking, chewing of tobacco products or gum, the application of makeup, and storage of food and tobacco products in lead work areas.

(2) Personnel working with lead shall wash their hands and faces prior to eating, drinking, smoking or applying cosmetics.

B1007. WASTE DISPOSAL PROCEDURES

a. Lead-containing waste materials are classified as hazardous material and must be handled per chapter B3. Bag hazardous lead waste in heavy-duty plastic bags or other impermeable containers. Label bags with caution labels described in paragraph B1006e(2).

b. Label containers such as bags and trash cans "**LEAD WASTE ONLY**." Care must be exercised in order to prevent bags and other containers from rupturing when being moved.

B1008. MEDICAL SURVEILLANCE

a. Medical surveillance consists of: preplacement medical evaluation, blood lead monitoring, and follow-up medical evaluation based on the results

of blood lead analysis, worker complaint, and physician opinion. Personnel are included in this program when industrial hygiene surveillance indicates that they perform work or are likely to be in the vicinity of an operation which generates airborne lead concentrations at or above the AL more than 30 days per year. Inclusion in this program is based on measured airborne concentrations without regard to respirator use, and therefore does not indicate that an individual is overexposed to lead.

b. Within 5 days of receipt of blood lead monitoring results, the command shall notify affected personnel in writing of his/her blood lead if their blood lead level is at or above 30 ug/100gm. Notification should include the criteria for removal from lead work and, if appropriate, notification that the person is being temporarily removed from lead exposure per reference B10-1. If an individual is pregnant, she should be counseled on the possible adverse affects to the pregnancy or fetus. A decision regarding any action to be taken will be made by the physician on a case-by-case basis.

c. All records of examinations, possible lead-related conditions, related laboratory results and all forms and correspondence related to the person's medical history shall become a permanent part of the health record and be retained for the period of naval service plus 20 years, or 40 years after the date of the last entry, whichever is longer.

B1009. WRITTEN COMPLIANCE PLAN

The supporting industrial hygiene officer or industrial hygienist shall prepare a written compliance plan for processes that produce exposures in excess of the PEL as specified in reference B10-1. The ship only needs a lead compliance plan if lead processes are identified during the baseline industrial hygiene survey. These plans shall include the following items, at a minimum:

a. A description of each operation in which lead is emitted; e.g. machinery used, material processed, controls in place, crew size, employee job responsibilities, operating procedures and maintenance practices

b. A description of the specific means that will be employed to achieve compliance, including engineering plans and studies used to determine methods selected for controlling exposure to lead

c. A report of the technology considered in meeting the permissible exposure limit

d. Air monitoring data that documents the source of lead emission;

e. A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.

f. A work practice program which includes items required under paragraphs (g), (h) and (i) of reference B10-1

g. An administrative control schedule required by paragraph (e)(6) of reference B10-1, if applicable

h. Other relevant information.

The supporting industrial hygiene officer/industrial hygienist shall review written plans and update as necessary at least every 6 months to reflect the current status.

B1010. TRAINING

a. All personnel who are potentially exposed to lead at or above the AL, and their supervisors shall receive initial training prior to such assignment and at least annually thereafter. This training shall, at a minimum, include the following:

(1) The specific nature of operations during which exposure is possible.

(2) The purpose, proper selection, fit testing, use and limitations of respirators.

(3) The adverse health effects of lead with particular attention to the reproductive effects upon both males and females, including the possible adverse effects on pregnancy and the fetus.

(4) The purpose and description of the medical surveillance program, including the use of chelating agents.

(5) The engineering controls and work practices to be applied and used in the work, including personal protective equipment and personal hygiene measures.

(6) The contents of any compliance plan in effect.

NOTE

The command shall procure sufficient copies of reference B10-1 from the Department of Labor and make them available to personnel required to receive training. They should be provided with appendix B (Employee Standard Summary) of reference B10-1 and, upon request, any other handout-type materials used in or related to the training.

b. All painted surfaces that cannot be identified as lead-free through laboratory analysis must be handled as containing lead. Division officers shall train personnel assigned to remove paint per the safety precaution for paint removal in chapters C18 and D12.

CHAPTER B10

REFERENCES

B10-1 29 Code of Federal Regulations (CFR) 1910.1025, Lead (As Amended) (NOTAL - This reference should be ordered by commands, as appropriate, to provide to personnel under medical surveillance (see paragraph B1008). Commands with an industrial hygiene officer as safety officer shall have this reference aboard).

CHAPTER B11

TAG-OUT

B1101. DISCUSSION

a. A tag-out procedure is necessary because of the complexity of modern ships and the cost, delays, and hazards to personnel which could result from improper operation of equipment or the inadvertent release of stored energy. In order to prevent injury to personnel and damage to equipment, the tag-out program is mandatory for all-shipboard equipments, components, and systems. The program is designed to notify personnel that tagged-out equipment or systems are not in a normal operating condition. The tag-out procedure consists of a series of tags or adhesive labels that are applied to instruments, gages, or meters to indicate that they are inoperative, restricted use, or out of calibration. Each tag contains information necessary to avoid a possible mishap. Standard tag-out procedures are to be used for all corrective maintenance including work done by an intermediate maintenance or depot level repair activity. Tag-out procedures shall be enforced at all times. The use of tags or labels is not a substitute for other safety measures such as chaining or locking valves, removing fuses, or racking out circuit breakers. If any system, portion of a system, component, equipment, or instrument has more than one type of tag or sticker, the **DANGER (RED)** tag, when present, shall take precedence over all other tags or stickers.

b. Reference B11-1 (Tag-Out User’s Manual) is the primary technical reference for all tag-out procedures conducted by ship's crew.

B1102. TAG-OUT SUBSECTIONS

The following subsections apply to tag-out:

a. Training and Qualifications. (reference B11-1, paragraph 1.4)

b. Planning Tag-outs. (reference B11-1, paragraph 1.5)

c. Establishing Tag-outs. (reference B11-1, paragraph 1.6)

d. Maintaining Tag-outs. (reference B11-1, paragraph 1.7)

e. Clearing Tag-outs. (reference B11-1, paragraph 1.8)

f. Planned Maintenance System Tag-out Procedure. (reference B11-1, paragraph 1.9)

g. Out of Calibration/Out of Commission Labels. (reference B11-1, paragraph 1.10)

CHAPTER B11

REFERENCES

B11-1 NAVSEA S0400-AD-URM-010/TUM, “Tag-Out User’s Manual”

CHAPTER B12

PERSONAL PROTECTIVE EQUIPMENT

B1201. DISCUSSION

This chapter provides procedures for provision and use of personal protective equipment (PPE). Chapters 1, 3, 4, 5, 6, 8, 9 and 10 of the B section of the manual contain more detailed instructions for use and maintenance of certain specialized equipment.

PPE establishes a "last line of defense" against workplace hazards, and in some cases, may be the only means of protection. Any personal protective equipment breakdown, failure, or misuse immediately exposes the wearer to the hazard. Many protective devices, through misapplication or improper maintenance, can become ineffective without the knowledge of the wearer. For this reason, proper equipment selection and maintenance, personnel training (including equipment limitations), and enforcement of protective equipment maintenance, configuration, and use are key elements to an effective personal protective effort.

NOTE:

Preparation for any availability should include careful assessment PPE needs over the entire period to ensure an adequate supply.

B1202. RESPONSIBILITIES

a. **The commanding officer shall** ensure that there is sufficient PPE aboard to meet the needs of his/her command. He/she shall ensure that adequate funding is provided to obtain or replace missing or worn out personal protective equipment.

b. **The safety officer shall** ensure that the use of PPE is monitored for required work or in required spaces, as well as being worn in a proper and effective manner.

c. **Division officers shall** stock personal protective clothing and equipment and shall provide it to personnel as needed. Division officers shall ensure that the supply officer is aware of required changes to the allowance of PPE so that Coordinated Shipboard/Shore-based Allowance List (COSAL), Allowance Parts List (APL) or Authorized Equipment List (AEL) can be changed accordingly. Once equipment is acquired, division officers shall ensure that it is properly maintained. Additionally, division officers shall ensure that assigned personnel are adequately trained on the type and proper use of PPE required at their work stations and shall enforce the proper use and wear of protective equipment.

d. **All hands shall** ensure that they wear the required PPE to perform assigned work in a proper manner. If the required equipment is not available to do the assigned work, or if instruction is needed on how to wear or use the equipment, the affected person shall notify his/her supervisor immediately.

B1203. PROTECTIVE EQUIPMENT

a. **Head Protection**. Helmets or hard hats protect crew members from the impact of falling and flying objects, from impact with low overheads, and on a

limited basis from electric shock and burn. Metal hard hats are not acceptable for shipboard use. See appendix B12-A for stock number information for hard hats. Stow helmets or hard hats in a manner so that cracks will not develop in hat material. Do not stow heavy materials atop composite material hard hats.

Do not wear hard hats if cracked, if the hat material has a hole other than one caused by the manufacturer or if painted. Such hard hats will be turned in and replaced. Do not drill any holes in hard hats or modify them in any way. Such action will greatly reduce the protective capability of the headwear. Affixing decals on protective headwear is permitted.

b. **Foot Protection**. Shipboard environments such as flight decks, hangar decks, machine shops, pipe shops, heavy supply parts stowage areas, replenishment areas, and rigging sponsons expose personnel in some degree to foot hazards. Leather shoes are required for all personnel aboard ship for normal daily wear. CORFAM® (or equivalent) shoes may only be worn when immediately departing or returning to the ship or when specifically authorized by the commanding officer for ceremonial or other special occasions. Do not wear CORFAM® (or equivalent), plastic, synthetic or vinyl shoes in firerooms, main machinery spaces or in hot work areas. Several types of safety shoes are available:

(1) Standard stock safety shoes, with built-in toe protection and non-slip soles, are intended primarily to provide protection from falling and rolling objects. Enlisted personnel are issued safety shoes at Recruit Training Commands. When safety shoes exhibit wear such that safety protection is no longer afforded the command shall provide standard stock safety shoes as organizational clothing (similar to coveralls or foul weather gear). Officers shall be provided standard stock safety shoes when required by their work.

Safety shoes should be periodically examined for worn soles and heels that would reduce the non-skid features of the shoe. Safety shoes shall be replaced when the upper leather is worn or develops cracks exposing the toe protection or the foot.

(2) Special safety shoes:

(a) Semi-conductive safety shoes are used to dissipate static electricity.

(b) Safety shoes with special electrical hazard soles are used to guard against shock hazards when performing electrical work and shall be provided to EMs, ETs, and personnel working around high voltage.

(c) Safety shoes or boots with rubber or synthetic material are used for protection against acids, caustics and other liquid chemical hazards. They may or may not have toe protection.

(d) Molders boots, with toe protection, should be provided to welders to provide easy removal in case hot slag or metal drops in or on the boot.

Protective shoes shall be stowed in a dry atmosphere. Where practical, they shall be stowed upright, allowing the insides to dry out.

(3) See appendix B12-A for stock number information for foot protection equipment.

c. **Hand Protection**. Hand hazards include handling sharp objects, working with chemicals or electrical equipment and hot work. The following guidance is provided:

(1) When handling sharp materials, wear leather gloves. Also wear leather gloves over electrical grade rubber gloves whenever the rubber gloves could be subjected to cutting by sharp or abrasive objects.

(2) Whenever it is necessary to work with portable electric tools or equipment in damp locations or when it is necessary to work on live electrical circuits or equipment, wear electrical grade insulating rubber gloves.

(3) Wear only gloves approved to handle acids, corrosives, solvents, and other industrial chemicals when required. The safety officer or hazardous material coordinator shall assist supervisors in the selection of gloves to protect against chemical hazards. Surgical or foodhandler type gloves are not approved for use with toxic materials.

(4) When it is necessary to handle hot items or perform hot work, even if tongs or other gripping/clamping tools are available, wear non-asbestos, insulated gloves.

(5) Do not wear gloves when operating machinery with rotating or moving parts.

(6) See appendix B12-A for stock number information on hand protection equipment.

(7) Stow rubber electrical insulating gloves in the box in which they came. Perform Planned Maintenance System (PMS) on the gloves prior to stowage. Stow other rubber electrical safety protection equipment in a clean, dry, oil-free location. Care should be taken not to fold such equipment as folding will frequently result in cracks that will greatly reduce the insulating capability of the material.

(8) Do not use electrical insulating gloves for non-electrical work such as; general cleaning with cleansers, work involving solvents, work involving alkali material, or work involving acids. Cleaning products, acids and alkalis will degrade the insulating properties of the gloves making them unsafe for electrical work.

d. **Safety Clothing**. Special clothing may consist of flameproof coveralls, disposable coveralls, impervious chemical spill coveralls, welding leathers, and chemical aprons. These items may be specified as required by annual safety zone inspections, baseline industrial hygiene surveys, or standard work practices. Special clothing is required for personnel involved in asbestos ripout (see chapter B1). Synthetic clothing, such as certified Navy twill (CNT), may only be worn when immediately departing or returning to the ship or when specifically authorized by the commanding officer for ceremonial or other special occasions. See appendix B12-A for stock number information on safety clothing.

Stow leather protection equipment in a clean, dry atmosphere. Dry gloves prior to stowing, preferably in the boxes supplied with them. Hang up welding leathers.

e. **Personal Fall Protection Equipment**. When climbing, working aloft or over the side, wear a parachute-type (full body) safety harnesses with Dyna-Brake® safety lanyard at all times. Additionally, use the following actions to provide maximum protection:

(1) Use wire rope instead of nylon line when doing hotwork.

(2) Inspect safety harnesses, D-rings, and safety lines before each use.

(3) Ships shall train personnel who work aloft or over the side in the proper use of personal fall protection equipment.

(4) Do not use safety lanyards for any other purpose than personal fall protection. In particular, do not use them for hoisting heavy objects.

(5) See appendix B12-A for stock number information on personal fall protection equipment.

Hang lanyards and safety harnesses used for personal fall protection equipment in a cool, dry atmosphere. Do not pile equipment one upon the other. Such action may prevent proper drying and result in rotting and weakening of lanyards.

f. **Personal Flotation Devices**. Whenever personnel other than aircrew members and flight deck personnel are required to wear life jackets in open sea operations, the life jackets must be inherently buoyant. Those jacket-type life preservers are used by personnel in exposed battle stations, when working over the side, topside in heavy weather, during replenishment at sea, and in small boats. See appendix B12-A for stock number information on personal flotation devices.

Thoroughly dry life jackets prior to stowage. Following drying, stow them in designated clean and dry locations. Hang flight deck, MK-1 inflatable life jackets in a clean, dry atmosphere.

Appendix B12-A

PERSONAL PROTECTIVE EQUIPMENT STOCK NUMBER INFORMATION

ITEM		NSN*
1. Head Protection:		
	Hard Hat	8415-01-025-9958
	Helmet, Flight Deck Crew Cloth	8415-00-861-3527
	Pad, Back Assembly	8415-00-178-6830
	Pad, Front Assembly	8415-00-178-6831
	Shell Assembly, Front	8415-00-178-7013
	Shell Assembly, Back	8415-00-178-6855
2. Safety Shoes:	Steel Tip	8430-00-596-5396 through 6052 8430-01-032-2900 through 2909 8430-01-079-1252, MIL-S-21894
	Steel Tip Boots	8430-00-624-2151 (series)
	Molder's	8430-00-926-9966 (series)
	Electrical	8430-00-611-8314 (series)
	Rubber	8430-00-624-2151 (series)
3. Gloves:	Leather	8415-01-092-3910
	Butyl	8415-00-753-6551 through 6554
	Industrial (corrosive handling)	8415-00-266-8673, 8675, 8677, 8679
	Industrial (organic solvent handling)	8415-00-823-7456, 7457
	Neoprene	8415-00-753-6551 through 6553
	PVC	8415-00-916-2817, 2818
	Rubber (chemical handling)	8415-00-753-6651 through 6654
	Rubber latex	8415-01-012-9294
	Protective Fuel and Oxidizer Resistant (Resin Modified Butyl)	8415-00-577-4091 (series)
	Chipper, Gauntlet Left	8415-00-559-1339 (series)

* National Stock Numbers (NSN) are subject to change. Recheck Numbers prior to ordering.

Appendix B12-A

PERSONAL PROTECTIVE EQUIPMENT STOCK NUMBER INFORMATION
(Continued)

	ITEM	NSN
	Chipper, Gauntlet Right	(series)
	Cotton, Work	8415-00-268-8330
	Cloth, leather palm	8415-00-268-8350
	Leather, Welder, Gauntlet	8415-00-269-0432 (series)
	Leather, heavy	8415-00-268-7871 (series)
	Leather, Gauntlet, Linesman	8415-00-274-2432 (series)
	Cotton Knit, Fire Retardant	8415-00-024-9505
	Heat Protective Mitten	8415-01-092-0039
	Rubber, Electrical Insulating	8415-01-158-9445 through 9449
4. Safety Clothing:	Butyl apron	8415-00-281-7813 through 7815
	Plastic apron	8415-00-715-0450
	Rubber apron	8415-00-082-6108
	Boot covers, butyl	8430-00-262-5295 through 5297
	Boot covers, disposable	8430-00-591-1359
	Coveralls, toxicological	8415-00-099-6962, 6968, 6970
	Coverall, white cloth	8405-00-082-5536 through 5539
	Coveralls (fire retardant)	8405-01-105-6138 (series)
	Coveralls, Catapult Crewman	8415-00-753-6346 (series)
	Coveralls, Cotton Sateen (Maintenance)	8405-00-131-6507 (series)
	Coveralls, Microwave Radiation Protection	8415-00-006-7770 (series)
	Coveralls, Arc Protection	8415-00-081-6481 (series)
	Footwear, Disposal Covers (used for OTTO II handling and with microwave protection coveralls)	0430-00-591-1359 (series)

Appendix B12-A

PERSONAL PROTECTIVE EQUIPMENT STOCK NUMBER INFORMATION

(Continued)

	ITEM		NSN
		Coveralls, Explosive Handling	8415-00-280-2455 (series)
		Coveralls, Rocket Fuel Handlers Impermeable Full Protection	8415-00-725-3627 (series)
		Hood, Rocket Fuel Handlers, Impermeable	8415-00-753-6210
		Clothing, leather (for welders)	
		Sleeves	8415-00-164-0513
		Jacket	8415-00-268-8262 (series)
		Apron	8415-00-250-2531
5.	Personal Fall Protective Equipment:	Safety Harness Complete Assembly (work/safety lanyard)	4240-00-402-4514
		Safety Harness	4240-00-022-2522
		Working lanyard, Nylon	4240-00-022-2518
		Safety lanyard, 1/2" Nylon Rope with Dyna-Brake®	4240-00-022-2521
		Safety lanyard, 1" Strap Nylon with Dyna-Brake®	4240-00-022-2521
		Climber Safety Sleeve	4240-01-042-9688
6.	Personal Flotation Devices:	Life Preserver, Vest, Foam Pack (Inherently Buoyant)	4220-00-200-0538
		Life Preserver, Steinke Hood	4220-00-066-4396
		Life Preserver, Vest MK1 Vest	
		Vest	4220-00-926-9459 (series)
		Bladder	4220-00-935-5528
		Inflation Assembly	4220-00-012-3571

NAVY

OCCUPATIONAL SAFETY AND HEALTH

(NAVOSH)

PROGRAM MANUAL

FOR FORCES AFLOAT

OPNAV INSTRUCTION 5100.19D
VOLUME II
SURFACE SHIP SAFETY STANDARDS

DEPARTMENT OF THE NAVY

OFFICE OF THE CHIEF OF NAVAL OPERATIONS

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DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, D.C. 20350-2000

IN REPLY REFER TO

OPNAVINST 5100.19D VOL II
N45
05 October 2000

OPNAV INSTRUCTION 5100.19D, VOLUME II

From: Chief of Naval Operations

Subj: NAVY OCCUPATIONAL SAFETY AND HEALTH (NAVOSH) PROGRAM MANUAL FOR FORCES AFLOAT, VOLUME II

Ref: (a) OPNAVINST 5100.19D, Volume II

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

1. Purpose. To provide the second volume of the Navy Occupational Safety and Health Program Manual for Forces Afloat.

2. Cancellation. OPNAVINST 5100.19C, Volume II

3. Discussion

a. This instruction provides surface ship safety standards and precautions necessary to carry out the program established in reference (a). Representatives of the Fleet Commanders in Chief and Type Commander staffs provided significant input to this document.

b. This instruction reflects modifications to regulatory requirements, embodies lessons learned from mishaps, and incorporates changes directed by the Fleet Review Board to enhance the NAVOSH Program. Since this document modifies every chapter and most of the paragraphs from OPNAVINST 5100.19C, it does not identify modified, added, or deleted paragraphs.

4. Action

a. Replace the current Volume II of OPNAVINST 5100.19C with enclosure (1).

b. Each command should have sufficient copies of enclosure (1) to ensure that personnel in each work center have access to the information.

5. Distribution. This instruction will be incorporated into the next CD-ROM produced by Navy Directives and distributed to all commands. In the interim to ensure timely distribution, a separate CD-ROM of this instruction will be distributed to each afloat Safety Officer within 90 days. Paper copies of this instruction are no longer distributed. Defense Automated

Printing Service is authorized to produce paper copies of CD-ROM instructions at cost to the requesting command.

6. Forms. The following forms may be ordered from the Navy Supply System per NAVSUP P2002:

FORM	TITLE	STOCK NUMBER
DD 2521 (12/88)	Hazardous Chemical Warning Label	0102-LF-012-0800
DD 2522 (12/88)	Hazardous Chemical Warning Label	0102-LF-012-1100

L. C. BAUCOM
By direction

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26J (Afloat Training Group and Detachment)
26U (Regional Maintenance Center)
26W (Cargo Handling Group and Battalions)
26GG (Explosive Ordnance Disposal Mobile Group and Unit) (EODGRU NINE Det. Fallon, only)
28 (Squadron, Division, and Group Commanders - Ships) (less 28K)
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FT31 (Training Center)
FT39 (Technical Training Center)
FT43 (Surface Warfare Officers School Command)
FT54 (Submarine School)
FT111 Occupational Safety and Health and Environmental Training Center

OPNAV (N09, N45 (100), N143D (12), N86, N87, and N88)

RECORD OF CHANGES			
CHANGE NUMBER	DATE OF CHANGE	DATE ENTERED	BY WHOM ENTERED

RECORD OF CHANGES			
CHANGE NUMBER	DATE OF CHANGE	DATE ENTERED	BY WHOM ENTERED

CHAPTER C1

BASIC SAFETY

C0101. DISCUSSION

a. Shipboard life is one of the more hazardous working and living environments that exist. The existence of hazardous materials and equipment, in addition to the fact that a ship is a constantly moving platform subject to conditions such as weather, collision, and grounding contribute to a hazardous environment. Any chain of mishaps could lead to a major catastrophe. It is for this reason, PRACTICAL SAFETY must be followed and the prescribed safety regulations strictly followed to prevent personal injury and illness.

b. The general safety standards in the following section are applicable to all shipboard operations and spaces.

C0102. GENERAL SAFETY STANDARDS

Complying with the following standards may save your life:

a. Locate and remember all exits from working and living spaces that you frequent.

b. Know where life jackets and EEBDs are stored in or near your working and living spaces.

c. Make sure that all movable objects in your spaces are secured for sea using appropriate materials.

d. Always wear clothing that snugly fits your body. Wear short sleeves or roll up sleeves when operating rotating industrial machinery.

e. Always move up or down a ladder with one hand on the railing. Never slide down inclined ladders.

f. Know the emergency shut down procedures for all equipment you use.

g. Always ensure exits are not blocked with equipment or boxes.

h. Always ensure ventilation ducts are free of blockage. Never alter ducts or diffusers without permission.

i. Horseplay is prohibited aboard ship.

j. Always remove rings, watches, key rings, and other items that may become entangled or caught on projections, or may be a shock hazard when working with electrical or electronic equipment.

k. Always wear approved safety shoes when required by the job.

l. Walk, don't run in passageways.

m. Always be cautious when nearing a "blind" corner.

n. Know the location of all lifeboat and life raft stations and know how to proceed to them from the living and working spaces you frequent.

o. Know the location of all fire stations and other firefighting equipment in or near the living and working spaces you frequent.

p. Keep constantly familiar with the whereabouts of crewmembers in the space where you are working, especially if they are working in tanks, voids or other restricted movement areas.

q. Smoke only in designated areas.

r. Only authorized personnel shall use equipment and then only in an authorized manner.

s. Only wear sunglasses topside, and do not wear them as protective equipment for operations such as firewatch or welding.

t. If you pass through a watertight door designated to be closed during normal operations, be certain to properly close and dog it.

u. Know where all life rings, watermarkers, and flares are located for man overboard emergencies.

v. Observe all personal protective equipment requirements.

w. Promptly inform senior personnel responsible for a given space or equipment of all unsafe conditions discovered.

x. Do not lean against lifelines. Never dismantle or remove any lifeline, or hang or secure any weight or line to any lifeline except as authorized by the commanding officer. Use temporary lifelines when possible.

y. Keep decks free of obstacles and materials causing slippery conditions, particularly in work areas. Post areas that are slippery with a warning sign. Ensure non-skid is installed around machinery work areas, including the top and bottom of each ladder, on both sides of doors and arches with a high coaming used for continuous traffic, and both sides of crew messing space doors.

z. Provide temporary protection by guardrails or chains, suitably supported by stanchions or pads when opening accesses in bulkheads or decks which are normally closed.

aa. Never straddle or step over lines, wire, and chains under tension.

ab. After opening and prior to passing through a watertight hatch, scuttle, or manhole cover ensure hatch brace pins and/or safety pawls and scuttle/manhole covers are positively locked.

ac. Wear a life-jacket topside where the potential exists of falling, slipping, being thrown, or carried into the water.

ad. Never lock escape scuttles so they cannot be opened from the inside.

ae. Never dismantle any permanent lifeline system without permission of the commanding officer and without providing temporary lifelines.

af. Never dismantle or remove any inclined or vertical ladder without permission of the commanding officer. Secure such areas with temporary lifelines and post with a warning sign.

ag. Never operate machinery or equipment with defective safety devices or missing machine guards without specific permission of the commanding officer.

ah. Never tamper with or render ineffective any safety device, interlock, ground strap or similar device intended to protect operators or the equipment without specific approval of the commanding officer.

ai. Only open or close electrical switches and pipe valves when authorized to do so.

aj. Ensure that low overheads above inclined ladders (72") and passageways (75") and obstructions in passageways are padded, and hazardous areas around machinery and elevators, and trip hazards, are color coded to warn people of danger areas.

ak. Never open or enter a tank, void, or manhole before obtaining permission from the gas free engineer.

al. When working in a tank or void, have a safety line attached, proper protective equipment, and a second person tending the safety line outside the tank or void.

am. Only wear portable stereo earphones while in your rack, in the berthing spaces, or in authorized ship spaces.

an. Never tamper with any damage control fittings or equipment.

C0103. TRAINING

a. While most of the standards specified in this chapter are covered during basic training and at specific training schools, a new crew member, upon reporting on board, should be given a brief orientation as to their intent and importance and where they may be found aboard ship.

b. Every time a mishap occurs involving a violation of one of these standards, all personnel should have the appropriate standard again brought to their attention. This can be accomplished through the use of Plan of the Day notes or divisional training at quarters.

C0104. SAFETY COLOR CODE FOR MARKING PHYSICAL HAZARDS

a. **Red**. Red is the basic color for the identification of:

(1) Fire protection equipment and apparatus.

(2) Safety cans or other approved portable containers of flammable liquids (see C2304) shall be painted red with some additional clearly visible identification either in the form of a yellow band around the can or the name of the contents conspicuously stenciled or painted on the can in yellow.

(3) **Danger**. Danger signs are red, black, and white, to indicate a hazardous situation, which has a high probability of death or severe injury.

(4) Emergency stop bars on hazardous machines, such as rubber mills, wire blocks, or flat work ironers. Stop buttons or electrical switches on which letters or other markings appear and are used for emergency stopping of machinery shall be red.

(5) Guards enclosing rotating machinery, shafts, or moving parts which could cause death or severe injury.

b. **Yellow**

(1) Yellow is the basic color for designating caution and for marking physical hazards such as: striking against, stumbling, falling, tripping, and "caught in between." Solid yellow, yellow and black stripes with suitable contrasting color should be used interchangeably, using the combination, which will attract the most attention in the particular environment. Overhead obstructions, monorails and turntables are painted yellow.

(2) Yellow and black are the colors of caution signs used to indicate a hazardous situation, which may result in minor or moderate injury. Use yellow and black for eye hazard and noise hazard signs.

(3) Use yellow and black striping or checkerboard designs to indicate industrial eye hazardous areas, trip hazard areas, or other areas where caution should be exercised.

c. **Green**. Green is the color of general safety information and instructional signs, such as the location of emergency eye wash stations.

CHAPTER C2

DRY CARGO OPERATIONS

C0201. DISCUSSION

a. Dry cargo is any cargo that is carried in its own container and is not in bulk form, such as fuel. Examples of dry cargo are stores, equipment and machinery that is carried in a ship for its own or another vessel's use.

b. This chapter does not include underway replenishment (UNREP) operations or refueling at sea (FAS) operations except fuel used in drums or other approved containers. UNREP and FAS operations are covered in other chapters.

c. Dry cargo handling evolutions are extremely dangerous, even though they appear routine. Cargo being handled in any manner can fall or shift, causing injury to personnel and damage to the ship. Additionally, damaged hazardous material cargo often causes illness or death in extreme conditions. Cargo handling gear can fail, causing not only cargo damage, but the failed cargo handling gear can itself maim and even kill, as well as cause physical damage. It is for these reasons that extreme care must be used during cargo handling operations.

C0202. PRECAUTIONS - CARGO HANDLING FOR SUPERVISORS

The following precautions are for cargo handling supervisors. Supervisors must initiate these precautions before beginning any cargo handling operations:

a. Ensure open hatches in use are cleared of adjacent loose equipment which might fall into the hold and injure personnel below.

b. Restrict traffic about hatches to the side away from where cargo is being worked. Rope off areas to traffic over which loads are travelling.

c. Secure or remove hatch beams or other structures in the way of hatches where cargo is being worked. Personnel engaged in moving hatch beams shall wear a safety harness and associated safety lines which shall be tended at all times.

d. Ensure that all personnel handling cargo gear are familiar with the use of their equipment and limitations on load capacity and outreach and are personnel qualifications standard (PQS) qualified.

e. Ensure that trained and qualified signalmen are designated and posted during crane or boom operations.

f. The following crane crew personnel will be qualified, per NSTM 589: Tagline Handler; Rigger; Signalman; Crane Operator; Crane Safety Observer; and Crane Maintenance Technician. Where applicable, NAVEDTRA Personnel Qualification Standards (PQS) are available and should be used to supplement the NSTM qualification requirements.

g. Ensure that there are no obstructions to cargo movement.

h. Verify that all designated cargo handlers are wearing the required personal protective equipment, including gloves (when handling wire rope or

banded material), hard hats, and safety shoes. Ensure all other personnel immediately involved in the cargo handling operations, i.e. safety observer, rig captain, signalmen, winch operator, and winch checker, including personnel observing for training, wear a hard hat with the chin strap in place under the chin.

i. Ensure that all cargo holds to be used are open and hatch covers properly stowed. Ensure all hinged or folding cargo hatches, normally stowed in an upright position are secured with hatch securing pawls and safety preventer chains engaged.

j. Visually verify that all pallets and containers are of the correct type and safe for the use intended. If a pallet appears unsafe, discard or repair.

k. Inspect the cargo handling area and ensure that dunnage is properly stowed clear of all proposed cargo handling activity.

l. Visually check and ensure that all required cargo handling warning signs are properly posted near personnel transit areas.

m. Ensure that all required trim and stability calculations have been completed **before** the cargo is loaded or off-loaded.

n. Visually check and verify that all cargo boom preventer guys, straps, and whips are rigged correctly.

o. If handling ordnance, ensure that all applicable safety standards are followed and enforced.

p. Use caution when using dock or mobile cranes. Rotary cranes, booms and structures can strike and damage the ship's superstructure.

q. Ensure that all suspected unsafe cargo handling gear is tagged out of commission, removed, and tested prior to re-issue.

r. Ensure that all holds and levels being utilized have the required safety barriers (rope, chains, and nets) installed.

s. Verify that all required cargo (save-all) nets are in place.

t. Ensure there are no oily or slick decks where cargo is to be handled.

u. Ensure adequate lighting is provided at the boom heads, cargo holds, and draft areas when conducting nighttime cargo operations.

v. Do not operate any cargo handling system with inoperative safety devices or guards without the specific approval of the commanding officer.

w. Rig suspended baskets/buckets per Naval Ships Technical Manual, Chapter 589. Personnel in the basket/bucket shall wear a safety harness with safety lines attached. When suspended over water, personnel shall also wear inherently buoyant lifejackets .

x. Use correct and well-maintained blocks and sheaves for safe load handling operations.

y. Conduct an informal safety brief for all participants prior to the start of first cargo operations after port calls and thereafter as warranted.

z. Ensure that safety observers are not involved in any other aspects of cargo handling operations except observing safe procedures.

C0203. PRECAUTIONS DURING CARGO OPERATIONS

All personnel handling cargo should follow the following precautions during cargo handling operations:

a. Always know where the cargo is during a transfer.

b. Wear a hard hat with chinstrap in place under chin, gloves (when handling wire rope or banded material), and safety shoes.

c. When transiting a cargo operations area, walk only in the designated transit areas which are located on the side of the ship opposite the cargo handling operations.

d. Never look into a hold when cargo is being handled or cargo gear is in use unless controlling the movement of the cargo.

e. Never walk under suspended cargo or tensioned highline.

f. Do **not** ride on pallets, containers, or hooks.

g. Know the firefighting and safety equipment locations.

h. Do not walk backwards.

i. Always listen to equipment. Abnormal sounds usually mean trouble.

j. Never allow cargo to swing or remain suspended for a period longer than necessary.

k. When cargo is being lowered, keep feet and hands clear.

l. Never allow unsecured cargo gear or equipment to go unattended.

m. Never put hands **under** cargo during transfer.

n. Never throw anything down a hold or onto a dock.

o. Never step into bights of line.

p. Never grab or hold onto cargo lines.

q. Know the location of all exits from holds.

r. Know the location and use of emergency cut-off switches.

s. Do not oil or lubricate equipment while it is in use.

t. Check cargo-handling equipment for damage should cargo being handled strike the cargo handling equipment.

u. Ensure cargo never exceeds cargo handling equipment's listed safe working load limit at the outreach being used.

v. Avoid making side pulls.

w. Never climb up or down exposed ladders when cargo is being handled within the immediate area.

x. Do not smoke.

y. Inform supervisors of unsafe or damaged equipment or conditions.

z. Do not ride on conveyors.

aa. Do not use personnel-only elevators for cargo.

ab. Always lift loads evenly.

ac. When suspending a load, only do so over the deck, not the hatch.

ad. Wear faceshields and goggles when removing steel strapping. Have personnel in the area stand to one side and out of the path the strapping will follow when cut.

ae. Do not overload hand and fork trucks. Ensure trucks are below handlers when going up or down an incline.

af. Remove, repair, or replace defective or broken strapping on cargo.

ag. Provide loads requiring continuous manual guidance while in motion with tag lines.

C0204. STOWAGE PRECAUTIONS

a. Before handling vehicles, inspect and ensure that all fuel has been emptied from the vehicle's tanks with the exception of combat loaded military vehicles.

b. Stow vehicles fore and aft, chock wheels, use approved or installed tie downs or wire rope lashings.

c. Always brace, shore, and lash cargo that may shift.

d. Always preplan the location of material to be stowed so that heavier items are stowed below lighter ones.

e. Use dunnage only when necessary.

f. For specific tiedown information, see the appropriate transportability guidance technical manual.

C0205. NETS

a. Use cargo nets when loading or unloading packages, bundled and bagged materials, or other objects that might roll or shift, creating an unsafe condition if lifted on a sling.

b. When cargo nets are used to discharge cargo onto trucks, land the load slowly to prevent damage to the truck and possible injury to personnel. Carefully disconnect the net from the sling and leave the net in the truck with its load.

c. Inspect nets prior to and during use for wear and damage. Remove worn or damaged nets from service until repaired.

d. Refer to NWP 4-01-4, Replenishment Underway, for additional precautions associated with vertical replenishment.

C0206. PALLETS

a. Palletizing speeds up the handling of cargo, prevents damage to easily crushed items, and increases the amount of cargo that can be stacked in a pile. For these reasons, pallets are extensively used in cargo handling operations.

b. When loading a pallet, stack the cargo so that no possibility of cargo spilling exists, and the pallet will be stable and level when lifted. When loading a pallet with cases of uneven size, place the highest and strongest cases at each end of the pallet with the smaller and more fragile cases in the center. In this manner, when piling one pallet on top of another, a stronger and more level surface is offered. This will result in safer stowage of the pallets. Do not lift pallets on which items are loose or broken and which cannot be properly reloaded in cargo nets.

c. Palletize round commodities, such as cylinders, by using specially constructed chocks, made up and spaced to fit the particular cargo. For safe handling, tie the chocks together by two narrow strips which lie in the space between the chocks and are flush with the top of the pallet's platform. Lay the second tier in the cantlines of the first.

d. Use pallet bridles and bars whenever possible and especially when loading or unloading pallets containing even-sized cases or cartons.

e. Do not lift a load on damaged pallets. A damaged, palletized load may be lifted if a sound pallet is placed under the damaged pallet or if the load is placed into a cargo net. Otherwise, repalletize the load.

f. Refer to NWP 4-01-4, Replenishment Underway, for additional precautions associated with vertical replenishment.

C0207. CONVEYORS

a. When using a power conveyor, run the device slowly enough that personnel at the end of the conveyor can handle the packages without rushing.

b. Do not ride a moving conveyor. Signs shall be posted on all conveyors to this effect. Do not walk on idle conveyors, except as required for maintenance.

c. Never leave a powered conveyor unattended while it is in operation. When operating a dual-control conveyor from one control station, use the station affording the best view of the entire conveying operation. For elevated conveyors, this usually means the elevated end. Control stations shall be placarded with operating instructions and precautions.

d. Do not convey materials having an unstable load distribution.

e. Examine all conveyors frequently for sharp edges, dents, worn liners, or any other conditions that could cause injury to personnel or damage to conveyed materials. Inspect power conveyors for loose or broken parts.

f. Do not lubricate, adjust, or repair any part of the conveyor while the machine is in operation. Tag-out and remove from service before performing maintenance, inspection, or adjustments.

g. Wear safety shoes when loading or unloading conveyors.

h. To avoid personnel injury from falling cargo, do not go underneath the conveyor or inside the specified safe distance from its sides and ends.

i. Always use the two-man rule when operating conveyors.

j. Always maintain positive communication between the levels of operation.

k. Ensure there is adequate lighting and firm footing (including non-slip) for personnel loading conveyors.

l. Ensure all platform-locking bars, interlocks, and audible alarms are working prior to using the conveyor.

m. Ensure that all conveyor operators and maintenance personnel are PQS qualified.

CHAPTER C3

UNDERWAY REPLENISHMENT

C0301. DISCUSSION

a. All precautions listed in chapter C2, must be followed, during underway replenishment (UNREP) operations. However, several operations involved with UNREP are unique and require special attention and safety. Vertical replenishment (VERTREP) operations are covered in chapter C7, Helicopter Operations. NWP 4-01-7, Underway Replenishment, contains additional procedures, requirements, safety precautions, and warnings associated with underway replenishment planning, ship handling, personnel, rigs, and transfer operations.

b. Fueling-at-sea (FAS) and replenishment-at-sea (RAS) involve the transfer of cargo, personnel, and fuel between two or more ships while underway. This involves not only the dangers normally found with cargo transfers but also adds the problem of heavy weather, motion, streaming operations, and the possibility of collisions. For these extra threats, special precautions and practices must exist.

C0302. PRECAUTIONS TO BE OBSERVED PRIOR TO UNREP OPERATIONS

The senior personnel in charge of UNREP Operations shall take the following precautions:

a. Ensure all UNREP equipment and breakaway equipment are in place and properly operational.

b. Ensure all assigned crew members know their duties, are certified where applicable, and are aware of their responsibilities.

c. Test and ensure that proper communications equipment is being used and is operating normally.

d. Ensure that communications (including back-up systems) are established with the UNREP vessel.

e. Ensure UNREP stations have non-slip deck treads or non-skid paint.

f. Ensure all lifelines are in place.

g. Ensure that all UNREP personnel have removed all watches, bracelets, etc., and are wearing life jackets, hardhats, gloves (when handling wire rope or banded material), and safety shoes. Ensure that personnel assigned to work stations are carrying an appropriate knife for routine or emergency use.

h. When fueling, ensure all firefighting stations are properly equipped for any possible cargo fire.

i. Ensure life rings, buoys, and markers are within easy access for UNREP team members, and station lookouts on the fantail for each engaged side.

j. Ensure that all UNREP team members are thoroughly familiar with emergency breakaway procedures. Station-to-station phone talkers and station

captains should discuss emergency breakaway procedures as soon as sound powered phone communications are established. Phone talkers should never fasten the phone strap around their necks. Emergency breakaway procedures shall be issued by the delivery ship, but can be initiated by either ship.

k. Ensure that all cargo handling equipment, including padeyes, are not overloaded.

l. Post UNREP warnings at designated personnel transit areas.

m. Only allow essential personnel at UNREP stations.

n. Ensure that all UNREP personnel wear snug fitting clothes.

o. In cold climates, make sure all ice and snow is removed from UNREP station and the UNREP area deck is properly sanded.

p. During night UNREP operations, ensure that all lights are operating.

q. During personnel transfers:

(1) Make sure transferring personnel wear hardhats and inherently buoyant life jackets equipped with whistle, personal light marker (PLMs), and dye marker.

(2) Ensure that transferring personnel know how to get out of the transfer chair in an emergency.

(3) Inspect transfer rig before using. In particular, inspect the manila/synthetic highline for evidence of rot, broken strands, cuts, or other signs of weakened condition.

(4) Use only manila/synthetic highlines and messenger lines. Hand tend messenger lines and highlines.

r. Ensure that a ready lifeboat is available in case of an emergency.

s. Clear area of dunnage.

t. Ensure padding is in place for ordnance.

u. Assign a PQS qualified safety observer to every UNREP station during the unrep evolution. Ensure that the safety observer's only function is to watch for hazardous conditions. The safety observer should know the locations of all nearby eye wash stations and be familiar with emergency measures in the event of accidental eye splashing.

v. Ensure a safety brief is held for all participants prior to all UNREP evolutions using the principles of operational risk management (ORM).

C0303. <u>PRECAUTIONS DURING UNREP OPERATIONS</u>

All personnel shall comply with the following:

a. Wear hardhat, gloves (when handling wire rope or banding material), life jacket, and safety shoes.

b. Wear snug fitting clothing appropriate for the weather conditions. Remove rings, watches, key rings, and other personal gear, which may become entangled in loads or lines.

c. Know the location of lifesaving and firefighting stations.

d. Be aware and exercise caution when line throwing gun and/or bolo are in use.

e. Stand clear of bights.

f. Transit the UNREP station area in the designated transit area on the side opposite the UNREP operations station.

g. Never turn your back on incoming cargo.

h. Stand clear of suspended or incoming cargo.

i. Do not stand between incoming cargo and a fixed object.

j. Secure cargo immediately.

k. Never step into cargo nets.

l. Know all emergency procedures, especially emergency breakaway.

m. Do not smoke.

n. Ensure supervisors are immediately informed of all damage or broken equipment, including the conditions of lines.

o. Ensure ship-to-ship phone talkers do not fasten phone line straps around the neck.

p. When passing lines:

(1) When possible, use a line-throwing gun for initial line transfer. Ensure that a bolo line is available at each transfer station as a backup.

(2) CVs/CVNs, LPDs, LHAs, LHDs, and ships configured for multiple air operations shall provide the shot line.

(3) Send the bolo/gun line across only after being advised that the station on the receiving ship is ready.

(4) Do not aim line-throwing guns and bolo lines to areas on the other ship that are under cover or where activities are obscured.

(5) Direct all station personnel to take cover before indicating ready to receive the bolo/gun line.

(6) Specified personnel shall retrieve the bolo/gun line only upon the order of the supervisor in charge of the station.

q. Neatly fake or coil down all lines to avoid a tripping hazard.

r. Stay clear of all lines, especially bights, unless directly engaged in their handling. Line handlers should always be inboard and forward of all lines, space permitting.

s. Space permitting, keep at least 6 feet from any block or cleat through which lines pass.

t. Use tag lines to control a load during hoisting and lowering.

u. Secure cargo to prevent shifting.

v. Ensure that all transfers of empty hooks are treated as full load transfers with the proper catenary maintained.

w. Keep working areas clear of all dunnage and items that create a tripping hazard.

x. When handling ammunition and guided missiles, use padding on decks, bulkheads, and gun mounts in the vicinity of the station.

y. Raise loads only as high as necessary to clear obstructions.

z. Do not overload hoist rigs.

aa. Keep the bridge informed of any change affecting the readiness of the station to transfer. When reporting all lines clear, ensure that all lines are clear of the receiving ship. When reporting all lines on deck, ensure that no lines are trailing in the water but are in fact on board and clear of the ship's sides.

ab. Do not step on or in cargo nets attached to a cargo hook.

CHAPTER C4

SMALL BOATS

C0401. DISCUSSION

a. The Navy uses several types of small boats. All can be used for emergency evacuation.

b. The most dangerous operations involving small boats are the launching and retrieval of these boats. It is during these periods that human error and mechanical failure of boat davits and launching/retrieval machinery can occur, and when weather and sea state can have its worst effects.

c. Unsafe contract liberty boats (water taxis) have contributed to the death and injury of Navy personnel. To reduce the hazards associated with these operations, contracts for these services shall specify a minimum level of safety and seaworthiness. In addition, commanding officers shall ensure that a knowledgeable officer inspects water taxis prior to their being placed in service and at least daily thereafter. Section C0405 provides guidance on these safety inspections.

C0402. PRECAUTIONS FOR LAUNCHING AND RETRIEVAL

Observe the following precautions:

a. NEVER ENGAGE A CRANK WHEN HOISTING MOTOR IS ENERGIZED.

b. Inspect all equipment before use, especially the condition of the boat falls, the machinery, and the boat itself.

c. Conduct an operations and safety briefing. Ensure personnel riding the boat wear an inherently buoyant life jacket, securely fastened, and a battle helmet with chinstrap unbuckled or a safety helmet with the chinstrap fastened under the chin. Personnel assigned to the boat handling station will dress out the same except they shall always fasten their chinstraps under the chin.

d. Conduct a boat inspection. Inventory equipment; install bilge plug; remove ropes from bags; and check hoisting hook, rings, slings, and bales.

e. Keep non-essential personnel away from the davit area. Do not stand under the boat during lowering or raising.

f. Prepare davit to raise/lower the boat. Post a davit winch watch to monitor the spooling of the wire rope falls.

g. Notify the bridge and raise/lower the boat slowly when cleared. Check that the sea painter is connected.

h. Only permit those persons actually required to be in the boat during lowering or hoisting operations, and they shall hold on to the manropes provided. Manropes shall be positioned to the outboard side of the boat.

i. Release the stern hook first when launching from a two point lift.

j. Do not launch a boat when own ship's speed is greater than 5 knots. (Does not apply to rigid inflatable boats).

k. Do not hoist boats aboard ship or lower with water in the bilge in excess of that which the installed bilge pumps would normally remove.

l. Properly secure lifting hook bails before a boat is raised or lowered.

m. Be alert for any possible malfunctioning and act quickly if it occurs. Do not lower or raise the davit arms into the davit arm stops at full speed. Do not use limit switches as stop switches.

n. When hoisting a motor whaleboat with survivors embarked, only three crewmembers are required to be aboard: bowhook, sternhook, and coxswain. Other crewmembers should disembark by alternate means in deference to survivors prior to hoisting the motor whaleboat. Although undesirable, when human life is in jeopardy and depending on operating conditions, the motor whaleboat limit of seven persons may be exceeded. The boat and boat davit safety factors are sufficient to permit hoisting the motor whaleboat to the rail or deck edge when carrying the full capacity (see Naval Ships Technical Manual (NSTM), Chapter 583, Section 5 for detailed guidance). However, under no circumstances shall the boat be swung in or out when carrying more than seven people.

o. Before raising or lowering a boat, ensure all slings, bale shackles, and pins are seated and seized.

C0403. SMALL BOAT FUELING

a. If possible, fuel a boat in the daytime and while it is in the water with its engine stopped. Fueling a boat at night requires the permission of the officer of the deck.

b. If it is necessary to fuel a boat in its shipboard stowage, provide adequate fire fighting equipment at the scene.

c. DO NOT fuel boats with passengers on board.

d. Prior to fueling, make a grounding connection between the fuel delivery pump and the fuel tank for gasoline propelled boats.

e. Always keep gas cap in place when not fueling.

f. Only personnel specifically authorized by the ship's engineer officer shall fuel small boats.

g. Do not permit smoking or use of non-explosion-proof lights in the vicinity of small boats while fueling operations are in progress.

h. Before starting the engine, inspect compartments and bilges, clean, and ventilate as necessary.

i. Ensure gasoline is stowed only in approved fuel containers, and returned to approved storage location upon completion of the fueling operation.

C0404. OPERATIONS

a. Know and obey the "Rules of the Road". Especially important to boat coxswains is the "Rule of Good Seamanship" which requires that boats give way to ships and seaplanes. Boats should turn away from ships or seaplanes early and radically or show clearly their intentions not to embarrass the larger and less maneuverable vessels.

b. Always post a bow lookout while underway.

c. DO NOT cut close to ships anchored or tied up or pass close around the corner of a pier, except when such a procedure cannot be avoided. Coxswains must run slowly until there is no danger of collision with any boat or vessel that may be obscured.

d. **Boat Capacity**

(1) Be familiar with and never exceed the designated personnel carrying capacity. Be able to calculate the load and regulate the number of personnel accordingly. While carrying stores, the load in pounds, including personnel and stores, shall never exceed the maximum allowable cargo load.

(2) Do not carry passengers, stores, or baggage on the top sides of motorboats. If it is necessary to carry stores or baggage, reduce the maximum number of passengers accordingly. Refer to NSTM, Chapter 583, for detailed guidance.

(3) Installation of flotation material shall not relieve operating personnel from exercising prudence in the loading of boats or providing of lifejackets when conditions warrant.

(4) In choppy seas, reduce capacity. The rated capacity designated on the label plate is the maximum capacity under normal weather conditions in calm waters. Always reduce capacity under extreme weather conditions or in the open sea.

e. Always display proper lights while underway at night.

f. DO NOT use gasoline to clean the engine or its parts.

g. Keep bilges and sumps dry.

h. Prohibit smoking or open flames.

i. Never start the engine if excessive vapors are present. Check for leaks, damaged piping, and loose connections. Correct deficiencies. If a leak is observed during engine operation, stop the engine and correct the cause of the leak.

j. Use PQS qualified boat officers in foul weather or reduced visibility or for long duration trips, first boat trips in foreign or unfamiliar ports, and when returning large liberty parties after sunset.

k. Do not operate the boat with a defective bilge pump.

l. NEVER open the bow ramp of a landing craft while underway.

m. Ensure boats carry proper fog signaling equipment (refer to NSTM, chapter 583, section 6) and two 18-inch life rings, one forward and one aft. Life rings shall be secured in such a manner that they are easily broken out.

n. For precautions on charging small boat batteries, see paragraph C0904.

o. Ensure boat crewmembers wear inherently buoyant life jackets under adverse weather conditions, including reduced visibility.

p. Run boats dead slow when passing other boats that are alongside ships or landings, in narrow or crowded waters, and when passing deeply laden boats.

q. Ensure that inherently buoyant life jackets (inflatable MACH 1 vest types) are readily accessible in boats for all members of the crew and all passengers. Never allow the number of personnel in the boat to exceed the number of life jackets available.

r. Do not operate boats with enclosed engine rooms without the engineer being on board and on station, and then only when proper ventilation is assured.

s. Ensure that boat fire extinguishers are in place and charged.

t. Ensure that life jackets are always kept dry.

u. Inspect the electrical system for loose connections and worn insulation before operating a boat and whenever damage to these systems is suspected. Do not operate the boat until corrective action is completed.

v. Display lights per the “Rules of the Road” when underway between sunset and sunrise or in reduced visibility. (Refer to NSTM, chapter 583, section 6 for guidance).

w. Ensure shackles and pins are used with anchors. Ensure hoisting slings or bales and steering cables are seized and/or cotter pins are in place.

x. **Boat Handling System**

(1) Be sure winch and davit safety and operating placards, lubrication charts, and test label plates are posted. Ensure winch controls, brake, clutch, and pawl handles are labeled to show function and direction of movement.

(2) Always check the wire rope on the winch drum before operation to ensure the wire is properly spooled on the drum.

(3) Except in an emergency, check limit switches for operability.

(4) Ensure all turnbuckles used on boat gripes are marked to show the limit of tensioning.

y. Ensure that only qualified (Class II or above) swimmers are assigned as boat crew members.

C0405. CONTRACT LIBERTY BOAT SAFETY

a. Prior to being placed into service, a knowledgeable officer, acting for the commanding officer, shall inspect and approve all contract liberty boats (water taxis) for operational safety.

(1) Ensure the navigation lights, lighted compass, distress signals, and a fog signal device are present and in working condition, and that the area charts are available and current.

(2) Ensure that fire extinguishers are present in sufficient number for the size of the boat.

(3) Verify that there is a working radio aboard, with backup battery, capable of bridge-to-bridge communications.

(4) Inspect the anchor and anchor chain for adequacy given the size of the vessel.

(5) Verify that the weather deck drains are free from obstructions and drain overboard; not into the bilge.

(6) Check engineering spaces/compartments for fire or flooding hazards.

(7) Conduct a visual inspection topside for conditions which may be hazardous to passengers.

(a) Ensure that the vessel is equipped with sufficient clean and serviceable life jackets for the maximum capacity of the vessel. Life jackets must be stowed in a readily accessible place marked clearly in English.

(b) Verify that decks, railings, doors and seats are structurally sound, latched, and tightened as appropriate.

(c) Ensure that no bare or exposed electrical wires or connections are located in the passenger area.

(d) Validate that sufficient unobstructed exits are present and marked in English.

(e) Verify that no loose gear, potential projectile hazards, or trip hazards exist.

b. It is impractical to establish detailed specifications for each and every inspection item. Inspectors must use their judgment and experience when advising the commanding officer of the overall safety of the contract water taxi.

c. Any item missing that is critical to safety may be provided by the commanding officer for the duration of the contract boat services. Remember to return any such item at the expiration of the contract. In all cases where government furnished property is provided due to contractor's failure to meet the terms of the contract or the contractor's vessel is unsafe for use, the commanding officer shall immediately notify the contracting officer

of the circumstances surrounding the deficiency(ies). If the contracting officer is not on site, notification shall be by message.

d. Assign boat officers to the contract water taxis during hours of darkness, or low visibility, and heavy weather. Boat officers shall be PQS qualified by the ship and responsible for maintaining good order and discipline of naval personnel onboard.

e. When boat officers are assigned to contract water taxis, they have the authority to not allow boarding when the water taxi's crew performance and navigation are unsatisfactory. When weather conditions are determined to be unsafe, the boat officer has the authority to refuse to get underway.

CHAPTER C5

WIRE AND FIBER ROPE

C0501. DISCUSSION

Ropes come in a multitude of types, quality, and sizes, each with its own characteristics. In general, there are two types of rope: fiber (natural and synthetic) and wire. When removed from a coil or reel, fiber ropes are generally referred to as lines. Wire is referred to as "wire rope" or "wire", but not "cable". Additionally, there is a fiber/wire hybrid known as "spring lay" rope. Spring lay rope is composed of six main strands laid around a fiber core. Each main strand consists of three preformed wire strands and three fiber strands laid alternatively around a fiber center. Each of these ropes have been developed to satisfy a specific requirement. They can be safely used, but must be properly maintained.

C0502. GENERAL PRECAUTIONS

a. Always inspect wires, ropes, and lines before use. Look for deterioration, broken wires or fibers, visible signs of rot, chafing, variations in color, crushing, or the other signs of damage.

b. Wear safety shoes with skid-proof soles before handling lines. When handling lines, do not wear rings, watches, key rings, and other items that may become entangled.

c. Check all rollers, capstans, gypsy heads, and windlasses, to ensure they are operating satisfactorily.

d. Avoid getting hands, feet, or clothing caught in bights formed by wires, ropes, or lines.

e. Do not stand directly in line with the point where (around a bitt, capstan, or through a block) wires, ropes, or lines change direction.

f. Do not straddle or stand on wires, ropes, or lines, whether under tension or not.

g. Avoid placing wires, ropes, or lines on rough or sharp surfaces that can cause chafing or cutting. Use chafing gear.

h. Do not place objects on wires, ropes, or lines.

i. Ensure all kinks are out of wires, ropes, or lines before use.

j. Check sheaves and blocks being used for proper size and strength. Do not use sheaves or blocks that are too small for the wire, ropes, or line used.

k. Listen to wires, ropes, and lines under tension. Any unusual popping or tearing noises may mean that the wire, rope, or line is in danger of failing.

l. Always place hands above lines fairled into gypsy heads, capstans, or bitts.

m. Do not lubricate lines.

n. Do not apply loads suddenly.

o. Never leave wires, ropes, or lines under strain on gypsy heads or capstans.

p. Do not use sheaves or drums with corrugated grooves.

r. Remove the loose ends of splices.

s. Seize all bitter ends.

t. Use the same type of material for stoppers as the hawser being held (i.e., synthetic stopper for synthetic line). Chain shall be used for stoppers on wire rope.

u. Do not use manila, wire, spring-lay rope, or synthetic line together on the same chock, bitt, or reel.

v. Do not permit rat guards and sharp edges to wear mooring lines. Use chafing gear and lash well.

w. Change boat falls, highlines, and mooring lines in accordance with Planned Maintenance System (PMS) procedures. Failure to make such changes can result in serious injury.

x. Make up wires, ropes, and lines not in use and stow clear of walkways and passages.

y. Ensure wires, ropes, lines, and rigging are not subject to overload.

z. Use steadying or frapping lines on boat falls and large lifts to prevent uncontrolled swinging or twisting.

aa. Refer to Naval Ships Technical Manual (NSTM), chapter 613, Wire and Fiber Ropes and Rigging for additional information on use, maintenance, and material requirements for wires, ropes, and lines.

C0503. NATURAL LINES

In addition to the precautions stated in paragraph C0502, also follow these precautions:

a. Do not use natural lines in sheaves and blocks built for wire rope service.

b. Never use manila lines 5 or more years old.

c. Do not continue to use natural fiber line in which any of the following conditions are present:

(1) Ruptured fibers and powdering between the strands.

(2) Dark red, brown, or black spots between the strands, and a sour, musty or acidic odor.

(3) Thirty percent of the yarns in the cross-section have been worn through.

(4) Long jawed and distorted strand areas.

(5) Salt incrustation and swollen areas.

(6) A harsh, dry, dead feel in manila or sisal lines.

(7) Evidence of gritty material between the strands.

d. Store lines in cool, dry spaces.

e. Fake lines down after use to dry out.

f. Do not use frozen lines.

g. Do not allow lines to come into contact with chemicals, acid, alkalis, paints, soaps, rust, or vegetable oils.

h. Do not drag lines over sand, grit areas, or non-skid decks.

i. Do not let line wear become localized; rotate lines.

j. Use chafing gear if necessary.

k. Only use undamaged lines. Always remove damaged lines from use and repair or discard immediately.

l. Do not use chain or wire stoppers on fiber lines.

C0504. SYNTHETIC LINES

In addition to the precautions in paragraph C0502, the following precautions shall be observed:

a. Do not expose lines unnecessarily to heat, sunlight, excessive cold, or chemicals.

b. Store nylon and polyester lines under cover or tightly wound on reels or on cleats during excessive cold.

c. Install tattletale lines to gauge how much lines are stretching.

d. Payout lines on cleats, bitts, or capstans slowly. Exercise extreme care when easing out synthetic lines under heavy load. Because of their high extendibility under load, their rapid recovery, and their low coefficient of friction, these ropes may slip suddenly on easing out, thereby causing injury to line handlers. For control in easing out or surging, take two round turns on the bitts and then apply one or two figure eight bends. No more than two figure eight bends shall be used. Because these bends tend to lock under surge, use of more than two figure eight bends will cause difficulty in easing out operations.

e. Double up lines under excessive strain.

f. Never use wire or chain stoppers on fiber lines.

g. Stand clear of lines under strain. (The videotape "Synthetic Line Snapback" should be viewed for an appreciation of this phenomenon.)

C0505. WIRE AND SPRING LAY ROPE

In addition to paragraph C0502, the following precautions shall be observed:

a. Always wear heavy-duty gloves when handling wire and spring lay rope.

b. Always wear goggles while splicing.

c. Seize wire ends to prevent unlaying.

d. Store wire and spring lay rope away from weather, acid, and chemicals.

e. Inspect wire and spring lay rope in accordance with PMS procedures.

f. When using U-bolt clamps to form an eye, always put the U-bolt itself over the bitter end. Tighten clamps only after putting line under stress.

g. Only operate winches with more than two turns of wire on the drum.

h. Do not use sheaves or blocks designed for use with fiber rope with wire rope.

i. Inspect end fittings, such as sockets, connectors, and wire rope clips prior to use to determine if there is an area of break adjacent to the fitting. Tighten clips after the first hour of running and at PMS specified intervals thereafter. Remove clips after long use and examine rope for broken wires. Remove the damaged part, if broken wires are found, and make a new attachment.

j. Inspect the bitter end of a wire on a drum to ensure it is properly attached.

k. Because spring lay is a combination of wire and fiber, rules for the care of both wire and fiber rope apply.

CHAPTER C6

GROUND TACKLE AND TOWING

C0601. DISCUSSION

a. Ground tackle is a general term used to refer to the anchor, anchor chain, the anchor windlass, and auxiliary equipment. Although this chapter discusses the gypsy head, additional information is provided under general line handling precautions in Chapter C5.

b. Personnel injury may result if any part of the anchor or its handling system fails when under strain. Precautions must be observed to avoid personnel injury or system damage resulting from excessive strain.

c. Towing is an evolution, which is seldom accomplished except in an emergency or for training. Due to the large inertia associated with the ships involved in the evolution, it can be extremely hazardous particularly if excessive strain is placed on the towline and its parts. Refer to Ship Towing Bill and reference C6-1.

C0602. GROUND TACKLE PRECAUTIONS

a. All personnel shall wear snug fitting clothing, gloves, hardhats, safety shoes, and safety goggles.

b. Check equipment to ensure it is in proper operating condition.

c. Ensure all equipment is lubricated and fluid levels are adequate.

d. Keep hands or feet off of moving anchor chains.

e. Beware of oily areas or ice on decks during cold weather. Clean up oil and spread salt and/or sand for ice.

f. Ensure proper communications to the bridge and the machinery spaces have been established prior to any evolution.

g. Only enter the chain locker when no anchor operations are planned and only with OOD permission. Chain lockers should be entered only when the ship is in port. Space must be certified as gas free before entry (see chapter B8).

h. Check that the chain locker is clear and free for running before using the anchor.

i. Allow only the anchor/line detail in the ground tackle area during operations.

j. Set brake on windlass immediately when yellow painted chain link is visible.

k. Never allow the chain to run free without braking. Excessive payout speed can cause loss of the anchor, or injury to personnel.

l. Ensure anchor chain is securely fastened to the padeye in the chain locker when reinstalling the chain after painting.

m. If using chain stoppers, set and clear the immediate area before strain is put on the chain.

n. Always keep the hawser deck bolster pipe cover in place when not hoisting or letting go the anchor.

o. When first red chain link appears on deck and the brake fails to hold, clear the immediate area.

p. House anchor in hawse pipe shell bolster at the lowest possible speed.

q. Operate windlass at a low speed whenever chain out exceeds 60 fathoms.

r. If the chain tends around the stem, report the situation to the bridge. The chain must be allowed to run free or the sharp bend may damage links. Detachable links are particularly susceptible.

s. Replace anchor chain if corrosion has reduced the mean diameter to less than the criteria in the Naval Ships Technical Manual, chapter 581, Anchors and Anchoring.

t. **Windlasses**

(1) When at anchor, nothing shall interfere with the readiness to run, slip, or heave in the chain, or let go the spare anchor.

(2) When using the gypsy head, observe the following safety precautions:

(a) Never make a line fast to the gypsy head, but only to fittings provided for that purpose, such as cleats or bitts.

(b) Disengage the wildcat shaft locking head and hold the wildcat by the brake.

(3) When using the capstan, observe the following procedures and safety precautions:

(a) Keep capstan heads free of gouges, paint, and rust.

(b) When using the capstan for heaving, ensure turns are taken in the right direction for heaving.

(c) Never make lines fast to capstans, but only to fittings provided for that purpose, such as cleats or bitts.

(d) When handling lines on the capstan; when possible, position line handlers perpendicular to the line of pull.

(4) Ensure operating, safety, and lubrication label placards and test label plates are posted on or in the vicinity of windlasses or capstans.

(5) Ensure controls, brakes, and clutch levers are labeled properly.

(6) Never place any part of the body into moving machinery.

(7) Do not wear jewelry, neckties, or loose fitting clothing while operating equipment.

(8) Wear proper protective clothing and equipment suited to the operation being performed.

u. Ensure that windlass test label plate, safety and operating placards, lubrication chart, and a ground tackle safety placard are posted near each anchor windlass.

CHAPTER C6

REFERENCES

C6-1 U.S. Navy Towing Manual (SL 740-AA-MAN-010) (NOTAL)

CHAPTER C7

HELICOPTER OPERATIONS

C0701. DISCUSSION

a. Helicopters are used for varied operations at sea, including anti-submarine warfare (ASW), vertical replenishment (VERTREP) and search and rescue (SAR). Helicopters create special hazards. Catastrophic accidents can severely damage a ship and cause injury and/or death.

b. Helicopter accidents can happen at any time and can involve anything from a crash on takeoff or landing to in-flight emergencies that require an immediate landing. Additionally, accidents can involve injury to ship's personnel from numerous areas, such as, static electricity discharge during hoisting evolutions, inadvertent external cargo release during VERTREP operations or injury from debris blown about by rotor wash.

c. These standards are written for all ships which are air-capable.

d. Consult NWP 3-04.1M/FMFM5-34 (Shipboard Helicopter Operating Procedures) and NWP 3-50-1 (Navy Search and Rescue Manual), Chapter 4 for further details concerning specific procedures and related safety procedures.

C0702. PRECAUTIONS

a. Avoid approaching within 50 feet of a helicopter when the rotor blades are turning, unless necessary. Whenever required to approach or leave a helicopter which has its blades rotating, remain in full view of the landing signalman, enlisted (LSE) and pilot and keep in a crouched position. Unless authorized, do not work in the area of the cockpit or cabin rearward while blades are rotating. Do not attempt to leave or approach a helicopter that is engaging or disengaging rotors. A crouched position with one side to the helicopter lowers the risk of being blown down or overboard by rotorwash.

b. Always wear complete flight deck uniforms, when required during flight quarters. Long sleeve shirts must be worn with sleeves rolled down at all times during flight operations. Personnel involved in flight deck operations including maintenance and refueling shall wear approved, non-sparking, safety shoes or boots with non-slip oil and fuel resistant soles.

c. Remove soft hats topside during helicopter landing or take-off.

d. Know the location and use of firefighting and lifesaving equipment.

e. Prohibit garbage dumping during helicopter operations.

f. Prohibit blowing tubes when helicopter is on or in close proximity to the flight deck.

g. FOD is the acronym for "Foreign Object Damage". It defines any article or object which may be disturbed by the wind across the deck or rotor wash and may cause damage to personnel, aircraft, or equipment. Conduct a FOD walkdown on the weather decks and flight deck prior to flight operations. FOD prevention is an all hands effort. Carry nothing to the flight deck that you do not actually use there, and take inventory of all you have brought before you leave the deck. Report any missing items immediately.

i. Secure all hatches that open into the helicopter operating area. Scuttles and hatches that open into the aircraft operating area will be posted with the following notice: **CAUTION: DO NOT OPEN DURING FLIGHT QUARTERS EXCEPT FOR EMERGENCY EXIT. NOISE HAZARD AREA - HEARING PROTECTION REQUIRED.**

h. During flight operations , only permit authorized personnel on the flight deck or weather areas adjacent to the flight deck. Personnel shall not stand in or otherwise block entrances to flight deck weather areas.

j. Do not take flash pictures during flight operations. Night operations are always most hazardous for both pilots and flight deck crews. Reduce the tempo of operations in both volume and intensity when compared to day operations. Night operations are in effect from 30 minutes prior to sunset to 30 minutes after sunrise.

CHAPTER C8

WORKING OVER THE SIDE OR ALOFT; DRY DOCK SAFETY

C0801. DISCUSSION

a. Since many areas on the exterior of a ship are inaccessible to the crew from decks or built-in work platforms, it becomes necessary to go "over the side" or "aloft" to reach these areas. "Over the side" shall be defined as anywhere outboard of the lifeline system. "Aloft" shall be defined as any mast, kingpost, or other structure where the potential for a fall exists.

b. The greatest hazard associated with working over the side or aloft is the danger of a fall. Other hazards include the dropping of objects on (or by) personnel, electrical shock and burns from transmitting antenna or radar, and asphyxiation.

c. When a ship is in dry dock, many of the precautions associated with working over the side or aloft must be followed. This chapter will discuss the hazards and precautions associated with this unique evolution.

d. Personnel suspended over the side by a crane are subject to electrical shock and burn hazards from voltage induced in the hoist wire from transmitting antenna and radar. When personnel are suspended over the side by a crane, all precautions listed in this chapter shall be taken.

C0802. GENERAL PRECAUTIONS

a. An appropriate check sheet shall be routed to the OOD/CDO for permission for working over the side or aloft. Example check sheets can be found in appendices C8-A and C8-B.

b. Wear a parachute type safety harness with Dyna-Brake safety lanyard, working lanyard and tending line (as required) with double locking snap hooks. The harness shall be inspected in accordance with established PMS prior to use. The lanyard length shall not exceed 6 feet or the distance from the work to 6 feet above the deck, whichever is shorter.

c. When performing hot work, replace personal safety and staging/boatswain (bosun) chair fiber lines with wire rope. Personal safety lines shall be corrosion resistant steel (CRES) wire rope.

d. Attach safety lanyards to all tools, if practicable. Never carry tools up and down ladders. Rig a line and raise/lower tools in a bucket.

e. Stop work when the ship begins to roll in excess of 10°, or the ship begins to pitch in excess of 6°, or wind speed is greater than 30 knots, and/or an ice storm/lightning threatens.

f. Ensure appropriate signal flags are hoisted. (KILO for personnel working aloft; KILO ONE for personnel working over the side; KILO THREE for personnel working aloft and over the side.)

g. When underway or when working near stacks or exhausts that are actively discharging gases, the commanding officer's permission is required to work aloft or over the side.

h. An experienced senior person shall check the rigging of the bosun chair or staging prior to use. Never rig lines over sharp edges. Inspect lines for damage, rot, and wear.

i. The petty officer in charge shall mark off an area and keep unnecessary personnel clear. He/she shall also maintain a sharp lookout for anything that would cause an increase in ship's motion or drastic change in direction. Personnel must not work over the side during maneuvers with other ships because of the unpredictable nature of these evolutions.

j. Read any safety placards (i.e., radio-frequency radiation warning signs) posted in the area prior to commencing work.

k. Cranes used to suspend personnel over the side shall be certified and work platforms shall be approved by COMNAVSEASYSCOM as safe for manned handling.

C0803. PROCEDURES FOR WORKING OVER THE SIDE

Complete a checklist that contains all of the elements included in appendix C8-B prior to commencing work over the side.

C0804. PROCEDURES FOR PERSONNEL WORKING ALOFT

Complete a checklist that contains all of the elements included in appendix C8-A prior to commencing work aloft.

a. Do not go aloft on masts, macks, stacks, or kingposts or be suspended over the side by a crane without first obtaining written permission from the OOD in the form of a working aloft checklist as described in paragraph C0802.

b. Wear the respiratory protection designated by the respiratory protection manager (RPM) when working near stacks or exhaust that are actively discharging gases.

c. Use a Dyna-Brake® and climber sleeve assembly in conjunction with the safety harness when going aloft where a climber safety rail is installed. If a climber safety rail is not installed, use a double lanyard configuration.

d. Prior to commencement of work and every 15 minutes thereafter, pass a verbal warning over the 1 MC, **"DO NOT ROTATE ANTENNAS, ENERGIZE OR RADIATE ANY ELECTRICAL OR ELECTRONIC EQUIPMENT WHILE PERSONNEL ARE WORKING ALOFT."** If personnel aloft are in the vicinity of the stacks add, **"DO NOT BLOW TUBES OR LIFT SAFETY VALVES WHILE PERSONNEL ARE WORKING ALOFT."**

e. Inform ships in the vicinity that personnel will be working aloft to ensure they take appropriate action on operation of electrical or electronic equipment.

f. Departments concerned shall ensure that all radio transmitters and radars that pose radiation hazards are placed in the STANDBY position and a sign placed on the equipment that reads: "SECURED. PERSONNEL ALOFT. DATE_____ TIME_____ INITIALS_____."

g. Position a safety observer on deck near the work being performed. Outfit the safety observer with a safety harness, lanyards, Dyna-Brake®, and

climber safety sleeve to permit rapid emergency assistance aloft if required. The safety observer shall keep the deck area beneath the work aloft free of unnecessary personnel.

C0805. DRY DOCK SAFETY PRECAUTIONS

a. Personnel working over the side while in dry dock shall comply with the precautions indicated in this chapter with the exception that life jackets are not required in dry docks without water. Personnel working over the side in drydock will normally be in a man basket with safety harness and Dyna-Brake® worn.

b. Ensure all staging is adequately constructed and supported.

c. Only enter the dock with a hard hat, safety shoes, and eye protection.

d. Shift no weights within the ship while in dry dock without the permission of the docking officer.

e. Ensure the ship is adequately grounded at all times.

f. Drain all lines subject to freezing, in freezing weather.

g. Ensure adequate topside lighting is provided by either installed dock lights or by temporary lighting, particularly in areas where normal passage is obstructed or disrupted by service lines or work in progress.

h. Ensure that any equipment that projects through the hull is only operated with the permission of the commanding officer and then with a safety observer outside the hull.

i. Do not throw anything over the side into the dock, including debris from cleaning or preservation.

j. When aboard a ship carrying fuel of any kind in drydock, do not allow fuel to drain into the dock. Should it be necessary to remove fuel from tanks or receptacles while in drydock, take precautions that will prevent any of the fuel from reaching the floor of the dock.

k. Safety nets shall be rigged extending a minimum of 6 feet on both sides under all access brows between the ship and the dock apron.

Appendix C8-A

WORKING ALOFT CHECK SHEET

USS _____ Time/Date _____

1. Personnel will be going aloft at (location) _____ for accomplishing the following work _____
_____

2. Prior to allowing personnel to go aloft, accomplish the following:

Initials

_____ a. If underway or when working near stacks or exhausts that are actively discharging gases, obtain the commanding officer's permission.

_____ b. DANGER tag-out all rotating equipment, such as radar antennas, in the vicinity of the work area.

_____ c. Place a sign on all HF, MF, and LF transmitters and all radars whose danger zone encompasses the work area. The sign should read: SECURED. PERSONNEL ALOFT
DATE_____ TIME_____ INITIALS_____

_____ d. Ensure personnel going aloft are wearing a parachute type safety harness with a Dyna-Brake® safety lanyard, working lanyard, and climber safety device (if a climber safety rail is installed). Ensure that PMS has been accomplished on all equipment prior to use.

_____ e. Notify the engineering officer of the watch/engineering duty officer to ensure that safety valves are lifted only in an emergency when personnel are aloft (main control should notify the officer of the deck of an impending emergency as soon as possible to permit warning of personnel aloft).

_____ f. If work is to be accomplished on or in the vicinity of the whistle, secure power to the whistle (steam, air, electricity) and **DANGER** tag-out.

_____ g. Ensure that personnel are briefed on safety prior to going aloft. This should include, as a minimum, keeping the lanyard attached with a minimum of slack to a fixed structure at all times; changing the lanyard connection point as work progresses; keeping good footing and grasp at all times.

_____ h. Ensure all tools are attached to personnel with preventer lines; or, if passed up, have lanyards attached that are firmly secured before removal from the bucket.

_____ i. Ensure that assistance is provided to keep areas below the working area clear and for passing tools or performing rigging.

_____ j. Ensure that personnel working in the vicinity of stacks, or other areas where they may be subjected to exhaust fumes, are wearing proper respiratory protection equipment.

_____ k. Do not permit work aloft, except in an emergency, if wind speed is greater than 30 knots, roll is in excess of 10°, pitch is in excess of 6°, or if ice or thunder storms threaten.

_____ l. If in port, notify officers of the deck/command duty officers of adjacent ship(s) to ensure that high-powered radio and radar transmitters will not be energized and endanger personnel going aloft.

_____ m. Fly the KILO or KILO THREE flag, as appropriate, if in port.

_____ n. Prior to personnel going aloft, have the following passed over the 1MC: **"DO NOT ROTATE ANTENNAS, ENERGIZE OR RADIATE ANY ELECTRICAL OR ELECTRONIC EQUIPMENT WHILE PERSONNEL ARE WORKING ALOFT."** If personnel aloft are in the vicinity of the stacks add, **"DO NOT BLOW TUBES OR LIFT SAFETY VALVES WHILE PERSONNEL ARE WORKING ALOFT."**

_____ o. If a crane is used to suspend personnel, ensure that the crane has a current certification and the work platform is approved by COMNAVSEASYSCOM for handling personnel.

_____ p. Be sure the safety observer is properly outfitted and positioned.

3. Conditions have been established to permit personnel working aloft.

_____
Command Duty Officer/Officer of the Deck/Time

Working Aloft Commenced _____

Working Aloft Completed _____

Note: Initials certify completion of an item. If an item is not applicable, indicate "NA" on initial line.

Appendix C8-B

WORKING OVER THE SIDE CHECK SHEET

USS _____ Time/Date _____

1. Personnel (number) _____ will be going over the side at (location) _____ _____ for accomplishing the following work _____ _____ _____

2. Prior to allowing personnel to work over the side, accomplish the following:

Initials

_____ a. If underway or in dry dock, or working near exhausts that are R) actively discharging gases, obtain the commanding officer's permission.

_____ b. Ensure that personnel working over the side wear a parachute type safety harness with Dyna-Brake® safety lanyard and working lanyard, wear an inherently buoyant lifejacket modified with a button hole in the back to wear with the safety harness, and wear a hard-hat with a chin strap. Appropriate PMS shall be performed on harness, safety lanyard, and lifejacket prior to use. (Note: If working from a float or punt in the water, safety harness and safety lanyard are not required. Lifejackets and hard hat shall be worn. If in a dry deck without water, the life jacket is not required).

_____ c. Each person working over the side has an assistant to tend lines. (Note: If working from a punt or float, at least one assistant shall be provided on the deck or pier. If in a dry dock without water, a tending line is not required.)

_____ d. Ship's propellers are stopped and overboard discharges in the area of personnel working over the side are secured and DANGER tagged.

_____ e. If work is to be accomplished in port between the ship and a pier or between the ship and other ships, a camel is in place.

_____ f. Power tools, if in use, are pneumatic. NO electric powered tools shall be used.

_____ g. Ensure that an experienced, senior person has checked the rigging of the bosun chair or staging prior to use.

_____ h. Ensure that personnel working over the side are briefed on safety prior to working over the side.

_____ i. Do not permit working over the side, except in an emergency, if wind speed is greater than 30 knots, roll is in excess of 10°, pitch is in excess of 6°, or if ice or thunder storms threaten.

_____ j. Ensure that a petty officer in charge of work is stationed at the work site. Ensure PO in charge is alert for anything that would cause an increase in ship's motion or drastic change in course. Underway maneuvers with other ships are not planned.

_____ k. If in port, notify officers of the deck/command duty officers of ships alongside.

_____ l. Fly the KILO ONE or KILO THREE flag, as appropriate, if in port.

_____ m. If a crane is used to suspend personnel over the side, ensure that the crane has current certification and that the work platform is approved by COMNAVSEASYSCOM for handling personnel.

3. Conditions have been established to permit personnel working over the side.

_____
Command Duty Officer/Officer of the Deck/Time

Working Over the Side Commenced _____

Working Over the Side Completed _____

Note: Initials certify completion of an item. If an item is not applicable, indicate "NA" on initial line.

CHAPTER C9

ELECTRICAL AND ELECTRONIC SAFETY AND TAG-OUT PRECAUTIONS

C0901. DISCUSSION

a. Practically every piece of equipment on board ship requires electrical power. Radars, communication equipment, gun mounts, as well as lighting, portable tools, and personal equipment all use power from the ship.

b. The fact that electrical equipment and tools are so commonplace means that hazards involved with electricity are often taken for granted. This is despite the fact that the hazard of electrical shock is commonplace ashore where the extra shipboard hazards of high-powered equipment, unstable work spaces, and saltwater are usually non-existent. Compared to other environments, the potential for electrical shock aboard ship is increased. Although ships' electrical/electronic systems are ungrounded, personnel and equipment may easily become a path to ground in cases of faulty wiring, resulting in injury or death or damage to equipment.

C0902. DEFINITIONS

a. "Electrical equipment" shall include generators, electrically powered machinery and mechanisms, power cables, controllers, transformers, and associated equipment.

b. "Electronic equipment" shall include radars, sonars, radios, power amplifiers, antennas, electronic warfare equipment, computers, and associated controls and peripherals.

C0903. ELECTRICAL PRECAUTIONS

a. **General Precautions for Portable Electrical Equipment**. Portable electrical equipment are devices that may be plugged into the ship’s electrical power. All personnel using portable electrical tools shall:

(1) Wear rubber gloves when using electric portable tools in hazardous conditions, such as wet decks or bilge areas.

(2) Wear leather gloves over rubber gloves when the work being done could damage the rubber gloves.

(3) Wear required PPE when working where particles may strike the eyes.

(4) Wear hearing protection (earplugs or circumaural muffs) when working with noise hazardous tools or in the area where such work is being conducted.

(5) Not use spliced cables.

(6) Not use any portable equipment that has a frayed cord or broken/damaged plug.

(7) Make sure that the on/off switch is in the "off" position prior to inserting/removing the plug from the energized receptacle.

(8) Always connect the cord of portable electrical equipment into the extension cord before the extension cord is inserted into an energized receptacle.

(9) Always unplug the extension cord from an energized receptacle before the cord of the portable electrical equipment is unplugged from the extension cord.

(10) Arrange the cords so that they will not create a trip hazard.

(11) Never pick up the tool by the electrical cord.

(12) When drilling/cutting through bulkheads, check opposite side for cables and pipes.

(13) Only use electric equipment in explosive atmospheres if the equipment is approved for such use (explosion proof).

(14) Do not join more than two 25-foot extension cords together.

(15) When it is necessary to run electrical leads through doors or hatches, protect the cord to guard against accidental closing of the door or hatch.

(16) Return portable electrical power tools, drop cords, extension cords, and security lighting to the Portable Electrical Tool Issue Room as required by paragraph B0707 of this manual.

(17) Visually inspect portable cables for any signs of an unsatisfactory condition, such as tears, chafing, exposed insulated conductors, and damaged plugs and receptacles. Cables shall be of the proper length and cross-sectional area.

(18) Use only COMNAVSEASYSCOM-authorized extension lights for shipboard use to eliminate or drastically reduce the many hazards associated with the use of unauthorized commercial grade lights. The approved lights most frequently used aboard ships are:

(a) A 100-watt incandescent bulb equipped with 50-foot, three conductor cable for use as a general multipurpose extension light, NSN 9G6230-00-701-2947.

(b) A small 4-watt fluorescent tube for servicing electronic equipment. This light is of all plastic construction with no outside conductive surfaces. It is intended for use in open electronic equipment only. It is not explosion proof and is not acceptable for use in hazardous atmospheres.

b. Do not touch a conductor, until it is tested, to be sure it is de-energized.

c. Obey all warning signs; read equipment warning labels before use.

d. Never work on live (energized) electrical equipment without the commanding officer's permission and only per paragraph B0704 of this manual.

e. Always de-energize and "tag-out" with red "DANGER, DO NOT OPERATE" tags, installed electrical equipment before starting any maintenance or repair. Test for energized circuits per the Naval Ships Technical Manual (NSTM) Chapter 300.

f. Do not energize any equipment that is tagged-out. Properly clear the tag first.

g. Only use authorized equipment to perform maintenance on electrical equipment. Ground all metal-cased electrical equipment, except power tools, verified to be double insulated on the label and by electrical safety check.

h. Close all fuse boxes, junction boxes, switch boxes, and wiring accessories.

i. Use the one-hand rule when turning on electrical equipment. Never operate a switch with the other hand on a metal surface, which would provide a path to ground through the body.

j. Never use outlets that appear to be burnt. Do not use equipment with worn or damaged cords, or crushed or damaged plugs. They are not to be patched with electrical tape. Turn in such items immediately to Electrical Tool Issue, informing them of the problem.

k. Ensure that "dead-man" switches work properly when installed.

l. Use a voltage indicator to test whether equipment or circuits are energized.

m. Never remove overload relays except for replacement.

n. Commanding Officer permission is required when working on energized equipment.

o. Use skin and eye protection when working with wet cell batteries and changing battle lantern batteries.

p. Only install fuses of the rating specified on a fuse box or panel. Do not over-fuse. Identify fuse panels that are missing fuse-rating labels.

q. Do not connect single-phase 115v mobile equipment, permanently located and energized more than 50 percent of the time (copiers, personal computers and their peripherals, vending machines, and money machines) to the ship's isolated receptacle circuits. Connecting this equipment to the ship's isolated receptacle circuits may overload the circuits, resulting in fire hazards. Connect equipment of this type to a separate single-phase circuit through an isolation transformer supplied by the lighting distribution system. See NSTM, chapter 300 for temporary modifications to power such mobile equipment.

r. Do not use aluminum or metal portable ladders when working on electrical equipment.

s. Use only Navy-approved power strips for computer equipment, printers, and peripherals. Never use power strips in series (connected one to another).

C0904. BATTERIES

a. The charging of wet cell batteries will produce hydrogen gas that may be ignited causing fire and explosion. Verify that wet cell battery compartments, which have been sealed, are first opened and well ventilated before entering, turning on any lights, making or breaking any electrical connections, or doing any work in the compartment. Verify that the ventilating apparatus of a wet cell battery compartment is running properly before starting to charge wet cell batteries, and that the exhaust ventilation

interlock with the charger is operable. Keep the wet cell battery storage area or compartment well-ventilated during charging. Ensure that battery charging circuit ventilation fans are interlocked so that if power is lost to the fans, the battery charger turns off.

b. While wet cell battery charging is in progress, post a warning placard at the access to the wet cell battery storage area or compartment that reads:

CAUTION: WET CELL BATTERY CHARGING IN PROGRESS.

c. Prohibit smoking in the charging area.

d. Prevent open flames, sparks, or electric arcs in wet cell battery charging areas.

e. Keep uninsulated tools and other metallic objects away from the top of uncovered wet cell batteries. When using tools around a wet cell battery, do not allow tools to bridge the wet cell battery terminals or short circuit any part of the wet cell battery. Only tools with insulated handles shall be used on the wet cell battery.

f. During normal use, keep cell service openings closed except when they must be opened to take readings or add water. When charging wet cell batteries, completely unscrew the wet cell battery cap, but leave the cap in place on top of the service opening. This will allow hydrogen gas, which is formed during the charging process, to escape but will minimize the release of acid or alkaline mist into the shop atmosphere.

g. Keep cell tops clean.

h. Never stow loose gear in the wet cell battery compartment. Gear such as cleaning rags, hydrometer boxes, pieces of wire, and tools must be removed immediately after use.

i. Charge a wet cell battery only at the rate stated on its nameplate. Never charge a wet cell battery at a higher finishing rate than that stated on its nameplate.

j. When charging several wet cell batteries at once, ensure the voltage of the charging line exceeds the total voltage of all the wet cell batteries being charged, but that the charging rate in amperes does not exceed the maximum charging rate of the wet cell battery in the line having the lowest ampere-hour capacity.

k. Do not operate wet cell batteries above 52°C (125°F). When charging wet cell batteries, lower the charging rate immediately if wet cell battery reaches 52°C (125°F) or emits gas.

l. When charging wet cell batteries, keep compartment temperature below 36°C (96°F), if possible.

m. While current is flowing in the charging line, do not attempt to repair the connections of any wet cell battery or connect/disconnect wet cell batteries from the line. Turn current off before attempting any of these procedures.

n. Do not add acid of specific gravity greater than 1.350 to a wet cell battery.

o. Water added to a wet cell battery must be pure distilled water. Never add salt water to a wet cell battery or use salt water to wash out wet cell

battery components. Salt water added to a wet cell battery will evolve extremely toxic chlorine gas.

p. Do not pour water into concentrated sulfuric acid. The heat generated will cause a violent reaction. Sulfuric acid is highly corrosive. Wash up spillage with water and sodium bicarbonate. When handling acid or electrolyte, always wear a rubber apron, rubber boots, rubber gloves, chemical goggles, and a face shield.

q. Do not connect or disconnect batteries in compartments that may contain gasoline vapors. In any use of wet cell batteries, verify that all connections are tight to prevent loose connections that may cause sparks.

r. When wet cell batteries are used with one terminal grounded, always disconnect the grounded terminal first when replacing wet cell battery.

s. Lithium batteries shall not be used aboard ship without specific approval of COMNAVSEASYSCOM.

t. Primary batteries, especially mercury and lithium batteries, shall never be punctured, incinerated or recharged.

u. Dispose of mercury and lithium batteries promptly as used hazardous material. Mercury cell batteries shall be disposed of at the first available shore installation. Lithium batteries shall not be stored at sea for shore disposal, but shall be disposed of in water over 600 feet deep per chapter B3 of this manual. Ashore, dispose of lithium batteries per chapter B3 of this manual.

v. Turn the battery switch off when battery-driven equipment is not in use or battery charge becomes insufficient to operate equipment. Remove batteries from any equipment that is to be stored or shipped. Cover removed batteries' terminals with insulating material to prevent short circuits. In the case of equipment powered by dry batteries, remove batteries if equipment is to remain idle for 2 weeks or more. These batteries should be scrapped or stored.

w. Store batteries in an adequately ventilated and cool fireproof area.

x. Use appropriate eye and skin protection when moving or charging wet batteries or working with acid.

y. Ensure alkaline batteries and equipment are segregated from lead acid batteries and equipment.

z. The B section of the Navy Type 19026 battery can deliver an extremely serious or fatal shock. Avoid contacting the terminals of this high voltage battery.

C0905. ELECTRICAL FIRES

a. For electrical fire fighting procedures, see NSTM, Chapter 555.

b. Battery Fires:

(1) A battery fire is nearly always preceded by an explosion. Great care is required fighting such a fire to avoid creating another explosion.

(2) The safest and most effective method for fighting a battery compartment fire is through oxygen starvation. Secure the compartment and stop all ventilation within, including agitation air, to deprive flames of oxygen.

WARNING

NEVER attempt to extinguish a battery fire by pouring water on the battery. The hydrogen and oxygen generated by electrolysis could produce a violent explosion.

c. Electrical Fire Prevention:

(1) Keep electric motors and generators clean.

(2) Ensure proper maintenance is performed on electrical equipment, i.e., motors, generators, bearings, and filters.

(3) Report overheating or arcing electrical equipment.

(4) Keep air filters clean.

C0906. FIRST AID FOR ELECTRICAL SHOCK

a. Fundamentally, electrical current rather than voltage is the criterion of shock intensity. The passage of even a very small current through a vital part of the human body can cause death. The voltage necessary to produce the fatal current is dependent upon the resistance of the body, contact conditions, the path through the body, etc.

b. It is imperative to recognize that the resistance of the human body cannot be relied upon to prevent a fatal shock from 115 volts or even lower voltage; fatalities from as low as 30 volts have been recorded. Tests have shown that body resistance under unfavorable conditions may be as low as 300 ohms and possibly as low as 100 ohms from temple to temple if the skin is broken. Volt for volt, DC potentials are normally not as dangerous as AC as evidenced from the fact that reasonably safe "let-go currents" for 60 hertz alternating current is 9.0 milliamperes for men and 6.0 milliamperes for women while the corresponding values for direct current are 62.0 milliamperes for men and 41.0 milliamperes for women.

(1) **Electrical Shock Symptoms**. In the event of severe electrical shock, the victim could become very pale or "bluish." His/her pulse is extremely weak or entirely absent, unconsciousness is complete, and burns are usually present. The victim's body may become rigid or stiff in a few minutes. This condition can be caused by muscular reaction to shock, and it should not be considered as rigor mortis. Therefore, artificial respiration shall be administered immediately, regardless of body stiffness, as recovery from such a state has been reported. Consequently, the appearance of rigor mortis shall not be accepted as a positive sign of death.

(2) **Victim Rescue**. The rescue of electrical shock victims is dependent upon prompt administration of first aid. All electrically-trained personnel shall be trained annually in cardiopulmonary resuscitation (CPR) procedures by an instructor certified by an authorized agency, such as the American Red Cross or the American Heart Association.

CAUTION

Do not attempt to administer first aid or come in physical contact with an electrical shock victim before the power is shut off, or, if the power cannot be shut off immediately, before the victim has been removed from the live conductor.

(3) When attempting to administer first aid to an electrical shock victim, proceed as follows:

(a) Shut off the power.

(b) If the power cannot be deactivated, per step (a), remove the victim immediately, observing the following precautions.

1. Protect yourself with dry insulating material.

2. Use a dry board, belt, dry clothing, or other available non-conductive material to free the victim (by pulling, pushing, or rolling) from the power-carrying object. DO NOT TOUCH the victim.

(c) Immediately after removal of the victim from the power-carrying object, administer artificial respiration.

(d) When providing first aid measures, any possible spinal injuries or fractures should be taken into consideration.

C0907. ELECTRONIC PRECAUTIONS

a. **Definitions**

(1) **Repair**. Removal or replacement, by any method, of any component, subassembly, module, circuit card, or conductor to bring malfunctioning equipment back to an operational status.

(2) **Corrective maintenance**. Alignment, adjustment, tuning, or trouble shooting of malfunctioning equipment per published maintenance or technical manual procedure.

(3) **Preventative maintenance**. Alignment, adjustment, tuning, or testing of operational equipment to ensure performance within published maintenance card or technical manual procedures.

b. Repair of electronic equipment is normally accomplished with the circuit deenergized. Every effort should be made to avoid making repairs to energized equipment. DO NOT repair energized electronic equipment unless you are using approved procedures from technical manuals or other documentation, or an emergency condition exists and the commanding officer has granted permission to perform such repair. In such an emergency, trained personnel shall accomplish the repair of energized circuits and an experienced technician or officer shall supervise. Electronic repair personnel should observe the safety precautions in section 3-4 of the Electronics installation and Maintenance Book (EIMB), NAVSEA SE 000-00-EIM-100, General Handbook.

c. Corrective maintenance on energized electronic equipment is authorized when done according to published maintenance or technical manual procedures. Freelance corrective maintenance (i.e., without a published procedure) on energized electronic equipment shall be performed ONLY with the specific permission of the commanding officer.

d. Preventive maintenance on energized electronic equipment is authorized when it is according to a published maintenance requirement card or technical manual procedures.

e. Only perform preventive or corrective maintenance on energized electronic equipment when duly authorized and trained on that type of equipment.

f. Whenever work on energized electronic equipment exposes the technician to 30 volts or greater the following precautions shall be adhered to:

(1) Study the applicable schematic and wiring diagrams before servicing.

(2) Research into or enter energized electronic equipment enclosure for the purpose of servicing or adjusting only when prescribed by applicable technical manuals, maintenance requirement card, or other approved documentation.

(3) Obtain the commanding officer's permission whenever work on energized electronic equipment deviates from published corrective or preventive maintenance procedures.

(4) Station a safety observer capable of securing power and rendering adequate aid in the event of an emergency.

(5) Provide warning signs and suitable guards to prevent personnel from coming in accidental contact with dangerous voltage.

(6) Obey all warning signs and heed all equipment warning labels.

(7) Insulate the work from ground with approved electrical grade rubber matting. Installation requirements for electrical grade matting are contained in chapter 634 of NSTM.

(8) Remove or snugly secure any loose clothing. Remove all jewelry.

(9) Insulate all metal tools.

(10) Use only one hand, if practical, in accomplishing the work.

(11) Wear electrical grade rubber gloves on both hands, if possible. If the nature of the work is too cumbersome to wear gloves on both hands, then a glove shall be worn on the non-working hand.

g. Reaching into deenergized equipment also requires special care and precaution.

(1) Study the applicable schematic and wiring diagrams before servicing.

(2) Ensure you are familiar with all circuits that must be deenergized and all voltage storing and high voltage components.

(3) Discharge all voltage storing components with an approved shorting probe.

(4) Do not touch a conductor or electronic component unless you have proven it to be deenergized by using a known good voltage tester.

h. Removal of a unit or part from the normal location within an assembly and the energizing of the unit or part, while it is outside the normal enclosure, removes the protective features such as interlocks, grounded, and enclosures. These safety features may then no longer function as designed. Ground the chassis and frame of all units removed for servicing and ground all circuits normally grounded in operation whenever power is applied to the unit.

i. Do not energize any equipment that is tagged out. Properly clear the tag out first.

j. Never defeat an interlock or built-in safety device. Modify such safeguard circuits only as authorized by the cognizant system command.

k. Refer to chapter 300 of NSTM and chapter 3 of EIMB General Handbook for additional precautions regarding electric systems.

CHAPTER C10

SHIPBOARD FUELS

C1001. DISCUSSION

a. Fuels are used to power the ship, emergency auxiliary equipment, aircraft, vehicles, small boats, and a multitude of smaller pieces of machinery. There are several types of fuels in use, each with its own characteristics and traits. It is impossible to cover all the scenarios that can occur with shipboard fuels; however, this chapter will cover the main points.

b. The biggest hazard with shipboard fuels is explosion and fire. Other hazards include asphyxiation, body burns, eye and respiratory difficulties, and environmental hazards. Due to the incredible impact a shipboard explosion and fire would have, the possibility that a catastrophe could occur should constantly be in the minds of all personnel, especially those involved in fuel storage and transfer operations.

C1002. PRECAUTIONS

a. Never smoke in fuel storage or transfer areas.

b. Prohibit any open flames, hot work, or the use of non-explosion-proof fixtures or equipment near fuel storage or transfer areas. Fluorescent fixtures are permitted in areas in which JP-5 or F-76 are handled.

c. Ensure forced ventilation is in operation during fuel transfers.

d. When working in MOGAS tanks, do not wear, and do not allow others to wear, shoes with steel clips, metal key chains, metal belt buckles, buttons made out of spark producing material, or clothes made of static generating material such as wool, silk, nylon, or Nomex®.

e. Always ventilate fuel tanks and obtain gas-free engineer's certification before entering.

f. Never enter a tank to aid an unconscious crewmember without proper emergency breathing apparatus, such as an SCBA, and a back-up person standing by. The back-up person shall also be equipped with the proper emergency breathing apparatus.

g. Detect leaks and make immediate repairs in all fuel systems. Clean up pools of leaked or spilled fuel immediately using appropriate hazardous material (HM) spill cleanup equipment and procedures. Dispose of fuel contaminated rags and materials as directed by the ship’s HM coordinator.

h. Inspect tanks, piping, cargo hoses, pumps, and communication equipment before transferring fuel. Ensure a drip pan is under all transfer hose connections and that gaskets are in place in hose joints and couplings.

i. Store oily wastes and rags in an approved container.

j. Do not discharge fuel or oily wastes over the side. Do not allow spilled fuel or oily wastes to go over the side. Use rags or sorbent materials to stop running fuel and report the spill immediately to your supervisor.

k. Avoid excessive contact with fuel(s) and thoroughly wash exposed skin after incidental contact. Personnel who suspect that they have injected or inhaled fuel should immediately seek medical attention.

l. Use respiratory protection if required by the respiratory protection manager (RPM).

m. When in canisters or drums, flammable fuels shall be placed on the weather deck if no flammable storeroom is provided. Gasoline storage shall be in remotely jettisonable racks on the weather decks. Do not store near heat sources or near ventilation ducts.

n. Close hatches, doors, and ports in vicinity of tank vents while transferring fuel.

o. During refueling, close and secure all portholes on the engaged side of the ship. Place absorbent at deck edge openings and scuppers to prevent spills from running over the side.

CHAPTER C11

WELDING, CUTTING, AND BRAZING

C1101. DISCUSSION

a. The convenience of metal arc and gas welding and cutting lies largely in the fact that the equipment can be taken to the job. This convenience leads to the performance of construction or repair jobs in locations that have not been designed for such concentrated heat, or mixtures of toxic or explosive gases. The failure to take proper precautions, during welding or cutting operations in such spaces, presents a serious fire, explosion, electric shock, and health hazard.

b. Health hazards common to welding, cutting, and brazing are numerous. In addition to electric shock, burns to the eyes and skin can be caused by sparks, molten metal, and ultraviolet and infrared radiation. Fumes and gases generated by welding can produce ozone and oxides of nitrogen which are poisonous. Lead, zinc, chrome, and cadmium in alloys produce toxic fumes. Paints and coatings may produce toxic gases and fumes when heated by the flames of the welding torch. Additionally, some metal fumes are capable of producing metal fume fever. Local exhaust ventilation is a must to remove excessive concentrations of air contaminants. Welding in closed, unventilated spaces can result in respiratory irritation or poisoning of personnel.

c. Hot work includes:

(1) Flame heating, welding, torch cutting, brazing, or carbon arc gouging

(2) Any operation which produces temperatures of 400°F (204°C) or higher

NOTE:

Operations not producing **hot** sparks or flame such as spark-producing or arc producing tools or equipment, static discharge, friction, open flames or embers, impact, and non-explosion-proof equipment such as lights, fixtures, or motors are not considered hot work unless occurring in the presence of flammable liquids or in a flammable atmosphere.

d. Hot work is divided into two classes where only class alpha materials, such as ordinary combustibles (wood, cloth, paper, rubber, and many plastics) are exposed. These classes are:

(1) **Class I**. These processes produce either high energy sparks or slag that can be thrown or dropped at the work site or produce heat that can be transferred through the deck, overhead, bulkhead, or structure to a location not visible to the hot work operator. This class includes:

(a) Flame cutting

(b) Welding

(c) Plasma cutting

(d) Arcing and gouging

(e) Electric arc welding

(f) Thermal spraying

(g) Other hot spark or flame producing process not included in class II.

(2) **Class II**. These processes produce flames or minimal energy sparks or slag which are generally localized to the immediate work area. This class includes:

(a) Stud welding with an electric stud gun

(b) Gas-tungsten-arc (GTA) welding

(c) Torch brazing

(d) Ferrous metal grinding with abrasive disks.

C1102. PRECAUTIONS

a. **Clothing**

(1) Use goggles, faceshield, respirators, flameproof gloves, jackets, leggings and boots, per reference C11-1, industrial hygiene survey, or other applicable reference.

(2) Remove lighters from pockets during hot work.

(3) Do not wear synthetic-fiber clothing.

(4) Do not roll up sleeves, cuffs, or have open pockets.

(5) Cartridge respirators, when properly selected (see chapter B6), will protect against metal fumes generated during welding. They do not provide oxygen, which may be necessary when working in a confined space. They also do not protect against hazardous gases which may be generated during welding, if sufficient ventilation is not available. Consult with the respiratory protection manager for specific guidance regarding cartridge selection or alternative respirators.

b. **Space Precautions**

(1) Observe the following precautions during the performance of hot work:

(a) Do not perform hot work when flammable liquids or flammable atmospheres are present without specific instructions of the Gas Free Engineer.

(b) Inspect the other side of the bulkhead, deck, overhead, or other structure to ensure that hot work will not damage materials or equipment that may be on the other side of the hot work operation.

(c) Remove explosive materials and flammable liquids or vapors and take suitable precautions against the re-accumulation of such materials. For welding in magazines or adjacent to magazines, refer to NAVSEA OP-4, *Ammunition Afloat*.

(d) Where practicable, relocate all combustibles at least 35 feet from the work site. Where relocation is impracticable, protect combustibles with metal guards or curtains constructed of MIL-C-24576 material. Tighten edges of covers at the deck to prevent sparks from going underneath the covers. This precaution is also important at overlaps where several covers are used to protect a large pile of combustibles.

(e) Protect intricate and vulnerable machinery and equipment from falling sparks or other potential sources of fire with metal guards or

curtains constructed of MIL-C-24576 material. Secure the protection in-place before commencing hot work.

(f) For hot work processes that generate slag, weld splatter, or sparks, cover openings in decks, bulkheads, or overheads within 35 feet which can be a path to prevent ignition sources from passing into adjacent compartments, spaces, or decks below. A complete containment system as described in reference C11-1, section 10 meets this requirement. If openings cannot be covered, post a fire watch on the far side.

(g) Blank off ducts and conveyor systems that might carry sparks to distant combustibles or otherwise suitably protect.

(h) When hot work is done near decks, bulkheads, partitions, or overheads of combustible construction, take precautions to prevent ignition.

(i) Do not undertake hot work on pipes or other metal in contact with insulation or combustible decks, bulkheads, partitions, or overheads if the work is close enough to cause ignition by heat conduction.

(j) Do not start hot work in areas other than those specifically designated for hot work, such as welding shops, without approval of the commanding officer or his/her designated representative. Abrasive disk grinding with a small wheel (typically 3-inch diameter or less) does not require notification or approval.

(k) De-energize all electrical equipment exposed to the hot work.

(2) Ensure that a gas-free engineer's survey has been completed before working in tanks, voids, or other confined spaces, including adjacent spaces (especially if those tanks contained flammable liquids or vapors) if these spaces are identified as a confined space per chapter B8 of this manual.

(3) Notify the damage control assistant (DCA) or fire marshall before starting hot work.

(4) Conduct hot work in or on fuel tanks, in spaces in which fuel tank vents terminate, or in other confined spaces known to contain flammable fuel, only with the commanding officer's approval.

(5) Set fire watches as follows:

(a) In **confined or enclosed spaces, machinery rooms, catapult rooms, bilges, and other locations proximate to flammable atmospheres** (e.g., near fuel tank vents and sounding tubes), fire watches shall be posted at the worksite when hot work is undertaken. After completion of the hot work operation, fire watches shall remain on station for a minimum of 30 minutes, ensure that the area is cool to the touch, and ensure that no smoldering embers remain.

(b) For **class I hot work**, post fire watches when hot work is undertaken. The fire watches shall stand watch for fire for 30 minutes after hot work is completed.

(c) For **class II hot work**, the DCA, fire marshall, or individual designated in writing by the DCA shall determine the need for a fire watch in addition to the hot worker based on his or her assessment of the worksite prior to undertaking hot work. When posted, the fire watch(es) shall stand watch for 30 minutes after hot work is completed.

NOTE:

Abrasive disk grinding on a ferrous material with a large wheel (larger than 3 inches in diameter) typically throws large sparks long distances. A fire watch is recommended for large wheel grinding when class alpha materials (ordinary combustibles) are exposed. The DCA or fire marshall shall determine the need for a fire watch.

(d) When a fire watch is not required for class II hot work, the hot worker shall have the appropriate fire extinguishing equipment available. The hot worker may leave the site after hot work is completed and after he/she has conducted a thorough survey of the area to check for smoldering fires. When grinding a ferrous material with a large abrasive disk wheel (larger than 3 inches in diameter), the hot worker shall stand watch for 30 minutes after the hot work ends.

(e) When any type of hot work is being performed on bulkheads, decks, or overheads where sparks or heat transfer may ignite combustibles on the opposite, accessible side, set a fire watch on the far side.

(f) The hot worker and the hot worker's supervisor are responsible for ensuring fire watches are in place prior to starting work.

(g) Train fire watches per reference C11-1, section 10.

(h) Equip fire watches with personal protective equipment (PPE) as required for the operation being conducted and anticipated hazards.

(i) When more than one fire watch is required, establish a communication means between fire watches.

(6) Ensure fire extinguishing equipment is available in immediate area. The types of fire extinguishing equipment fire watches shall use is specified in reference C11-1, section 10.

(7) Provide ventilation as specified in reference C11-1, industrial hygiene survey, gas free chit, or hot work chit.

(8) Personnel in areas adjacent to welding areas exposed to arc-produced ultraviolet radiation shall be protected by providing screens, appropriate goggles, or other approved means.

(9) Never weld near a source of halocarbons, such as trichloroethane or refrigerant gases. Phosgene gas can be produced when halocarbons are exposed to high temperatures.

(10) Do not perform hot work during fueling or ammunition transfer operations. AS-type ships are exempted from this requirement, but shall comply with the requirements of OPNAVINST 8020.14 while performing hot work or ammunition handling.

c. **Practices**

(1) Never use oxygen to operate pneumatic tools, on oil preheating burners, start internal combustion engines, blow out pipe lines, blow dust from clothing or work areas, create pressure, or for ventilation purposes.

(2) Do not carry oxygen, acetylene, or other fuel gas cylinders into confined spaces.

(3) Always return cylinders to the storage racks when work is completed and ensure cylinders are secured in place by metal retaining collars.

(4) Ground all electrical welding equipment before use.

(5) Stand on a dry surface or insulating material if surface is not completely dry to avoid potential electric shock.

(6) Never permit the metal part of the electrode or the electrode holder to touch the bare skin or any damp clothing which the operator may be wearing. Do not loop the welding cable over your shoulder or other parts of your body. Operators have been dragged off staging or scaffolds when the cables were fouled by other workmen or moving equipment.

(7) When stopping work for a significant time (lunch or overnight), remove the electrode from the electrode holder, deenergize the equipment and disconnect welding supply cable from the welding machine.

(8) When using portable machines, ensure that the primary supply cables are separately laid and do not become entangled with welding supply cables.

(9) Inspect work and electrode lead cables regularly for wear and damage. Replace cables with damaged insulation or exposed conductors. Use connecting devices specifically intended for the purpose when joining lengths of supply and electrode cables. Adequately insulate the connecting devices for the proposed service conditions.

(10) Keep welding cables dry and free from grease and oil, wherever practical, to prevent premature breakdown of the insulation which could cause serious short circuits.

(11) Suitably support cables overhead when necessary to run them some distance from the welding machine. If this cannot be done, and cables are laid on deck, protect them in such a manner that they will not be damaged or interfere with safe passage of personnel. Take special care to see that welding supply cables are not close to power supply cables, lighting circuits, or any equipment that utilizes magnetic tapes or depends upon a magnetic principle for operation. Block hatches and doors to prevent damage to welding cables.

(12) Protect welding equipment used in the open from weather conditions (e.g., rain, sleet, snow, spray, etc.) to prevent short circuiting.

(13) Do not smoke cigarettes or use other forms of tobacco while welding or brazing.

d. **Cylinder Safety**

(1) Store individual cylinders securely fastened in the upright position (valve end up) by metal collars, each cylinder independently fastened, and ensure that the cylinder valve protection caps are in place.

(2) Store flammable and explosive gases securely on the weather decks protected from direct exposure to the sun or in flammable compressed gas cylinder storerooms.

(3) Never store flammable gases with oxidizing gases. Typical oxidizing gases are oxygen and chlorine. Compressed gases such as helium, carbon dioxide, nitrogen, and argon can be stored with all gases except acetylene, oxidizing or flammable. Ensure inert gases are segregated and readily identifiable.

(4) Do not lift cylinders by valve-protection caps. Bars shall not be used under valves or valve-protection caps to pry cylinders loose when frozen in place or otherwise fixed. Use warm (not boiling) water to defrost.

(5) Close valves of empty cylinders.

(6) Place cylinders a safe distance away from the actual welding or cutting operation so that sparks, hot slag, or flame will not reach them. Use fire-resistant shields.

(7) Do not place cylinders where they might become part of an electric circuit. Contacts with energized equipment shall be avoided. Cylinders shall be kept away from radiators, piping systems, or layout tables that may be used for grounding electric circuits, such as for arc welding machines. Any practice, such as the tapping of an electrode against a cylinder to strike an arc, is prohibited.

(8) Never use cylinders as rollers or supports, whether full or empty.

(9) Do not change or alter the numbers and markings stamped into cylinders.

(10) Never attempt to mix gases in a cylinder. Unauthorized personnel should never refill a cylinder.

(11) Unless connected to a manifold, do not use oxygen from a cylinder without first attaching an oxygen regulator to the cylinder valve. Before connecting the regulator to the cylinder valve, open the valve slightly for an instant and then close valve. Always stand to one side of the outlet when opening the cylinder valve.

(12) Do not use hammers or wrenches to open cylinder valves. If valves cannot be opened by hand, return the cylinder to supply.

(13) Do not tamper with, or attempt to repair, cylinder valves. If experiencing trouble, remove from service, tag as defective and notify the supplier, indicating the character of the trouble and the cylinder's serial number. Follow supplier's instructions as to its disposition.

(14) Do not remove the stem from a diaphragm-type cylinder valve.

(15) Always place the fuel-gas cylinders with valve end up. Store and ship liquefied gases with the valve end up. Prior to use, store acetylene cylinders in a vertical position for a minimum of 2 hours to stabilize the gas.

(16) Handle cylinders carefully. Rough handling, knocks, or falls are liable to damage the cylinder, valve, or safety devices and cause leakage.

(17) Close the cylinder valve and release the gas from the regulator before the regulator is removed from a cylinder valve.

(18) Do not place anything on top of an acetylene cylinder which may damage the safety device or interfere with the quick closing of the valve.

(19) Never use fuel gas from cylinders through torches or other devices equipped with shutoff valves without reducing the pressure through a regulator attached to the cylinder valve or manifold.

(20) Do not use copper tubing with acetylene gas cylinders due to the potential of an explosive chemical reaction taking place.

CHAPTER C11

REFERENCES

C11-1 Naval Ships Technical Manual 074 (V1), S09086-CH-STM-010, Welding and Allied Processes, 31 July 1998 (NOTAL)

CHAPTER C12

SHIPBOARD AIRCRAFT SAFETY

C1201. DISCUSSION

a. This chapter applies to fixed-wing and/or rotary wing operations on ships that have full flight and hangar decks(CVs, CVNs, LHAs, LHDs, LPHs, and MCS). This chapter also applies to helicopter operations on such ships.

b. Flight decks are hazardous and the danger to personnel goes beyond the possibility of crashes. Air intakes on jet engines can actually suck personnel off the deck and into the engine. Jet engine exhaust can propel personnel into other objects or over the side of the ship. Propellers and rotor blades can maim or kill. Aircraft carry ordnance and fuel that can cause fires and explosions. Moving aircraft can hit personnel. The ship itself is pitching and rolling. For these reasons, personnel whose job requires them to work on the flight deck must be constantly alert to many hazards to avoid injury or death.

C1202. GENERAL FIRE PRECAUTIONS

a. **Smoking**

(1) Do not smoke or permit open flames on flight/hangar decks, sponsons, and weather decks.

(2) Only smoke in designated smoking areas.

b. **Open Flames/Ignition Sources**

(1) Do not permit open flames or other ignition source in the vicinity of flammable liquids, gases, or explosive ordnance.

(2) Provide continuous fresh air or properly designed exhaust systems where flammable vapors are present.

c. **Heating Units**

(1) Use caution when using element space heaters in any part of a hangar deck or in any shop where a fire hazard exists.

(2) In no case permit such heaters in locations where concentrations of flammable or explosive substances are present.

d. **Shoes**. Personnel shall wear approved non-sparking, protective toe box leather safety shoes with non-slip oil and fuel resistant soles in the vicinity of flammable gases and vapors.

e. **Stowage of Combustible Rags**. Correctly labeled, metal receptacles with metal covers shall be provided for the disposal of oily rags, waste, and other combustible materials.

f. **Stowage of Combustibles**. Approved flammable storage lockers are required for storing combustible materials.

C1203. HOUSEKEEPING

a. Clean work areas and keep them clean, during and after maintenance evolutions.

b. Keep decks free from oil, grease, and debris.

c. Properly store compressed air tanks, tools, and equipment after use.

d. **Spills**

(1) Immediately clean up oil, grease, fuels, and other flammable or slippery substances to prevent injury or fire.

(2) Use drip pans during maintenance evolutions to prevent drips and leaks from becoming fire or slip hazards, particularly under aircraft engines.

e. **Cords/Hoses**. Place hoses, power cords, and similar equipment in their designed stowage areas to alleviate trip hazards. This will also reduce excessive wear and damage to the cords/hoses from traffic and deck abrasion.

C1204. FOREIGN OBJECT DAMAGE (FOD)

a. Prohibit dumping of trash and garbage during launch or recovery operations. Only dump trash from the fantail or designated sponsons.

b. Only use approved/required flight deck uniforms, cranial headgear and sound attenuators per appropriate NATOPS during flight operations. Do not wear ball caps, white hats, watch caps, garrison hats, bridge caps, or hard hats on the flight deck, catwalks, or gallery decks during flight operations.

c. Do not put loose objects in shirt pockets while in flight operations area.

d. Aircraft jet engines suck up loose objects from the deck or the area immediately adjacent to the intake, including in some cases, personnel who venture too close. Ingestion of articles into engines can cause costly damage or complete loss of the engine. Aircraft NATOPS manuals depict intake and exhaust danger zones.

C1205. LIQUID OXYGEN

a. Liquid oxygen, often abbreviated as LOX, is a pale blue fluid which flows like water. It boils into gaseous oxygen at minus 297°F; therefore, it is capable of immediately freezing any object that comes in contact with it. When warmed to ambient temperature, liquid oxygen expands as a gas to about 860 times its liquid volume. Therefore, if a volume of the liquid were confined and allowed to warm, it would exert extremely high pressure (up to 12,000 pounds per square inch (PSI)). Because of these properties, extra safety precautions must be observed when working with liquid oxygen.

b. **Fire Protection**

(1) Keep the work area and equipment free of oil, grease, or any readily combustible material.

(2) Keep tools and clothing free of oil and grease.

(3) Ensure that the aircraft or the LOX converter when removed from the aircraft and the LOX servicing trailer are grounded.

(4) Prohibit smoking, open flames, or sparks within 50 feet of liquid or gaseous oxygen servicing trailers that are transferring or storing oxygen. Any combustion in an oxygen-rich atmosphere may be violent.

(5) Mark oxygen generation and storage spaces with a sign reading: **OXYGEN - NO SMOKING - NO OPEN FLAMES** -DO NOT BLOCK LOX JETTISON RAMPS, or an equivalent.

(6) Ensure that adequate ventilation is provided when transferring liquid oxygen to avoid an oxygen-rich atmosphere.

(7) Do not spill liquid oxygen on deck areas. In case of accidental spillage, the area should be thoroughly ventilated.

(8) Ensure a suitable fire extinguisher is immediately available in the LOX handling space.

(9) Ensure that only approved non-sparking tools are used when working on LOX equipment.

c. **Freezing Precautions**

(1) The extreme cold of LOX will instantly produce burns if held in contact with the skin.

(2) Frostbite or freezing will occur if the skin comes into contact with surfaces that have been cooled by LOX.

d. **Protective Clothing**. The possibility of exposure from accidental spillage of LOX exists, therefore wear the following protective clothing:

(1) Face shield and protective goggles

(2) White cuffless coveralls

(3) Protective gloves made of leather or cloth for cold protection

(4) Molder's (style) safety shoes

(5) Ensure that all protective clothing worn is clean and free of oil and grease.

e. **Handling Precautions**

(1) Wear clean, dry leather gloves offering insulation to cold, when handling parts of equipment which have been cooled by LOX. In the event

rubber or neoprene gloves are used, wear a covering glove or an interlining glove in conjunction with the molded glove.

(2) Only handle the tubing or fittings through which the liquid oxygen is flowing when necessary, and then only with insulated gloves or other devices for protection against freezing.

(3) Do not permit LOX to flow onto any part of the body, clothes, pockets, or cuffs where it might be trapped.

(4) In the event the LOX is spilled on clothing, remove the clothing immediately and thoroughly air to allow dilution of the oxygen concentration.

(5) When an uninsulated container of LOX is touched, or when there is any reason to suspect some part of the body has been frozen or chilled through contact with LOX, thoroughly wash the area with clean water and immediately seek medical treatment.

(6) Ensure that at least two persons conduct LOX operations.

(7) Protect storage containers, piping, valves, regulating equipment, and other accessories against physical damage and tampering.

C1211. ARRESTING GEAR AND BARRICADES

a. Unauthorized personnel shall remain clear of the walkways, arresting gear machinery, spaces, and equipment.

b. During arresting gear maintenance evolutions, all personnel shall remain clear of the bight of the wire.

CHAPTER C13

MACHINERY

C1301. DISCUSSION

a. Machinery is located everywhere in your ship, from the more obvious examples of propulsion equipment in the engineroom, to the less than obvious example of galley equipment. The purpose of this chapter is to define precautions for all types of machinery. Chapter C9 covers electrical safety precautions.

b. All machinery has moving parts. The fact that moving parts exist means that the possibility of personnel injury is also present. While personnel injury is one aspect of machinery injury, the fact that a person has interrupted the machinery process can lead to even more disastrous accidents.

C1302. GENERAL PRECAUTIONS

a. **General Precautions**. Personnel must observe the safety precautions and adhere to the standard operating procedures for individual machine or ship system operations.

(1) Never place any part of the body into moving machinery.

(2) Never attempt to ride machinery that is not designed for transport.

(3) Do not wear jewelry, neckties, or loose fitting clothing while operating equipment.

(4) Wear proper protective clothing and equipment suited to the operation being performed as required by technical manual or Baseline Industrial Hygiene Survey.

(5) Do not wear polyester or other synthetic clothing when operating fuel fired equipment (in particular, no engineroom or fireroom personnel may wear such clothing) or while standing watch or performing maintenance in main propulsion spaces.

(6) Engineroom and fireroom personnel shall wear fire retardant coveralls with sleeves rolled down when on watch or when performing maintenance in machinery spaces where steam is circulating in piping systems or fuel fired machinery is in operation.

(7) Observe manufacturer's safety precautions on the Material Safety Data Sheet (MSDS) and warning labels when handling flammable or toxic liquids; in particular, ensure that ventilation is adequate, and wear appropriate personal protective equipment.

(8) Use electrical tools and lights only if inspected and approved. The damage control assistant may require non-sparking and explosion-proof electrical equipment.

(9) Ensure that equipment is deenergized and/or depressurized and properly tagged out of service before attempting to perform repairs or preventive maintenance.

(10) When working in the vicinity of electrical equipment or electrical cables, be alert to the presence of dangerous voltages and avoid striking such

equipment with tools of any kind. Should such damage inadvertently occur, report it immediately to the ship's electrical officer.

(11) Do not use compressed air to clean personnel or to perform general housekeeping. Compressed air may be used to clean machinery parts that have been properly disassembled provided that the supply air pressure does not exceed 30 psi or the nozzle is equipped with a 30-psi limiter. Wear safety goggles when using compressed air for cleaning.

(12) Do not store in-use quantities of paints, solvents, acids, or corrosives to unapproved containers. Ensure material compatibility and proper labeling.

(13) Return flammable consumables to approved storage lockers, the HAZMINCEN, or to the flammable liquid storeroom/paint locker at the end of each working day.

(14) Keep containers of flammable or volatile fluids/adhesives tightly closed when not in use.

(15) Supervisors shall ensure that personnel who incur any type of injury or who are exposed to any occupational hazard receives prompt medical attention.

(16) Promptly reinstall shaft guards, coupling guards, deck plates, handrails, flange shields, and other protective devices removed as interference immediately after completion of maintenance on machinery, piping, valves, or other system components.

(17) When working with asbestos-containing material ((Garlock®), spiral wound (flexitallic) gaskets, pipe hangers, clutch plates, brake pads) comply with Chapter B1. Beware of asbestos. Ensure proper handling/disposal requirements are followed (see chapter B1). Asbestos fireproofing material is still common aboard some ships and asbestos can be found in sheet gaskets and some lagging. Train personnel who routinely handle asbestos containing materials on the hazards, proper precautions, protective equipment requirements and disposal.

(18) Do not use low pressure (LP) air to unclog flammable fluid piping systems unless a specific directive or approved procedure requires its use.

C1303. MAINTENANCE

a. Ensure that all installed safety devices, alarms, and sensors are inspected and/or tested in accordance with scheduled Preventive Maintenance System (PMS) and other Type Commander requirements.

(1) Assign the repair of defective safety devices a high priority.

(2) Corrected oil leaks at their source. Wipe up spills of any kind immediately and dispose and store the wiping rags in fire safe containers.

(3) Avoid trip hazards by maintaining proper stowage.

(4) Open all drains and vents to all drums and headers before loosening manhole or handhold plates. Stand clear of such fittings when initially opening them after service.

b. When maintenance exceeds boundaries of PMS, appropriate supervisors shall ensure the QA documentation and procedures are followed per the Forces

Afloat Quality Assurance Manual (COMNAVSURFLANTINST 9090.1A/COMNAVSURFPACINST 4855.22).

C1304. INDUSTRIAL EQUIPMENT

a. **General Industrial Equipment Operation and Repair Safety**

(1) Read manufacturer's instruction books for essential details of readying machines and equipment for operation, cleaning, lubricating, and general care and maintenance. These instruction books, supplemented by technical handbooks, provide comprehensive instructions on all phases of shop practice.

(2) Inspect before operating industrial equipment (fixed or portable) to ensure that the equipment is in good working condition and that all installed or attached safety features (such as guards, limit switches, interlocks, and speed limiting controls) are in place and in good working order.

(3) Unplug or disconnect from power source and affix a red tag (DANGER - DO NOT OPERATE) on all fixed or portable industrial equipment requiring repairs.

(4) Shut off the power when changing industrial equipment parts such as face plates or chucks on lathes or drill bits in electric drills.

(5) Block up ram where applicable and open the switches and red tag (DANGER - DO NOT OPERATE) on power shears, drills, punches, and presses when it becomes necessary to place any part of the body underneath or within the equipment.

(6) Replace machine guards and safety devices after repairing, oiling or greasing, or after inspections or PMS have been completed before the machine is started or operated.

(7) Remove all industrial tools or test equipment used in making repairs, adjustments to machinery, or other shipboard equipment/systems so that all working parts of the machinery, equipment, or system will be free to operate without damage.

(8) Take care that no one is in a position to be injured when the machinery/equipment/system is again set in operation.

(9) Be sure all personnel are clear before starting any industrial tools or equipment.

(10) Do not permit anyone to operate electrical or mechanical equipment or machines in any space when alone.

(11) Make sure there is plenty of light to work by before operating a machine.

(12) See that tools and work are properly clamped before starting a machine.

(13) Only place/mount a saw, cutter head, grinding wheel, or tool collar on a machine arbor when the tool is the proper size to fit the arbor.

(14) Ensure each powered machine has a means of cutting off power which can be safely reached and operated from the operator's normal position, without reaching through the point of operation or other hazardous areas.

(15) On machines where injury to personnel might result if motors were to restart after power failures, check that provisions have been made to prevent machines from automatically restarting upon restoration of power.

(16) Make sure that operating controls, including treadles, are protected by recessing, guarding, location, or other effective means against unexpected or accidental activation of the machine.

(17) The point operation is the area of a machine where the work is actually performed upon the material being processed. Check that the point-of-operation is guarded so that personnel cannot be injured by contact with the machine or by flying objects propelled from the machine. Methods of point-of-operation guarding include barriers, shields, interlocks, automatic feed and removal, and two-hand activation devices. The best guarding device is usually one designed and attached by the manufacturer as an integral part of the machine. The selection and design of guards other than those provided by the manufacturer must be adequate to protect personnel and not present a hazard in themselves.

(18) Power transmission devices include belts, chains, pulleys, shafting, fly wheels, gears, sprockets, and any other moving parts of a machine other than the point of operation. Ensure that power transmission devices are enclosed within the machine or otherwise guarded or so located that it is not possible for personnel to contact the moving parts. Power transmission devices over seven feet above the deck or other standing/walking surface need not be guarded.

b. **Housekeeping**

(1) Keep areas around machines clear of obstructions and in a non-slippery condition. Clean up all spilled oil or grease immediately.

(2) Keep machines clean.

(3) Do not clean chips from the surface of machines with compressed air or with hands; use a brush or hook and wear leather gloves.

(4) Do not use compressed air to clean clothing or to blow dust off the body or to assist in the clean up of dust, debris, or other particulate matter.

(5) Do not place hand tools on lathes or other machines. Keep them in their assigned location.

(6) Turn off all power to the equipment before removing chips and other debris.

(7) Ensure that all portable tools (electrical or pneumatic) have been tested prior to initial use and periodically, as prescribed by PMS or other data.

(8) Ensure that all machine guards and other safety devices are in place prior to equipment operation.

c. **Portable Power Tools**

(1) Ensure all portable electric power tools have a current safety inspection by the electrical tool issue room prior to use.

(2) Ensure that portable circular saws, electric or pneumatic chain saws, and percussion tools without positive accessory holding are equipped with an operable "deadman" switch.

(3) Keep portable power tools clean, lubricated, and in good repair.

(4) Keep all electrical cords clear of moving parts when using portable electrical equipment around machine tools.

d. **Operating Precautions - General**

(1) Remove chuck keys, wrenches, or other devices used to attach accessories to industrial machines before operating.

(2) Do not attempt to adjust a tool or feel the edge to be cut while the equipment or tool is in motion.

(3) Never attempt to stop or grab by hand or apply a wrench or tool to moving work or to moving industrial equipment parts.

(4) Do not use hangers to knock cutters into positions.

(5) Never lean against a machine that is running.

(6) Never leave moving machinery unattended.

(7) Do not distract the attention of a machine operator.

(8) Remove cutting tools from machines when not in use.

(9) Avoid excessive cutting speeds, feeds, and depth of cut. Keep hands clear of moving parts. Use a separate block to feed stock into cutting blades.

e. **Securing for Sea.** When securing for sea, take all precautions to ensure that components of industrial equipment or tools, including accessories, will not sway or shift with the motion of the ship. These precautions should include, but are not limited to, the following:

(1) Lower the arm of top-heavy equipment, such as a radial drill press, to rest on the table or base of the machine and then clamp and block securely.

(2) Secure chain falls, trolleys, overhead cranes, and other suspended equipment, such as counterweights on boring mills and drill presses.

(3) Secure tailstocks of lathes.

(4) Secure spindles of horizontal boring mills.

(5) Protect and secure tools stowed in cabinets or drawers. Secure drawers and cabinet doors.

(6) Inspect foundation bolts of heavy equipment annually to ensure tightness.

(7) While underway or while at anchor in high sea states, do not operate shop machines whose components are subject to shifting or swaying with the motion of the ship, so as to present a hazard to operators, without the expressed permission of the commanding officer. In addition, do not perform

such operations as the melting and pouring of metal or similarly dangerous evolutions while the ship is underway.

f. **Posted Safety Precautions**

(1) Post operating instructions and safety precautions tailored to the specific equipment at each piece of industrial plant equipment. Install warning plates, located to ensure visibility, wherever necessary to minimize possible injury. Also, instructions to never allow machines to run unattended and not to distract the operator while the machine is in operation are appropriate.

(2) Clearly establish and mark equipment hazard zones per ship's plans, and specifications and Industrial Hygiene Survey.

g. **Safety Precautions for Specific Types of Equipment**

(1) **Pneumatic Tools - General**

(a) Wear and use necessary personnel protective devices.

(b) Do not connect or drive pneumatic tools by air pressure in excess of that for which the tools are designed.

(c) Only authorized and trained personnel shall operate pneumatic tools.

(d) Lay pneumatic tools down in such a manner that no harm can be done if the switch is accidentally tripped. Do not leave idle tools in a standing position.

(e) Keep pneumatic tools in good operating condition and thoroughly inspect them at regular intervals with particular attention given to on-off control valve trigger guard (if installed), hose connections, guide clips on hammers, and the chucks of reamers and drills.

(f) Pneumatic tools and air lines may be fitted with quick disconnect fittings which incorporate automatic excess flow shut-off valves, which shuts off the air at the air lines before changing grinding wheels, needles, chisels, or other cutting or drilling bits.

(g) Only use air hose suitable to withstand the pressure required for the tool. Remove leaking or defective hoses from service.

(h) Do not lay hoses over ladders, steps, scaffolds, or walkways in such a manner as to create a trip hazard. Where a hose is run through doorways, protect the hose against damage by the door edge. Preferably, elevate air hose over walkways or working surfaces in a manner to permit clear passage and prevent damage to the hose.

(i) Connect a tool retainer on each piece of equipment which, without such a retainer, may eject the tool.

(j) Ensure that all portable pneumatic grinders and reciprocating saws are equipped with a safety lock-off device. The lock-off device must automatically and positively lock the throttle in the off position when the throttle is released.

(k) Pneumatic tool air hose fittings shall not fit the hose fittings designated for airline respirators.

(l) Ensure that air hoses are equipped with "quick disconnect" fittings at all hatches, doors, or scuttles.

(2) **Pneumatic Hammers**

(a) Do not point any pneumatic hammer at other personnel. Operate hammers in a careful and safe manner at all times.

(b) Ensure that all hammers are equipped with a device for holding the tool bit in the hammer. Inspect safety tool holders at frequent intervals per PMS.

(c) Do not restrict the air exhaust in any fashion.

(d) Ensure that all pneumatic hammers are equipped with a hand-whip safety switch (deadman switch).

(e) Use pneumatic hammers only for those purposes for which designed.

(f) When operating a power hammer, wear necessary eye, face, ear, and body protection, including gloves.

(3) **Power Saws**. In addition to the general precautions for portable electric and pneumatic tools contained in this manual, observe the following precautions for electric and pneumatic saws:

(a) Provide all circular power saws with guards that fully encompass the unused portion of the blades.

(b) Ensure that qualified personnel install circular saw blades.

(c) Only use portable electric or pneumatic saws that have handgrip "deadman" switches installed.

(d) Grasp portable power saws with both hands and hold firmly against the work. Take care that the saw does not break away, thereby causing injury.

(e) Disconnect the power supply and inspect the blade at frequent intervals or immediately after it has locked, pinched, or burned.

(f) Inspect and remove potential obstacles from the material to be cut before using a saw.

(g) Immediately remove dull, badly set, improperly filed, or improperly tensioned saws from service before they can begin to cause the material to stick, jam, or kickback when it is fed to the saw at normal speed.

(h) Immediately clean saws to which gum has adhered to the sides. Disconnect power before cleaning.

(i) Keep bearings well lubricated.

(j) Keep arbors of all circular saws free from play.

(k) Only designated personnel with certified skill shall sharpen or tension saw blades or cutters.

(l) Maintain cleanliness around woodworking machinery, particularly as regards the effective functioning of guards and the prevention of fire hazards in switch enclosures, bearings, and motors.

(m) Remove all cracked saws from service.

(n) Do not permit the practice of inserting wedges between the saw disk and the collar to form what is commonly known as a "wobble saw."

(o) Provide push sticks or push blocks at the work place in the several sizes and types suitable for the work to be done. Push sticks, blocks, or other special hand tools are not substitutes for guards. Keep all required guards in place and operable when push sticks or blocks are used.

(p) On band saws, ensure all portions of the blade are enclosed or guarded, except for the working portion of the blade between the bottom of the guide rolls and the table. The portion of the guard between the upper-saw-wheel guard and the guide rolls must guard the front and outer side of the blade and must be adjustable to move with the guide as it is raised and lowered. When the band saw is in use, position the adjustable guard to maintain the minimum clearance between the guide rolls and the material consistent with free movement of the material being cut.

(q) To avoid vibration, welded joints in bandsaws shall be the same thickness as the saw blade.

(r) Ensure that each circular table saw is guarded by a hood which completely encloses the portion of the saw above the table and above the material being cut. Mount the hood so that it will automatically adjust itself to the thickness of, and remain in contact with, the material being cut. An approved clear plastic guard cantilevered over the saw table may be used as an alternative to the enclosing hood. The plastic guard must be large enough and set low enough to prevent the hands of personnel from contacting the blade.

(s) Make sure that each hand-fed rip saw has a spreader mounted in a position one-half inch from the back of the largest saw which may be mounted on the machine. The spreader prevents material from squeezing the saw and being thrown back on the operator. The spreader shall be thinner than the saw kerf and rigid enough to resist side thrust and bending. The spreader is not required for grooving, dadoing, or rabbeting but must be replaced immediately upon completion of such operations.

(t) Check that each ripsaw, including hand-fed rip saws with spreaders, are provided with non-kickback fingers or dogs to prevent material from being thrown toward the operator.

(u) Ensure that self-feed circular saws have a hood or guard which will prevent the operator's hands from contacting the nip point of the feed rolls.

(v) Verify that radial saws are guarded, as required by the following subparagraphs:

1. The upper portion of the blade, including the arbor, must be completely enclosed by a hood. The sides of the lower portion of the blade must be guarded to the full diameter of the blade by a guard that will automatically adjust to the thickness of the material being cut.

2. The work surface must be wide enough, or a stop shall be provided, to prevent the cutting head from traveling to a point where the blade extends beyond the outer edge of the table.

3. The unit shall be tilted back or counterweights shall be provided so that the cutting head will return to the starting position when released.

4. Ripping and ploughing with a radial saw must be against the direction that the saw rotates. The direction of rotation must be conspicuously marked on the hood. A label shall be affixed to the rear of the hood reading "**DANGER: Do not rip or plough from this end**." Non-kickback fingers must be provided for ripping and ploughing operations.

(w) Inspect saw blades by non-destructive, PMS test methods for surface cracks and defects.

(4) **Sanding Machines**

(a) Carefully inspect all sanders before use. Do not use sanding discs or belts if they are frayed or cracked.

(b) Use goggles and disposable dust respirator during sanding operations and while cleaning up. Operate dust collecting systems for sanders, if installed, when sanding is in progress.

(c) Keep hands or other parts of the body from coming into contact with the abrasive surface of the sander.

(d) Grasp portable hand-held sanders with both hands and hold firmly against the work. Take care that the sander does not break away, thereby causing injury or damage.

(e) When permanently mounted sanders are used, grasp the work firmly and hold it to the sanding surface carefully to avoid finger contact with the sanding belt or disc. Sand small pieces of work that would bring the fingers within 1 inch of the belt or disc surface by hand, rather than on powered sanders.

(f) For portable sanders and fixed sanders having electric plugs, pull the electric plug before sanding belts or discs are changed or before repairs or adjustments are made to the sander. Open and DANGER tag the power source circuit breaker of fixed sanders that are "hard wired" before making repairs or adjustments or changing belts or discs.

(g) Ensure each belt sanding machine has both belt pulleys enclosed in such manner as to guard the points where the sanding belt runs onto the pulleys. Enclose the unused run of the sanding belt. Adjust belt type sanders to the proper tension.

(h) Ensure coast down brakes, where installed by the manufacturer, are in good working condition before commencement of sanding and use them to stop belt or disc motion after the power is secured.

(5) **Buffers, Grinders, and Cut-Off Wheels - General**

(a) Check the spindle speed of the machine before mounting of the wheel to be certain that it does not exceed the maximum operating speed marked on the wheel.

(b) Gently tap wheels with a light non-metallic implement, such as the handle of a screwdriver for light wheels, or a wooden mallet for heavier wheels, immediately before mounting. Do not use if they sound cracked (dead). This is known as the "ring test." It should also be noted that organic bonded wheels do not emit the same clear metallic ring as do vitrified and silicate wheels.

(c) Wheels must be dry and free from sawdust when applying the "ring test," otherwise the sound will be deadened.

(d) Dress or replace wheels that are chipped, have imbedded non-ferrous material, are rounded, or worn out of round prior to using the grinder.

(e) Replace fabric buffer wheels that are frayed or worn out of round.

(f) Replace wire buffer wheels that are badly worn or loose at the hub.

(g) Permanently mounted buffers and grinders shall have a shatterproof safety shield in place between the operator's eyes and the work at all times while buffing and grinding. Wear safety glasses when operating either portable or permanently mounted buffers or grinders.

(h) Clean the flange surface of grinding and buffing wheels, normally placed between washers and the spindle hole, before mounting the wheel so that clamping pressure will be evenly distributed.

(i) Ensure that the hole in the buffer or grinding wheel is of the proper size for spindle (neither too small nor too large).

(j) Use compression washers as large as the flanges in diameter for buffer and grinding wheels.

(k) Tighten spindle nuts just enough to keep the buffer or grinding wheel from moving out of position between the washers.

(l) Mount tool or work rests on firm supports and space not more than one-eighth of an inch from the surface of grinding wheel. Ensure any dust collection bags, of non-flammable material, are in place and emptied regularly.

(m) Ensure that the hood around grinding wheels is constructed so its periphery can be adjusted to the constantly decreasing diameter of the wheel by means of an adjustable tongue or equivalent. Maintain the distance between the wheel periphery and the tongue or end of the periphery band at approximately one-fourth of an inch.

(n) Ensure that the upper point of opening in the grinding wheel hood facing the operator is not less than 25 degrees and not more than 65 degrees from a vertical line drawn through the spindle center.

(o) Ensure that the maximum exposure of a grinding or cut-off wheel periphery or circumference for hoods on a swing frame machine does not exceed 180 degrees and the top half of the wheel is protected at all times.

(p) Ensure that the maximum exposure of the wheel periphery or circumference on bench or floor stands does not exceed 90 degrees.

(q) Protect cup type wheels used for external grinding by either a movable cup guard or a band type guard. Provide all other portable abrasive wheels used for external grinding with safety guards (protection hoods), except as follows:

1. When the work location makes it impractical, use a wheel equipped with safety flanges.

2. When using wheels 2 inches or less in diameter, securely mount the wheel on the end of a steel mandrel.

(r) When safety flanges are required, use them only with wheels designed to fit the flanges. Use only safety flanges of a type and design and properly assembled as to ensure that the pieces of the wheel will be retained in case of accidental breakage.

(s) Ensure portable abrasive wheels used for internal grinding are provided with safety flanges (protection flanges), except as follows:

1. When wheels are 2 inches or less in diameter, securely mount on the end of a steel mandrel.

2. If the wheel is entirely within the work area being ground.

(t) Ensure that all deck or bench mounted abrasive wheels have a work rest. Keep the work rest adjusted to within one-eighth inch of the wheel periphery to prevent the work from being jammed between the rest and the wheel.

(6) **Operating Grinding, Buffing, and Cut-Off Wheels**

(a) Stand to one side of the wheel when first applying power.

(b) Take care that the hands are not drawn into contact with buffing, grinding, and cut-off wheels.

(c) Never operate stationary grinding wheels unless protective eye guards and hooks are in their place and the tool rest is correctly adjusted.

(d) Never operate portable pneumatic or electric grinding machines using wheels and wire brushes without a hood.

(e) Before the power is turned on, check to ascertain that the wheel runs true, is not out of balance, and does not strike or rub against housing, hood, safety shield, or tool rest. Dress wheels as necessary.

(f) Never use a grinding wheel on nonferrous materials. Dress grinding wheels that have excessive imbedded non-ferrous material.

(7) **Spray Paint Booths**. A paint spray booth is a ventilated structure provided to enclose a spraying operation, to confine and limit the escape of spray, vapor, and residue and direct them safely to an exhaust system. Paint spray booths are installed in AS, CV, CVN, LHD, LHA and MCS type ships. They are typically found in carpenter shops, optical shops, and AIMDs. Spray booths use filters to collect paint overspray.

(a) If spray paint is not filtered out, it will collect in the exhaust fan and ducting, creating a potential fire hazard.

(8) **Industrial Slot Hoods**. Parts washers, ultrasonic cleaners, dip tanks, and varnish tanks may be equipped with local exhaust ventilation, usually in the form of a slot hood.

(a) Ensure that local exhaust ventilation is operational prior to using. Know where the controllers are for local exhaust systems. If the system is not working properly, notify your supervisor.

(b) Ensure the slots on the hood area are not obstructed.

(c) Follow the posted operating instructions and safety precautions for the dip tank or washer and never put other than approved chemicals or cleaners into the tank.

CHAPTER C14

ORDNANCE

C1401. DISCUSSION

a. By mission definition most naval ships carry some type of ordnance for offensive or defensive operations. Ordnance can take the traditional form of shells for large and small caliber guns, or it can be in the form of missile warheads, torpedoes, and nuclear weapons. Generally, every Navy ship has some sort of ordnance on board, ordnance that has the inherent power to destroy a ship, and if alongside a dock, to seriously damage other ships and facilities.

b. The greatest danger from ordnance is explosion. Due to built-in safety devices, ordnance requires outside intervention to set it off unintentionally. Improper handling, fire, excessive heat, or simple misjudgment or mistakes can cause a weapon discharge. The major safety factor in preventing an ordnance catastrophe is a well experienced and knowledgeable person-in-charge that can identify and correct potential safety hazards. A crew that knows and understands the basics of ordnance safety and which has a real respect for ordnance hazards must assist this supervisor.

C1402. GENERAL ORDNANCE PRECAUTIONS

a. Do not smoke or allow open flames near ordnance.

b. If ordnance leaks any material, stop operations immediately; remove leaky ordnance and clean up spill as required for the specific explosive. Reference C14-1 prescribes the minimum safety requirements and regulations for handling and storing conventional ammunition by units afloat.

c. Get immediate first aid if splashed with rocket fuel or oxidizer.

d. Never enter a space where rocket propellant leaks are suspected without having a gas-free survey conducted.

e. Use only authorized equipment on ordnance to perform any operation. Do not use improvised equipment.

f. Do not engage in operations involving ordnance which are within a 10-mile radius of thunderstorms or high winds.

g. Use approved standard operating procedures (SOPs) for all hazardous operations. Discuss such procedures with all personnel concerned and post in the shop spaces specifically designated as ordnance shops, handling rooms or checkout areas. Do not post SOPs in areas where they will present a potential safety hazard, such as the flight deck and hangar deck of a carrier, main deck of DDs, FFs, CGs, and handling areas of AE/AOE class ships.

h. Do not leave exposed ordnance unattended. Do not leave open magazines or lockers unattended.

C1403. ORDNANCE HANDLING PRECAUTIONS

a. Keep ordnance handling to a minimum and conduct handling with utmost care using certified/qualified personnel, approved equipment, and established procedures. Ensure a safety brief is held prior to ordnance handling operations. This brief shall cover all the duties and responsibilities of personnel involved and details of the operation.

b. Ensure that "BRAVO" flag is flying during ordnance cargo handling operations or a red task light is displayed at night.

c. Thoroughly wash hands after handling ordnance.

d. Do not allow any other cargo handling operations to take place in the area where ordnance handling is taking place.

Chapter C14

REFERENCES

C14-1 OP-4, "Ammunition Afloat"

CHAPTER C15

MARINE SANITATION DEVICES (SEWAGE SYSTEMS)

C1501. DISCUSSION

a. All naval ships have marine sanitation device (MSDs) designed and operated to prevent the overboard discharge of untreated or inadequately treated sewage into navigable waters of the United States or other countries.

b. MSDs either hold raw sewage until it can be discharged overboard or to a pier connection, or treated so that the effluent quality meets established discharge standards.

C1502. SANITARY, HYGIENIC, AND SAFETY PROCEDURES

a. **Hygienic Procedures**. The following hygienic procedures are applicable to all MSDs (i.e., collection, holding, and transfer (CHT) systems; VCHT systems; JERED Vacu-Burn Sewage Treatment System; Koehler-Dayton Recirculating Flush System; and the Pall-Trinity Biological Sewage Treatment System):

(1) After handling sewage transfer hoses, thoroughly wash hands, lower arm, and face (in that order) with hot water and soap prior to handling potable water hoses.

(2) Wear rubber gloves, rubber boots, chemical splash goggles, faceshield and coveralls, while connecting or disconnecting sewage hoses.

(3) After working in MSD spaces or on MSD equipment, thoroughly wash hands, lower arm, and face (in that order) with hot water and soap prior to smoking, eating or drinking

(4) Make certain that removable drip pans or coamings are installed in health sensitive spaces, such as food storerooms, food preparation or messing areas, sculleries, medical and dental spaces, or berthing spaces, to catch, contain and detect possible leakage from valves or takedown joints.

(5) Ensure that removable drip pans are installed beneath comminutors to detect leakage or prevent leakage from causing an unsanitary condition.

(6) Verify that health-warning placards are posted in appropriate locations, identifying procedures to be followed in those areas.

b. **Leak or Spill Clean-up Procedures**

(1) In the event spaces become contaminated with sewage as a result of leaks, spills, or sewage system backflow, evacuate the space immediately and notify the officer of the deck (OOD), damage control assistant, and medical department of the spill.

(2) Secure the spill area from traffic.

(3) The ship's gas free engineer (GFE) shall test the area to ensure that the atmosphere is within acceptable gas limits.

(4) Use proper respiratory protection (a full facepiece, self-contained breathing apparatus (SCBA)) operated in the pressure-demand mode or a full facepiece air-line respirator operated in the pressure demand mode and equipped with an auxiliary self-contained air supply) if the atmosphere is not within acceptable limits.

(5) Post a safety watch with respiratory protection at the compartment access during clean-up (two-man rule).

(6) Remove or wash down spilled sewage.

(7) Keep respiratory protective equipment available even if the atmosphere is within acceptable limits. Emergency escape breathing devices (EEBD) are to be mounted in CHT pump rooms and kept available in MSD work areas for emergency exiting. A minimum of two EEBDs shall be mounted in each pump room.

(8) Ensure proper ventilation is provided, maintained and the area is recertified as gas free at least every 2 hours, (every 1 hour for ambient temperatures above 90°F), or more frequently if deemed necessary, until the clean-up is complete.

(9) Accomplish a final wash down with water and stock detergent.

(10) Treat food service spaces, berthing areas, and medical spaces with an approved disinfectant.

(11) The MDR must certify the space as clean.

C1503. GAS FREE ENGINEERING FOR MSD SYSTEMS

a. Do not open MSD units, enter a CHT tank or remove a component which will leave an opening to the tank unless inspected and certified by a GFE, industrial hygienist (certified GFE), or National Fire Prevention Agency marine chemist, since toxic and explosive gases may exist in the tank.

WARNING

Ship's force shall not open the manhole or enter a CHT tank at any time unless this is done at a suitable industrial facility. If problems develop preventing CHT operation which require such tank access for correction, divert all drains overboard and secure the CHT system until proper facilities are available.

b. Do not allow smoking, open flame, ordinary electric lights, flashlights, regular tools, or sparking electrical apparatus in or near open tank.

C1504. CONTROL OF TOXIC GAS HAZARDS IN SEWAGE CHT SYSTEMS

To minimize the potential hazards resulting from the release of toxic gases from the CHT system, observe the following precautions:

a. Always assume that the CHT tank contains sewage and toxic gases, and has an oxygen deficient atmosphere. Of particular concern is hydrogen sulfide (H_2S), a gas with a rotten egg smell at low concentrations. This odor

is not reliable as a warning signal because H_2S deadens the sense of smell. As H_2S concentration increases, the degree of danger increases.

b. Never enter the tank or open the manhole access at any time unless at a suitable industrial facility, and only after certification by a GFE, industrial hygienist (certified GFE) or NFPA marine chemist.

c. If hydrogen sulfide is detected by smell when working in the CHT pump room, comminutor space, or any space containing CHT piping, evacuate the space immediately. If the space is equipped with a hydrogen sulfide alarm, evacuate the space immediately when the alarm sounds.

d. Contact a GFE immediately. A space in which the hydrogen sulfide odor has been detected should only be reentered by personnel who have been properly trained and are wearing the proper IDLH respiratory protection equipment.

e. In any space where a sewage spill has occurred, do not conduct any work or maintenance other than work required to clean up the spill, until gas levels are below acceptable limits, as determined by a GFE, and all sewage wastes, including solids, have been removed from the space and the space washed down.

f. In spaces where the ventilation low flow indicator reads zero and/or the low flow alarm has sounded, ensure the atmosphere is tested prior to entry.

Chapter C15

REFERENCES

C15-1 Naval Ships' Technical Manual, Chapter 593 (NAVSEA S9086-T8-STM-000/CW 593R, Pollution Control) (NOTAL)

CHAPTER C16

HEAVY WEATHER

C1601. DISCUSSION

a. Heavy weather is any weather condition that results in high winds, extreme sea states, and heavy rain, snow and/or hail.

b. There are multitudes of hazards present in heavy weather. Objects can slide or fall on personnel, causing injury. Personnel can fall into machinery or equipment. All personnel must be aware of potential hazards and safety requirements.

C1602. LIFELINES

a. Keep lifelines or rails rigged at all times along all boundaries. Keep permanent lifelines in good repair.

b. Keep unguarded openings adjacent liferail or lifeline sections or an end section and adjacent structures to a minimum and in no case greater than 5 inches.

C1603. TIE-DOWNS

a. Use approved tie-downs or lashing to secure moveable shipboard items, such as aircraft, vehicles and cargo, against the motion of the ship and exposed areas against the forces of wind and waves.

b. Seize or tie-down shackles, hooks, turnbuckles, release devices to prevent working loose. Check them for security more frequently in heavy weather.

C1604. SAFETY PRECAUTIONS UNDER HEAVY WEATHER CONDITIONS

a. Be aware of stowage locations of all equipment necessary for rigging heavy weather lifelines.

b. Inspect tie-down equipment such as cables, turnbuckles, deck pads and bolts, at frequent intervals to ensure their security.

c. Only use the fittings provided on the aircraft, vehicle, and equipment to be transported to secure the item to the ship.

d. Do not use excessive force to place a tie-down onto a fitting.

e. Ensure that the arrangement of individual tie-down assemblies is in strict conformance with design requirements.

f. Ensure that when lashing and tie-down equipment is not in use, it is stowed in its proper location.

CHAPTER C17

ABANDONING SHIP

C1701. SAFETY PRECAUTIONS DURING ABANDONING SHIP

a. Wear a full set of clothing including shoes and a soft cap or head covering as protection from exposure.

b. Do not wear a steel helmet when going over the side.

c. Inherently buoyant type life jackets shall be securely fastened. When distance to the water is over 30 feet and/or there is burning oil on the water, throw the life jacket over the side. Inflatable life jackets shall not be inflated until the wearer is in the water. The life jacket shall be inflated as soon as wearer is in the water and/or clear of flames.

d. Go over the sides by means of a line, ladder, or debarkation net if time permits.

e. Look first to be sure that water below is clear of personnel or floating gear or wreckage, if it is necessary to jump.

f. Do not dive, always jump feet first.

g. Always abandon ship as far away from the damage as possible.

h. Know direction of the wind and go to windward side of ship, if possible, to avoid flames, oil, and drift of ship.

i. When in water, concentrate on staying calm and avoiding panic. Obey the following rules:

(1) Conserve energy by moving as little as possible.

(2) Keep clear of oil slicks if possible. If possible, protect eyes and breathing passages by keeping head high or swimming underwater. If swimming underwater, prior to coming the surface, put hands above head and splash the water surface to disperse oil, debris or flames.

(3) If there is danger of underwater explosion, float or swim on the back as near the surface of the water as possible.

(4) Stay with other persons in the water to reduce danger of sharks and make rescue easier. In cold water, forming close circles with others will preserve heat.

(5) If ship is sinking rapidly, swim clear promptly, and tow injured persons clear, to avoid suction effect.

CHAPTER C18

PAINTING AND PRESERVATION

C1801. DISCUSSION

a. For precautions for application and removal procedures of lead-based paint, see chapter B10. This chapter deals exclusively with the application and removal of non-lead based paint.

b. Many paints, varnishes, lacquers, cleaners, solvents, and other finishing materials contain flammable solvents and, therefore, present a fire hazard. In addition, these same products may give off toxic vapors which can be harmful. It is therefore necessary that personnel take proper precautions in handling and using these products. See Naval Ships Technical Manual, Chapter 631, Painting and Preservation of Ships for detailed procedures and precautions.

c. Paint removal operations can produce extremely high personnel exposures to substances found in paints, depending on the method of removal. Follow administrative and protective measures to lessen the amount of dust from sanding, grinding, and chipping paints and from fumes generated during hot work on painted surfaces.

C1802. SAFETY PRECAUTIONS FOR PAINT REMOVAL

a. Ship’s force shall not perform shipboard paint removal for cosmetic reasons or due to excessive thickness. Ship’s force should only remove paint when required to accomplish preservation of corroded surfaces, incidental to hot work, welding, or when bare metal is necessary for an inspection.

b. Wear safety goggles and long sleeve shirt with sleeves rolled down

c. For paint removal keep mechanical grinding and sanding to the absolute minimum with primary reliance on manual removal methods, impact tools and authorized chemical paint strippers.

d. Do not use electric wire brushes and chipping tools over the side.

e. When working over the side or aloft, see chapter C8 of this manual for additional precautions.

f. Wear rubber gloves when handling cleaning compounds or chemical removers.

g. Wear rubber electrical safety gloves when using portable, electric-powered tools. See chapter C9 of this manual for additional precautions when using electrical power tools.

h. Many paint removal tools are noise hazardous equipment. If so labeled, ensure that proper hearing protective equipment is worn. See chapter B4 of this manual for additional information.

i. Assume all paint contains substances, such as lead and chromate, which are hazardous to health if ingested or inhaled in small amounts, unless

proven otherwise by sample analysis (see chapter B10 for sample analysis procedures).

j. Ensure that all personnel involved in paint removal wear disposable coveralls, gloves, and other personal protective equipment (PPE) as required. Personnel may use PPE contained in AEL 2-33—24-45, asbestos rip-out kit, for paint removal operations, provided the inventory is maintained.

k. Follow the requirements of chapter B6 regarding the use and care of respirators.

l. Treat lead or chromate contaminated paint debris as hazardous material and controlled and disposed of accordingly. Topside, set up barriers to prevent paint entry into surrounding waters.

m. Secure and cover all deck drains and installed ventilation systems and openings in the paint removal work area. Isolate the work area to the maximum extent possible with drop cloths and/or plastic.

n. Personnel shall minimize the use of water in the paint removal process, since any used in the operation must be treated as hazardous material (HM).

o. Tools and surfaces in at the work area shall be wiped down after completion of the task.

p. Ensure that paint debris, wipe down rags, and other disposable materials are separated from reusable coveralls, gloves, and boots. Place disposable materials into plastic bags and turn them in to the HAZMINCEN or HM coordinator.

C1803. <u>SAFETY PRECAUTIONS FOR SURFACE PREPARATION AND PAINTING OPERATIONS</u>

a. Wear chemical safety goggles when spray painting or brush painting.

b. Do not paint in any area where welding or other hot work is being performed.

c. Wear respirators for painting operations as directed by the RPM.

d. Return paint to the paint locker or HAZMINCEN at the end of each day.

e. Store paint, brushes, and stirring sticks in closed metal containers. Do not place or store paint and paint wastes on the pier for extended periods of time. Turn in all paint waste to the HAZMINCEN or designated area for disposal.

f. Provide adequate exhaust ventilation in closed areas when painting.

g. Wear chemical/toxicological gloves when handling cleaning compounds, thinners, paints, removers, or other irritants. Do not use electrical safety gloves.

h. De-energize all equipment in areas being painted if using highly flammable paints.

i. Use a spray booth when spray painting, if available and practical.

j. Provide explosion proof lighting during spray painting operations if using highly flammable paints.

k. All paints, paint cleaners, solvents and brush cleaners are HM. Return all paints and thinners to the paint locker or HAZMINCEN upon completion of the job, at the end of the workday, or when taking a lengthy break.

l. Only perform paint mixing in the paint locker or HAZMINCEN if adequately ventilated. If not adequately ventilated, only mix paints on the weather decks. Provide posted barricades to ensure smoking, open flames, or hot work does not occur in the vicinity of the paint mixing area.

CHAPTER C19

FOOD PREPARATION AND SERVING FACILITIES

C1901. DISCUSSION

A basic necessity for any ship is a galley. The crew must be fed and personnel must prepare food for consumption. The massive food preparation required to feed a large body of people means that machinery and equipment must be used. The use of this machinery introduces hazards unique to the galley and food preparation areas.

C1902. GENERAL PRECAUTIONS

Before attempting to operate machinery, observe the following general precautions:

a. Check for and determine the location of emergency equipment, such as fire extinguishers and first aid boxes, to ensure their availability should an accident occur. Report any deficiencies or malfunctioning equipment to the supervisor.

b. Make sure that the area around the equipment is clear of obstructions and thoroughly dry. Clean up all spills immediately to ensure a clean, dry, non-slippery working surface.

c. Ensure that the working area has ample lighting.

d. Observe and follow posted operating instructions and safety precautions.

e. If there is any doubt about operating procedures or safety precautions, report to your supervisor.

f. Unauthorized personnel shall not attempt to operate equipment.

g. Be certain no loose gear is in the vicinity of moving parts of machines. Prior to starting, make sure that all safety guards, screens, and devices are in place.

h. Never use your hands or body to stop moving blades and parts.

i. If ship movement is severe, exercise caution in operating machines; if severe movement continues, discontinue nonessential machine operation and turn off equipment.

j. Utilize safety equipment such as protective gloves, splash proof chemical goggles, and dip baskets while handling chemicals or hot water.

k. Keep your hands, body, and clothing away from operating machine parts.

l. Never leave operating machinery unattended.

m. Do not attempt to clean or service a machine while it is in operation. Before cleaning, adjusting, oiling or greasing equipment, be sure power is turned off and equipment is DANGER tagged. Follow tagout procedure when servicing or cleaning equipment.

n. Ensure only authorized personnel make all repairs and service machines.

o. Make sure safety devices such as safety interlocks on galley equipment, such as the covers of vegetable peelers and bread slicer, are maintained in proper working condition at all times. If removed for any reason, replace such devices before the machine is returned to operation.

p. Remove rings and watches, and eliminate any loose clothing such as rolled-up sleeve cuffs, oversized gloves, and ill-fitting coats and jackets.

q. Ensure that permanently-mounted equipment is hardwired (extension cords are not permitted).

C1903. COOKING UTENSILS

a. Make certain that all heavy items, knives, and other sharp tools are securely fastened and stowed in racks to prevent injury to personnel.

b. Secure all coffee pots and urns to prevent dislodging and splashing.

c. Exercise extreme caution and care when handling hot oils, water, and other liquids or when operating steam valves and equipment. In heavy or moderate sea states, do not transfer hot liquids.

d. Never leave hot plates, pots, griddles, or fryers unattended.

e. Be careful not to place meat, vegetables, or other foods on a knife or other sharp instrument. The food may conceal the cutting edge.

f. Do not place knives in the wash water until ready to wash them. Lay them in plain view beside the sink.

g. When using a cleaver, keep your free hand as far from the path of the cleaver as is necessary to assure safety.

h. Use a metal or Kevlar® protective glove when boning meat.

i. Keep the surfaces of meat blocks level.

j. Do not allow the handles of cooking utensils to extend beyond the edge of the range. They can be bumped and serious burns to personnel result from spilled food or liquid.

k. Before removing foods from hot ranges and ovens, be sure there is a clear place on which to set them.

l. Use only the proper implements for opening cans and other containers.

m. Keep knives in a rack designated for this purpose only.

n. Magnetic knife racks are prohibited due to knife magnetism picking up foreign material.

o. Keep knives sharp at all times.

p. Ensure hot pads are clean and dry.

C1904. SAFE OPERATION OF EQUIPMENT

a. Observe all posted operating procedures for each piece of food service equipment. Additionally, observe all exposed electrical wiring to ensure chafed or frayed (i.e. range, griddle hotplate, and disposals).

b. Ensure all power switches are functional.

c. Ensure all required guards are in place.

CHAPTER C20

LAUNDRIES, DRY CLEANING PLANTS AND PHOTOGRAPHY

C2001. DISCUSSION

Hazards in laundries, dry cleaning plants, and photographic laboratories include mechanical equipment, toxic chemicals, electric power, and heat stress. Safety precautions contained in this chapter are basic and general.

C2002. PRECAUTIONS FOR USING LAUNDRY CLEANERS

(See Chapters B3 and C23 for handling and stowage requirements.) Personnel shall use protective equipment listed in the baseline industrial hygiene survey when required.

C2003. PRECAUTIONS FOR LITHOGRAPHIC, PHOTOGRAPHIC AND RADIOGRAPHIC DARKROOMS AND LABORATORIES

a. Ensure each chemical mixing and developing area is equipped with an emergency eye wash station.

b. Avoid skin contact with chemicals. Personnel shall use protective equipment listed in the baseline industrial hygiene survey when required.

c. Clean rubber gloves and other protective equipment after each use.

d. Take care when entering or leaving the area because of the rapid change of lighting and the temporary blindness this causes.

e. Inspect all electrical connections frequently for damage and fraying. Ensure that all electrical equipment is properly grounded, has been safety checked, and approved electrical plugs are used.

f. Never touch an electrical plug, switch, or any part of an electrically operated machine with wet hands or while standing on a wet deck.

g. Use rubber mats with appropriate electrical ratings around equipment that could cause electrical shock.

h. Do not use the photographic chemicals, 1,1,2 Trichloroethane and 1,2,2 Trifluoroethane.

i. Ensure chemicals are properly collected for shore disposal, if required, and that overboard deck drains are secured when a potential for chemical spillage exists.

j. **Flash Equipment**

(1) Severe electrical shock is the hazard to guard against when using electronic flash equipment. Stored energy in photographic electronic flash units can be lethal (some units operate from voltages as high as 4,000 volts). Use caution whenever operating this equipment.

(2) Only those thoroughly familiar with the equipment shall repair electronic flash equipment. The storage capacitors may have a large charge at high voltage and can be discharged at high amperage which may be lethal.

(3) Use extreme caution when utilizing flash equipment on the flight deck during launch, recovery, or taxi evolutions especially at night. At no time use flash equipment without the expressed approval of the flight deck officer.

CHAPTER C21

MEDICAL AND DENTAL FACILITIES

C2101. DISCUSSION

This chapter contains basic safety precautions that medical and dental personnel must observe to protect themselves and their patients from harm. Consult operating manuals and Planned Maintenance System (PMS) Maintenance Requirement Cards (MRC) for complete safety precautions related to specific items of equipment.

C2102. SAFETY PRECAUTIONS FOR MEDICAL AND DENTAL FACILITIES

a. **Special Precautions**

(1) Dispose of disposable needles and syringes in "sharps" containers as an entire unit.

(2) Keep all liquid pesticides under lock and key. Keep bulk amounts in a flammable liquid storeroom.

(3) Ensure that only medical department personnel who are instructed in the proper use and toxicity of the pesticides use them.

(4) Keep all poisons and bulk compounding materials under lock and key.

(5) Double lock the pharmacy when not in use, with keys made available only to authorized personnel.

(6) Do not stow, use, or dispense methyl alcohol in the pharmacy.

(7) Account for methyl alcohol in same manner as ethyl alcohol and narcotics. Attach a prominent label to each container of methyl alcohol with clear warning of its dangerous qualities.

(8) Maintain a poison antidote locker. Secure the locker with a seal and ensure a complete inventory is made whenever the seal is broken and antidotes removed.

(9) Stow inorganic medical acids such as hydrochloric, sulfuric, nitric and phosphoric in lead-lined containers in the medical storeroom (see paragraph C2306c3). Stow organic acids such as glacial acetic, oxalic, carbolic, cresylic, and picric acids in a locker lined in acid resistant material (not lead) in the flammable liquids storeroom (see paragraph C2306d).

(10) Only keep a minimum working stock of flammable materials (e.g., alcohol and acetone) on hand in medical department spaces. Keep stocks of a bulk nature in a separate locked cabinet in the flammable liquid storeroom.

(11) Ensure only medical department personnel handle bacteriological specimens.

(12) Due to a large number of extremely hazardous shipboard jobs requiring full attention at all times, label all medications affecting awareness.

(13) When handling and disposing of medical waste follow the guidelines in OPNAV Publication-45-113-3-99, *Afloat Medical Waste Management Guide*, stock number: 0420LP0226620.

b. **General Safety Precautions**

(1) Do not permit any smoking in areas where oxygen is being administered.

(2) Secure all medical equipment having wheels when not in use. Use wheel blocks or securing straps for this purpose.

c. **Sitz Bath and Whirlpool Tank.** Safety check electrical cords to ensure that all cords are in good repair, i.e., without frayed insulation or exposed wires, prior to such treatments to preclude the potential for electrical shock.

CAUTION:

Do not use electrical appliances including radios, other than authorized equipment in the physical therapy spaces at any time.

CHAPTER C22

CO_2 FIXED FLOODING SYSTEM SAFETY PRECAUTIONS AND PROCEDURES

C2201. DISCUSSION

a. This chapter contains basic safety precautions that personnel must observe to protect themselves from harm from CO_2 fixed flooding systems. Consult operating manuals and Planned Maintenance System (PMS) Maintenance Requirement Cards (MRCs) for complete safety precautions related to specific items of equipment.

b. Follow the procedures and precautions in this chapter whenever performing corrective or preventive maintenance work inside or outside a space protected by a CO_2 fixed flooding system. This includes work on the CO_2 fixed flooding system and in the immediate area of manual or electrical controls for the system.

c. This chapter discusses the health hazards of CO_2, general safety precautions, and procedures for disabling CO_2 fixed flooding systems, for general maintenance and for rescue personnel.

d. Carbon dioxide (CO_2) is a colorless, odorless gas that is naturally present in the atmosphere at an average concentration of 0.03 percent. It extinguishes fires at high concentrations by reducing the concentration of oxygen to the point that combustion stops. Concentrations of CO_2 in the range of 30 to 70 percent are needed to extinguish fires.

e. Carbon dioxide for fire fighting is stored as a liquid at high pressures. Upon discharge into a protected space, most of the liquid flashes to vapor and the rest forms fine, dry ice particles.

C2202. HEALTH HAZARDS OF CARBON DIOXIDE

a. Carbon dioxide is 1.5 times heavier than air, and will collect at low points. Unless forced ventilation is provided CO_2 will remain in the protected space and may migrate to adjacent spaces, especially if they are lower than the protected space. Ship's personnel should be aware of this whenever they approach a room in which the CO_2 has discharged.

b. If CO_2 concentrations are greater than 30 percent, loss of consciousness will occur within half a minute. As the concentration increases further, cardiac arrest, brain damage due to lack of oxygen, and even death might occur. The body reacts to concentrations less than 10 percent by rapid and deeper breathing, headaches, and vomiting.

c. Tests have shown that within 2 seconds of actuation of a CO_2 fixed flooding system within a protected space, visibility is obstructed and within 3 seconds enough pressure has built up to prevent opening inward swinging doors.

C2203. SAFETY PRECAUTIONS

a. Personnel performing work inside CO_2-protected spaces without a CO_2 system time delay, shall ensure that inward swinging access doors are blocked open by a positive means, such as a C-clamp rigidly attached to the frame or door, to provide a minimum opening of six inches.

b. Ensure that the following safety precautions are followed when working on the CO_2 system **INSIDE** a CO_2-protected space with the CO_2 system functional:

(1) Do not begin work on a CO_2 fixed-flooding system until a safety briefing has been given to all personnel involved in the maintenance work, the assigned rescue personnel, and persons in areas susceptible to CO_2 leakage.

(2) Verify that CO_2-protected space ventilation is in operation.

(3) Evacuate all personnel from the CO_2-protected space except those directly associated with the maintenance work. Evacuate all non-essential personnel from areas susceptible to CO_2 leakage.

(4) Identify and be familiar with an escape path from the protected space and areas susceptible to leakage of CO_2 to a safe haven not susceptible to CO_2 leakage.

(5) Verify that doors or hatches to the CO_2-protected space and from areas susceptible to CO_2 leakage are blocked open and hatches or doors on the way to a well-ventilated space or to the weather are blocked open.

(6) Post temporary danger signs to warn personnel of the hazard and temporary warning signs to limit access to the CO_2-protected space and spaces susceptible to leakage of CO_2. These signs should have lettering of at least 1 inch high. Danger signs shall include the words, "**DANGER - CARBON DIOXIDE GAS - WHEN ALARM SOUNDS - VACATE IMMEDIATELY**." Post signs at the accesses to CO_2-protected spaces, inside the protected space, and inside all spaces susceptible to CO_2 leakage.

(7) Ensure all personnel inside CO_2-protected spaces wear operating OBAs.

(8) Verify that all personnel in spaces susceptible to leakage of CO_2 have EEBDs immediately available.

(9) Ensure rescue personnel are assigned, equipped, and located per paragraph C2206. Rescue personnel shall maintain a count of personnel inside the CO_2-protected space.

c. Ensure that the following safety precautions are followed when working on the CO_2 system **OUTSIDE** a CO_2-protected space with the CO_2 system functional:

(1) Follow the procedures listed in paragraph C2203b for work done inside the CO_2-protected space with the exception of the following escape path procedures.

(a) Verify that the doors and hatches to the CO_2-protected space are closed.

(b) Verify that the doors or hatches in the escape path are blocked open.

d. Test the alarm systems within the guidelines provided by the PMS cards.

e. Be aware that any movement of the cylinder or the pull cable can actuate the pull-cable actuation systems.

f. Be aware that the seawater sprinkling system controls look similar to components of the CO_2 fixed-flooding systems.

g. Be aware that CO_2 can be discharged from CO_2 bottles if they are dropped and their discharge heads become damaged.

h. Take precautions to not accidentally rotate the CO_2 cylinder in its brackets, thereby putting tension on the actuation cable.

i. Follow PMS procedures carefully during the process of removing and installing discharge and control heads to avoid accidental discharge of CO_2.

C2204. GENERAL PROCEDURES DURING MAINTENANCE WORK

a. Ensure that the damage control assistant (DCA), the engineering officer of the watch (EOOW), cognizant department head, and the officer of the deck (OOD), when underway, or the command duty officer (CDO), duty engineer, cognizant department head, the OOD, and damage control (DC) central, when in-port, are notified and requested to be ready to respond immediately in case of an emergency before the work starts.

b. Ensure that all personnel directly involved follow tag-out procedures, including tag-out of all locations from which CO_2 discharge can be actuated.

c. The cognizant division officer shall verify that all ship maintenance personnel involved in maintenance on CO_2 fixed-flooding systems meet the applicable Personnel Qualification Standards and that knowledgeable, qualified supervision is assigned.

d. Ensure that any actuation of a CO_2 discharge alarm, either audible or visual, is investigated. An alarm that continues longer than 1 minute is abnormal and should be immediately investigated.

e. When corrective or preventive maintenance work is being done on the CO_2 system, do not permit normal space functions and other maintenance work in the CO_2-protected space.

C2205. DISABLING PROCEDURES

a. Always disable CO_2 fixed-flooding systems by removal of the discharge heads and removal of the CO_2 cylinder control head, when installed.

b. Ensure that the period of time that a CO_2 fixed-flooding system is disabled is limited whenever flammable material is in the CO_2-protected space.

c. Establish backup flammable liquid fire fighting capabilities (such as an aqueous film forming foam (AFFF) hose or a seawater hose with a 5-gallon can of AFFF concentrate and a portable educator) during the period the CO_2 system is disabled.

d. Establish fire watches during the period that the CO_2 system is disabled.

C2206. RESCUE PERSONNEL PROCEDURES

a. Ensure that a minimum of two rescue personnel are assigned. Assign additional personnel when more than four maintenance personnel are present using a ratio of one rescue person for each two maintenance personnel.

b. Locate rescue personnel at or near the access to the CO_2-protected space in which the maintenance work is being performed or in the area in which

the work is being done outside the CO_2-protected space. Position rescue personnel such that they can monitor maintenance personnel and space/area conditions.

c. One rescue person shall have communications, such as a sound-powered phone, with a manned location such as D.C. Central, main control, the quarter-deck, or the bridge.

d. Equip assigned, qualified rescue personnel with SCBA or OBAs and ensure they are capable of providing cardio-pulmonary resuscitation (CPR).

e. Once accidental discharge of CO_2 has occurred, rescue personnel should do the following:

(1) Inform DC central, main control, and quarterdeck or bridge of the emergency and request assistance, including medical assistance.

(2) Help maintenance personnel escape.

(3) Count personnel leaving area to assure all personnel have depart-ed.

(4) Search for personnel who have not departed and assist them to escape.

(5) Verify that space in which CO_2 is dumped is free of personnel and then close the access door or hatch to reduce spread of CO_2 to other areas of the ship or space.

(6) Proceed to a safe haven.

(7) Perform CPR on any personnel that require help until assistance arrives.

(8) Report status of escape to operating station.

(9) Start ventilation to space.

f. Rescue personnel shall wear personal protective equipment (SCBAs or OBAs) appropriate for entry into IDLH atmospheres (refer to paragraphs B0610(a) and (d)).

CHAPTER C23

HAZARDOUS MATERIAL CONTROL AND MANAGEMENT STANDARDS

C2301. DISCUSSION

a. Hazardous material control and management (HMC&M) standards address the storage, use, and disposal of all hazardous material (HM). The information in this chapter provides the detailed guidance that ships need to properly manage and control HM. It implements the considerations contained in Chapter B3.

b. Special precautions are required for the stowage, handling, and use of HM aboard ship. Significant hazards include fire, poisoning by breathing toxic substances in unventilated spaces, dermatitis, asphyxiation, and burns of the skin and eyes. This chapter contains specific management guidance and precautions for stowage and use of all HM, precautions for subcategories of HM (flammable materials, toxic materials, corrosive materials, oxidizers, aerosol containers, and compressed gases), and specific precautions for selected materials. Chapter B3 describes HM emergency response and training requirements.

C2302. GENERAL HMC&M STANDARDS

a. **HM Requisitioning**

(1) Before ordering any HM, ships shall determine that a valid requirement exists. The Ships Hazardous Material List (SHML) provides the requirements for shipboard HM. Ships shall order only material allowed by this document, unless otherwise specifically authorized by the commanding officer (or other designated officer O-5 and above).

(2) If a HM minimization center (HAZMINCEN) is in operation, this center shall requisition all HM (including HM storage containers) with a SHML Material Management Indicator (MMI) of "Y". HM items with a SHML MMI of "N" may be requisitioned by individual workcenters.

NOTE:

Some hazardous material may not pose a significant safety or health hazard to users. Other HM may be used by a specific workcenter with the required knowledge of the material and for which centralized control is unnecessary. These materials are not required to be requisitioned, received, and issued from the HAZMINCEN and are identified by MMI of "N" in the SHML. Those items with a MMI of "Y" should be managed by the ship’s HAZMINCEN.

b. **SHML**. The SHML is a record of the HM authorized aboard U.S. Navy surface ships. The SHML provides surface ships with the ability to determine HM authorized and preclude stocking of dangerous material for which the ship has no use. For ease of use, the SHML is provided quarterly on the DoD's CD-ROM, *Hazardous Material Control & Management/Hazardous Material Information System (HMC&M/HMIS)*. The SHML can be searched using FSC, NIIN, nomenclature, or part number. Each SHML item is marked with a HM use category in the Allowed Onboard data field. The Naval Supply Systems Command working with the technical systems commands assigns these use categories based on a technical and safety and health assessment of the product. These use categories are:

(1) **Allowed (A)**. No restriction on use of this HM on surface ships.

(2) **Prohibited (P)**. HM not allowed aboard surface ships and cannot be requisitioned.

(3) **Restricted (R)**. HM not allowed aboard surface ships except with specific restrictions.

(4) **Obsolete (O)**. HM that is obsolete and in most cases no longer procurable.

(5) **Not Determined (N)**. HM that is under review for authorization for use afloat. This HM shall not be issued or used unless/until it is validated as necessary and action is taken to add it to the SHML.

Equipment and tasking vary among ships within a single type, and configurations of individual ships may vary over time. If a ship has identified a valid requirement for an HM, and that material is either not listed in the SHML or is listed with a P or N, personnel shall complete a SHML Feedback Report (SFR). They may generate this report using Hazardous Material Inventory Control System for Windows (HICSWIN) or Standard Automated Logistics Tool Set (SALTS) software and submit it to the Naval Inventory Control Point (NAVICP) Code 07122, notifying the appropriate type commander and procurement department. NAVICP will screen and flag SFRs for technical commands, which will provide a response within 48 hours of submission via SALTS. If SALTS is unavailable, reference C23-6 provides a hard copy SFR format.

NOTES:

1. The fact that a HM is listed in the SHML does not in itself prove a "valid need" for a given ship to have that item aboard. No ship will have a valid need for all items in the SHML. Each ship must assess its own needs, using the SHML as a guide.

2. Subsets of the master SHML tailored to individual ship types (Type-SHMLs or T-SHMLs) shall be used by ships for which they are available. T-SHMLs have been built into HICSWIN as the authorized use list for each ship. T-SHMLs are updated monthly and placed in a downloadable repository SALTS for use in updating the HICSWIN T-SHMLs. Ships of a type not covered under the existing T-SHMLs shall use the master SHML as their authorized use list.

c. **HM Open Purchase.** Navy policy is that, to the maximum extent feasible, ships shall only procure and use standard stock HM.

(1) In **the exceptional case** for which the stock-numbered product can be clearly demonstrated to be inferior, or due to the urgency of need cannot be satisfied from supply system stock, commanding officers may justify and authorize open market purchases of HM for those items. The SFR, when completed and signed by the commanding officer (or a designated officer O-5 or above) and attached to the purchase request, shall be used as the required certification. The ship shall obtain an MSDS from the manufacturer or supplier prior to approval of a new product for purchase or use and retain the MSDS aboard. An SFR with the HMIS MSDS number shall be submitted via SALTS to NAVICP Code 07122, notifying the appropriate type commander and procurement department. If no MSDS number is available in HMIS, submit a hardcopy of the MSDS to NAVICP Code 07122.

(2) If ships or other commands are approached by commercial vendors offering HM not listed in the SHML for shipboard use or for substitution for stock-numbered HM, they shall refer vendors to NAVICP, Code 07122.

d. **HM Receipt**

(1) The supply department shall check all containers of HM obtained through open purchase upon receipt to ensure that they contain a manufacturer's label as described in paragraph C2302e. They shall refuse a container not so marked.

(2) When HM containers are accepted and brought aboard, they shall be immediately placed in an appropriate stowage location based on the hazard associated with the product.

(3) If a HAZMINCEN is in operation, the HAZMINCEN shall be the receiving point for HM that was requisitioned by, and will be issued from, the HAZMINCEN. This will allow HM data to be entered into the HICSWIN software. HM with a SHML MMI of "N" may be received from supply by the requisitioning workcenter.

e. **Container Marking**

(1) Manufacturer's labels for shipboard identification of HM containers must clearly identify the material name, the manufacturer's name and address, and the nature of the hazard presented by the HM including the target organ affected by the material. A manufacturer's label may be a tag, sign, placard, or gummed sticker. When dispensing HM from the shipping container to another container, personnel shall annotate the receiving container to indicate the material name, manufacturer name and address, and the nature of the hazard (including target organ) as specified by the manufacturer to preserve the continuity of information. To mark unlabeled containers, tanks, or containers where the label has been destroyed or damaged, ships may use the Department of Defense (DoD) Hazardous Chemical Warning Label, DD 2521 or DD 2522. HMIS provides this label and label information at the end of each MSDS. Personnel can print the label on plain paper or the pre-printed color forms: DD 2521 (8.5"x11") (S/N 0102-LF-012-0800) or DD 2522 (4"x7") (S/N 0102-LF-012-1100). If the material is used and not in its original container, the HAZMINCEN (work center) shall ensure that the material is labeled as required above. In addition, a label identifying the material as used HM (see appendix C23-B) shall be completed and attached to the container. This label shall contain information on the process in which the material was used (e.g., used spring bearing lube oil, circuit board cleaning solvent, dried out epoxy paint, etc.). It will also identify any known impurities that the material might contain based on routine PMS analysis (e.g., Naval Oil Analysis Program (NOAP) test results) and any special storage requirements. This information is necessary to assist the shore activity in properly storing the used HM and filling out disposal documents if the material is processed as waste.

NOTE:

If the material is transferred into a small container, such as a dropper bottle for boiler water chemistry, and insufficient room exists to place the required information on the label, the label shall at a minimum contain the material name, manufacturer's name, and stock number. The ship shall provide the remaining information on a card in a location known to users, that is in close proximity to the container, so that it can be readily referenced. In addition,

supplemental label information shall be cross-referenced to the smaller container, using numbers or letters (e.g. MSDS serial number).

f. **HM Issue**. Only limited quantities of HM essential for immediate needs during a work shift shall be issued from flammable liquid storerooms or other issue rooms. Generally, less than a 7-days supply of each routinely-used item shall be in or near the user compartment for HM issued from the HAZMINCEN (SHML MMI of "Y").

g. **Collection And Offload Of Used Or Excess Hazardous Material**

(1) Control of shipboard used or excess HM is an important element in the Navy's comprehensive HM management effort. Ship's force shall carefully follow the practices delineated for shipboard HM disposal and off-loading to minimize workload and allow full compliance with applicable regulations. Supervisors must emphasize to all hands that they must control and offload rags, protective clothing, empty containers, and items used in spill response contaminated by hazardous substances with the same precautions as applied to all other HM. Reference C23-1, appendix L provides guidance for the transfer and disposal of used HM. The requirements detailed below 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) Ships shall exhaust all beneficial uses from a HM prior to transfer or disposal. This action includes increasing the useful life of the material by extending the shelf life per approved procedures outlined in reference C23-2 or redistribution within the ship for reutilization.

(3) **Collection of Used HM**. Appendix L of reference C23-1 and Maintenance Requirement Cards (MRCs), as applicable, provide guidance for determining which types of used HM must be collected and held for treatment by shore disposal facilities.

(a) Ships shall **segregate** collected used HM. They shall normally fill a container with one type of HM, i.e., all the used HM in a container shall normally be of only one stock number. They shall place used HM either in the container for the original material or in an impervious container specified in appendix C23-A. The container shall be securely sealed using the installed or provided closure devices to ensure the container does not leak during transportation. The container shall be properly labeled (refer to paragraph C2302e for labeling requirements) to indicate content, and stowed in appropriate locations following the stowage precautions in this chapter for comparable HM.

(b) If the contents of a HM container are unknown, the label must state so, and fleet accounts must pay the costs of chemical analysis to determine specific content. The workcenter originating the HM for offload shall provide any useful information in identifying the origin or composition of the material in the container. If the contents are unknown and the originating workcenter can determine by experience that the material is flammable or combustible (the most common type of HM aboard ship), reactive, toxic, or corrosive, they shall supply that information on the container to allow proper stowage aboard ship and at the receiving shore activity.

(c) Specific procedures for oil pollution abatement, including requirements for segregation of oily wastes, used oil, and waste oil are found in Naval Ships Technical Manual, Chapter 593, "Pollution Control." Ships equipped with oily waste holding tanks (OWHT) shall direct all shipboard oily waste to the OWHT. They shall collect used lube oils separately and store and

label for eventual shore recycling. They shall also collect synthetic lube oils and hydraulic oils separately from other used/waste oils. Ships that do not have a system dedicated to the collection of used synthetic oils shall use epoxy-lined steel containers, properly labeled, for eventual shore recycling.

(4) **Procedures for Off-Loading Used or Excess HM to a Naval Shore Activity**. The HM supervisor shall receive and consolidate all used HM for offload. The HM supervisor shall turn over used or excess HM to the shore facility Hazardous Material Offload Team (HOT), normally the local fleet and industrial supply center (FISC). Ships that have a HAZMINCEN aboard shall use the HAZMINCEN as the collection point for all used HM.

(a) **Processing Used HM**

1. The HAZMINCEN (or workcenter generating used HM for ships not having a HAZMINCEN) shall ensure that HM is properly packaged in the original container or in a container specified for the material in appendix C23-A. If any questions exist regarding the integrity of the original container (e.g., badly rusted, badly dented, or poorly sealed), the contents shall either be transferred to a new container or the HAZMINCEN/workcenter shall place the damaged container into an "overpack" container (a steel drum with removable cover (see appendix C23-A)). The overpack container shall be filled with sorbent material to absorb possible leaks and prevent movement of the original container within the overpack container. Refer to paragraph C2302e for labeling requirements.

NOTE:

Label or mark overpack containers regarding orientation to prevent spills if the container were improperly stored or transported.

2. The HM supervisor shall ensure that a DD 1348-1 or DD 1348-1A is prepared for each container of used HM. Clearly identify the following information (where known) on the DD 1348-1 or DD 1348-1A: the NSN, the material name, and the manufacturer's name and address. The individual filling out the DD 1348-1 or DD 1348-1A shall properly label the container with information required by paragraph C2302e including the Used Hazardous Material label (see appendix C23-B).

(b) **Transferring Used HM Ashore**

1. The ship's point of contact shall contact the shore activity HOT point of contact to request a pick-up and ascertain local requirements. These requirements may be obtained from shore activity instructions, senior officer present afloat or ashore (SOPA) regulations or the response to the logistics request (LOGREQ). For used HM which can be identified by a stock number, manufacturer and for which a MSDS is available in the HMIS, no MSDS need be provided to the receiving Navy activity. One may be required if transferring HM to a non-Navy activity or overseas. Used HM for which a MSDS does not exist in the HMIS or which has been open purchased shall be accompanied by a hard copy of the MSDS. In situations where compatible materials are inadvertently mixed, the ship shall include the MSDSs of each material in the mixture with the used HM. If the contents are unknown, the ship need not include a MSDS. However, they shall supply information, such as whether the material is flammable or combustible, reactive, toxic, or corrosive, in the "Special Stowage Requirements" item of the Used HM label to allow proper stowage at the receiving shore activity.

2. Navy shore activities shall only require that ships provide used HM that is properly packaged in the original container or in a container specified for the material in appendix C23-A. The container shall

be properly secured and properly labeled with a properly filled out DD 1348-1 or DD 1348-1A and a MSDS, if the material originated outside the supply system or a MSDS is unavailable in the HMIS. Non-compliant material shall be returned to the originating ship. Receiving shore activities shall report problems experienced with material received from a ship to the command and, if flagrant or repeated, to the ship's immediate superior in command (ISIC). If any additional requirements (e.g., waste profile sheets) are placed on the shore activity by Federal or State laws and regulations or by the supporting Defense Reutilization and Marketing Office (DRMO), the receiving shore activity **shall** ensure that these requirements are met using information supplied by the ship on the DD 1348-1 or DD 1348-1A and container label. When required, the shore activity shall charge analysis of unknown material to fleet accounts.

(c) **Excess HM**. A workcenter shall turn in full, properly sealed containers of usable HM in excess of its needs to the HAZMINCEN (or supply department if a HAZMINCEN is not installed). HAZMINCEN personnel shall determine if this material may be used elsewhere in the ship or if it exceeds the ship's needs. If the material exceeds the ship's needs, the ship shall transfer it to the supporting FISC with a properly completed DD 1348-1 or DD 1348-1A for each NSN of material being transferred.

C2303. HAZARDOUS MATERIAL MINIMIZATION CENTER

a. **General**. If established, the HAZMINCEN shall store and centrally control the issue of all HM with a SHML MMI of “Y” and collection of all HM for disposal for the ship.

b. **Functions**. The HAZMINCEN shall perform the following functions:

(1) Store HM in containers or compartments reserved and configured exclusively for HM. Bulk and infrequently used HM shall be stored in compliant storage spaces and only moved to the HAZMINCEN when necessary for replenishment and use.

(2) Make HM available to workcenters 24 hours a day.

(3) Record and control HM using the Navy-developed HICSWIN software in a manner that permits auditing of both the store inventory and the user.

(4) Restrict the amount of HM in use to the lowest level necessary for the work performance of ship workcenters. Workcenters may retain a 7-day quantity of SHML MMI “Y” HM used daily in suitable lockers.

(5) Provide optimal procedures and facilities for the turn-in of used HM, empty HM containers, and HM-contaminated items.

(6) Consolidate previously issued unused HM for either reuse or categorizing for alternate use.

(7) Properly process HM for safe offload/disposal.

(8) Coordinate procurement and receipt of authorized HM aboard.

c. **Facility**. The ship shall identify suitable space for use as the HAZMINCEN, based on the following guidance. This space shall have suitable protection in the event of a fire or spill of HM (see C2304 for HM storage precautions). The ship shall have appropriate personal protective equipment, adequate ventilation, sufficient shelving, and containment to store safely, segregate, and issue the various types of common-use HM used aboard. The space shall be sufficiently large and equipped to permit issuance of HM and

consolidation of either used or unused HM, empty HM containers, and HM-contaminated items. The ship shall install a computer and peripherals needed to run the HICSWIN software in the HAZMINCEN's administrative office and not in the HM storage area. NAVSEASYSCOM has identified spaces for use as HAZMINCENs and administrative offices for most ship classes. Type commanders will provide guidance concerning interim HAZMINCEN spaces, including minor modifications to ensure proper safety and health, until final spaces can be converted by SHIPALT.

d. **Manning**. Ships shall assign sufficient personnel to the HAZMINCEN to accomplish the functions listed in paragraph C2303b. Ships should use the HAZMAT Work Center listed in their Activity Manpower Document (AMD) as guidance for HAZMINCEN manning. If the ship’s AMD does not list a HAZMAT Work Center, HAZMINCEN manning guidance should be obtained from the type commander. The supply department shall train all personnel assigned to the HAZMINCEN on their duties and responsibilities prior to assignment.

e. **Operation**. Reutilization and inventory management is a proven afloat methodology that establishes central control and management of ship's HM. It relies on a controlled HM issue/reuse site (HAZMINCEN) with HM inventory tracking by HICSWIN. This concept has worked successfully on both large and small surface ships. The following guidance is based upon installations of shipboard HAZMINCENs:

(1) **Startup**. The HAZMINCEN should reduce on board quantities of HM through inventory control and management. After a suitable HAZMINCEN facility(ies) is identified and prior to commencing operations, the ship must plan to systematically and incrementally assume management and inventory control of workcenter HM stocks throughout the ship (for HM normally managed by the HAZMINCEN (SHML MMI "Y")). This shall be accomplished by:

(a) Workcenter personnel in conjunction with HAZMINCEN personnel identifying and moving HM to the HAZMINCEN facility(ies). A maximum of 7-days use of HM may be entered into HICSWIN and reissued to the workcenter.

(b) Storing in compliant storerooms all HM beyond the capacity of the HAZMINCEN issue room.

(c) Moving ashore all ship's excess HM for redistribution or disposal per the procedures of C2302g.

Experience has shown that sufficient material should be available on board after these efforts to conduct HAZMINCEN operations and perform the preventive, corrective, and facilities maintenance needed to support ship operations.

During startup, it is highly likely that a large portion of the volume collected will be unusable due to material deterioration or expired shelf life, which cannot be extended. This material shall be transferred to the supporting shore activity for reuse or disposal. The initial collection of HM may include material not on the SHML. Retention of this material on board shall have to be justified or the material transferred ashore. If the material is required aboard, the SHML modification shall be requested per paragraph C2302b.

HAZMINCEN operators shall enter HM nomenclature, NSN, manufacturer's part number, unit of issue, stowage location, and other pertinent information into HICSWIN to initialize the inventory control system.

After the HAZMINCEN is in operation, the safety officer, HM coordinator, and master-at-arms force can initiate periodic surveys of ship spaces to account

for all stores of HM so that it may be entered into HICSWIN. A 7-day's supply of HM may remain under the control and management of the workcenter(s) provided adequate stowage (e.g. flammable liquid storage cabinets) is available.

(2) **Operation**

(a) **Hours of operation**. The HAZMINCEN shall provide 24 hours of service to workcenter customers. The ship can accomplish this by establishing normal hours of store operation during ship's working hours and on-call service during other periods. The number of hours that the store should remain open will be dictated by experience, but shall be sufficient to support ship's maintenance and allow personnel to return unused HM, used HM, and HM-contaminated items during and at the end of the normal workday. Guidance on HAZMINCEN hours of operations may be available from type commanders based on experience on other ships.

(b) **HM delivery**. When workcenter supervisors require HM that is normally issued from the HAZMINCEN, they should provide that requirement to the HAZMINCEN. The following are request procedures that have been successful:

1. Phone-in HM request in advance for immediate pickup

2. Request turned in at the HAZMINCEN for pickup with a minimal wait

3. Request form filled out and submitted in advance of the requirement for immediate pickup the next day.

The system shall concentrate on being user-friendly, emphasizing paperwork reduction and ease of obtaining the material to do the work. The HAZMINCEN shall not require the user to submit a requisition for HM . Ships should consider paperless procedures, which require providing the necessary information verbally to the HAZMINCEN operator, but the user shall sign for the HM using a form generated by HICS.

The HAZMINCEN shall provide workcenter personnel with the amount of HM necessary to accomplish the job. If a worker needs only a pint of a solvent , only a pint should be issued; not a quart. The HAZMINCEN should, where possible, break down the volume issued using smaller containers. The HAZMINCEN shall mark these containers per paragraph C2302e prior to issue. Re-pour operations may not be an option for all HAZMINCENs due to space and safety limitations. Consult with the safety officer (or supporting industrial hygiene officer) to determine advisability of re-pour operations.

When HM is requested, the HAZMINCEN operator will consult the HICSWIN database to determine if the HM is available. If the HM is available, an issue transaction is accomplished and the HM is issued. If the material is not available, the HAZMINCEN shall requisition it from the ship's supply department. The HAZMINCEN shall account for the HM in HICSWIN upon receipt and issue it to the requesting workcenter. Material not on board will have to be requisitioned by the supply department using normal procedures.

Once a HAZMINCEN is in operation, the supply department shall not accept requisitions for or provide any SHML MMI “Y” directly to ship workcenters.

(c) **HAZMINCEN stock levels**. The HAZMINCEN HM stock levels will require establishment without historic use data. The HAZMINCEN shall survey workcenters to determine the amount and types of HM that they expect to use and they expect the HAZMINCEN to have on-hand. A review of Planned

Maintenance System (PMS) and technical manual requirements for HM use will establish a credible basis for carrying the SHML MMI "Y" items aboard. Once usage data becomes available, the HAZMINCEN shall establish high and low (reorder point) stock levels for each HM it manages and shall strive to maintain levels above the low-level point. When the stock level of a HM reaches a reorder point, HAZMINCEN shall obtain resupply from the supply department bulk stowage and repackaged as necessary into units of issue workcenters normally require.

(d) **HM return**. At the completion of a maintenance action, the end of the workday, or the end of a 7-day use period, workcenters shall return unused HM that was issued from the HAZMINCEN and its container as well as any residue from the maintenance action to the HAZMINCEN. Unused HM shall be consolidated with like material and appropriate inventory adjustments made in HICSWIN. Used HM shall also be consolidated with like material for offload per section C2302g. Empty containers free from contaminants shall be retained for future use with the same HM. Empty containers that are contaminated or cannot be reused shall be disposed of per the requirements of reference C23-3. Rags or other residual materials used with HM shall be processed aboard (if capable) or containerized for shore processing.

At the end of the workday, HAZMINCEN operators shall use HICSWIN to print a report of workcenters delinquent in returning unused HM or empty containers. They should vigorously seek out any material not returned.

(e) **Lessons learned**. Through operation of the HAZMINCEN on prototype ships, the Navy has learned the following lessons:

1. Failure to meet the demands of a workcenter for a HM will probably result in the stockpiling of the HM by the workcenter in the future.

2. HAZMINCENs must overcome resistance to change and mistrust of their ability to provide needed HM with exceptional response time, material availability, and reduction (to the greatest extent possible) of paperwork demands upon the customer. An around-the-clock operation is essential.

3. It is likely that large amounts of excess, expired, or used HM will be collected in the initial phases of implementation and will require off-loading to a shore facility. Space must be set aside to accommodate this material and advanced planning with the supporting shore facility is necessary to enable a smooth and rapid transfer of this material off the ship.

C2304. GENERAL STORAGE REQUIREMENTS

Observe the following general precautions to minimize hazards inherent in the handling and storage of HM:

NOTE:

Precautions are applicable to storage of HM in all locations.

a. Material normally thought to be safe may become hazardous under certain conditions. When containers leak or are heated, chemical reactions may result, leading to fire, explosion, or release of toxic reaction products. Consequently, stow chemicals in such a way that incompatible chemicals are segregated and separated.

b. Stow all large quantities of flammable and combustible liquids with a flashpoint less than 200°F in flammable liquid storerooms, ready service storerooms, or issue rooms. Coolants, hydraulic fluids, lubricants, and

aerosols shall also be stowed in one of the above. Use in-use flammable liquid cabinets within or near the workspace to stow a limited (7-day) quantity of flammable liquids used routinely on a daily basis. Do not use in-use flammable liquid cabinets to store more than 30 gallons of flammable liquid per space.

c. Post HM stowage locations with a CAUTION sign that states:

HAZARDOUS MATERIAL STORAGE AREA

Obtain these signs through the Navy supply system using National Stock Number (NSN) 9905-01-342-4851 (10" X 7") or 9905-01-342-4859 (3" X 5").

d. Permanently mount a label on lockers and cabinets used for in-use flammable and combustible liquids worded as follows:

FLAMMABLE/COMBUSTIBLE LIQUIDS

DURING STRIP SHIP CONDITION, THE CONTENTS OF THIS CABINET SHALL BE RELOCATED TO A FLAMMABLE LIQUIDS STOREROOM, ISSUE ROOM, OR READY SERVICE STOREROOM.

e. Ensure that HM stowage locations other than cabinets and lockers are equipped with supply and exhaust ventilation. Keep ventilation system in good operating condition. Any area to be used for HM stowage must first be evaluated by an industrial hygienist.

f. Restrict access to HM stowage locations to personnel authorized by the responsible division officer. **Entry to confined locations shall occur only after obtaining the gas free engineer's approval as specified in chapter B8 of this manual.**

g. Mark stowage compartments to identify type of HM stored and keep the compartment/materials clean and dry at all times.

h. Do not transfer material to any container that was previously used for a different material without first checking the materials' compatibility. If unsure, check with the HM Coordinator.

i. Stow incompatible materials in separate compartments to prevent mixing in the event of a spill. See appendices C23-C Hazardous Material Compatibility Storage Diagram and C23-F Incompatible Materials Chart. Appendices C23-D and C23-F provide information on stowage requirements based on the hazard characteristic code (HCC).

j. Stow HM only in containers that are compatible with the material (e.g. do not place corrosive materials in metal drums).

k. If space limitations necessitate storing incompatible materials in the same compartment, maintain a separation distance of at least 3 feet. This provides only limited protection, therefore use all precautions, such as a high coaming, to prevent accidental mixing. Coamings will not prevent vapors, generated from incompatible HM in spaces, from mixing and reacting.

NOTE:

Before using this exemption, consult the specific requirements of sections C2306 to C2311 that apply to the two incompatible materials for specific prohibitions (e.g. section C2309c(1)(a) prohibits the storage of calcium hypochlorite with flammable or combustible liquids).

l. Stack containers so that they will not crush lower containers, become imbalanced, or be difficult to access.

m. Use material on a first-in, first-out basis, considering shelf life.

n. Prohibit smoking, eating, or drinking in stowage areas.

o. Never permit open flames or spark producing items in HM stowage areas.

p. The gas free engineer shall monitor stowage compartments for oxygen depletion, suspect explosive atmospheres, presence of potentially toxic vapors, and CO_2 accumulation any time the question arises as to the safety of a stowage area.

q. Operate only explosion-proof electrical equipment in a potentially explosive environment.

r. Seal and protect all containers against physical damage and secure for heavy seas.

s. Maintain explosion-proof electrical fixtures in proper condition in applicable HM stowage areas.

t. Do not stow HM in spaces or locations that are not specifically authorized for HM stowage.

C2305. GENERAL HANDLING AND USE REQUIREMENTS

Observe the following general requirements when handling HM:

a. Work center supervisors shall ensure that, prior to using any HM, personnel under their supervision are trained on the hazards associated with that material, and that they have been provided with necessary protective clothing and equipment (i.e. eye protection, respirators, and gloves).

b. Workcenter supervisors shall ensure that adequate supply and exhaust ventilation is maintained in all spaces where HM is used, that such systems are in good operating condition, and that they have been evaluated as adequate by an industrial hygiene survey team. Keep ventilation intakes clear of HM at all times.

c. Never store excess supplies of HM in work areas. Return surplus material to the appropriate storage area or HAZMINCEN when not being used.

d. Handle incompatible materials in separate compartments to prevent mixing in case of a spill.

e. Never mix incompatible materials in the same collection containers.

f. Use appropriate personal protective equipment (PPE) when using HM.

g. Avoid contact with the eyes or prolonged contact with skin when using HM.

h. Prohibit smoking, drinking, or eating in areas where HM is used.

i. Ensure PPE (eye protection, respirators, gloves appropriate to the HM in use, etc.) is in good operating condition and is readily available to all personnel working with HM.

j. When mixing or pouring HM, eye protection shall consist of chemical goggles and full-face shields which have been cleaned and disinfected before being issued to another wearer.

k. Before entering spaces that have been closed for significant periods, have a gas free engineer determine that atmosphere is safe for entry.

l. Use an appropriately selected and fitted respirator when potentially exposed to harmful levels of particulate matter, hazardous gases, or vapors. When in doubt, consult the MDR for specific guidance in this regard or for a determination of the need for more stringent respiratory protection requirements.

C2306. FLAMMABLE AND COMBUSTIBLE MATERIAL

A flammable material is any solid, liquid, vapor, or gas that will ignite easily and burn rapidly with a flash point less than 1500°F. A flammable liquid is defined by the National Fire Protection Association (NFPA) as a liquid with a flash point below 100°F. Liquids having a flash point at or above 100°F are combustible liquids. Flammable liquids are more hazardous than combustible liquids since they can produce ignitable vapors in the typical shipboard environment without first being heated. All flammable and combustible liquids pose a danger to personnel and the ship, particularly those liquids having flash points below 200°F, since hot surfaces up to 200°F commonly occur aboard ship. Never carry flammable or combustible liquids aboard ship in quantities in excess of that required. Stow flammable and combustible liquids in approved locations. Dispense flammable and combustible liquids from shipping containers only into safety cans or other approved portable containers. Never use flammable or combustible liquids near a heat source or spark-producing device.

a. **Storage Requirements**

(1) Store flammable and combustible materials following the precautions listed in paragraph C2304.

(2) Store flammable and combustible materials separately from oxidizing materials (i.e., sodium nitrite, calcium hypochlorite, potassium permanganate, peroxides, and strong inorganic acids (nitric, hydrochloric, and sulfuric acids)). See appendices C23-C, Hazardous Material Compatibility Storage Diagram, and C23-F, Incompatible Materials Chart.

(3) Authorized storage locations for flammable and combustible materials are limited to the following:

Material	Location
(a) Liquids with flash points below 200 degrees Fahrenheit	Flammable liquids storeroom/ in-use flammable liquids stowage cabinet (in-use material only).

NOTES:

1. No in-use storage of these materials is allowed in machinery spaces.

2. In nuclear powered ships, small amounts of isopropyl alcohol (less than two quarts) may be stowed in a nucleonics room or secondary chemistry room cabinet.

Material	**Location**
(b) Solids and semi-solids which readily give off flammable vapors.	Flammable liquids storeroom
(c) Solids which burn with extreme rapidity because of self-contained oxygen.	Flammable liquids storeroom/ in-use flammable liquids stowage cabinet
(d) Materials which ignite spontaneously when exposed to air.	Flammable liquids storeroom
(e) All lubricating oils and petroleum products with a flash point greater than or equal to 200 degrees Fahrenheit but less than 1,500 degrees Fahrenheit.	Flammable liquids storeroom/ flammable liquids commercial cabinet (in-use material only)/Up to 12 Gals. within a coaming capable of containing the total amount stowed (in-use material only)

(f) Store cargo of the type described in (e) above, carried by **Cargo Ships and Oilers** in either a cargo hold under fixed HALON or CO_2 gas flooding or sprinkler protection or on the weather deck under protection from the elements. Normally stow used/excess HM aboard combat logistics force ships, carried for the purpose of easing used/excess HM stowage requirements of combatants or for retrograding such material to the continental U.S. (CONUS), on the weather deck under protection from the elements unless below decks cargo stowage for this material is available aboard the ship.

(g) Ensure ordinary combustible materials such as rags, paper and wood are not stowed in flammable stowage areas; however, oily rags should be stowed in these areas after being placed in suitable containers.

(4) Prohibit open flames or spark-producing items in flammable stowage areas.

(5) Ensure containers are secured with metal banding or other approved tie-downs vice nylon, polypropylene or manila line.

b. **Handling and Usage Requirements**

(1) Handle and use flammable and combustible materials per the precautions listed in paragraph C2305. Many flammable and combustible materials have additional hazardous properties (e.g. toxicity, see C2307).

(2) Never use a flammable material near a heat source or a spark-producing device. Do not smoke in an area in which flammable material is being used. Post spaces in which flammable materials are used as **NO SMOKING** areas.

(3) Keep scrapings and cleaning rags soaked with flammable or combustible liquids in a covered metal container. Do not leave scrapings and cleaning rags in a soaked state even in a covered metal container for longer than one work shift. Treat such materials as used/excess HM, containerize to prevent leakage, and properly label and store.

(4) Ensure that containers of partially used flammable materials are returned to proper stowage facilities, are tightly closed, and are properly labeled.

(5) Keep suitable fire extinguishing equipment and materials ready at all times for instant use.

C2307. TOXIC MATERIAL

A toxic material has the inherent capacity to produce personal injury or death through ingestion, inhalation, or absorption through any body surface. Toxic materials are considered, and often marked by the manufacturer as being, poisonous. Avoid contact with toxic materials by the proper use of suitable impermeable protective clothing, respiratory protection, and by strictly following all prescribed safe-handling procedures. Solvents, degreasers, refrigerants, mercury, and hydraulic fluids are but a few of the toxic materials that may be found aboard ship. If stowed, handled, and used in the proper manner, they present little or no danger.

a. **Storage Requirements**

(1) Store all toxic material per the precautions listed in paragraph C2304. Many toxic materials have additional hazardous properties (e.g. flammability or combustibility, see C2306).

(2) Store all toxic material in cool, dry, well ventilated spaces separated from all sources of ignition, acids and acid vapors, caustics, and oxidizers. See appendices, C23-C Hazardous Material Compatibility Storage Diagram, and C23-F, Incompatible Materials Chart.

(3) Seal all containers and protect them against physical damage.

b. **Handling and Usage Requirements**

(1) Handle and use toxic materials per the precautions listed in paragraph C2305.

(2) Use appropriate gloves and protective clothing when handling sensitizers or potential skin irritants such as epoxy and polyester resins and hardeners where significant skin contact is likely. Only use protective skin cream to supplement, but not replace, the appropriate gloves for any operation where significant contact with potentially toxic/ irritant/sensitizing materials is likely.

c. **Halocarbons (Refrigerants)**. Liquid or gaseous halocarbons have multiple applications in the Navy. They are used as refrigerants, aerosol propellants, solvents, and dielectric fluids and as fire extinguishing and degreasing agents. Due to changes in the Clean Air Act, the use of halocarbons is being phased out; however, they are still used in the Navy. With common names of refrigerant R-11, R-12, R-22, R-113, R-114, and R-116, these products may be better known by names such as FREON , ISOTRON , FRIGEN , FLUORANE , FREON MF , FREON TF , GENSOLV D , BLACO-TRON TF , and ARKLONE P-113 .

(1) To minimize the size of spills, procure, store, and use halocarbons in the smallest amount and container possible for an operation.

(2) The Naval Supply System stocks all normally used halocarbons. Ships should procure halocarbons only through that system.

(3) Prohibit smoking and hot work in areas or vicinity where halocarbons are being used.

(4) Prohibit storage and consumption of food and tobacco in areas where halocarbons are being used.

(5) Some types of FREON are nearly odorless and can numb the sense of smell.

(6) Only use FREON-113 as a solvent when specified and when such use is essential.

d. **Toxic Cleaning Solvents**. Conduct shipboard operations involving toxic cleaning solvents in a manner which will not result in exposure of personnel to hazardous concentrations of airborne materials, significant or prolonged skin contact, the creation of a potentially explosive atmosphere, or reduce oxygen levels below safe limits. Ensure spaces subject to accidental or uncontrolled concentration of toxic vapors are checked by a gas free engineer and certified safe for entry prior to beginning work. Use mechanical exhaust ventilation (explosion proof) to exhaust vapors overboard to prevent reentry and recirculation. Eliminate sources of ignition of vapors prior to ventilating such spaces. For normal cleaning operations:

(1) Whenever practicable, completely enclose the cleaning operation to prevent escape of vapors into working spaces.

(2) Ensure exhaust ventilation is available to remove or dilute the concentration of the vapors for the entire work period. If exhaust ventilation is not present to lower vapor concentration, use respiratory protection equipment.

(3) Wear gloves appropriate to the HM in use and chemical goggles, at a minimum, to protect the skin and eyes from exposure.

(4) Use chemical goggles and other protective clothing appropriate to the HM in use to protect the face, neck, arms, hands, and body when using acid or alkali cleaners.

e. **Trichloroethane** (also known as 1, 1, 1-Trichloroethane and inhibited methyl chloroform) is a halogenated hydrocarbon extensively used as a solvent for greasy films and oil deposits on machinery and other equipment. When properly used, its vapors have a low order of toxicity. However, vapors of this solvent, especially when sprayed or heated, will readily accumulate in confined spaces and increase the chance of harmful exposure. Trichloroethane is toxic if taken internally and when heated will decompose into products that may be more toxic.

f. **Mercury** represents a potential personnel health hazard if ingested, absorbed through the skin, or inhaled. Inorganic or elemental mercury can vaporize at room temperature in amounts hazardous to the health. In addition to health hazards, mercury may be damaging to materials and equipment. Mercury and its compounds are especially corrosive to certain non-ferrous metals and their alloys, such as aluminum, copper, and silver.

(1) **Mercury Storage**

(a) Store mercury and mercury compounds, including waste, in a cool, dry, well-ventilated area. The storage area shall be well away from sources of heat.

(b) Secure mercury containers to avoid accidental breakage or spillage, and keep in trays or shelves with a lip of sufficient height to contain the contents, if spilled.

(c) Store mercury and mercury compounds in their original containers, whenever possible. Tightly seal containers with a stopper or cap and keep closed when not actually in use. Label containers per paragraph C2302e.

(d) Clean up mercury or mercury compound spills immediately.

(e) Store small quantities of mercury in a NAVSEASYSCOM mercury storage locker, NAVSEA drawing number 803-5184175.

(2) **Mercury Use**. Personnel engaged in mercury handling shall:

(a) Wear protective clothing as necessary to prevent their skin and clothing from coming in contact with mercury. Such protective clothing includes rubber or plastic clothes, aprons or equivalent coveralls, and rubber-soled shoes or rubber boots.

(b) Remove all jewelry that could become contaminated with mercury.

(c) Not eat, drink, smoke, or apply cosmetics in a mercury handling area.

(d) Wash with soap and water immediately after working with mercury or mercury components, and prior to eating, drinking, smoking, or applying cosmetics.

(e) Carefully examine clothing after any mercury spill and at the end of each work session. Any clothing found to be contaminated with mercury or mercury compounds shall be cleaned of visible mercury, then removed, placed into double plastic bags and disposed of as mercury waste.

(f) Prior to handling or transporting any instrument or equipment containing mercury, seal, cap, plug, or double-bag the item in plastic to prevent spillage.

(g) Immediately and properly clean up spilled mercury.

(h) Not use compressed air for cleaning up spilled mercury.

(i) Avoid allowing mercury to contact hot surfaces that could accelerate vaporization and increase the inhalation hazard.

(j) Decontaminate equipment used in handling mercury after each work session.

g. **Polychlorinated Biphenyls**

(1) In general, PCBs, if properly managed, do not present a major health hazard. The Environmental Protection Agency banned PCBs in most manufacturing processes in 1979. However, PCBs may be found as a fire retardant in many materials used in ship construction where stocks of PCB material purchased prior to the ban were consumed. Some examples of shipboard materials used in ship construction which may contain PCBs include: sound dampening on reduction gears; electrical cable insulation; foam hull insulation; rubber (used as banding and sheet rubber for cableways, pipe hanger liners, isolation mount, and vent gaskets); packing and grommets for electrical cable stuffing boxes; and pipe insulation and lagging.

NOTE:

PCB-containing construction materials installed in Navy ships need not be removed because they contain PCBs. Installed PCB-containing construction materials normally need not be labeled.

(2) Label PCB-containing electrical/electronic components (primarily capacitors) per the guidance provided in reference C23-4. Label PCB-contaminated tools and waste materials (such as dust from ventilation ducting which are known to contain PCB-impregnated felt gaskets) per paragraph C2307g(4)(c).

(3) With the exception of ventilation duct cleaning, work involving known or potential PCB-containing materials shall normally be accomplished in port. Obtain assistance through the nearest naval shipyard environmental

program office, Navy medical treatment facility, or NAVENPVNTMEDU prior to such action.

(4) For situations not involving unprotected PCB skin contact, employ routine work and personal hygiene measures (such as washing hands and other exposed skin surfaces with soap and water when work is completed) appropriate for any occupational setting.

(a) When working with PCB-impregnated materials such as insulating felts or with articles that contain liquid PCB solutions, strictly observe good housekeeping procedures to avoid the possibility of secondary surface contamination.

(b) Personnel involved in PCB-related work activities shall not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the space in which work is being performed.

(c) Collect and dispose of PCB-containing waste, scrap, and debris; dust collected from ventilation systems known or suspected of containing PCB-impregnated felt gaskets; and PCB-contaminated clothing (consigned for disposal) in sealed impermeable containers specified in appendix C23-A and labeled with the large label described in appendix C23-E. Disposal should be per the procedures of section C2302g. Specifically notify the receiving activity that PCBs or material containing PCBs is being transferred.

(d) When PCBs or PCB-containing material are sufficiently heated they will decompose into products that are more toxic than PCBs. Do not perform hot work in the immediate area when work is performed with PCBs or PCB-containing material. Do not perform hot work, including welding, torch cutting, brazing, grinding, and sawing on ventilation systems components within 12 inches of either side of a flange containing felt gaskets.

(e) Specific work practices for the removal and handling of PCB felt, maintenance and cleaning of ventilation ducting containing PCB felt, and maintenance and handling of other shipboard PCB materials are provided in reference C23-4.

(f) Label all reusable cleaning equipment employed in cleaning systems potentially contaminated with PCBs with PCB labels described in appendix C23-E. Use the large label whenever practicable. If the large label does not fit, use the small label. Equipment to be labeled includes vacuum cleaner, vacuum hoses and working end tools, brushes, Vent Duct Cleaning System components, dust pans, scrapers, and putty knives. Label; bag, where possible; and stow this equipment in a location where it will not be accidentally used for other purposes.

(5) The baseline industrial hygiene survey shall specify personal protective equipment and medical surveillance for any potential PCB-related work.

C2308. CORROSIVE MATERIALS

Corrosive materials are chemicals such as acids, alkalis, or other liquids or solids which, when in contact with living tissue, will cause severe damage to such tissue and/or metals by chemical action. In case of leakage, corrosive material may materially damage surfaces or cause fire when in contact with organic matter or with certain chemicals.

a. **Storage Requirements**

(1) Store all corrosive materials per the precautions listed in paragraph C2304.

(2) Store corrosive materials in their properly labeled, original containers.

(3) Ensure that acids and alkalis are stowed separately from each other.

(4) Ensure corrosive materials are not stored near oxidizers or other incompatible materials. See appendices C23-C Hazardous Material Compatibility Storage Diagram and C23-F Incompatible Materials Chart.

b. **Handling and Usage Requirements**

(1) Handle and use corrosive materials per the precautions listed in paragraph C2305 or as directed by Maintenance Requirement Card, NSTM, industrial hygiene survey, or manufacturer's instructions.

(2) As a minimum, wear chemical goggles, full-face shields, and rubber gloves when handling acids or other corrosive materials. Greater protection may be required as specified by Maintenance Requirement Card, NSTM, industrial hygiene survey, or manufacturer's instructions.

(3) Never allow corrosive materials or their vapors to come in contact with the skin or eyes.

c. **Inorganic Acids**

(1) Stow liquid inorganic acids, such as hydrochloric, sulfuric, nitric and phosphoric acids bottled in glass or plastic in such a manner that they are cushioned against shock. They should be kept in their original shipping carton inside suitable acid-resistant lockers, cabinets or chests, located in storerooms below the full-load waterline. Except where stowed in chests or lockers, the lower part of the bulkheads where acids are stored shall be provided with a watertight acid-resistant rubber lining.

(2) Maintain hydrofluoric acid in acid-proof polyethylene or ceresin-lined bottles at all times and never allow them to come in contact with skin or eyes.

(3) Stow medical acids in acid resistant containers in the medical storeroom.

(4) Do not stow inorganic acids in flammable liquid storerooms, except when contained within an acid stowage locker. Since many inorganic acids are oxidizers, stowage in a flammable liquid storeroom, even in an acid locker, should be avoided.

d. **Organic Acids**. Do not permit liquid and solid organic acids, such as glacial acetic, oxalic, carbolic, cresylic, and picric acids to come in contact with the eyes or skin. These acids are corrosive to aluminum and its alloys, to zinc, and to lead. Keep these acids, usually packaged in glass bottles, from freezing and physical damage. Stow these acids in a locker lined with acid-resistant material in the flammable liquids storeroom separated by a partition, or by at least 3 feet, from all other material.

e. **Alkalis**. Stow alkalis (bases), such as sodium hydroxide, trisodium phosphate, sodium carbonate, potassium hydroxide, lithium hydroxide, and ammonium hydroxide (ammonia water) in designated lockers, cabinets, or chests.

Keep alkalis separated from acids, oxidizers, and other incompatible materials. Ensure the stowage area is dry.

NOTE:

Many shipboard cleaning agents and laundry materials contain alkalis in very strong concentrations. Observe specified stowage and handling precautions for these materials.

C2309. OXIDIZERS

An oxidizer is any material, such as chlorate, perchlorate, permanganate, peroxide, nitrate or nitrite which yields oxygen readily to support the combustion of organic matter, or which may produce heat, or react explosively when it comes in contact with many other materials. Higher temperatures increase the possibility of oxygen release from oxidizers and the possible initiation of fire. Heat shall be avoided when handling and storing oxidizers.

a. **Storage Requirements**

(1) Store oxidizers following the precautions listed in paragraph C2304.

(2) Do not store oxidizers in an area adjacent to a magazine or heat source or where the maximum temperature exceeds 100 degrees Fahrenheit under normal operating conditions.

(3) Ensure that oxidizers are not stored in the same compartment with flammable or combustible materials such as fuels, oils, solvents, grease, paints, or cellulose products. See appendices C23-C, Hazardous Material Compatibility Storage Diagram, and C23-F, Incompatible Materials Chart.

b. **Handling and Usage Requirements**

(1) Handle and use oxidizers per the precautions listed in paragraph C2305.

(2) Do not use oxidizers in an area where they might mix with flammable or combustible materials (i.e., fuels, solvents, oils, grease, paints, or cellulose products).

(3) When transferring oxidizers to second containers, **ensure that the second container is compatible with the oxidizing material**. Place appropriate warning labels on the second container.

(4) Do not remove or obliterate warning labels from containers.

(5) Ensure oxidizing materials are only handled or used by authorized personnel.

c. **Calcium hypochlorite** is a very strong oxidizer used to provide the sanitizing and bleaching property of chlorine without requiring the handling of gaseous chlorine.

(1) The following precautions apply to the stowage of calcium hypochlorite:

(a) Stow the ready usage stock of 6-ounce bottles issued to the medical and engineering departments in a locked box mounted on a bulkhead, preferably in the cognizant department office space. Do not, under any circumstances, install the box in a machinery space, flammable liquids storeroom, berthing space, storeroom, or in the oil and water test laboratory areas. A

metal box such as a first aid locker is recommended for this purpose. Drill three vent holes in the bottom of the box, each 1/4-inch in diameter, to allow the release of any chlorine products. (The metal box is a standard stock item, readily available, is relatively inexpensive and requires only repainting to be suitable). No more than 3 days supply of calcium hypochlorite shall be maintained in ready usage stock at any one time. Only 6-ounce bottles are to be used as ready usage. Do not use 3-3/4-pound bottles of calcium hypochlorite as ready usage stock.

(b) Stow ready usage stock for sewage disposal treatment in steel or aluminum cabinets or racks located on a bulkhead in the macerator-chlorinator space. Do not stow paints, oils, greases, or combustible organic material in this space. Equip cabinets or racks with shelving and retaining bars to secure the individual containers.

(c) Stow storeroom stocks in labeled, ventilated lockers, or bins. Locate these lockers or bins in an area where the maximum temperature will not exceed 100 degrees Fahrenheit under normal operating conditions and which is not subject to condensation or water accumulation. The area shall not be adjacent to a magazine, and the lockers and bins shall be located at least 5 feet from any point heat source or surface that may exceed 140 degrees Fahrenheit. Do not locate these lockers in an area used for stowage of paints, oils, greases, or combustible organic materials. Do not stow more than 48 6-ounce bottles or 36 3-3/4-pound bottles in any individual locker or bin. Only issue calcium hypochlorite to personnel designated by the medical or engineer officer.

(d) Stow calcium hypochlorite, carried as cargo, in a separate enclosure constructed of steel or expanded metals. Ensure that the enclosure has a secure door. Do not locate the enclosure in an area used for stowing paint, oils, greases, or other combustible materials. Locate the enclosure in an area where maximum temperature will not exceed 100 degrees Fahrenheit under normal operating conditions and is not subject to condensation or water accumulation. Do not locate the enclosure adjacent to a magazine and within 5 feet from any point heat source. Sprinkler protection is not required but need not be avoided. For unpalletized material, equip the enclosure with shelving and retaining bins to contain securely the individual boxes.

(e) Label all lockers, bins, and enclosures with red letters on a white background:

HAZARDOUS MATERIAL, CALCIUM HYPOCHLORITE

(2) The following precautions apply when using calcium hypochlorite:

(a) Mix only with water.

(b) Do not allow calcium hypochlorite to come into contact with paints, oils, greases, wetting agents, detergents, acids, antifreeze, alkalis, or combustible materials.

(c) Do not remove or obliterate warning labels.

(d) Dispense only in clean, dry utensils and only in amounts required for immediate use.

(e) Avoid contact with skin and eyes.

(f) Ensure containers are not used for any other purpose.

(g) Do not mix with materials containing ammonia.

(h) For external contact or if taken internally, follow the instructions printed on the container label or in the MSDS.

(i) No special firefighting precautions are required for fires caused by calcium hypochlorite.

d. **Organic Chlorine Laundry Bleach**. This bleach contains an organic chlorine-liberating compound and was selected as a less hazardous material to replace calcium hypochlorite as laundry bleach. However, under conditions of high heat and humidity, organic chlorine laundry bleach emits vapors that can be hazardous to personnel. Stow this bleach in a cool, dry place as far from conditions of high heat and humidity as possible. Do not mix with materials containing ammonia.

C2310. AEROSOLS

Materials in aerosol containers: An ever-increasing demand exists for pressurized (aerosol) dispensers for the application of paints, enamels, lacquers, insecticides, inspection penetrant kits, lubricating oils, silicones, and rust preventatives. The aerosol propellants may be low boiling hydrocarbons that are flammable, such as propane or isobutane. The contents of the aerosol-type pressurized containers are under pressure, and exposure to heat may cause bursting of the dispensers. The propellants in higher concentrations may be anesthetic, asphyxiating, and extremely flammable. The decomposition products formed when propellants contact open flames or hot surfaces may be corrosive, irritating, or toxic.

a. **Storage Requirements** (except for personal hygiene and shaving products)

(1) Stow aerosols following the precautions listed in paragraph C2304.

(2) Ensure that inside stowage of aerosols is in the flammable liquid storeroom. See appendices C23-C, Hazardous Material Compatibility Storage Diagram, and C23-F, Incompatible Materials Chart.

(3) Stow ship's stores aerosol stock items in the flammable liquid storeroom.

(4) Do not stow containers in areas with temperatures above 120 degrees Fahrenheit or adjacent to steam lines, hot zones, or heat sources.

(5) Limit ready-usage stocks of any one product located at work areas to 7-days supply.

b. **Handling and Usage Requirements**

(1) Handle and use aerosols per the precautions listed in paragraph C2305.

(2) Never use aerosols near a heat source or a spark-producing device. Do not smoke in the area in which aerosol material is being used.

(3) Keep aerosol containers away from steam lines, electronic equipment, hot water, and other heat sources.

(4) Avoid prolonged exposure of aerosol containers to sunlight.

(5) Avoid prolonged or repeated inhalation of aerosol spray or vapors of residual liquid.

(6) Do not disperse aerosol spray near flames, hot surfaces or ignition sources due to potential hazards from thermal decomposition products.

(7) Ensure food or tobacco products are not contaminated with spray.

(8) Avoid accumulation of wetted rags or clothing that may be subject to spontaneous heating or ignition. Ignition may be initiated by the temperature of low-pressure steam pipes, the surfaces of incandescent light bulbs, sunlight, or any other heat source.

(9) Avoid accumulation of aerosol or flammable concentrations of aerosol spray or vapors in the air.

(10) Use aerosols containing material with a flash point less than 73 degrees Fahrenheit on board ship only when required for a specific use and authorized by the cognizant division officer.

C2311. COMPRESSED GASES

Aboard Navy ships, numerous cylinders of compressed gases will be found. Compressed gases are used for welding operations (oxygen and acetylene), in refrigeration and air conditioning systems, and for purging various systems (nitrogen). Cylinders of compressed gases are potential explosion, fire, and health hazards if strict compliance with existing requirements is not met.

a. **Storage Requirements**

(1) General

(a) Only stow compressed gases, with the exception of flammable and explosive gases and ready service cylinders, in compartments designated for cylinder storage, as shown in applicable plans for each ship. Whenever practical, stowage shall permit removal of any cylinder without disturbing other cylinders. Such compartments shall:

1. Be kept free of all flammable and combustible materials (especially greases and oils).

2. Be maintained at temperatures below 130 degrees Fahrenheit.

3. Have instructions posted at all entrances requiring ventilation of the compartment for a period of at least 15 minutes prior to entry.

(b) Securely fasten each individual cylinder in the vertical position (valve end up) by metal collars and with horizontal restraints to meet Grade "B" shock mounting requirements.

(c) Stow cylinders by date of receipt, and place into service in the order of receipt.

(d) Tag empty cylinders **EMPTY**, or mark **MT**, and segregate from full or partially full cylinders.

(2) Oxygen

(a) Only stow oxygen cylinders in designated, well-ventilated spaces except as noted in paragraph C2311a(4)(b).

(b) Conduct an atmospheric analysis prior to entry into any sealed compartment where oxygen is stowed as specified in chapter B8.

(3) Flammable and Explosive Gas Weather Deck Stowage. Unless approved below-deck stowage locations are shown on a ship's plan, all flammable and explosive gas storage shall be on the weather deck. Take the following

precautions, in addition to those in section C2311a(1) when storing flammable or explosive gasses on the weather deck:

(a) Never stow oxygen bottles in close proximity to fuel gas cylinders.

(b) Screen cylinders from the direct rays of the sun.

(c) Protect cylinder valves during winter months from accumulations of snow and ice.

(d) Make every effort to prevent corrosion of threaded connections on cylinders. However, under no circumstances use grease or flammable corrosion inhibitors on oxygen cylinders.

(e) Ensure stowage areas are as remote as possible from navigating, fire control, and gun stations.

(f) Keep all flammable materials, especially greases and oils, out of the stowage area.

(4) Ready Service

(a) The following gas cylinders, when in use or staged for use, are permitted below decks outside of stowage compartments:

1. Fire extinguishers (portable)

2. Fire-extinguishing cylinders permanently connected to fixed fire-extinguishing systems

3. Gas and chemical canisters for oxygen breathing apparatus

4. Welding cylinders

5. Medical gas cylinders

6. Cylinders containing refrigerants

7. Disposable cylinders supplied as repair kit accessories (halide leak detector kits, for example).

(b) Welding Cylinders. Observe the following special instructions and precautions regarding oxygen and fuel gas cylinders in ready service:

1. Install cylinders of gas necessary to equip each authorized shop and repair locker in accordance with approved plans or specifications.

2. Fasten cylinders securely in a rack (stationary or wheeled). Ensure acetylene cylinders are always stowed vertically. Securely fasten the rack, in turn, to the bulkhead at the designated locations.

3. Never leave equipment unattended.

4. Return welding units to designated stowage as soon as work is complete.

5. Post the following warning at each designated stowage location:

WARNING

NOT SECURE

Unit is **NOT SECURE** while pressure shows on gauges, or when cylinders are not firmly fastened to rack or to bulkhead, or when rack is not firmly fastened to bulkhead. If removed from this location, constantly attend this unit until returned and secured.

6. Attach a card to each welding unit with the following instructions:

Return to (designated location) immediately on completion of work. Do not leave unit unattended while away from above location. Unit is **NOT SECURE** while pressure shows on gauges, or cylinders are not firmly fastened to rack, bulkhead, or stanchion.

b. **Handling and Usage Requirements**

(1) Never drop cylinders nor permit them to strike against one another violently.

(2) Never use a lifting magnet or a sling (line or chain) when handling cylinders. If a crane or hoist is used, provide a safe cradle or platform to hold cylinders.

(3) When returning empty cylinders, be sure that valves are closed and that valve outlet, if provided, and cylinder valve protection caps are in place.

(4) Be sure that all cylinders in the ship's stores are approved under Department of Transportation (DOT) regulations. Non-magnetic cylinders are an exception.

(5) Refill cylinders only when such action is specifically approved by the command.

(6) Fill a cylinder only with the gas for which the cylinder has been specifically designated.

(7) Do not remove or change the numbers or marks stamped into cylinders without the specific approval of the Defense General Supply Center.

(8) Never use cylinders for rollers, supports, or for any purpose other than to carry gas.

(9) Never tamper with the safety devices on valves or cylinders.

(10) Never hammer or strike the valve wheel in attempting to open or close valves. Use only wrenches or tools provided and approved for this purpose.

(11) Be sure that the threads of regulators or other auxiliary equipment are the same as those on cylinder valve outlets. Never force connections that do not fit.

(12) Do not use regulators, pressure gauges, manifolds, and related equipment that are provided for a particular gas on cylinders containing different gases.

(13) Repair or alter cylinders or valves only when authorized by NAVSEASYSCOM.

(14) Unless specifically authorized, never subject compressed gas cylinders, either in stowage or in service, to a temperature in excess of 130 degrees Fahrenheit. Do not allow a direct flame to come in contact with any part of a compressed gas cylinder. For carbon dioxide extinguishers in spaces above 130 degrees Fahrenheit, see NSTM 555.

(15) Protect cylinders from objects that will cut or otherwise abrade the surface of the metal.

(16) When testing for leaking gas cylinders, use soapy water or leak-detection compound conforming to MIL-PRF-25567E.

(17) Only use a gas cylinder that is properly marked (by color of paints or with the name of the gas stenciled on cylinder and valve). Return all mis-marked cylinders to the nearest Naval Supply Depot.

(18) Work center supervisors shall ensure that supply and exhaust ventilation exists in compartments where compressed gases are stored or in use, systems are in good operating condition, and have been evaluated as adequate by an industrial hygiene survey team.

(19) To thaw out valve outlets that are clogged with ice, use warm (not boiling) water. The use of boiling water will melt the fusible plugs, if present, and vent the cylinders.

(20) Never discharge a cylinder into any device or equipment in which the gas will be entrapped and create pressure. The only exception is a cylinder equipped with a pressure regulator set to control the pressure.

(21) Never use oil-tolerant gases when oil-free gases are required. This practice is discouraged by the fact that valve outlets are not interchangeable, however, there have been cases in which this safety feature has been overcome by homemade adapters.

c. **Recharging Cylinders Aboard Ships**

(1) Recharge only oxygen, nitrogen and carbon dioxide cylinders, except as noted in paragraph C2311c(2).

(2) Ensure that the recharging is supervised by a graduate of the Fleet Training Center Cryogenics School.

NOTE:

Small cylinders of hydrogen routinely used for nuclear propulsion plant operations may be refilled without a graduate of Cryogenics School being present.

(3) Recharge a cylinder only if less than 5 years have passed since its last hydrostatic test date. The only exceptions are 3A and 3AA cylinders having water capacities under 125 pounds, for which a 10-year hydrostatic test frequency is approved. For fire extinguisher and fire extinguishing system cylinder hydrostatic test requirements, see NSTM Chapter 555.

(4) If evidence of oil or grease above the neck ring is present, do not recharge oxygen cylinders.

(5) Before recharging, sniff-test each cylinder for evidence of contamination by a foreign gas. Oxygen and oil-free nitrogen cylinders should be odorless. An oily odor from these cylinders indicates hydrocarbon contamination. Do not recharge contaminated cylinders.

(6) Keep shipboard oxygen cylinders (aviators' breathing oxygen) and nitrogen cylinders dry by not allowing the cylinder pressure to go below 25 lb/in^2g. Consider a cylinder wet if there is insufficient internal pressure to cause a hissing noise when the valve is opened.

CHAPTER C23

REFERENCES

C23-1 OPNAVINST 5090.1B, Environmental and Natural Resources Program Manual (NOTAL)

C23-2 NAVSUPINST 4410.52B, Shelf-Life Item Identification, Management, and Control (NOTAL)

C23-3 OPNAV Publication P-45-114-95, CNO Policy Guide for Shipboard Hazardous Material Container Disposal (NOTAL)

C23-4 NAVSEA S9593-A1-MAN-010, *Shipboard Management Guide to PCBs* and associated NAVSEA issued PCB Advisories (NOTAL)

Appendix C23-A

HAZARDOUS MATERIAL/HAZARDOUS WASTE CONTAINERS

PART 1

SHIPBOARD USED/EXCESS MATERIAL/CONTAINER CROSS-REFERENCE

Hazardous Material	Container[1]
Acetic acid	Plastic bottle; plastic-lined steel drum
Acetic acid, glacial	Plastic bottle
Acetone	Tin can; steel drum, bung, and vent
Activator/stabilizer (sodium borate)	Plastic-lined steel drum
Adhesive, lagging (organic polymer)	Steel drum
Adhesive, N.O.S.[5]	Steel drum
AFFF (aqueous film forming foam)	Variable[2]
Alodine 1201 (chromic acid)	Glass carboy
Ammonia solution, nickel electroplating	Plastic bottle
Aniline	Tin can; steel drum, bung, and vent
Asbestos	6 mil (6/1,000 inch) plastic bag
Batteries (lead-acid or alkaline wet cell)	Steel drum[4]
Battery acid (sulfuric)	Plastic bottle; plastic-lined steel drum[3]
Baygon (phenolic pesticide)	Steel drum, bung, and vent
Blanket wash (acacia gum)	Steel drum
Bulbs, fluorescent light (with mercury)	Original carton
Chemicals, photographic, N.O.S.[5]	Plastic bottle
Chromium electroplating solution	Plastic bottle
Citric acid	Plastic bottle[3]
Cleaner, chemical, N.O.S.[5]	Tin can; steel drum
Cleaning solvent, N.O.S.[5]	Steel drum, bung, and vent
Cobalt electroplating solution	Plastic bottle

Appendix C23-A

HAZARDOUS MATERIAL/HAZARDOUS WASTE CONTAINERS

PART 1

SHIPBOARD USED/EXCESS MATERIAL/CONTAINER CROSS-REFERENCE

Hazardous Material	Container[1]
Compound, epoxy	Steel drum
Compound, silicone	Steel drum
Concentrated Solutions (photo refresher) N.O.S.[5]	Plastic bottle; plastic-lined steel drum
Copper electroplating solution	Plastic bottle
Compound, antiseize (graphite-petroleum)	Steel drum, removable cover
Compound, antiseize (lead oleate)	Steel drum, removable cover
Compound, boiler passivator (oxalic acid)	Plastic-lined steel drum
Compound, descaler (caustic/acid)	Plastic-lined steel drum
Compound, sealing (synthetic polymer)	Steel drum
Damping fluid (petroleum base)	Tin can
Darco drycoal activated	Steel drum (for contaminated material, removable cover)
Developer, N.O.S.[5]	Plastic-lined steel drum
Disinfectant, fungisol (quinone)	Plastic bottle
Disinfectant, general purpose	Steel drum, bung, and vent
Disodium phosphate	Steel drum, removable cover
Earth, diatomaceous (filter)	Plastic-lined steel drum (for contaminated material)
Electroplating etching solution, N.O.S.[5]	Plastic bottle; plastic-lined steel drum
Ethylene glycol (antifreeze)	Plastic-lined steel drum
Ethyl alcohol	Plastic bottle
Fiberglass epoxy	Steel drum
Fixer (w/silver halides), N.O.S.[5]	Plastic bottle; plastic-lined steel drum

Appendix C23-A

HAZARDOUS MATERIAL/HAZARDOUS WASTE CONTAINERS

PART 1

SHIPBOARD USED/EXCESS MATERIAL/CONTAINER CROSS-REFERENCE

Hazardous Material	Container[1]
Flux (sodium nitrate/nitrite) N.O.S.[5]	Tin can; steel drum
Formic acid solution, nickel electroplating	Plastic bottle; plastic-lined steel drum
Freon	Plastic bottle; plastic-lined steel drum
Grease, ball bearing	Steel drum, removable cover
Grease, general purpose	Steel drum, removable cover
Grease, graphite	Steel drum, removable cover
Grease, halocarbon	Steel drum, removable cover
Hydraulic fluid (petroleum)	Steel drum, removable cover
Hydraulic fluid (synthetic)	Epoxy-lined steel can; plastic lined steel drum
Hydrochloric acid	Plastic bottle[3]
Hydrofluoric acid	Plastic bottle
Hydrogen peroxide	Plastic bottle; plastic-lined steel drum
Hypo cleaning (ammonium persulfate)	Plastic-lined steel drum
Indicator, stop bath (organic dye)	Steel drum, bung, and vent
Ink, black oil based	Steel drum, bung, and vent
Insecticide diazinon (organophosphate)	Tin can; steel drum, bung, and vent
Isopropyl alcohol	Plastic bottle
Lacquers	Tin can; steel drum, bung, and vent
Leak test (penetrant)	Plastic bottle
Lithographic solutions, N.O.S.[5]	Plastic bottle; plastic-lined steel drum
Lithographic solvents, N.O.S.[5]	Steel drum, bung, and vent
Mercuric nitrate	Plastic bottle

Appendix C23-A

HAZARDOUS MATERIAL/HAZARDOUS WASTE CONTAINERS

PART 1

SHIPBOARD USED/EXCESS MATERIAL/CONTAINER CROSS-REFERENCE

Hazardous Material	Container[1]
Mercury (amalgam)	Plastic bottle
Mercury remover (calcium oxide-sulfur)	Steel drum, removable cover
Methyl alcohol	Plastic bottle
Methyl ethyl ketone	Steel drum, bung, and vent
Molybdenum graphite, drylube	Steel drum, removable cover
Molybdenum nickel 447	Plastic bottle
Morpholine, 40 percent	Tin can; steel drum[3], bung, and vent
Naphtha	Steel drum, bung, and vent
Nickel, chromium, aluminum 441	Tin can; steel drum, removable cover
Nickel solutions	Plastic bottle
Nitrate, silver	Plastic bottle; plastic-lined steel drum
Nitric acid	Glass carboy
Nonskid flight deck compound (asphaltic)	Steel drum, removable cover
Oil, cutting (synthetic)	Epoxy-lined steel can
Oil, liquid coolant (synthetic)	Epoxy-lined steel can
Oil, N.O.S.[5]	Steel drum, bung, and vent
Oxygen breathing apparatus canister	Fiberboard box
Paint, enamel, N.O.S.[5]	Steel drum, bung, and vent
Perchloroethylene	Steel drum, bung, and vent
Petrobond sand with waste oils	Steel drum, removable cover
Phosphoric acid	Plastic bottle; plastic-lined steel drum
Pinso pads (shellac)	Steel drum, removable cover

Appendix C23-A

HAZARDOUS MATERIAL/HAZARDOUS WASTE CONTAINERS

PART 1

SHIPBOARD USED/EXCESS MATERIAL/CONTAINER CROSS-REFERENCE

Hazardous Material	Container[1]
Polychlorinated Biphenyls (PCB's), items containing	Polyethylene lined steel cans; plastic- lined steel drum, bung, and vent/removable cover
Remover, paint (caustic)	Plastic bottle; plastic-lined steel drum
Resin, ion exchange (activated polymers)	Steel drum (for contaminated material)
Resin, laminating (plastic)	Steel drum
Reverser (aromatic hydrocarbon reducers)	Steel can
Silver solutions	Plastic bottle
Sodium chromate (ballast)	Variable[2]
Sodium chromate	Plastic bottle
Sodium cyanide solution, gold electroplating	Plastic bottle
Sodium hydroxide solid	Steel drum, removable cover
Sodium hydroxide solution	Steel can; steel drum[3], bung, and vent
Sodium nitrate	Steel drum
Sodium phosphate	Steel drum[3]
Stannous chloride	Plastic bottle
Stannous fluoride	Plastic bottle
Stop bath, N.O.S.[5]	Plastic bottle
Sulfamic acid solid	Plastic-lined steel drum
Sulfamic acid solution	Plastic bottle; plastic-lined steel drum[3]
Sulfuric acid	Glass carboy; plastic bottle; plastic-lined steel drum
Thinner (organic), N.O.S.[5]	Tin can; steel can; steel drum
Tin plating solution	Plastic bottle

Appendix C23-A

HAZARDOUS MATERIAL/HAZARDOUS WASTE CONTAINERS

PART 1

SHIPBOARD USED/EXCESS MATERIAL/CONTAINER CROSS-REFERENCE

Hazardous Material	Container[1]
Tin 2090	Plastic bottle
Toluene	Tin can; steel can; steel drum, bung, and vent
Trichloroethane solvent	Tin can; steel can; steel drum, bung, and vent
Trichloroethylene	Tin can; steel can; steel drum, bung, and vent
Trichlorofluoromethane	Tin can; steel can; steel drum, bung, and vent
Trisodium phosphate	Steel drum[3]
Varnish, insulating electrical	Steel drum, bung, and vent
Varnish, N.O.S.[5]	Steel drum, bung, and vent
Varnish, phenolic resin	Steel drum
Xylene	Tin can; steel can; steel drum, bung, and vent
Zinc quick cold galvanizing	Plastic bottle; plastic-lined steel drum

NOTES: 1. Wherever possible, the Department of Transportation-approved container used in the original issue of the material shall be reused. Container openings specified are for storage of those materials that are characteristically liquid, semi-solid, or solid. Some materials (for example, silicone compounds) may appear in more than one state, depending upon usage. The choice of openings for containers used to hold those materials shall be made on a case-by-case basis.

2. No standard container proposed. Containers may vary from 5- to 55-gallon drums to large bulk tanks.

3. Bulk usage is probable in large-scale operations.

4. Typical shipboard portable wet-cell batteries vary widely in size. Accordingly, personnel shall match the size of the storage drums used to the size and number of batteries to be containerized. A standard 18 gauge, 55-gallon steel drum, for example, will accommodate, respectively, two BB259 batteries; four BB258 batteries; six BB257 batteries; or 40 BB255 batteries. (Weight constraints, however, may also be a factor in determining the total number of batteries per container.) Batteries shall be stored right side up.

5. Not otherwise specified.

Appendix C23-A

HAZARDOUS MATERIAL/HAZARDOUS WASTE CONTAINERS

PART 2

SHIPBOARD USED/EXCESS MATERIAL/CONTAINERS:

DESCRIPTION AND SUPPLY DATA

Type	National Stock Number	Item Description
Bag	8105-00-848-9631	Polyolefin, single wall, 5 mil, 36-in by 54-in, flat, wire tie
Plastic bottle with screw cap closure[1]	8125-00-174-0852	Polyethylene, 1 gal, round
	8125-00-731-6016	Polyethylene, 13 gal, round
	8125-00-888-7069	Polyethylene, 5 gal, round
Fiberboard box	8115-01-012-4597	Fiberboard, RSC style, 34-in by 26-in by 16-in, burst-strength 400 lb
Tin can with screw cap closure[1]	8110-00-879-7182	Tin, 1 gal, oblong, enamel outside surface treatment
Steel can lined	8110-00-128-6819[2]	Steel, 24 gauge, 1 gal, screw cap with neoprene liner closure, epoxy resin interior lining
	8110-00-400-5748[2]	Steel, 24 gauge, 5 gal, screw cap with neoprene liner closure, epoxy resin interior lining
Glass carboy	8125-00-598-9380	Glass, 5 gal, wood box overpack
Steel drum with removable cover	8110-00-030-7780[2]	Steel, 16 gauge, 55 gal, removable cover with lock ring, enamel outside surface treatment
	8110-00-951-9728	Bolt ring set for 55 gal drum
	8110-00-823-8121	Steel, 18 gauge, 55 gal, removable cover with lock ring, enamel outside surface treatment
	8110-01-101-4055	Hazardous material recovery, 85 gal, open head
Steel drum with removable cover[1]	8110-00-866-1728	Steel, 18 gauge, 30.0 gal., removable cover with lock ring, enamel outside/inside surface treatment
	8110-01-016-7362	Bolt ring set for 30 gal. drum

Appendix C23-A

HAZARDOUS MATERIAL/HAZARDOUS WASTE CONTAINERS

PART 2

SHIPBOARD USED/EXCESS MATERIAL/CONTAINERS:

DESCRIPTION AND SUPPLY DATA

Type	National Stock Number	Item Description
	8110-00-082-2625	Steel, 18 gauge, 27 gal., removable cover with lock ring, enamel inside/outside treatment
	8110-00-044-2984	Steel, 18 gauge, 20 gal., removable cover with lock ring, enamel inside/outside treatment
	8110-00-254-5716	Steel, 20 gauge, 12 gal., removable cover with lock ring, enamel inside/outside treatment
	8110-00-254-5715	Steel, 20 gauge, 9 gal., removable cover with lock ring, enamel inside/outside treatment
	8110-00-254-5713	Steel, 22 gauge, 6 gal., removable cover with lock ring, enamel inside/outside treatment
	8810-01-254-5722	Steel, 22 gauge, 4 gal., removable cover with lock ring, enamel inside/outside treatment
	8110-01-101-4056	Hazardous material recovery, 85 gal, open head
Steel drum with bung and vent[1]	8110-00-282-2520[2]	Steel, 5 gal, enamel exterior treatment, spout
	8110-00-292-9783[2]	Steel, 18 gauge, 55 gal, with bung and vent, enamel outside surface treatment
Steel drum with bung and vent[1]	8110-00-597-2353[2]	Steel, 16 gauge, 55 gal, with bung and vent, paint exterior surface treatment
Plastic liner	8115-00-145-0038[2]	Liner, polyethylene, 5 gal, to be used with 5-gal steel drum
Plastic drum	Not available	Polyethylene, 5 or 55 gal, used to contain AFFF, reusable[3]

NOTES:

1. Container openings specified are for storage of those materials that are characteristically liquid, semi-solid, or solid. Some materials (for example, silicone compounds) may appear in more

than one state, depending upon usage. The choice of openings for containers used to hold those materials shall be made on a case-by-case basis.

2. EPA-approved container types for packaging liquid PCBs. Suitable containers that meet the DOT specifications: 5, 5B, 6D (with 2S or 2S polyethylene inserts), 17C, and 17E may be used as substitutes. PCBs should be packed in these approved containers with absorbent material such as standard absorbent sweeping compound, NSN 7930-00-209-1272, or Safestep , NSN 7930-01-145-5797 25 lb.

3. This type can be reused only if the drum:

   a. Is in good condition.

   b. Is triple rinsed and completely drained before reuse.

   c. Is properly relabeled.

Appendix C23-B

NAVY USED HAZARDOUS MATERIAL IDENTIFICATION LABEL

USED

SHIP_____ WORK CENTER_____

NAME OF MATERIAL_____

PROCESS IN WHICH MATERIAL USED _____

_____

ANY KNOWN IMPURITIES_____

SPECIAL STOWAGE REQUIREMENTS_____

_____

DIVISION OFF. SIGNATURE _____ DATE_____

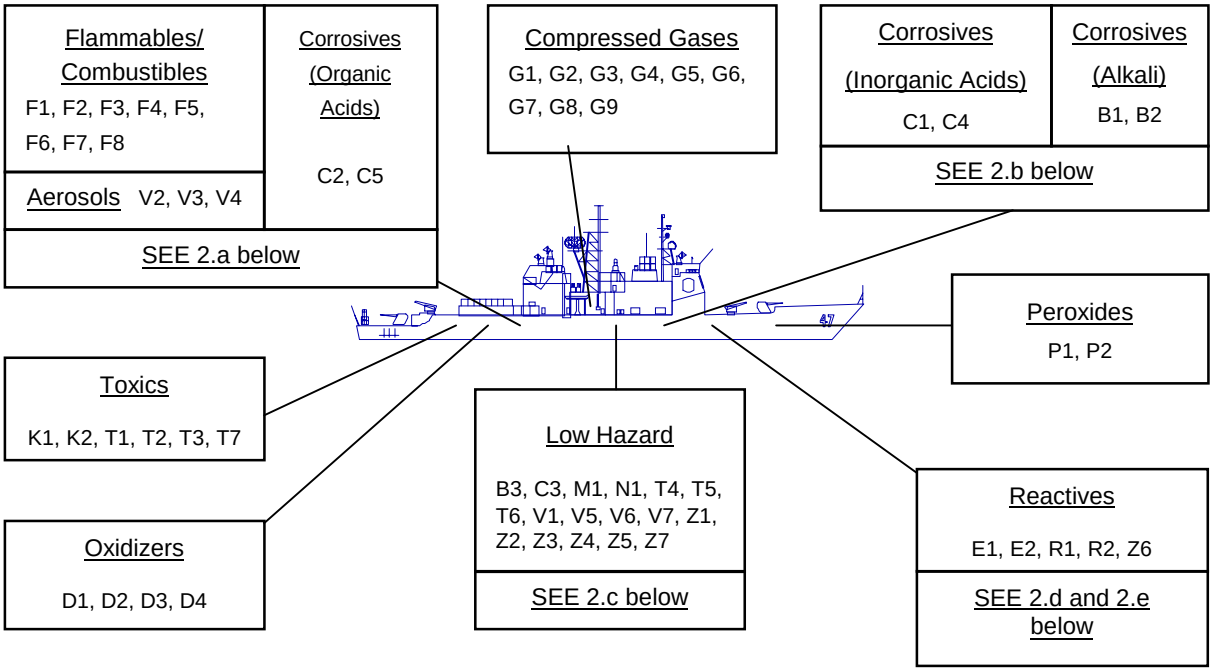
HAZARDOUS MATERIAL

OPNAV 5100/18 (12-93) S/N 0107-LF-016-9100

Appendix C23-C

HAZARDOUS MATERIAL COMPATIBILITY STORAGE DIAGRAM (USING HMIS HAZARD CHARACTERISTIC CODE (HCC))

The Hazardous Characteristic Code (HCC) for each SHML item can be found in the Hazardous Material Information System (HMIS). The HCC and their intended use are defined and explained in appendix C23-D.



Instructions:

1. Each block represents a separate stowage location. The codes in the boxes are grouped with other codes with which they are compatible for storage. A subdivision within a block represents secondary separation within the primary classification.

2. The following secondary stowage requirements apply:

   a. Stow organic acids in a locker lined with acid-resistant material in the flammable liquids storeroom separated by a partition, or by at least 3 feet, from all other material. Separate aerosols (V2, V3, V4) from flammables by placing in a locker or barrier such as floor to ceiling wire mesh, chain link fence, etc. to protect personnel from aerosols that can become self-propelled projectiles.

   b. Separate B1, B2, C1, and C4 by at least 3 feet from each other.

   c. Separate B3 and C3 by at least 3 feet from each other.

d. Further segregate R1 into a Spontaneously Combustible storage within the Reactive Storage area.

e. Should not store R2 in areas protected with water sprinkler system. Fire protection should be non-water based.

Appendix C23-D

HMIS CODING AND STORAGE REQUIREMENTS

Table C23-D-1

HAZARD CHARACTERISTIC CODE FOR HAZARDOUS MATERIAL GROUPS

The Hazard Characteristic Code (HCC) is a two digit alpha-numeric code that is used to provide a means of categorizing hazardous materials (HM). It is an identification and tracking mechanism which links the stock number with details of the product hazards. Trained scientific or engineering personnel assign HCCs using the data provided on the Material Safety Data Sheet (MSDS), thereby, uniformly identifying hazardous materials managed by all Government activities. This information is captured in the DoD Hazardous Materials Information System (HMIS), and it allows the systemic tracking and identification for any regulatory purpose.

HCCs allow relatively untrained personnel to properly receive, handle, store, process and manage hazardous materials at a high level and are most effective when used in conjunction with the detailed regulations of Title 10, 29, 40, and 49 of the Code of Federal Regulations. NAVSUPPUB 485 provides storage location guidance for each HCC. The HCC also serves as an identifier for automated processing of hazardous materials transactions, space utilization management, and compatible storage.

HAZARD GROUP	HCC
1. Radioactive Materials	
a. Licensed	A1
b. License Exempt	A2
c. License Exempt, Authorized	A3
2. Alkali Materials	
a. Corrosive, Inorganic	B1
b. Corrosive, Organic	B2
c. Low Risk	B3
3. Acid Materials	
a. Corrosive, Inorganic	C1
b. Corrosive, Organic	C2
c. Low Risk	C3
d. Corrosive and Oxidizer, Inorganic	C4
e. Corrosive and Oxidizer, Organic	C5
4. Oxidizers	
a. Oxidizer	D1
b. Oxidizer and Poison	D2
c. Oxidizer and Corrosive, Acidic	D3
d. Oxidizer and Corrosive, Alkali	D4

Table C23-D-1 (Cont'd)

HAZARD GROUP	HCC
5. Explosives (See OP4, OP5, and OP2165)	
a. Explosives, Military	E1
b. Explosives, Low Risk	E2
6. Flammable/Combustible Materials	
a. Flammable Liquid, DOT Packing Group I, OSHA	F1
b. Flammable Liquid, DOT Packing Group II, OSHA IB	F2
c. Flammable Liquid, DOT Packing Group III, OSHA IC	F3
d. Flammable Liquid, DOT Packing Group III, OSHA II	F4
e. Flammable Liquid and Poison	F5
f. Flammable Liquid and Corrosive, Acidic	F6
g. Flammable Liquid and Corrosive, Alkali	F7
h. Flammable Solid	F8
7. Compressed Gases	
a. Gas, Poison (Nonflammable)	G1
b. Gas, Flammable	G2
c. Gas, Nonflammable	G3
d. Gas, Nonflammable, Oxidizer	G4
e. Gas, Nonflammable, Corrosive	G5
f. Gas, Poison, Corrosive (Nonflammable)	G6
g. Gas, Poison, Oxidizer (Nonflammable)	G7
h. Gas, Poison, Flammable	G8
i. Gas, Poison, Corrosive, Oxidizer (Nonflammable)	G9
8. Medical Substances	
a. Infectious Substance	K1
b. Cytotoxic Drugs	K2
9. Magnetized Material	M1
10. Not Regulated as Hazardous	N1
11. Peroxides	
a. Peroxide, Organic, DOT Regulated	P1
b. Peroxide, Organic, Low Risk	P2
12. Reactive Chemicals	
a. Reactive Chemical, Flammable	R1
b. Water Reactive Chemical	R2
13. Toxic Chemicals	
a. DOT Poison - Inhalation Hazard	T1
b. UN Poison, Packing Group I	T2
c. UN Poison, Packing Group II	T3
d. UN Poison, Packing Group III	T4
e. Pesticide, Low Risk	T5
f. Health Hazard	T6
g. Carcinogen (OSHA, NTP, IARC)	T7

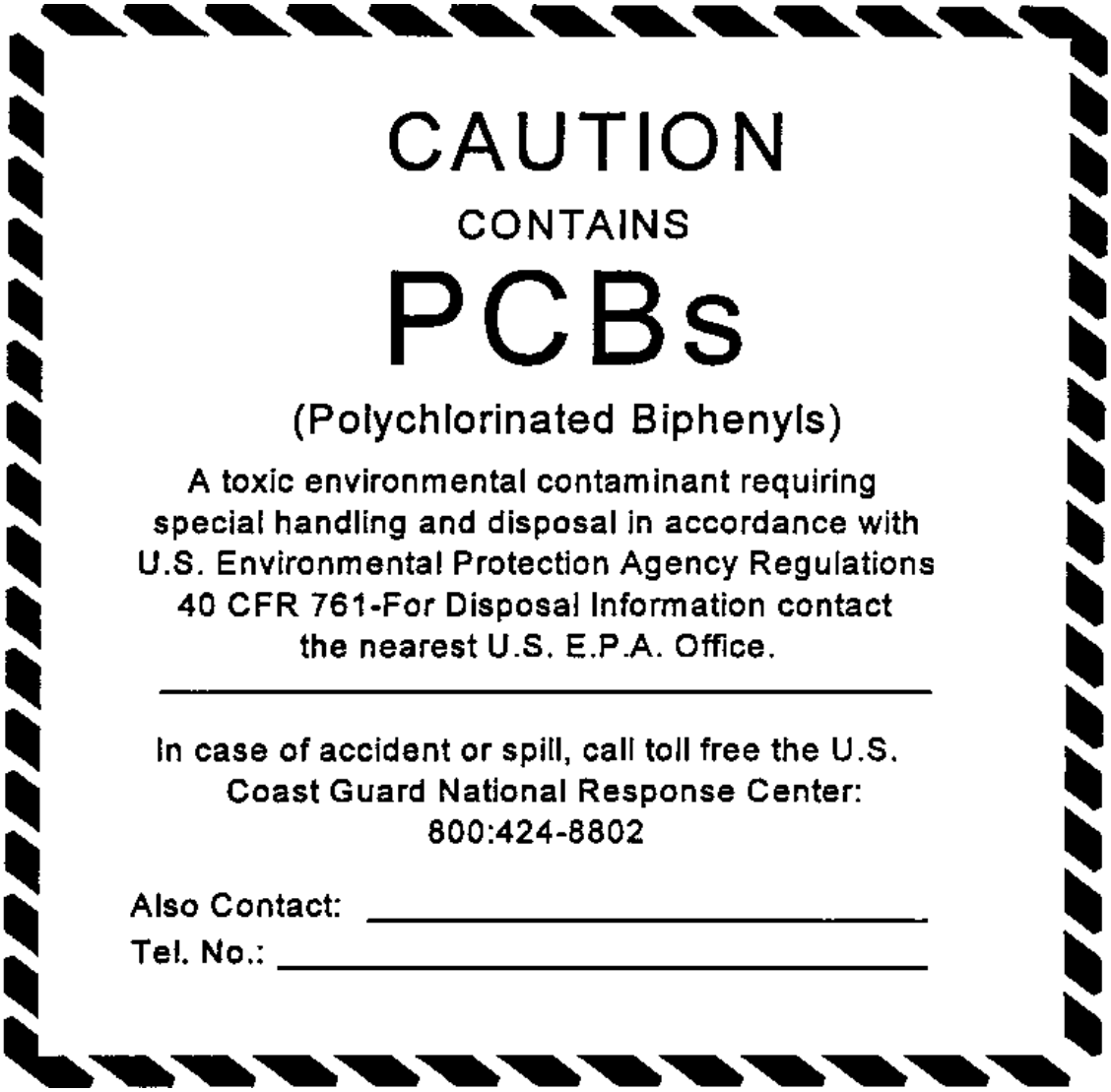
Table C23-D-1 (Cont'd)

HAZARD GROUP	HCC
14. Miscellaneous Hazardous Materials	
a. Miscellaneous Hazardous Materials - DOT Class 9	V1
b. Aerosol, Nonflammable	V2
c. Aerosol, Flammable	V3
d. DOT Combustible Liquid, OSHA IIIA	V4
e. High Flash Point Materials, OSHA IIIB	V5
f. Petroleum Products	V6
g. Environmental Hazard	V7
15. OSHA and DOT Articles	
a. Article Containing Asbestos	Z1
b. Article Containing Mercury	Z2
c. Article Containing Polychlorinated Biphenyl (PCB)	Z3
c. Article, Battery, Lead Acid, Nonspillable	Z4
d. Article, Battery, Nickel Cadmium, Nonspillable	Z5
e. Article, Battery, Lithium	Z6
f. Article, Battery, Dry Cell	Z7

Appendix C23-E

PCB LABELS

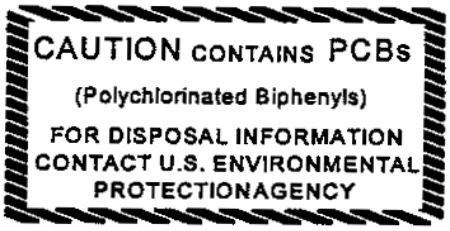
Large PCB Label



This label is available in the following sizes:

Size	Stock Number
6" X 6"	0116-LF-050-9030
4" X 4"	0116-LF-050-9020

Small PCB Label



This label is available in the following size:

Size	Stock Number
1" X 2"	0116-LF-050-9010

Appendix C23-F
Incompatible Materials Chart

HMUG GROUP	HCC see note 2	GROUP NAME	EXAMPLES	INCOMPATIBLE MATERIALS	EXAMPLES	REACTION IF MIXED
1	C1, C2, C4, C5	ACIDS	Battery Acid Paint Removers De-Rust Spray	FLAMMABLES/ COMBUSTIBLES ALKALIS/BASES/CAUTICS OXIDIZERS (HMUG Groups 2, 3, 6, 7, 9, 10 ,11, 12, 13, 14, 16, 17, 18, 20, 22)	Degreasers, Carbon Removers, Anti-Fogging Compounds	HEAT Gas Generation VIOLENT REACTION
2	F1 to F7, P1, T6, V3, V4	ADHESIVES	Epoxies Isocyanates Diethylenetriamine	ACIDS ALKALIS/BASES/CAUSTICS OXIDIZERS (HMUG Groups 1, 3, 18)		HEAT FIRE HAZARD
3	B1, B2	ALKALIES BASES/ CAUSTICS	Ammonia Sodium Hydroxide Cleaners	ACIDS/OXIDIZERS FLAMMABLES/COMBUSTIBLES (HMUG Groups 1, 2, 9, 10, 14, 18, 20)	Battery acid, Paint Removers, De-Rust Sprays, Paints, Solvents	HEAT Gas Generation VIOLENT REACTION
4	C1-C4, B1-B3, F2 to F7, T4, T6, V2-V4	CLEANING COMPOUNDS	Degreasers Carbon Removers Antifogging Compounds	DETERGENTS/SOAPS OXIDIZERS (HMUG Groups 7, 18)	Calcium Hypochlorite, Sodium Nitrate, Hydrogen Peroxide	HEAT FIRE HAZARD
5	G1 to G9	COMPRESSED GASES	Acetylene, Propane, Nitrogen, Argon, Helium, Oxygen	HEAT SOURCES Consult paragraph C23 and NSTM 670 for specific handling and stowage guidance (HMUG Groups 8, 9, 10, 11, 12, 15, 18, 19)		FIRE HAZARD EXPLOSION HAZARD
6	F2 to F5, T6, V2, V3, V4	CORROSION PREVENTIVE COMPOUNDS	Corrosion Inhibitors Chemical Conversion Compounds	ACIDS/BASES OXIDIZERS IGNITION SOURCES (HMUG Group 1, 18)		FIRE HAZARD
7	B3	DETERGENTS/ SOAPS	Trisodium Phosphate Scouring Powders Disinfectants	ACID-CONTAINING COMPOUNDS (HMUG Groups 1, 18)	Battery Acid, Paint Removers De-Rust Sprays	VIOLENT REACTION HEAT
8	F8, V6, V7	GREASES	Lithium Grease Silicone Molybdenum	OXIDIZERS ALKALIS/BASES/CAUSTICS (HMUG Groups 5, 18)		FIRE HAZARD HEAT
9	T6, V4, V6, V7	HYDRAULIC FLUIDS	Petroleum-Based Synthetic Fire-Resistant	CORROSIVES, OXIDIZERS (HMUG Groups 1, 3, 5, 18)		VIOLENT REACTION
10	F2 to F4, T4, T6, V2-V6	INSPECTION PENETRANTS	Petroleum-Based Dyes	CORROSIVES, OXIDIZERS (HMUG Groups 1, 3, 5, 18)	Battery Acid Caustic Soda Chlorine laundry bleach Calcium Hypochlorite Hydrogen Peroxide OBA Canisters Paint Removers	
11	F4, T6, V2, V3, V4, V6	LUBRICANTS/ OILS	General Purpose, Gear, Turbine, Weapons			EXPLOSION HAZARD
12	F2 to F6, P1, T3, T4, T6, V1-V4	PAINT MATERIALS	Primers, Enamels, Urethanes, Lacquers, Varnishes, Non-Skid, Thinners	ACIDS, OXIDIZERS (HMUG Groups 1, 5, 18)		HEAT FIRE HAZARD
13	C1-C4, B1-B3, D1	PHOTO CHEMICALS	Developers, Stopbath, Toners, Bleaches, Replenishers	ACIDS HEAVY METALS (HMUG Groups 1, 18, 20)		HEAT FIRE HAZARD
14	F4	POLISH/WAX COMPOUNDS	Buffing Compounds Metal Polishes General Purpose Waxes	CORROSIVES OXIDIZERS (HMUG Groups 1, 3, 18)		HEAT, FIRE HAZARD VIOLENT REACTION
15	F2 to F6, T3, T4, T6, V1-V4	SOLVENTS	Methyl Ethyl Ketone (MEK) Toluene, Xylene Acetone	CORROSIVES OXIDIZERS BATTERIES (HMUG Groups 5, 18, 21, 22)	Battery Acid Calcium Hypochlorite Sodium Nitrate Sodium Hydroxide	HEAT FIRE HAZARD
16	T6, T7, Z1	THERMAL INSULATION	Asbestos Fiberglass Glass Wool	**MATERIAL IS NOT REACTIVE KEEP DRY**		**NO REACTION**
17	C1-C4, B1-B3, D1	WATER TEST/ TREATMENT CHEMICALS	Nitric Acid Mercuric Nitrate Caustic Soda	CORROSIVES OXIDIZERS HEAVY METALS (HMUG Groups 1, 3, 18, 20)		HEAT VIOLENT REACTION
18	D1 to D4	OXIDIZERS	Calcium Hypochlorite Laundry Bleach OBA Canisters	PETROLEUM BASED MATERIALS FUELS, SOLVENTS, CORROSIVES, HEAT (HMUG Groups 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22)		FIRE HAZARD TOXIC GAS GENERATION TOXIC
19	F1 to F4, V4, V5, V6	FUELS	JP4, JP5 Gasoline Diesel Fuel	CORROSIVES OXIDIZERS (HMUG Groups 1, 3, 18)	Battery Acid Calcium Hypochlorite Sodium Nitrate Sodium Hydroxide	FIRE HAZARD TOXIC GAS GENERATION
20	T6, V7, Z2	HEAVY METALS	Mercury Lead Beryllium	CORROSIVES OXIDIZERS WATER TREATMENT/PHOTO CHEMICALS (HMUG Groups 1, 3, 6, 13, 17, 18, 21)		VIOLENT REACTION GENERATION OF TOXIC AND FLAMMABLE GAS
21	Z4 to Z7	BATTERIES	Lead-Acid Dry-Cell Alkaline	SOLVENTS HEAVY METALS OXIDIZERS (HMUG Groups 15, 18, 20)	Xylene Toluene Alcohol	HEAT VIOLENT REACTION TOXIC GAS GENERATION TOXIC
22	T2 to T6	PESTICIDES	Insecticides, Fungicides Rodenticides Fumigants	CORROSIVES OXIDIZERS (HMUG Groups 1, 3, 18)		TOXIC GAS GENERATION

1. This chart is to be used as a *GUIDE ONLY!*
2. Compare the desired HMUG Group/HCC in the left column with the incompatible Material(s) of that Group in the center column on the same row. Mixing of the HMUG Group/HCC with the Incompatible Material(s) will result in the reaction(s) listed in the right column.
3. Not all applicable HCCs are listed; only the most frequently encountered

NAVY

OCCUPATIONAL SAFETY AND HEALTH

(NAVOSH)

PROGRAM MANUAL

FOR FORCES AFLOAT

OPNAV INSTRUCTION 5100.19D
VOLUME III
SUBMARINE SAFETY STANDARDS

DEPARTMENT OF THE NAVY

OFFICE OF THE CHIEF OF NAVAL OPERATIONS

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, D.C. 20350-2000

IN REPLY REFER TO
OPNAVINST 5100.19D VOL III
N45
05 October 2000

OPNAV INSTRUCTION 5100.19D, VOLUME III

From: Chief of Naval Operations

Subj: NAVY OCCUPATIONAL SAFETY AND HEALTH (NAVOSH) PROGRAM MANUAL FOR FORCES AFLOAT, VOLUME III

Ref: (a) OPNAVINST 5100.19D, Volume I

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

1. Purpose. To provide the third volume of the Navy Occupational Safety and Health Program Manual for Forces Afloat.

2. Cancellation. OPNAVINST 5100.19C, Volume III

3. Discussion

a. This instruction provides the submarine safety standards and precautions necessary to carry out the program established in reference (a). Representatives of the Fleet Commanders in Chief and submarine Type Commander staffs provided significant input to this document.

b. This instruction reflects modifications to regulatory requirements, embodies lessons learned from mishaps, and incorporates changes directed by the Fleet Review Board to enhance the NAVOSH Program. Since this document modifies every chapter and most of the paragraphs from OPNAVINST 5100.19C, it does not identify modified, added, or deleted paragraphs.

4. Action

a. Replace the current Volume III of OPNAVINST 5100.19C with enclosure (1).

b. Each command should have sufficient copies of enclosure (1) to ensure that personnel in each work center have access to the information.

5. This instruction will be incorporated into the next CD-ROM produced by Navy Directives and distributed to all commands. In the interim to ensure timely distribution, a separate CD-ROM of this instruction will be distributed to each afloat Safety Officer within 90 days. Paper copies of this instruction are no

longer distributed. Defense Automated Printing Service is authorized to produce paper copies of CD-ROM instructions at cos to the requesting command.

6. Forms. The following forms may be ordered from the Navy Supply System per NAVSUP P2002:

FORM	TITLE	STOCK NUMBER
DD 2521 (12/88)	Hazardous Chemical Warning Label	0102-LF-012-0800
DD 2522 (12/88)	Hazardous Chemical Warning Label	0102-LF-012-1100

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FT39 (Technical Training Center)
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FT54 (Submarine School)
FT111 Occupational Safety and Health and Environmental Training Center

OPNAV (N09, N45 (100), N143D (12), N86, N87, and N88)

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RECORD OF CHANGES			
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CHAPTER D1

BASIC SAFETY

D0101. DISCUSSION

a. Shipboard life is one of the more hazardous working and living environments that exist. The existence of hazardous materials and equipment, in addition to the fact that a ship is a constantly moving platform subject to conditions such as weather, collision, and grounding contribute to a potentially hazardous environment. Any chain of mishaps could lead to a major catastrophe. It is for this reason, PRACTICAL SAFETY must be followed and the prescribed safety regulations strictly followed to prevent personal injury and illness.

b. The general safety standards in the following section are applicable to all shipboard operations and spaces.

D0102. GENERAL SAFETY STANDARDS

Complying with the following standards may save your life:

a. Locate and remember all exits from working and living spaces that you frequent.

b. Know where life jackets and Steinke hoods are stored.

c. Make sure that all movable objects are secured for sea using appropriate materials.

d. Always wear clothing that snugly fits your body. Wear short sleeves or roll up sleeves when operating rotating industrial machinery.

e. Always move up or down a ladder with one hand on the railing. Never slide down inclined ladders.

f. Know the emergency shut-down procedures for all equipment you use.

g. Always ensure exits are not blocked with equipment or boxes.

h. Always ensure ventilation ducts are free of blockage. Never alter ducts or diffusers without authorization.

i. Horseplay is prohibited aboard ship.

j. Do not wear rings, watches, key rings, and other items that may become entangled or caught on projections, or may be a shock hazard when working with electrical or electronic equipment.

k. Always wear approved safety shoes when required by the job.

l. Walk, don't run in passageways.

m. Always be cautious when nearing a "blind" corner.

n. Know the location of submarine escape equipment for all escape stations and know how to conduct an escape from each escape station.

o. Know the location of all fire stations and other firefighting equipment throughout the ship.

p. Keep constantly familiar with the whereabouts of crew members in the space where you are working, especially if they are working in tanks, voids or other restricted movement areas.

q. Smoke only in designated areas.

r. Equipment shall be operated only by authorized personnel and in an authorized manner.

s. Sunglasses shall only be worn topside, and shall not be worn as protective equipment for operations such as firewatch or welding.

t. If you pass through a watertight door designated to be closed during normal operations, be certain that it is properly closed and dogged.

u. Know where all life rings, watermarkers, and flares are located for man overboard emergencies.

v. Observe all personal protective equipment requirements.

w. Promptly inform senior personnel responsible for a given space or equipment of all unsafe conditions discovered.

x. Do not lean against lifelines. Never dismantle or remove any lifeline, or hang or secure any weight or line to any lifeline except as authorized by the Commanding Officer. Use temporary lifelines when possible.

y. Keep decks free of obstacles and materials causing slippery conditions, particularly in work areas. Areas that are slippery shall be posted with a warning sign.

z. Provide temporary protection by guardrails or chains, suitably supported by stanchions or pads, when opening accesses in bulkheads or decks which are normally closed.

aa. Never straddle or step over lines, wire, and chains under tension.

ab. After opening and prior to passing through a watertight door, hatch, scuttle, or manhole cover, ensure hatch brace pins and/or safety pawls and scuttle/manhole covers are positively locked.

ac. Wear an inherently buoyant life-jacket or auto-inflatable utility life preserver (AIULP) and approved topside shoes topside where the potential exists of falling, slipping, being thrown, or carried into the water. Safety harnesses shall be worn by all personnel on the main deck while underway, except during the maneuvering watch, or unless otherwise specified by the commanding officer.

ad. Never dismantle or remove any inclined or vertical ladder without permission of the commanding officer. Such areas shall be secured with temporary lifelines and shall be posted with a warning sign.

ae. Never operate machinery or equipment with defective safety devices or missing machine guards.

af. Never tamper with or render ineffective any safety device, interlock, ground strap or similar device intended to protect operators or the equipment without specific approval of the commanding officer.

ag. Never open or close electrical switches and pipe valves unless authorized to do so.

ah. Ensure that low overheads above inclined ladders (72") and passageways (75") and obstructions in passageways are padded, and hazardous areas around machinery are color-coded to warn people of danger areas.

ai. Only enter tanks and/or voids that have been checked by a gas free engineer and the results posted at the entrance.

aj. Never tamper with any damage control or rig for dive fittings or equipment.

ak. Portable stereo earphones shall not be worn while performing work aboard ship or while transiting throughout the ship. Wear portable stereo earphones only while in your rack, recreation/study areas, in berthing spaces or ship authorized spaces.

D0103. TRAINING

a. While most of the standards specified in this chapter are covered during basic training, Submarine School, and at specific training schools, new crew members, upon reporting on board, should be given a brief orientation as to their intent and importance and where they may be found aboard ship.

b. Every time a mishap occurs involving a violation of one of these standards, all personnel should have the appropriate standard again brought to their attention. This can be accomplished through the use of Plan of the Day notes, divisional training, or quarters.

D0104. EMERGENCY RESPONSE EQUIPMENT

a. Ensure all emergency response equipment is complete and in good repair.

b. Stow emergency response equipment in a location affording quick, easy access.

CHAPTER D2

STORES HANDLING/RIGGING

D0201. DISCUSSION

a. Stores are any material that are carried in its own container and are not in bulk form, such as fuel. Examples of stores are provisions and supplies that are carried aboard submarines.

b. Stores handling evolutions are extremely dangerous even though they appear routine. Stores being handled can fall or shift, causing injury to personnel and damage to the ship. Additionally, hazardous material that is damaged often causes illness or death in extreme conditions. Stores handling gear can fail, causing not only stores damage, but also the handling gear itself can maim or even kill, as well as cause physical damage. It is for these reasons that care must be used during stores handling operations.

c. This chapter is written from the standpoint that a submarine would be the receiver of stores. Such stores may be received from a tender or from the shore through the use of cranes or other lift equipment.

d. Submarines are required to perform some rigging operations for the removal of or installation of equipment. Rigging aboard submarines will frequently involve the use of chainfalls and come-a-longs and may involve the use of the ship's davit.

D0202. STORES HANDLING PRECAUTIONS

The following precautions should be followed during stores handling operations:

a. When using the ship's davit for stores handling, use correct and well-maintained blocks and sheaves for safe load handling operations. The following procedures and safety precautions shall be observed at all times:

(1) Ensure the SAFE WORKING LOAD is stamped on each block and on the davit. A test label plate showing test data, facility conducting test, and date of test should be located on the davit.

(2) Before use, inspect blocks and sheaves for defects. Sheaves with corrugated grooves, chips, or excessive wear and blocks with damaged shells, straps, swivels, shackles, eyes, or excessive wear shall not be used.

(3) Know the load capacity of hooks and ensure that such capacity is not exceeded. Test all hooks for which no applicable manufacturer's recommendations are available at twice the intended safe working load before initially putting into use. Maintain a record of the dates and results of such tests. Inspect hooks periodically to see that they have not been bent by overloading. Do not use bent or sprung hooks. Visually inspect hooks before lifting the rated load.

(4) Use safety hooks fitted with a safety latch or mouse the hook.

(5) Keep hands safely away from a hook until clearance is given to hook or unhook. Be especially careful to keep clear of swinging hooks.

(6) Set hooks firmly in place before making a lift. Never carry a load on the point of a hook.

b. When stores are being put aboard ship, using a crane:

(1) Always know where the cargo is during a transfer.

(2) Wear a hardhat with chin strap in place under the chin, gloves when handling wire rope or banding material, and safety shoes.

(3) Never walk under suspended cargo.

(4) When stores are being lowered, keep feet and hands clear.

(5) Never put hands **under** cargo during transfer.

c. When loading stores by hand, personnel topside and those forming a chain down the stores loading hatch shall wear approved hard hats and safety shoes.

d. Know firefighting and safety equipment locations.

e. Do not walk backwards.

f. If wearing glasses, ensure they are shatter proof.

g. Never throw anything down a hatch or onto a dock.

h. Do not smoke.

i. Inform supervisors of unsafe conditions.

j. Do not ride on conveyors.

k. Wear faceshields and goggles and gloves when removing steel strapping. Have personnel in the area stand to one side or out of the path the strapping will follow when cut.

l. Always brace, shore, and lash stores that may shift.

D0203. CHAINFALLS AND COME-A-LONGS

a. Do not exceed weight for which the equipment was designed.

b. Never kink, twist, or knot chains or slings, as these are among the greatest causes of failures.

c. Never splice or shorten chains by bolting, wiring, or knotting.

d. Clearly mark chainfalls and come-a-longs to show the capacity. Do not exceed marked capacity.

e. Do not use chain, whether new, repaired, or to which hooks or rings have been added, without thoroughly inspecting or weight testing, if required. Tag defective chains or slings or immediately cut up and properly dispose of them.

f. Do not subject chains to sudden shock while in use. Jerky movements put severe strains on the chain.

g. Keep chains free from grit and dirt. Do not drag chains or drop them on hard materials.

h. Use attachments or fittings for chains of the type, grade, and size suitable for service with the size of chain used.

i. Keep brakes free from grease, oil, and rust. Adjust for wear as required.

j. Do not operate unless the ratchet and pawl mechanism is engaged.

k. Keep the equipment dry and rust-free. Lubricate only the load chain.

CHAPTER D3

WIRE AND FIBER ROPE

D0301. DISCUSSION

Ropes come in a multitude of types, quality, and sizes, each with its own characteristics. In general, there are two types of rope: fiber (natural and synthetic) and wire. When removed from a coil or reel, fiber ropes are generally referred to as lines. Wire is referred to as "wire rope" or "wire," but not "cable." Each of these ropes have been developed to satisfy a specific requirement. They can be safely used, but must be properly maintained.

D0302. GENERAL PRECAUTIONS

a. Always inspect wires and lines before use. Look for deterioration, broken wires or fibers, visible signs of rot, chafing, variations in color, crushing, or other signs of damage. Refer to Naval Ships Technical Manual (NSTM) Chapter 613, Wire and Fiber Ropes and Rigging, for additional information on use, maintenance, and material requirements for ropes.

b. Wear topside shoes with skid-proof soles before handling lines. When handling lines, do not wear rings, watches, key rings, and other items that may become entangled.

c. Check and test capstans to ensure they are operating satisfactorily.

d. Avoid getting hands, feet, or clothing caught in bights formed by lines.

e. Do not stand directly in line with the point where (around a bitt, capstan, or through a block) lines change direction.

f. Do not straddle or stand on wires or lines, whether under tension or not.

g. Avoid placing wires or lines on rough or sharp surfaces that can cause chafing or cutting.

h. Do not place objects on wires or lines.

i. Ensure all kinks are out of wires or lines before use.

j. Check sheaves and blocks being used for proper size and strength.

k. Listen to lines under tension. Any unusual popping or tearing noises may mean that the line is in danger of failing.

l. Always place hands above lines fairled into capstans or bitts.

m. Do not lubricate lines.

n. Do not apply loads suddenly.

o. Never leave wires or lines under strain on capstans.

p. Do not use sheaves with corrugated grooves.

q. Remove the loose ends of splices.

r. Seize all bitter ends.

s. Do not use manila, wire, spring-lay rope, or synthetic line together on the same chock or bitt.

t. Carefully make up lines not in use.

u. Do not permit rat guards and sharp edges to wear mooring lines. Use chafing gear and lash well.

v. Change mooring lines in accordance with PMS procedures. Failure to make such changes can result in serious injury.

w. Ensure wires, lines, and rigging are not subject to overload.

D0303. SYNTHETIC LINES

In addition to the precautions in paragraph D0302, the following precautions shall be observed:

a. Do not expose lines unnecessarily to heat, sunlight, excessive cold, or chemicals.

b. Always thaw frozen lines before use.

c. Install tattletale lines to gauge how much mooring lines are stretching.

d. Payout lines on cleats, bitts, or capstans slowly. Exercise extreme care when easing out synthetic lines under heavy load. Because of their high extendibility under load, their rapid recovery, and their low coefficient of friction, these ropes may slip suddenly on easing out, thereby causing injury to line handlers. For control in easing out or surging, take two round turns on the bitts and then apply one or two figure eight bends. No more than two figure eight bends shall be used. Because these bends tend to lock under surge, use of more than two figure eight bends will cause difficulty in easing out operations.

e. Double-up lines under excessive strain.

f. Never use wire or chain stoppers on fiber lines.

g. Stand clear of lines under strain. (The videotape "Synthetic Line Snapback" or SOBT video #4 on "Submarine Line Handling" should be viewed for an appreciation of this phenomenon.)

D0304. WIRE ROPE

In addition to paragraph D0302, the following precautions shall be observed:

a. Always wear heavy duty gloves when handling wire rope.

b. Always wear goggles while splicing.

c. Seize wire ends to prevent unlaying.

d. Store wire rope away from weather, acid, and chemicals.

e. Inspect wire rope in accordance with PMS procedures.

f. When using U-bolt clamps to form an eye, always put the U-bolt itself over the bitter end. Tighten clamps only after putting line under stress.

g. Do not use sheaves or blocks designed for use with fiber rope with wire rope.

h. Inspect end fittings, such as sockets, connectors, and wire rope clips prior to use, to determine if there is an area of break adjacent to the fitting. Tighten clips after the first hour of running and at PMS specified intervals thereafter. Remove clips after long use and examine rope for broken wires. Remove the damaged part, if broken wires are found, and make a new attachment.

CHAPTER D4

WORKING OVER THE SIDE, TOPSIDE, OR ALOFT; DRYDOCK SAFETY

D0401. DISCUSSION

a. Since many areas on the exterior of a ship are inaccessible to the crew, it becomes necessary to go "over the side" or "aloft" to reach these areas. "Over the side" shall be defined as anywhere outboard of the life-lines. "Aloft" shall be defined as either work on or within the sail.

b. The greatest hazards associated with working over the side, topside, or aloft are the potential for slipping and/or falling. Other hazards include the dropping of objects on (or by) personnel and radiation burns From transmitting antenna or radar, and asphyxiation.

c. When a ship is in drydock, many of the precautions associated with working over the side, topside, or aloft must be followed. This chapter will discuss the hazards and precautions associated with this unique evolution.

d. Additional precautions for working over the side, working topside, working aloft, and drydock safety are found in references D4-1 and D4-2.

D0402. GENERAL PRECAUTIONS

a. Wear a parachute type safety harness with Dyna-Brake® safety lanyard, working lanyard and tending line (as required) with double-locking snap hooks. The harness shall be inspected in accordance with established PMS prior to use.

b. Attach safety lanyards to all tools, if practicable. Rig a line and raise/lower tools to the work area in a bucket.

c. When underway, the commanding officer's permission is required to work over the side, topside, or aloft.

d. An experienced senior person shall check any rigging or staging prior to use. Never rig lines over sharp edges. Inspect lines for damage, rot, and wear. Secure lanyards to solid structures.

e. The petty officer in charge shall mark off the work area and keep unnecessary personnel clear. He shall also maintain a sharp lookout for anything that would cause an increase in ship's motion. If the slightest chance of collision exists, personnel shall be moved to safety.

f. Read any safety placards posted in the area prior to commencing work. Submarines shall rig temporary safety placards during hazardous evolutions topside.

g. Cranes used to suspend personnel over the side shall be certified and man-baskets shall be approved by COMNAVSEASYSCOM as safe for manned handling. Comply with the caution plates attached to the inside and outside of the man-basket gate. Personnel suspended over the side by a crane are subject to radiation burn hazards from voltage induced in the hoist wire from transmitting antenna and precautions must be taken.

D0403. ADDITIONAL PRECAUTIONS FOR WORKING OVER THE SIDE OR TOPSIDE

a. Wear an inherently buoyant lifejacket modified with a button hole in the back for concurrent use with the parachute type safety harness and wear a hardhat with chin strap when working over the side.

b. Each person working over the side shall have an assistant to tend lines.

c. Secure the ship's propeller and overboard discharges in the area of personnel working over the side.

d. Only perform work between ships or between a ship and dock with a camel in place.

e. Perform work over the side with the ship in drydock only with the commanding officer's permission.

f. Ensure that a safety line is attached to all power tools (electrical or pneumatic) prior to use topside or over the side.

g. Personnel shall keep clear of all shore power cables and high pressure lines.

D0404. PERSONNEL WORKING ON OR WITHIN THE SAIL

a. Do not go aloft without first obtaining permission from the duty officer.

b. Prior to commencement of work and every 30 minutes thereafter, pass a verbal warning over the 1 MC, **"THERE ARE MEN WORKING IN THE SAIL. DO NOT RAISE, LOWER, ROTATE OR RADIATE FROM ANY MAST OR ANTENNA, DO NOT SOUND THE SHIP'S WHISTLE. DO NOT CYCLE THE FAIRWATER PLANES; THERE ARE MEN WORKING IN THE SAIL."** Upon completion of the work, pass on the 1 MC, **"THE SAIL IS CLEAR."**

c. All radio transmitters and the radar shall be placed in the STANDBY position.

d. Ensure that a safety line is attached to all tools prior to use on or in the sail.

e. Ensure that the safety harness is attached to the sail safety fitting (if provided).

D0405. DRYDOCK SAFETY PRECAUTIONS

a. Personnel working over the side in the drydock shall comply with the precautions indicated in this chapter with the exception that life jackets are not required in drydocks without water. Personnel working over the side in drydock will normally be in a man basket with safety harness and Dyna-Brake® worn. On scaffolding with guard rails, no safety harness is required.

b. Ensure all staging is adequately constructed and supported.

c. Only enter the dock with a hard hat, safety shoes and eye protection.

d. Shift no weights within the ship while in drydock without the permission of the docking officer.

e. Ensure the ship is adequately grounded at all times.

f. Drain all lines subject to freezing, in freezing weather. If frequent service is required, maintain a small flow through the line to prevent freezing.

g. Ensure adequate topside lighting is provided by either installed dock lights or by temporary lighting, particularly in areas where normal passage is obstructed or disrupted by service lines or work in progress.

h. Ensure that any equipment which projects through the hull is operated only with the permission of the commanding officer and then with a safety observer outside the hull.

i. Do not permit horseplay, leaning on lifelines or other negligent practices leading to falling over the side.

j. Do not throw anything over the side into the dock, including debris from cleaning or preservation.

k. When carrying fuel of any kind in drydock, do not allow fuel to drain into the dock. Should it be necessary to remove any fuel from tanks while in drydock, take precautions which will prevent any of the fuel from reaching the floor of the dock.

l. Safety nets shall be rigged extending a minimum of 6 feet on both sides under all access brows between the ship and the dock apron.

CHAPTER D4

REFERENCES

D4-1 COMSUBLANT, COMSUBPAC Instruction 5400.38, "Standard Submarine Organization and Regulations Manual (SSBN)"

D4-2 COMSUBLANT, COMSUBPAC Instruction 5400.39, "Standard Submarine Organization and Regulations Manual (SSN)"

CHAPTER D5

ELECTRICAL AND ELECTRONIC SAFETY AND TAG-OUT PRECAUTIONS

D0501. DISCUSSION

a. Practically every piece of equipment on board ship requires electrical power. Radars, communication equipment, as well as lighting, portable tools, and personal equipment all use power from the ship.

b. The fact that electrical equipment and tools are so commonplace means that hazards involved with electricity are often taken for granted. This is despite the fact that the hazards of electrical shock are commonplace ashore where the extra shipboard hazards of high-powered equipment, unstable work spaces, and saltwater are usually non-existent. Compared to other environments, the potential for electrical shock aboard ship is increased. Although ships' electrical/electronic systems are ungrounded, personnel and equipment may easily become a path to ground in cases of faulty wiring, resulting in injury or death or damage to equipment.

c. Refer to Naval Ships Technical Manual (NSTM) Chapter 300, Electric Plant General, for further guidance.

D0502. DEFINITIONS

a. "**Electrical equipment**" shall include generators, electrically-powered machinery and mechanisms, power cables, controllers, transformers, and associated equipment.

b. "**Electronic equipment**" shall include radars, sonars, radios, power amplifiers, antennas, electronic warfare equipment, computers, and associated controls and peripherals.

D0503. ELECTRICAL PRECAUTIONS

a. **General Precautions for Portable Electrical Equipment**. Portable electrical equipment are devices that may be plugged into the ship’s electrical power. All personnel using portable electrical tools shall:

(1) Wear approved electrical grade rubber gloves when using electric portable tools in hazardous conditions, such as wet decks or bilge areas.

(2) Wear leather gloves over rubber gloves when the work being done could damage the rubber gloves.

(3) Wear eye protection (Z-87.1-approved) when working where particles may strike the eyes.

(4) Wear hearing protection (earplugs or circumaural muffs) when working with noise hazardous tools or in the area where such work is being conducted.

(5) Not use spliced cables.

(6) Not use any portable equipment that has a frayed cord or broken/damaged plug.

(7) Make sure that the on/off switch is in the “off” position prior to inserting/removing the plug from the energized receptacle.

(8) Always connect the cord of a portable electrical equipment into the extension cord before the extension cord is inserted into an energized receptacle.

(9) Always unplug the extension cord from an energized receptacle before the cord of the portable electrical equipment is unplugged from the extension cord.

(10) Arrange the cords so that they will not create a tripping hazard.

(11) Never pick up the tool by the electrical cord.

(12) When drilling/cutting through bulkheads, check opposite side for cables and pipes.

(13) Only use electric equipment in explosive atmospheres if the equipment is approved for such use (explosion proof).

(14) Do not allow cords to run through hatches, chemicals, scuttles, or watertight doors or over sharp objects or hot surfaces.

(15) Do not join more than two 25-foot extension cords together.

(16) When it is necessary to run electrical leads through doors or hatches, protect the cord to guard against accidental closing of the door or hatch.

(17) Return portable electrical power tools, drop cords, and extension cords, to the proper location to prevent damage to the equipment.

(18) Use only COMNAVSEASYSCOM-authorized extension lights for shipboard use in order to eliminate or drastically reduce the many hazards associated with the use of unauthorized commercial grade lights.

b. Do not touch a conductor, until it is tested to be sure it is de-energized.

c. Obey all warning signs; read equipment warning labels before use.

d. Never work on live (energized) electrical equipment without the commanding officer's permission and only per paragraph B0707 of this manual.

e. Always de-energize and "tag-out" with red "**DANGER, DO NOT OPERATE**" tags, installed electrical equipment before starting any maintenance or repair.

f. Do not energize any equipment that is tagged-out. Properly clear the tag first.

g. Only use authorized equipment to perform maintenance on electrical equipment.

h. Close all fuse boxes, junction boxes, switch boxes, and wiring accessories.

i. Never operate a switch with the other hand on a metal surface.

j. Never use outlets that appear to be burnt.

k. Ensure that "dead-man" switches work properly when installed.

l. Use a voltage meter to test whether equipment or circuits are energized.

m. Never remove overload relays except for replacement or preventive maintenance.

n. Use all safety precautions in NSTM, Chapter 300 when working on energized circuits or equipment.

o. Use skin and eye protection when working with wet cell batteries.

p. Visually inspect portable cables, such as shore power "pigtails", for any sign of an unsatisfactory condition, such as tears, chafing, exposed insulated conductors, and damaged plugs and receptacles. Cables shall be of the proper length and cross-sectional area. Do not use spliced portable cables except in emergency conditions, as outlined in Naval Ships Technical Manual, Chapter 300, paragraph 300-4.6.8.

D0504. BATTERIES

a. **Main Storage Batteries**

(1) Observe the following safety precautions when working in the battery well:

WARNING

Remove all metal from body and pockets.

(a) Do not enter the battery well while a charge is in progress.

(b) Never work alone in the battery well except when performing daily gravity checks.

(c) Make no repairs to battery storage connectors when battery current is flowing.

(d) Measure battery ground resistance prior to any work which involves the battery well. Insulate the body from ground by using a rubber sheet.

(e) Use only insulated tools and non-metallic flashlights in the battery well. Be very careful never to short-circuit any part of the battery. Appropriate precautions should be taken (i.e., insulated carrying tray) to ensure that no tools or equipment are dropped between battery cells.

(f) Tools used in the battery well shall be shorter than the distance between metal terminals, when practical.

(g) Ground detectors should never be used with personnel inside the battery well due to the potential for electrical shock.

(h) Keep cell service openings closed except when they must be opened to take readings or add water.

(i) Keep cell tops clean.

(j) Never stow loose gear in the battery well. Gear such as cleaning rags, hydrometer boxes, pieces of wire, and tools must be removed immediately after use.

(k) Station a fire watch in the battery well whenever hot work is being performed at a well boundary. Have an insulated CO_2 fire extinguisher

available for minor fires. Two insulated CO_2 fire extinguishers should be mounted near the battery well.

(2) The charging of batteries will produce hydrogen gas that may be ignited causing fire and explosion. Keep the battery well properly ventilated during charging.

(3) Post a warning placard at the storage battery well access while battery charging is in progress.

(4) Hydrogen is emitted from lead acid batteries during discharge, stand, or charge, and therefore must be continuously ventilated.

(5) Hydrogen detectors must be operated continuously with readings taken at either 15- or 30-minute intervals, depending on the voltage or charging rate. See NSTM chapter 223, volume I, paragraph 223-3.61 for details.

(6) Do not pour water into concentrated sulfuric acid. The heat generated will cause a violent reaction. Sulfuric acid is highly corrosive. Wash up spillage with water and sodium bicarbonate. When handling acid or electrolyte, always wear a rubber apron, rubber boots, rubber gloves, chemical goggles, and a face shield. Know locations of nearest emergency eyewash station.

(7) Do not charge a battery for which the resistance is less than 100,000 ohms.

(8) Add to the battery only pure distilled water or water that analysis has found to be pure enough for battery use. Do not use the battery watering hose for any other purpose.

(9) Refer to Naval Ships Technical Manual, Chapter 223 and applicable technical manual for battery charging and maintenance procedures.

b. **Equipment Batteries**

(1) Mercury batteries shall not be used in nuclear submarines without approval of COMNAVSEASYSCOM.

(2) Lithium batteries shall not be used aboard ship without specific approval of COMNAVSEASYSCOM.

(3) Primary batteries, especially mercury and lithium batteries, shall never be punctured, incinerated or recharged.

(4) Dispose of mercury and lithium batteries promptly as hazardous waste. Mercury cell batteries shall be disposed of at the first shore installation. Lithium batteries shall not be stored at sea for shore disposal, but shall be disposed of in water over 600 feet deep per chapter B3 of this manual. Ashore, dispose of lithium batteries per chapter B3 of this manual.

(5) Remove batteries from equipment before shipment or storage. Cover terminals of batteries with an insulating material to prevent short circuits.

(6) Store spare and used batteries in an adequately ventilated and cool fireproof area.

(7) Turn battery switch off when equipment is not in use or after the battery fails to operate the equipment.

D0505. ELECTRICAL FIRES

a. For electrical fire fighting procedures, see Naval Ships' Technical Manual, Chapter 555.

b. **Main Storage Battery Fires**

(1) A battery fire is nearly always preceded by an explosion. Great care is required fighting such a fire to avoid creating another explosion.

(2) The safest and most effective method for fighting a battery well fire is through oxygen starvation. Secure the well and stop all ventilation within, including agitation air, to deprive flames of oxygen.

CAUTION

NEVER attempt to extinguish a battery fire by pouring water on the battery. The hydrogen and oxygen generated by electrolysis could produce a violent explosion.

c. **Electrical Fire Prevention**

(1) Keep electric motors and generators clean.

(2) Ensure proper maintenance is performed on electrical equipment, i.e., motors, generators, bearings, and filters.

(3) Report overheating or arcing of any electrical equipment.

(4) Keep air filters clean.

D0506. FIRST AID FOR ELECTRICAL SHOCK

a. Fundamentally, electric current rather than voltage is the criterion of shock intensity. The passage of even a very small current through a vital part of the human body can cause death. The voltage necessary to produce the fatal current is dependent upon the resistance of the body, contact conditions, the path through the body, etc.

b. It is imperative to recognize that the resistance of the human body cannot be relied upon to prevent a fatal shock from 115 volts or even lower voltage; fatalities from as low as 30 volts have been recorded.

(1) Symptoms of Electrical Shock. In the event of severe electrical shock, the victim could become very pale or "bluish." His pulse is extremely weak or entirely absent, unconsciousness is complete, and burns are usually present. The victim's body may become rigid or stiff in a few minutes. This condition can be caused by muscular reaction to shock, and it shall not, necessarily, be considered as rigor mortis. Therefore, artificial respiration shall be administered immediately, regardless of body stiffness, as recovery from such a state has been reported. Consequently, the appearance of rigor mortis shall not be accepted as a positive sign of death.

(2) Rescue of Victims. The rescue of electrical shock victims is dependent upon prompt administration of first aid. All electrically trained personnel shall be trained annually in cardiopulmonary resuscitation (CPR) procedures by an instructor certified by an authorized agency, such as the American Red Cross or the American Heart Association.

CAUTION

DO NOT ATTEMPT TO ADMINISTER FIRST AID OR COME IN PHYSICAL CONTACT WITH AN ELECTRICAL SHOCK VICTIM BEFORE THE POWER IS SHUT OFF, OR, IF THE POWER CANNOT BE SHUT OFF IMMEDIATELY, BEFORE THE VICTIM HAS BEEN REMOVED FROM THE LIVE CONDUCTOR.

(3) When attempting to administer first aid to an electrical shock victim, proceed as follows:

(a) Shut off the power.

(b) If the power cannot be deactivated, per step (a), remove the victim immediately, observing the following precautions.

1. Protect yourself with dry insulating material.

2. Use a dry board, belt, dry clothing, or other available non-conductive material to free the victim (by pulling, pushing, or rolling) from the power-carrying object. DO NOT TOUCH the victim.

(c) Immediately after removal of the victim from the power-carrying object, administer CPR.

(d) When providing initial first aid measures, take into account any possible spinal injuries or fractures.

D0507. ELECTRONIC PRECAUTIONS

a. **Definitions**

(1) **Repair**. Removal or replacement, by any method, of any component, subassembly, module, circuit card, or conductor to bring malfunctioning equipment back to an operational status.

(2) **Corrective maintenance**. Alignment, adjustment, tuning, or trouble shooting of malfunctioning equipment per published maintenance or technical manual procedure.

(3) **Preventative maintenance**. Alignment, adjustment, tuning, or testing of operational equipment to ensure performance within published maintenance card or technical manual procedures.

b. Repair of electronic equipment is normally accomplished with the circuit deenergized. Every effort should be made to avoid making repairs to energized equipment. DO NOT repair energized electronic equipment unless you are using approved procedures from technical manuals or other documentation, or an emergency condition exists and the commanding officer has granted permission to perform such repair. In such an emergency, trained personnel shall accomplish the repair of energized circuits and an experienced technician or officer shall supervise. Electronic repair personnel should observe the safety precautions in section 3-4 of the Electronics installation and Maintenance Book (EIMB), NAVSEA SE 000-00-EIM-100, General Handbook.

c. Corrective maintenance on energized electronic equipment is authorized when done according to published maintenance or technical manual procedures. Freelance corrective maintenance (i.e., maintenance without a procedure) on energized electronic equipment shall be performed ONLY with the specific permission of the commanding officer.

d. Preventive maintenance on energized electronic equipment is authorized when it is according to a published maintenance requirement card or technical manual procedures.

e. Perform preventive or corrective maintenance on energized electronic equipment only when duly authorized and trained on that type of equipment.

f. Whenever work on energized electronic equipment exposes the technician to 30 volts or greater adhere to the following precautions:

(1) Study the applicable schematic and wiring diagrams before servicing.

(2) Research into or enter energized electronic equipment enclosure for the purpose of servicing or adjusting only when prescribed by applicable technical manuals, maintenance requirement card, or other approved documentation.

(3) Obtain the commanding officer’s permission whenever work on energized electronic equipment deviates from published corrective or preventive maintenance procedures.

(4) Station a safety observer capable of securing power and rendering adequate aid in the event of an emergency.

(5) Provide warning signs and suitable guards to prevent personnel from coming in accidental contact with dangerous voltage.

(6) Obey all warning signs and heed all equipment warning labels.

(7) Insulate the work from ground with approved electrical grade rubber matting. Installation requirements for electrical grade matting are contained in chapter 634 or NSTM.

(8) Remove or snugly secure any loose clothing. Remove all jewelry.

(9) Insulate all metal tools.

(10) Use only one hand, if practical, in accomplishing the work.

(11) Wear electrical grade rubber gloves on both hands, if possible. If the nature of the work is too cumbersome to wear gloves on both hands, then a glove shall be worn on the non-working hand.

g. Reaching into deenergized equipment also requires special care and precaution.

(1) Study the applicable schematic and wiring diagrams before servicing.

(2) Ensure you are familiar with all circuits that must be deenergized and all voltage storing and high voltage components.

(3) Discharge all voltage storing components with an approved shorting probe.

(4) Do not touch a conductor or electronic component unless you have proven it to be deenergized by using a known, approved voltage tester.

h. Removal of a unit or part from the normal location within an assembly and the energizing of the unit or part, while it is outside the normal enclosure removes the protective features such as interlocks, enclosures and the grounding. These safety features may then no longer function as designed. Ground the chassis and frame of all units removed for servicing and ground all circuits normally grounded in operation whenever power is applied to the unit.

i. Do not energize any equipment that is tagged out. Properly clear the tag out first.

j. Never defeat an interlock or built-in safety device. Modify such safeguard circuits only as authorized by the cognizant system command.

k. Refer to chapter 300 of NSTM and chapter 3 of EIMB General Handbook for additional precautions regarding electric systems.

D0508. TAG-OUT PRECAUTIONS

Submarine Force tag-out procedures shall be enforced per current joint COMSUBLANT/COMSUBPAC Instruction 5101.2 at all times. Enforcement is necessary during normal operations as well as during repair, construction, testing, or maintenance.

CHAPTER D6

SHIPBOARD FUELS

D0601. DISCUSSION

Fuels are used aboard submarines to power emergency auxiliary equipment. The biggest hazard with shipboard fuels is explosion and fire. Other hazards include asphyxiation, body burns, dermatitis, eye and respiratory difficulties, and environmental hazards. Due to the incredible impact a shipboard explosion and fire would have, the possibility that a catastrophe could occur should constantly be in the minds of all personnel, especially those involved in fuel storage and transfer operations.

D0602. PRECAUTIONS

a. Never smoke in fuel storage or transfer areas during maintenance, fueling, or venting operations.

b. Prohibit any open flames, hot work, or the use of non-explosion proof fixtures or equipment near opened fuel storage or transfer areas. Fluorescent fixtures are permitted in areas in which fuel is handled.

c. Ensure forced ventilation is in operation during fueling or venting operations.

d. Always ventilate fuel tanks and obtain gas-free engineer's certification before entering. Ship's medical department representative may certify for entry of ship's force only.

e. Never enter a fuel tank to aid an unconscious crew member without permission, an emergency breathing apparatus (EAB) as respiratory protection and a back-up person standing by.

f. Detect leaks and make immediate repairs in all fuel systems. Clean up pools of leaked or spilled fuel immediately using appropriate hazardous material or oil spill clean-up equipment and procedures. Dispose of fuel contaminated materials as directed by the HM Coordinator.

g. Inspect tanks, piping, fuel hoses, pumps, and communication equipment before transferring fuel. Ensure a drip pan is under all transfer hose connections and that gaskets are in place in hose joints and couplings.

h. Store oily wastes and rags in an approved container and empty daily to avoid spontaneous combustion.

i. Do not discharge fuel or oily wastes over the side. Report any spills over the side immediately. Place sorbent pads at deck edges to prevent spillage from running over the side.

j. Ensure that flash screens (flame arresters) on tank vents are in place and in good material condition.

k. Check air relief valves or pressure-vacuum relief valves to ensure that they are operating properly in accordance with the Planned Maintenance System (PMS).

l. Do not move fuel until all involved have signaled readiness. Maintain a hose and overboard discharge watch during transfer operations.

m. Frequently monitor fuel levels in tanks. Constantly monitor fuel level when fueling.

n. Avoid physical contact with fuel(s). Immediately wash off any fuel spilled on skin with soap and fresh water and remove any clothing soaked in fuel.

o. Do not inhale fuel vapors. Consult with the respiratory protection manager (RPM) to identify an appropriate respirator, if required.

p. Always ground hoses before transferring fuel. Do not break that ground until hoses are disconnected.

q. While pierside, stop all transfer operations during electrical storms or thunderstorms.

r. Install flange shields over pipe joints in accordance with Naval Ships Technical Manual, Chapter 505, Section 7.7. The purpose is to prevent flammable liquids from spraying over a greater area or contacting hot surfaces in the event a leak occurs.

CHAPTER D7

WELDING, CUTTING, AND BRAZING

D0701. DISCUSSION

a. The convenience of metal arc and gas welding and cutting lies largely in the fact that the equipment can be taken to the job. This convenience leads to the performance of construction or repair jobs in spaces that have not been designed for such concentrated heat, or mixtures of toxic or explosive gases. The failure to take proper precautions, during welding or cutting operations in such spaces, presents a serious fire, explosion, electric shock, and health hazard.

b. Health hazards common to welding, cutting, and brazing are numerous. In addition to electric shock, burns to the eyes and skin can be caused by sparks, molten metal, and ultraviolet and infrared radiation. Fumes and gases generated by welding, brazing, and cutting can produce ozone and oxides of nitrogen which are poisonous. Lead, zinc, chrome, and cadmium in alloys produce toxic fumes. Paints and coatings may produce toxic gases and fumes when heated by the flames of the welding torch. Additionally, any metal fume is capable of producing metal fume fever, although metal fume fever is commonly associated with galvanized or zinc-containing metals. Local exhaust ventilation is a must to remove excessive concentrations of air contaminants to safe levels. Welding in closed, unventilated spaces can result in respiratory irritation or poisoning of personnel.

c. Hot work includes:

(1) Flame heating, welding, torch cutting, brazing, carbon arc gouging

(2) Any operation producing temperatures of 400°F or higher

NOTE:

Operations not producing **hot** sparks and flames such as spark-producing or arc producing tools or equipment, static discharge, friction, open flames or embers, impact, and non-explosion-proof equipment such as lights, fixtures, or motors are not considered hot work unless occurring in the presence of flammable liquids or in a flammable atmosphere.

d. Where only class alpha materials (ordinary combustibles) (e.g., wood, cloth, paper, rubber, and many plastics) are exposed, hot work is divided into two classes. These are:

(1) **Class I**. These processes produce either high energy sparks or slag that can be thrown or dropped at the work site or produce heat that can be transferred through the deck, overhead, bulkhead, or structure to a location not visible to the hot work operator. This class includes:

(a) Flame cutting

(b) Welding

(c) Plasma cutting

(d) Arcing and gouging

(e) Electric arc welding

(f) Thermal spraying

(g) Other hot spark or flame producing process not included in class II.

(2) **Class II**. These processes produce flames or minimal energy sparks or slag which are generally localized to the immediate work area. This class includes:

(a) Stud welding with an electric stud gun

(b) Gas-tungsten-arc (GTA) welding

(c) Torch brazing

(d) Ferrous metal grinding with abrasive disks.

D0702. PRECAUTIONS

a. **Clothing**

(1) Use welding goggles or helmet and safety glasses, flameproof gloves, jackets, leggings and boots, as appropriate. A respirator may be required if indicated by the Respiratory Protection Manager (RPM).

(2) Remove lighters from pockets during hot work.

(3) Do not wear synthetic-fiber clothing.

(4) Do not roll up sleeves, cuffs, or have open pockets.

(5) Always wear a welder's jacket or sleeves and apron while welding. Helmets and welding shields shall be fitted with the proper filter and cover lenses.

(6) Always wear gloves when removing or replacing electrodes, or handling energized holders, tables, or equipment. The gloves shall be dry and in good condition.

(7) Cartridge respirators, when properly selected (see chapter B6), will protect against the metal fumes generated during welding. They do not provide oxygen, which may be necessary when working in a confined space. If sufficient ventilation is not available, they will not protect against hazardous gases which may be generated during welding; particularly M inert Gas and Tungsten Inert Gas welding. Where either condition exists, use a supplied-air respirators. Consult the Respiratory Protection Manager (RPM) about respirator use and selection.

b. **Space Precautions**

(1) The following precautions shall be observed during the performance of hot work:

(a) Do not perform hot work when flammable liquids or flammable atmospheres are present without specific instructions of the Gas Free Engineer.

(b) Inspect the other side of the bulkhead, deck, overhead, or other structure to ensure that hot work will not damage materials or equipment that may be on the other side of the hot work operation.

(c) Remove explosive materials and flammable liquids or vapors and take suitable precautions against the reaccumulation of such materials. For welding in spaces in which explosive materials are located (torpedo rooms, missile compartments, etc) refer to NAVSEA OP-4, *Ammunition Afloat*.

(d) Where practicable, relocate all combustibles at least 35 feet from the work site. Where relocation is impracticable, protect combustibles with metal guards or curtains constructed of MIL-C-24576 material. Tighten edges of covers at the deck to prevent sparks from going underneath the cover. This precaution is also important at overlaps where several covers are used to protect a large pile of combustibles.

(e) Protect intricate and vulnerable machinery and equipment from falling sparks or other potential sources of fire with metal guards or curtains constructed of MIL-C-24576 material. Secure protection in-place before commencing hot work.

(f) For hot work processes that generate slag, weld splatter, or sparks, cover openings in decks, bulkheads, or overheads within 35 feet which can be a path to prevent ignition sources from passing into adjacent compartments, spaces, or decks below. A complete containment system as described in chapter 074 section 10 of the Naval Ships Technical Manual (NSTM) meets this requirement. If openings cannot be covered, post a fire watch on the far side.

(g) Blank-off ducts that might carry sparks to distant combustibles or otherwise suitably protect.

(h) When hot work is done near decks, bulkheads, partitions, or overheads of combustible construction, take precautions to prevent ignition.

(i) Do not undertake hot work on pipes or other metal in contact with insulation or combustible decks, bulkheads, partitions, or overheads if the work is close enough to cause ignition by heat conduction.

(j) Do not start hot work in areas other than those specifically designated for hot work without approval of the commanding officer or his designated representative. Abrasive disk grinding with a small wheel (typically 3-inch diameter or less) does not require notification or approval.

(2) Ensure that a gas-free engineer's survey has been completed before working in tanks, voids, or spaces, including adjacent spaces (especially if those tanks contained flammable liquids or vapors) if these spaces are identified as a confined space per chapter B8 of this manual.

(3) Obtain the commanding officer's permission before starting hot work underway (duty officer, in port). Conduct hot work in or on fuel tanks, in spaces in which fuel tank vents terminate, or in other confined spaces known to contain flammable fuel, only with the commanding officer's approval.

(4) Set fire watches as follows:

(a) In **confined or enclosed spaces, machinery rooms, bilges, and other locations proximate to flammable atmospheres (e.g., near fuel tank vents and sounding tubes)**, post fire watches at the worksite when hot work is undertaken. After completion of the hot work operation, fire watches shall remain on station for a minimum of 30 minutes, ensure that the area is cool to the touch, and ensure that no smoldering embers remain.

(b) For **class I hot work**, post fire watches when hot work is undertaken. The fire watches shall stand watch for 30 minutes after hot work is completed.

(c) For **class II hot work**, a commanding officer’s representative (normally the duty officer, engineering officer of the watch, or engineering duty officer) shall determine the need for a fire watch based on his assessment of the worksite prior to undertaking hot work. When posted, the fire watch(es) shall stand watch for 30 minutes after hot work is completed.

NOTE:

Abrasive disk grinding on a ferrous material with a large wheel (typically larger than 3 inches in diameter) typically throws large sparks long distances. A fire watch is recommended for large wheel grinding when class alpha materials (ordinary combustibles) are exposed. A commanding officer's representative shall determine the need for a fire watch.

(d) When a fire watch is not required for class II hot work, the hot worker shall have the appropriate fire extinguishing equipment available. The hot worker may leave the site after hot work is completed and after he/she has conducted a thorough survey of the area to check for smoldering fires. When grinding a ferrous material with a large abrasive disk wheel (larger than 3 inches in diameter), the hot worker shall stand watch for 30 minutes after the hot work ends.

(e) When any type of hot work is being performed on bulkheads, decks, or overheads where sparks or heat transfer may ignite combustibles on the opposite, accessible side, set a fire watch on the far side.

(f) The hot worker and the hot worker's supervisor are responsible for ensuring fire watches are in place prior to starting work.

(g) Train fire watches per NSTM, chapter 074, section 10.

(h) Equip fire watches with personal protective equipment (PPE) as required for the operation being conducted (e.g., appropriate eye protection (welding goggles, or safety glasses and welding helmet), helmet, respiratory protection, fire retardant clothing).

(i) When more than one fire watch is required, establish a communication means.

(5) Ensure fire extinguishing equipment is available in immediate area. The types of fire extinguishing equipment to be used by fire watches is specified in NSTM chapter 074, section 10.

(6) When possible, use a shield painted with a non-reflecting coat of zinc oxide or flat black to separate the welder from other personnel.

(7) Contact the gas free engineer to ensure adequate ventilation is provided in the space prior to commencing hot work.

(8) Protect personnel in areas adjacent to welding sites from arc-produced ultraviolet radiation burns by using protective screens, welding goggles, or other approved means.

(9) When welding in a space which is entirely screened on all sides, arrange the screens so that they will clear the deck so as not to restrict ventilation carrying off the fumes and vapor from the operation.

(10) Never weld near a source of halocarbons, such as refrigerant. Phosgene gas can be produced when halocarbons are exposed to high temperatures.

(11) Do not perform hot work during fueling or ammunition transfer operations.

(12) When anticipating welding/burning on areas treated with vinyl, chip and scrape the area free of vinyl before starting hot work.

(13) Ship's force will not normally weld on the hull. If such welding is necessary, take proper precautions to ensure that special requirements are met. Accomplish radiography at the first opportunity.

c. **Practices**

(1) Only use non-shatterable type cylinders.

(2) Never use oxygen to operate pneumatic tools, blow out pipe lines, blow dust from clothing or work, create pressure, or for ventilation purposes.

(3) Do not carry oxygen, acetylene, or other fuel gas cylinders into confined spaces.

(4) Always return cylinders to the proper storage when work is completed and ensure cylinders are secured in place by metal retaining collars, if installed.

(5) Ground all electrical welding equipment before use.

(6) Stand on a dry surface or insulating material if surface is not completely dry to avoid electric shock.

(7) Do not work alone. Post designated personnel nearby for fire watch as well as rescue purposes. Immediate first aid care in case of an electrical shock may prevent serious consequences.

(8) Never permit the metal part of the electrode or the electrode holder to touch the bare skin or any damp clothing which the operator may be wearing. Do not loop the welding cable over your shoulder or other parts of your body.

(9) Do not put an energized electrode holder under the arm at any time. If an insulated surface or insulated holding peg is not available, remove the electrode and lay the insulated holder on the deck or other adjacent object.

(10) When stopping work for a significant time (lunch or overnight), remove electrode from electrode holder, deenergize the equipment and disconnect welding supply cable from the welding machine.

(11) Where conditions are crowded and welding must be performed close to other personnel, the welding operator shall take special care to ensure that the electrode and holder do not touch nearby occupants.

(12) When using portable machines, ensure that the primary supply cables are separately laid and do not become entangled with welding supply cables.

(13) Inspect work and electrode lead cables regularly for wear and damage. Replace cables with damaged insulation or exposed conductors. Use connecting devices specifically intended for the purpose when joining lengths of supply and electrode cables. Adequately insulate connecting devices for the proposed service conditions.

(14) Keep welding cables dry and free from grease and oil, wherever practical, to prevent premature breakdown of the insulation which could cause serious short circuits.

(15) Suitably support cables overhead when it is necessary to carry them some distance from the welding machine. If this cannot be done, and cables are laid on deck, protect them in such a manner that they will not be damaged or interfere with safe passage of personnel. Take special care to see

that welding supply cables are not close to power supply cables, lighting circuits, or any equipment that utilizes magnetic tapes or depends upon a magnetic principle for operation. Block hatches and doors open to prevent damage to welding cables.

(16) To prevent short circuiting, protect welding equipment used in the open from weather conditions (e.g., rain, snow, sleet, spray).

(17) Smoking cigarettes or other forms of tobacco shall not be permitted while welding or brazing.

d. **Cylinder Safety** Refer to chapter D15 for compressed gas safety precautions.

D0703. EXTRA PRECAUTIONS FOR WORK IN RESTRICTED ACCESS SPACES

a. For the purpose of this section, a restricted space shall mean:

(1) A space with only one exit and,

(2) A space where equipment or structural barriers prevent easy exit or entrance.

b. Ensure proper ventilation is available to permit work in restricted access spaces. When sufficient ventilation cannot be obtained without blocking the means of access, personnel in the confined space shall be protected by air line respirators. Ensure space has been certified gas free, if the space is unmanned and ventilation is non-existent or the space is used to store hazardous material.

c. Leave gas cylinders and heavy welding or cutting equipment outside the restricted access space.

d. Station an attendant outside with instructions to observe the welding operator at all times, and in case of emergency, immediately shut off the gas or welding machine and render such help as the occasion warrants.

e. If entering a restricted access space through a manhole or other small opening, provide means for quick personnel removal in case of an emergency. When safety belts and lifelines are used for this purpose, they shall be so attached to the body that the body cannot be jammed in a small exit opening.

f. If the access fitting to a restricted access space is remotely controlled, ensure measures are taken to secure and DANGER tag-out remote-control equipment to avoid accidental closing of doors.

g. If work in a restricted access space is suspended for any substantial period of time, remove electrodes from the holders of arc welding equipment. One of the three following precautions must be taken:

(1) Remove all arc welding equipment from the restricted access spaces.

(2) Disconnect all such equipment from the source of power. This shall always be done if the equipment is to be left overnight.

(3) Positively insulate all such equipment, including the electrode holder, so that no accidental contacts can be made even if the equipment is moved during this period.

h. In the case of gas welding equipment, always close the torch valves and the gas supply to the torch, when not actually in use, to eliminate the possibility of gas escaping through leaks or improperly closed valves. The

gas supply to the torch must be able to be positively secured from outside the space. Torches shall remain in restricted-access spaces only for the period necessary to perform the required hot work. Overnight and at the change of shifts, the torch and hose shall be immediately removed from confined spaces when they are disconnected from the torch or other gas consuming device.

CHAPTER D8

MACHINERY

D0801. DISCUSSION

a. Machinery is located everywhere in the ship, from the more obvious examples of propulsion equipment in the engineroom, to the less than obvious example of galley equipment. The purpose of this chapter is to define precautions for all types of machinery, including industrial equipment. Electrical safety precautions are covered in chapter D5. Galley equipment is described in D13.

b. All machinery has moving parts. Whenever there are moving parts, there is the possibility of personnel injury. While personnel injury is one aspect of machinery injury, the fact that a person has interrupted the machinery process can lead to even more disastrous accidents.

c. Except in emergencies, and then only when no qualified operator is present, no person shall operate, repair, adjust, or otherwise tamper with any machinery unless assigned by a competent authority, (for example, OOD, CDO, or EDO), to perform a specific function on such machinery. No person shall be assigned to operate or adjust machinery unless he has demonstrated a practical knowledge of its operations and repair and all applicable safety precautions, and then, only when qualified by the department head having cognizance over such machinery. Unqualified personnel will operate machinery only under the supervision of qualified personnel.

D0802. GENERAL PRECAUTIONS

a. Never place any part of the body into moving machinery.

b. Never attempt to ride machinery which is not designed for transport.

c. Do not wear jewelry, neckties, or loose fitting clothing while operating equipment.

d. Wear proper protective clothing and equipment suited to the operation being performed (i.e., hearing protection, eye, hand and foot protection, dust and paint respirators, if indicated by the Respiratory Protection Manager (RPM).

e. Do not wear polyester or other synthetic clothing while standing watch or performing maintenance in main propulsion spaces.

f. Engineering personnel shall wear long-sleeved shirts with sleeves rolled down when on watch or when performing maintenance in machinery spaces where steam is circulating in piping systems or the diesel engine is in operation. Suitable leather or other heavy type gloves shall be worn when working on steam valves or other hot units.

g. Observe manufacturer's safety precautions in the Material Safety Data Sheet (MSDS) and warning labels when handling flammable or toxic liquids; in particular, ensure that ventilation is adequate. Avoid breathing toxic vapors; wear proper personnel protective equipment such as goggles and respirators, if indicated by the Respiratory Protection Manager (RPM).

h. Use only hand tools and work lights that are in good material condition. Electrical tools and lights shall be used only if inspected and approved. Special non-sparking and explosion-proof electrical equipment may be required in the presence of flammable solvents and fuels.

i. Ensure that equipment is deenergized and/or depressurized and properly DANGER-tagged before attempting to perform repairs or preventative maintenance.

j. When working in the vicinity of electrical equipment or electrical cables, be alert to the presence of dangerous voltages and avoid striking such equipment with tools of any kind. Should such damage inadvertently occur, report it immediately to the ship's electrical officer.

k. Do not use compressed air to clean personnel or clothing or to perform general space cleanup in lieu of vacuuming or sweeping. Compressed air may be used to clean machinery parts that have been properly disassembled provided that the supply air pressure does not exceed 30 pounds per square inch (psi) and that a proper safety shield tip is used. Wear safety goggles, hearing protection, and proper respiratory protection, if indicated by the Respiratory Protection Manager (RPM), when using compressed air for cleaning machinery parts.

l. Hazardous materials (HM) are frequently used in the operation and maintenance of machinery. Refer to chapter D15 for safety precautions associated with HM.

m. Supervisors shall ensure that personnel who incur any type of injury or who are exposed to any occupational hazard receive prompt medical attention.

n. Promptly reinstall shaft guards, coupling guards, deck plates, handrails, flange shields, and other protective devices removed as interference immediately after completion of maintenance on machinery, piping, valves, or other system components.

o. Be aware of asbestos thermal insulation and asbestos-containing materials. Ensure proper training, handling/disposal requirements are followed (see chapter B1). Asbestos fireproofing material is still common aboard some ships and asbestos can be found in sheet gaskets, spiral-wound (flexitallic) gaskets, pipe hangers, clutch plates, brake pads, and some lagging.

D0803. MAINTENANCE

Ensure that all installed safety devices, alarms, and sensors are inspected and/or tested following scheduled Preventive Maintenance System (PMS) and other Type Commander requirements.

a. Assign the repair of defective safety devices a high priority.

b. Oil leaks shall be corrected at their source. Spills of any kind shall be wiped up immediately and the wiping rags disposed of immediately or stored in fire-safe containers, emptied daily. Dispose of rags as directed by the HM Coordinator.

c. Avoid trip hazards by maintaining proper stowage.

d. Do not allow fire hazards to accumulate.

e. Ensure that all firefighting equipment is kept in a maximum state of readiness at all times.

f. Ensure repair lockers are properly outfitted and restored after each use.

g. Continuously monitor fire and flooding alarm panels. No alarm or flag shall be allowed to go uninvestigated. Alarm panels known to give false or spurious indications shall either be labeled and repaired or replaced as soon as possible.

h. Piping systems which have been opened for maintenance (after having been properly isolated and tagged-out of service) shall not be left open overnight. Install appropriate metal blank flanges if a section of piping has to remain open overnight or for any extended period of time. Add such temporary openings to the list of items to be checked by the below decks, shutdown roving watch, or space watch for the duration of the maintenance period.

i. Open all tank or piping drains and/or vents before loosening manhole or handhold plates or flanges. Stand clear of such fittings when initially opening them after service.

D0804. INDUSTRIAL EQUIPMENT

a. General Industrial Equipment Operation and Repair Safety

(1) Read manufacturer's instruction books for essential details of readying machines and equipment for operation, cleaning, lubricating, and general care and maintenance. These instruction books, supplemented by technical handbooks, provide comprehensive instructions on all phases of shop practice.

(2) Inspect before operating industrial equipment (fixed or portable) to ensure that the equipment is in good working condition and that all installed or attached safety features (such as guards, limit switches, interlocks, and speed limiting controls) are in place and in good working order.

(3) Unplug or disconnect from power source and affix a red tag (DANGER - DO NOT OPERATE) on all fixed or portable industrial equipment requiring repairs.

(4) Shut off the power when changing industrial equipment parts such as face plates or chucks on lathes or drill bits in electric drills.

(5) Replace machine guards and safety devices after repairing, oiling or greasing, or after inspections or PMS have been completed before the machine is started or operated.

(6) Remove all industrial tools or test equipment used in making repairs, adjustments to machinery, or other shipboard equipment/systems so that all working parts of the machinery, equipment, or system will be free to operate without damage.

(7) Take care that no one is in a position to be injured when the machinery/equipment/system is again set in operation.

(8) Be sure all personnel are clear before starting any industrial tools or equipment.

(9) Make sure there is plenty of light to work by before operating a machine.

(10) See that tools and work are properly clamped before starting a machine.

(11) Only place/mount a saw, cutter head, grinding wheel, or tool collar on a machine arbor when the tool is the proper size to fit the arbor.

(12) Ensure each powered machine has a means of cutting off power which can be safely reached and operated from the operator's normal position, without reaching through the point of operation or other hazardous areas.

(13) On machines where injury to personnel might result if motors were to restart after power failures, check that provisions have been made to prevent machines from automatically restarting upon restoration of power.

(14) Make sure that operating controls are protected by recessing, guarding, location, or other effective means against unexpected or accidental activation of the machine.

(15) The point of operation is the area of a machine where the work is actually performed upon the material being processed. Check that the point of operation is guarded so that personnel cannot be injured by contact with the machine or by flying objects propelled from the machine. Methods of point-of-operation guarding include barriers, shields, interlocks, automatic feed and removal, and two-hand activation devices. The best guarding device is usually one designed and attached by the manufacturer as an integral part of the machine. This selection and design of guards other than those provided by the manufacturer must be adequate to protect personnel and not present a hazard in themselves.

(16) Power transmission devices include belts, chains, pulleys, shafting, fly wheels, gears, sprockets, and any other moving parts of a machine other than the point of operation. Ensure that power-transmission devices are enclosed within the machine or otherwise guarded or so located that it is not possible for personnel to contact the moving parts.

(17) Ensure non-skid strips are installed on the deck (in the operator's work area) in front of permanently mounted machine tools.

b. **Housekeeping**

(1) Keep areas around machines clear of obstructions and in a non-slippery condition. Clean up all spilled oil or grease immediately.

(2) Keep machines clean.

(3) Do not clean chips from the surface of machines with compressed air or with hands; use a brush or hook and wear leather gloves.

(4) Do not use compressed air to clean clothing or to blow dust off the body or to assist in the cleanup of dust, debris, or other particulate matter.

(5) Do not place hand tools on lathes or other machines. Keep them in their assigned location.

(6) Turn off all power to the equipment before removing chips and other debris.

(7) Ensure that all portable tools (electrical or pneumatic) have been tested prior to initial use and periodically, as prescribed by PMS or other data.

(8) Ensure that all machine guards and other safety devices are in place prior to equipment operation.

c. **Portable Power Tools**

(1) Ensure all portable electric power tools have a current safety inspection prior to use.

(2) Ensure that deck grinders and pneumatic needle guns without positive accessory holding are equipped with an operable, manufacturer-installed "deadman" switch.

(3) Keep portable power tools clean, lubricated, and in good repair.

(4) Keep all electrical cords clear of moving parts when using portable electrical equipment around machine tools.

(5) Wear and use necessary personal protective equipment, such as hearing protection for those tools and equipment labeled as noise hazardous.

d. **Operating Precautions - General**

(1) Remove chuck keys, wrenches, or other devices used to attach accessories to industrial machines before operating.

(2) Do not attempt to adjust a tool or feel the edge to be cut while the equipment or tool is in motion.

(3) Never attempt to stop or grab by hand or apply a wrench or tool to moving work or to moving industrial-equipment parts.

(4) Never lean against a machine that is running.

(5) Never leave moving machinery unattended.

(6) Do not distract the attention of a machine operator.

(7) Remove cutting tools from machines when not in use.

(8) Avoid excessive cutting speeds, feeds, and depth of cut. Keep hands clear of moving parts. Use a separate pusher bar or block to feed stock into cutting blades.

e. **Securing for Sea**. When securing for sea, take all precautions to ensure that components of industrial equipment or tools, including accessories, will not sway or shift with the motion of the ship. These precautions should include, but are not limited to, the following:

(1) Lower the arm of top-heavy equipment, such as a radial drill press, to rest on the table or base of the machine and then clamp and block securely.

(2) Secure chain falls and other suspended equipment, such as counterweights on drill presses.

(3) Secure tailstocks of lathes.

(4) Protect and secure tools stowed in cabinets or drawers. Secure drawers and cabinet doors.

(5) Inspect foundation bolts of heavy equipment annually in accordance with PMS to ensure tightness.

f. **Posted Safety Precautions**

(1) Post operating instructions and safety precautions tailored to the specific equipment at each piece of industrial plant equipment. Install warning plates, located to ensure visibility, wherever necessary to minimize possible injury. Also, instructions to never allow machines to run unattended and not to distract the operator while the machine is in operation are appropriate.

(2) Equipment hazard zones and eye hazard areas should be clearly established and marked per chapter B5 of this instruction, ship's plans and specifications, or General Specifications for Ships, section 602j.

g. **Safety Precautions for Specific Types of Equipment**

(1) **Pneumatic Tools - General**

(a) Wear and use necessary personnel protective devices.

(b) Do not connect or drive pneumatic tools by air pressure in excess of that for which the tools are designed.

(c) Only authorized and trained personnel shall operate pneumatic tools.

(d) Lay pneumatic tools down in such a manner that no harm can be done if the switch is accidentally tripped. Do not leave idle tools in a standing position.

(e) Keep pneumatic tools in good operating condition and thoroughly inspect them at regular intervals with particular attention given to on-off control-valve trigger guard (if installed) and hose connections.

(f) Pneumatic tools and air lines may be fitted with quick-disconnect fittings which incorporate automatic excess flow shut-off valves, which shuts off the air at the air lines before changing grinding wheels, needles, chisels, or other cutting or drilling bits.

(g) Only use air hose which is suitable to withstand the pressure required for the tool. Remove leaking or defective hoses from service.

(h) Do not lay hoses over ladders, steps, scaffolds, or walkways in such a manner as to create a trip hazard. Where a hose is run through doorways, protect the hose against damage by the door edge. Preferably, elevate air hose over passageways or working surfaces in a manner to permit clear passage and prevent damage to the hose.

(i) Connect a tool retainer on each piece of equipment which, without such a retainer, may eject the tool.

(j) Ensure that all portable pneumatic grinders are equipped with a safety lock-off device. The lock-off device must automatically and positively lock the throttle in the off position when the throttle is released.

(k) Ensure that air hoses are equipped with "quick disconnect" fittings at all hatches, doors, or scuttles.

(2) **Buffers, Grinders, and Cut-Off Wheels - General**

(a) Check the spindle speed of the machine before mounting of the wheel to be certain that it does not exceed the maximum operating speed marked on the wheel.

(b) Gently tap wheels with a light non-metallic implement, such as the handle of a screwdriver for light wheels, or a wooden mallet for heavier wheels, immediately before mounting. Do not use if they sound cracked (dead). This is known as the "ring test." It should also be noted that organic-bonded wheels do not emit the same clear metallic ring as do vitrified and silicate wheels.

(c) Wheels must be dry and free from sawdust when applying the "ring test," otherwise the sound will be deadened.

(d) Dress or replace wheels that are chipped, rounded, or worn out of round prior to using the grinder.

(e) Replace fabric buffer wheels that are frayed or worn out of round.

(f) Replace wire buffer wheels that are badly worn or loose at the hub.

(g) Permanently-mounted buffers and grinders shall have a shatterproof safety shield in place between the operator's eyes and the work at all times while buffing and grinding. Wear a face shield and safety goggles or safety glasses when operating either portable or permanently mounted buffers or grinders.

(h) Clean the flange surface of grinding and buffing wheels, normally placed between washers and the spindle hole, before mounting the wheel so that clamping pressure will be evenly distributed.

(i) Ensure that the hole in the buffer or grinding wheel is of the proper size for spindle (neither too small nor too large).

(j) Use compression washers as large as the flanges in diameter for buffer and grinding wheels.

(k) Tighten spindle nuts just enough to keep the buffer or grinding wheel from moving out of position between the washers.

(l) Mount tool or work rests on firm supports and space not more than 1/8 inch from the surface of grinding wheel. If equipped with dust collector bags, ensure they are of non-flammable material and are emptied regularly.

(m) Ensure that the hood around grinding wheels is constructed so its periphery can be adjusted to the constantly decreasing diameter of the wheel by means of an adjustable tongue or equivalent. Maintain the distance between the wheel periphery and the tongue or end of the periphery band at approximately 1/4 inch.

(n) Ensure that the upper point of opening in the grinding wheel hood facing the operator is not less than 25 degrees and not more than 65 degrees from a vertical line drawn through the spindle center.

(o) Ensure that the maximum exposure of a grinding or cut-off wheel periphery or circumference for hoods on a swing frame machine does not exceed 180 degrees and the top half of the wheel is protected at all times.

(p) Ensure that the maximum exposure of the wheel periphery or circumference on bench or floor stands does not exceed 90 degrees.

(q) Protect cup-type wheels used for external grinding by either a movable cup guard or a band type guard. Provide all other portable abrasive wheels used for external grinding with safety guards (protection hoods), except as follows:

1. When the work location makes it impractical, use a wheel equipped with safety flanges.

2. When using wheels 2 inches or less in diameter, securely mount the wheel on the end of a steel mandrel.

(r) When safety flanges are required, use them only with wheels designed to fit the flanges. Use only safety flanges of a type and design and properly assembled as to ensure that the pieces of the wheel will be retained in case of accidental breakage.

(s) Ensure portable abrasive wheels used for internal grinding are provided with safety flanges (protection flanges), except as follows:

1. When wheels are 2 inches or less in diameter, securely mount on the end of a steel mandrel.

2. If the wheel is entirely within the work area being ground.

(t) Ensure that all deck or bench mounted abrasive wheels have a work rest. Keep the work rest adjusted to within 1/8 inch of the wheel periphery to prevent the work from being jammed between the rest and the wheel.

(3) **Operating Grinding, Buffing, and Cut-Off Wheels**

(a) Stand to one side of the wheel when first applying power.

(b) Take care that the hands are not drawn into contact with buffing, grinding, and cut-off wheels.

(c) Never operate stationary grinding wheels unless protective eye guards and hooks are in their place and the tongue or the tool rest is correctly adjusted. Wear safety glasses and a face shield.

(d) Never operate portable pneumatic or electric grinding machines using wheels and wire brushes without a hood.

(e) Before the power is turned on, check to ascertain that the wheel runs true, is not out of balance, and does not strike or rub against housing, hood, safety shield, or tool rest. Dress wheels as necessary.

(f) Never use a grinding wheel on nonferrous materials.

D0805. TRASH COMPACTOR/TRASH DISPOSAL UNIT

The following is a list of precautions applicable to the submarine trash compactor:

a. When working with disposable cans, wear cut resistant gloves. Be careful of any sharp edges.

b. Keep unit clean and sanitary.

c. Do not load wet garbage or liquids into the trash compactor. Drain excess liquids from containers that are to be compacted.

d. Do not put rigid materials, such as thick metal or wood, into the compactor.

e. Ensure that disposable cans are properly formed to prevent hang-up in or damage to the trash disposal unit muzzle ball valve mechanism.

f. Do not attempt to service the compactor while it is in operation. Ensure that the hydraulic supply isolation valve is shut and DANGER tagged in accordance with the Submarine Force tag-out procedures.

g. Do not modify interlocks to operate the trash compactor without closing the cover.

h. Wear safety glasses, cut-resistant gloves and a rubber apron when operating the trash compactor.

i. Ensure legible operating instructions are posted for the trash compactor and trash disposal unit.

j. For SSBN 726 class trash compactors:

(1) Before unlatching the retainer doors, ensure that the safety hood (cover) is raised.

(2) Do not place hands under the ram unless the safety hood (cover) is raised and the hydraulic supply isolation valve is shut.

(3) Before opening the hydraulic supply isolation valve, ensure that the ram control valve is latched in the centered position and the retainer doors are shut and latched.

(4) Do not operate the ram with the doors open.

(5) Ensure that all four toggle pins on the retainer doors are securely latched shut before operating unit. Failure to do this may result in the container bursting under compactor pressure unit.

k. For other submarine trash compactors:

(1) Pin lock the hydraulic control valve in the NEUTRAL position to prevent inadvertent operation while loading the compactor.

(2) Prior to compacting, ensure that the disposable container is in full contact with the retainer to prevent container distortion during compacting.

(3) Prior to compacting, ensure the retainer is securely latched in place so the ram will be unobstructed when it is lowered.

(4) Material must never be inserted into the compactor while the retainer is positioned vertically under the ram and the control valve is in a position other than locked in the NEUTRAL position.

CHAPTER D9

SANITATION SYSTEMS

D0901. DISCUSSION

Submarine sanitation systems are designed and operated to prevent the overboard discharge of untreated sewage into navigable waters of the United States or other countries. Sanitation systems hold raw sewage until it can be discharged overboard beyond 3 nm from any coastline or to a pier connection.

D0902. GAS FREE ENGINEERING FOR SANITATION SYSTEMS

a. Do not open or enter a sanitary tank or remove a component which will leave an opening to the tank unless inspected and certified by a gas free engineer (GFE), industrial hygienist (certified GFE), or National Fire Protection Association (NFPA) marine chemist, since toxic and explosive gases may exist in the tank.

b. Observe a no smoking regulation. Do not allow open flame, ordinary electric lights, flashlights, regular tools, or sparking electrical apparatus in or near an open tank.

c. Recertify (gas free) open sanitary tanks at least every 4 hours. Personnel must recognize that even though a tank may be certified gas free, toxic gases can remain in the sludge blanket and could be released when the blanket is disturbed.

d. Before opening a tank in any manner, or removing any valves or components below the highest level of the tank overflow, wear proper respiratory protective equipment (see chapter B6 for respiratory protection requirements or consult the respiratory protection manager (RPM)).

e. Force-ventilate the tank continuously after opening. Ventilation should be sufficient to provide a change of air in the tank every 3 minutes. Avoid contamination of the air compressor or ventilation intakes.

f. Work can continue outside the tank without respirators once forced ventilation of the tank has commenced.

g. Do not weld or perform hot work inside or outside the tank without a GFE determining that the tank is safe for hot work. After welding is complete, inspect the coating for heat damage and repair as necessary.

h. See NSTM, Chapter 593, Pollution Control, section 4, for additional information and precautions.

D0903. SUBMARINE SANITATION SYSTEMS

a. **Control of Toxic Gas Hazards**. To minimize the potential hazards resulting from the release of toxic gases from the sanitation system, observe the following precautions:

(1) Venting pressure from the sanitary tank should be done through the installed restriction lines to improve filtering by installed charcoal filter

by reducing gas velocity through the charcoal. Use of the restrictor lines also minimizes the chance of wetting the charcoal with entrained moisture.

(2) Always assume that the sanitary tank contains sewage and toxic gases, and has an oxygen-deficient atmosphere. Be especially attentive for hydrogen sulfide (H_2S), a gas with a rotten egg smell at low concentrations. This odor is not reliable as a warning signal because H_2S deadens the sense of smell. As the H_2S concentration increases, the degree of danger increases.

(3) Never enter the tank or open the manhole access at any time unless at a suitable industrial facility, and only after certification by a GFE, industrial hygienist (certified GFE) or NFPA marine chemist.

(4) To minimize hazards, always flush tanks and blow twice and ensure gas free if components are to be removed or disassembled outside the tank, or from the piping below the highest point of the sanitary tank overflow.

(5) Always recheck gas levels in the tank before reopening the tank or piping to replace repaired components if more than 2 hours have elapsed since the tank was last certified gas free (1 hour if the ambient temperature is above 90 degrees Fahrenheit).

(6) If levels of gases have climbed above acceptable limits, repeat flushing procedure.

(7) Wear proper supplied air respiratory protective equipment, an emergency air breathing (EAB), device when replacing components, as indicated by the RPM.

(8) In any space where a sewage spill has occurred, do not conduct any work or maintenance other than work required to clean up the spill, until gas levels are below acceptable limits and all sewage wastes, including solids, have been removed from the space and the space washed down.

b. **Safety Precautions for Sanitary Systems**. After completion of sewage-transfer-hose blowdown or seawater-flushing, ensure transfer hose is depressurized. Close discharge valves prior to disconnecting sewage hose.

c. **Safety Requirements for Sanitary Systems Maintenance**

(1) Do not attempt sanitary system maintenance until the safety requirements and precautions have been thoroughly read and understood and only use the specific procedures for this maintenance outlined in the Ship's Information Book. If these procedures cannot be followed due to some equipment malfunction, maintenance shall be deferred until a suitable industrial facility/service becomes available.

(2) If maintenance not requiring tank entry calls for equipment to be removed which will leave an opening in the tank, or calls for the removal or disassembly of any valve or piping component or anywhere below the highest point of the sanitary tank overflow piping, observe the following safety precautions:

(a) Post a safety watch with a spare supplied air respirator (EAB) at the access.

(b) Ensure that the installed ventilation system is operating properly and that the compartment access is open. The ship's GFE shall determine if any additional temporary ventilation is required.

(c) Flush the tank and piping.

(d) Immediately seal openings using either blank flanges or a suitable sealing device.

(e) Have a GFE recheck the tank atmosphere using a proper supplied air respirator (EAB) before replacing failed components if more than 2 hours have elapsed since the tank was last certified gas free (1 hour if ambient temperature is above 90 degrees Fahrenheit). If levels have climbed above acceptable limits, repeat flushing procedure until acceptable levels are obtained. Equipment or components can then be replaced using proper respirators.

(f) Wash down the area with hot potable water and stock detergent.

WARNING

NEVER assume a tank is empty or is not dangerous because the tank has not been in use.

D0904. SANITARY, HYGIENIC, AND SAFETY PROCEDURES

a. **Hygienic Procedures**. The following hygienic procedures are applicable to all submarine sanitation systems:

(1) If connecting or disconnecting sewage transfer hoses, do not subsequently handle potable water hoses without a thorough wash-up (hands, lower arms, and face in that order) with hot soap and water.

(2) Wear rubber gloves, rubber boots, safety goggles and faceshield, and coveralls, while connecting or disconnecting sewage hoses.

(3) Do not smoke, eat, or drink prior to a thorough wash-up with hot water and soap after working on sanitation systems.

(4) Ensure that personnel exposed to sewage or who work on sanitation systems are placed in medical surveillance and maintain their basic immunizations as required by BUMEDINST 6230.15.

(5) Verify that health warning placards are posted in appropriate locations, identifying procedures to be followed in those areas.

b. **Maintenance Procedures**

(1) Wear protective rubber gloves, rubber boots, safety goggles and faceshields, and coveralls when performing maintenance which requires disassembly of sewage equipment or when contact with sewage is possible.

(2) Wash down the area and components with hot potable water and stock detergent and rinse with sea-water or fresh water upon completion of maintenance.

(3) When sanitation system maintenance is complete, place protective clothing contaminated with sewage in two plastic bags for transport to the laundry. Use dissolvable bags plus an outer fabric or plastic bag, where possible, to prevent contact with sewage contamination. Place disposable TYVEK coveralls in plastic trash bags for disposal.

(4) Wash rubber boots and gloves in hot potable water and stock detergent, and rinse with an approved disinfectant solution.

(5) Launder sanitary-soiled fabric protective clothing separately from other laundry items in 160 degrees Fahrenheit water or water containing a disinfectant such as bleach.

(6) Never walk through living, eating, working, or any manned spaces while wearing protective clothing, boots, or gloves that were worn while working on sanitary systems.

(7) Thoroughly wash hands, lower arms and face, IN THAT ORDER, with hot water and soap, using the nearest wash-up facilities following maintenance.

c. **Leak or Spill Clean-up Procedures**

(1) In the event a space becomes contaminated with sewage as a result of leaks, spills, or sewage system backflow, evacuate the space immediately and notify the executive officer, damage control assistant, and the medical department representative.

(2) Secure the spill area from traffic.

(3) Test the area for explosive/combustible and toxic gases including hydrogen sulfide (H_2S), carbon dioxide (CO_2), and methane (CH_4). If the area is free of gases, use of respirators is not required; however, maintain EABs readily available at the scene.

(4) Remove spilled sewage and wash down with water and stock detergent.

(5) The MDR must certify the space as clean and sanitized. If food service, berthing, or medical spaces are involved, the MDR shall ensure they are washed down with an approved disinfectant.

(6) The MDR shall ensure personnel involved in the cleanup operations have current immunizations.

d. **Sewage Transfer Operations**

(1) Wash with hot potable water and stock detergent, and rinse with sea water or potable water, all deck discharge connections, components, and immediate deck areas each time sewage transfer operations are terminated and the sewage hose is disconnected.

(2) Check the discharge connection periodically during sewage transfer operations to ensure that the connection is intact and that an unsanitary condition is not developing.

e. **Contaminated Bilges**

(1) Bilges contaminated with sewage wastes shall be pumped out, washed down, and pumped out again.

(2) If potable water tanks form the deck or any boundary of the bilge, daily monitor the water from those tanks for coliform contamination. Continue monitoring until it is assured that sewage contamination of the tanks has not occurred.

(3) If the potable water system is suspected of being contaminated, secure the appropriate tanks until the problem is corrected and the water is determined to be safe for consumption.

(4) Refer to OPNAVINST 5090.1B (NOTAL) prior to discharging overboard in restricted waters.

CHAPTER D10

HEAVY WEATHER

D1001. DISCUSSION

a. Heavy weather is any weather that results in high winds, extreme sea states, heavy rains, snow and/or hail. While a submarine is on the surface, heavy weather will generate excessive rolls, yaws, and pitching which makes working and living conditions on board a potential dangerous environment.

b. A multitude of hazards may occur in heavy weather. Objects can slide and fall on personnel, causing injury. Personnel can fall into machinery or equipment. Personnel topside and on the bridge can be swept overboard. Heavy weather is as dangerous now as it was during the days of sail, and all personnel must be aware of potential hazards and safety requirements.

D1002. SAFETY PRECAUTIONS WHILE IN PORT AND/OR MOORED

a. Keep complete topside safety lifelines and stanchions rigged at all times while in port except when mooring another submarine alongside. Do not dismantle any lifeline on the ship without the duty officer's permission and ensure temporary lifelines are rigged prior to dismantling. Keep lifelines and stanchions in good repair.

b. Keep complete floating lifelines rigged at all times while moored. Keep floating lifelines in good repair.

c. Keep an accommodation (Jacob's) ladder rigged from the ship's safety track or cleat to the waterline in the vicinity of the hatch used for ship access at all times while moored or anchored. Keep ladder in good repair. Attach the accommodation (Jacob's) ladder so that it can be quickly removed and relocated to another location.

d. Inspect all topside safety equipment daily. Ensure that gear adrift topside is removed at all times and report any unsafe conditions to the immediate supervisor.

e. Topside watchstanders inport shall wear approved topside shoes.

f. Topside watchstanders shall be secured to the ship and/or wear a Kapok life jacket after dark, in inclement weather, and at other times prescribed by the duty officer.

g. If worsening weather conditions make it prudent to shift the watch to the bridge, ensure that topside equipment is unrigged as feasible and secure topside for sea.

h. Normally mooring lines are doubled. With worsening weather conditions, use triple lines and/or install wire rope lines. Forward and after wire rope night riders may also be used.

D1003. OPEN OCEAN OPERATIONS

a. Based on the consideration of personnel safety, sending personnel topside in open sea should be authorized only for emergency situations, Sea Air Rescue operations, and extreme tactical necessity.

b. The chief of the watch should inspect personnel going topside to ensure that they are wearing the proper gear and that it is donned properly. Personnel going topside should utilize the buddy system such that one man in the hatch will tend a safety line to each man going topside until he has fastened his safety harness to the safety track. Conversely, when proceeding below, each man will attach the line being tended from the hatch to his safety harness before disconnecting from the safety track.

c. Personnel may be required to go topside through the bridge access hatch vice topside access hatches due to severe weather. These personnel are required to be inspected to ensure the wearing of appropriate safety equipment prior to exiting the control room.

d. During normal surfaced underway steaming, all bridge personnel shall wear, as a minimum, a stowed Steinke hood or other approved personal flotation device. Personnel that are required to man the bridge during heavy weather should wear a safety harness attached to the bridge and wear a life jacket. For extreme high seas, rig the bridge for dive and shift the watch to control.

e. Use of a cranial helmet and a fibrous life jacket will minimize potential injuries when striking the hull or deck if washed overboard.

CHAPTER D11

ABANDONING SHIP

D1101. SAFETY PRECAUTIONS DURING ABANDONING SHIP

a. Wear a full set of clothing including shoes and a soft cap or head covering as protection from exposure.

b. Securely fasten inherently buoyant type life jackets. Do not inflate inflatable life jackets (Steinke hoods) until the wearer is in the water. Inflate the life jacket as soon as wearer is in the water.

c. Do not dive; always jump feet first.

d. Always abandon ship as far away from the damage as possible.

e. Know direction of the wind and go to windward side of ship, if possible, to avoid flames, oil, and drift of ship.

f. When in water, concentrate on staying calm and avoiding panic. Obey the following rules:

(1) Conserve energy by moving as little as possible.

(2) Keep clear of oil slicks if possible. If possible, protect eyes and breathing passages by keeping head high or swimming underwater. If swimming underwater, prior to coming the surface, put hands above head and splash the water surface to disperse oil, debris or flames.

(3) If a danger of underwater explosion exists, float or swim on the back as near the surface of the water as possible. In cold water, forming close circles with others will preserve heat.

(4) Stay with other persons in the water to reduce danger of sharks and make rescue easier.

(5) If ship is sinking rapidly, swim clear promptly, and tow injured persons clear, to avoid suction effect.

g. Follow all other procedures/precautions as delineated in the ship's Abandon Ship Bill.

CHAPTER D12

PAINTING AND PRESERVATION

D1201. DISCUSSION

a. For application and removal precautions for lead-based paint, see chapter B-10. This chapter deals exclusively with the application and removal of non-lead based paint.

b. Many paints, varnishes, lacquers, cleaners, solvents, and other finishing materials contain flammable solvents and, therefore, present a fire hazard. In addition, these same products frequently give off toxic vapors which can be harmful. For this reason, paints and similar products are not carried aboard submarines. See Naval Ships Technical Manual, Chapter 631, Painting and Preservation of Ships for detailed procedures and precautions.

c. Paint removal operations can produce extremely high personnel exposures to substances found in paints, depending on the method of removal. Chipping causes scale to be dislodged, presenting possibility of eye or facial injury. It is therefore necessary that personnel take proper precautions in handling and using these products. Administrative and protective measures need to be followed to lessen the amount of dust from sanding, grinding, and chipping paints and from fumes generated during hot work on painted surfaces.

D1202. SAFETY PRECAUTIONS FOR SURFACE PREPARATION AND PAINTING OPERATIONS

a. Wear safety goggles and full faceshield and long sleeve shirts with sleeves rolled down and all buttons buttoned at all times while chipping or operating power brushes, chipping, or scaling tools. Wear particulate air-purifying respirators for all chipping, scaling, and sanding operations, except if the paint being removed is known or suspected of containing lead. If lead-based paint is to be removed, an industrial hygienist should evaluate the operation and recommend proper respiratory protection and other personal protective clothing per chapter B10.

b. Log all paint brought onboard ship in the atmosphere control log. The executive officer shall approve all paint brought onboard ship.

c. Do not paint in any area where welding is being performed.

d. Do not use electric power wire brushes and chipping tools over the side.

e. Wear emergency air breathing masks when engaged in spray painting operations internal to the ship or in confined external areas (free-flood areas). Supplied air respirator may be required for extensive external spray paint operations. For minor external spray painting and touchup of small areas, an organic vapor cartridge type with paint mist pre-filter may be used.

NOTE

Aerosol paint cans are not permitted within the submarine for use or storage.

f. When working over the side or aloft, see chapter D4 of this manual for additional precautions.

g. Bring only 1 day's amount of paint below decks in the area being painted. Do not bring full-strength ketone solvents below decks.

h. Do not store paints, brushes, and stirring sticks on the pier for extended periods of time.

i. Do not smoke when painting. Post "NO SMOKING" signs in the area(s) being painted. If painting with vinyl, saran, or other explosive or toxic vapor paints, observe the following additional precautions :

(1) Fly the BRAVO flag from the sail.

(2) Do not permit smoking on board, topside, or below decks.

(3) Do not permit smoking or hot work within 50 feet of the ship. Post signs on the pier "DANGER-SPRAYING WITH VINYL."

(4) Notify adjacent ships.

(5) Take precautions to prevent vapor pocketing in low points. Shut and dog hatches. Shut induction and exhaust valves.

(6) A petty officer shall supervise painters.

(7) All personnel within 15 feet of vinyl painting or mixing operations shall wear organic vapor cartridge respirators with paint mist prefilter.

(8) Painters shall have no spark-producing materials on their person.

(9) Ground spray guns.

j. Provide ventilation in closed areas when painting.

k. Wear rubber gloves when handling cleaning compounds, thinners, paints, removers, or other irritants.

l. De-energize all equipment in areas being painted.

m. Provide explosion proof lighting during spray-painting operations.

n. Remove all paints and thinners from the ship when taking a lengthy break. Upon completion of painting, properly dispose of unused paint and waste.

o. Wear rubber insulating gloves when using portable, electric powered tools. See chapter D5 of this manual for additional precautions when using electrical power tools.

p. Many paints, paint cleaners, solvents and brush cleaners are hazardous materials. Refer to chapter D15 of this manual for hazardous material storage, use, and disposal procedures.

q. Many paint removal tools are noise-hazardous equipment. If so labeled, ensure that proper hearing protective equipment is worn. See chapter B4 of this manual for additional information.

r. Terminate all internal painting with oil based paints 5 days prior to sealing the ship. Terminate painting with latex or water based paint 3 days prior to sealing the ship.

s. Perform paint mixing on the pier adjacent to the ship. Post barricades to ensure there is no smoking, open flame, or hot work in the vicinity of the paint mixing area.

t. Do not permit personnel with a history of chronic skin disease or allergies to work with paint compounds or thinners. Personnel who are sensitive to paint compounds and thinners shall report to the medical department for evaluation.

u. Do not allow food or drink in the paint area. When handling painting materials, take care to wash hands prior to eating, drinking, smoking, or using the head.

v. When painting engineering spaces, they should be in a cold-iron condition before and during paint application. Heat-producing work areas adjacent to where brush/roller application of paint is being performed may be considered, provided that:

(1) The painting operation involves only minor (touchup) operations.

(2) There is no hot work within 25 feet of painting operation while using surface ventilation lineup, unless separated by a water tight bulkhead.

D1203. SAFETY PRECAUTIONS FOR PAINT REMOVAL

a. Do not perform shipboard paint removal by ship's force for cosmetic reasons or due to excessive thickness. Shipboard paint removal by ship's force should only be done when required to accomplish preservation of corroded surfaces, incidental to hot work, welding, or when bare metal is necessary for an inspection.

b. Keep mechanical grinding and sanding to the absolute minimum with primary reliance on impact tools and authorized chemical paint strippers for paint removal.

c. Assume all paint contains substances, such as lead or chromate, which are hazardous to your health if ingested or inhaled in small amounts, unless proven otherwise by sample analysis. (See chapter B10 for sample analysis procedures).

d. Personal protective equipment (PPE) contained in AEL 2-330024045, asbestos rip-out kit, may be used for paint removal, provided an inventory is maintained.

e. Ensure that all personnel involved in paint removal wear disposable coveralls, gloves, and other PPE as required.

f. Follow the recommendations of the respiratory protection manager and the requirements of chapter B6 regarding the use and care of respirators.

g. Secure and cover all deck drains and installed ventilation systems and openings in the paint removal work area. Isolate the work area to the maximum extent possible with drop cloths and/or plastic.

h. At the end of the work shift personnel shall vacuum debris and all surfaces in the area with HEPA-equipped vacuum cleaner. Vacuum coveralls and gloves prior to removal.

i. Personnel shall minimize the use of water during paint removal, since any used in the operation must be treated as used hazardous material.

j. Ensure that paint debris, HEPA filters, and wipe down rags are separated from coveralls, gloves, and other disposable materials. Place them into plastic bags and label both groups as hazardous materials.

k. Wipe down tools and surfaces in the work area after completion of the task.

CHAPTER D13

FOOD PREPARATION AND SERVING FACILITIES

D1301. DISCUSSION

A basic necessity for any ship is a galley. The crew must be fed and personnel must prepare food for consumption. The food preparation required to feed a large body of people means that machinery and equipment must be used. The use of this machinery introduces hazards unique to the galley and food-preparation areas. Additional precautions may be found in references D13-1 and D13-2. Personnel assigned to permanent and temporary work in food service areas shall be given a copy of these precautions prior to their beginning their assignment.

D1302. GENERAL PRECAUTIONS

Before attempting to operate machinery, observe the following general precautions:

a. Check for and determine the location of emergency equipment, such as fire extinguishers and first aid boxes, to ensure their availability should an accident occur. Report any deficiencies or malfunctioning equipment to the supervisor.

b. Make sure that the area around the equipment is clear of obstructions and thoroughly dry. Clean up all spills immediately to ensure a clean, dry, non-slippery working surface.

c. Ensure that the installed lighting in the work area is operating properly and provides sufficient light.

d. Observe and follow posted operating instructions and safety precautions.

e. If there is any doubt about operating procedures or safety precautions, ask your supervisor.

f. Unauthorized personnel shall not attempt to operate equipment.

g. Be certain no loose gear is in the vicinity of moving parts of machinery. Make sure that all safety guards, screens, and devices are in place before turning on machinery.

h. When operating a machine, maintain a safe distance from all moving parts. Never use your hands or body to stop moving blades and parts even though power has been turned off.

i. Never lean against a machine while it is operating.

j. If ship movement is severe, exercise caution in operating machines; if severe movement continues, turn off nonessential machines.

k. Use safety equipment such as protective gloves, safety glasses, and dip baskets while handling chemicals or hot water. Personnel at the deep

sink shall wear rubber gloves with elbow-length sleeves to prevent hot water burns.

l. Keep your hands, body, and clothing away from operating machine parts.

m. Never leave operating machinery unattended.

n. Do not distract the attention of personnel who are operating machines.

o. Do not attempt to clean or service a machine while it is in operation. Before cleaning, adjusting, oiling or greasing equipment, turn off power and DANGER tag out equipment or unplug, if not hardwired. If in doubt about the requirement to tag-out any equipment, consult your supervisor.

p. Ensure that all repairs and servicing are made only by authorized personnel.

q. Make sure safety devices, such as safety interlocks on galley equipment (i.e. the cover of a dough-mixing machine), are maintained in proper working condition at all times. If removed for any reason, replace such devices before the machine is returned to operation.

r. Remove rings and watches, and eliminate any loose clothing such as rolled-up sleeve cuffs, oversized gloves, and ill-fitting coats and jackets.

s. Ensure that permanently mounted equipment is hardwired (extension cords are not permitted).

t. If the ship will be taking steep angles (a planned evolution), ensure that the level of liquid (grease or water) in pots and other containers is sufficiently low that it will not overflow its container during the maneuvers. During normal operations, maintain container liquid levels as low as possible, to avoid injury due to unexpected ship angles.

D1303. COOKING UTENSILS

a. Make certain that all heavy items, knives, and other sharp tools are securely fastened and stowed in racks to prevent injury to personnel.

b. Secure all coffee pots and urns to prevent dislodging and splashing.

c. Exercise extreme caution and care when handling hot oils, water, and other liquids or when operating steam valves and equipment. Do not transfer hot liquids in heavy or moderate sea states or when planning to take steep angles.

d. Never leave drawers, doors, or access panels open where they could become hazardous to personnel.

e. Never leave hot plates, pots, griddles, or fryers unattended.

f. Be careful not to place meat, vegetables, or other foods on a knife or other sharp instrument. The food may conceal the cutting edge.

g. Do not place knives in the wash water until ready to wash them. Lay them in plain view beside the sink.

h. Keep your free hand away from the sharp edge of the cleaver when chopping foods.

i. Use a metal or kevlar protective glove when boning meat.

j. Use a scoop or perforated serving spoon to handle shrimp.

k. Store utensils in their proper places.

l. Do not allow pot/pan handles to extend beyond the edge of the range or counter. They can be bumped and cause serious burns to personnel resulting from spilled or splashed food or liquid.

m. Before removing foods from hot ranges and ovens, be sure there is a clear place on which to set them.

n. Use only the proper implements for opening cans and other containers.

o. Hold knives firmly. Ensure knife handles are dry or free of grease before handling them.

p. Only keep knives in a rack designated for this purpose.

q. Magnetic knife racks are prohibited due to knife magnetism picking up foreign material.

r. Keep knives sharp at all times.

s. Never handle a knife while carrying another object.

t. Ensure hot pads are clean and dry.

u. Keep all tools clean and dry.

D1304. FOOD PREPARATION

a. Practice good personal hygiene at all times, and report all illnesses and injuries to your supervisor.

b. Keep your hands clean and thoroughly wash hands with soap and water after using the head, touching your mouth or nose, or handling raw meat or fish.

c. Keep fingernails short.

d. Wear appropriate hair covering at all times in food-handling areas.

e. Do not touch food with your bare hands unless necessary. Use appropriate implements for handling food when possible of plastic food handling gloves.

f. Never handle food when you have an infection of any kind on your hands or arms. If you develop a sore throat, cold, intestinal disturbance, or symptoms of other general disease, report to the corpsman at once.

g. Clean up spilled food immediately.

h. Do not use leftovers held over 36 hours. Ensure all leftovers are marked with the date and time they were placed in storage.

i. Ensure that distant-reading dial thermometers and, when required, electronic temperature-monitoring units are installed and operating. Verify thermometer accuracy monthly. Ensure the emergency door-release mechanism required in "walk-in" refrigerators and freezers is installed and properly operating.

j. Discard protein foods that have remained at temperature between 40 degrees Fahrenheit and 140 degrees Fahrenheit longer than 3 hours.

k. Observe safety precautions around all electrical equipment to avoid injury from shock. Do not reach into areas for cleaning around griddles and ovens that have exposed wiring unless the equipment has been tagged out.

l. Notify your supervisor immediately if the heat stress dry bulb thermometers read 100 degrees or greater, or if you experience dizziness, nausea, or other heat related symptoms.

m. Wear chemical splash goggles and rubber gloves when using oven cleaners or other strong cleaning materials. Do not dispense bulk cleaners into spray bottles without properly labeling the spray bottle with the new contents. See chapter D15 for details on handling of hazardous materials and atmosphere contaminants.

D1305. SAFE OPERATION OF EQUIPMENT

a. **Deep Fat Fryer**

(1) Beware, this is high voltage equipment.

(2) Extinguish a fire in the deep fat fryer per NSTM, Chapter 555.

(3) Never leave fryer unattended when in use.

(4) If solid fat is used, do not allow large pieces to drop on heating units or thermostat bulb.

(5) Whenever possible, melt solid cooking oil or fat prior to putting into deep fat fryer.

(6) Ensure heating coils are completely covered with fat before turning on the equipment.

(7) Never exceed the maximum temperature noted by manufacturer.

(8) Monitor cooking oil temperature with a proper thermometer whenever the deep fat fryer is in use. Ensure back up safety thermostat is installed and operational.

(9) Install cover when fryer is not in use.

(10) Secure deep fat fryer following posted instructions when not in use.

(11) Ensure that grease spills are cleaned up promptly.

(12) Wash and change grease filters in range hoods as often as necessary per PMS, but not less than weekly, to avoid the danger of fire.

b. **Dough Mixing Machine**

(1) Never attempt to cut dough while the agitator is revolving.

(2) Never attempt to knead or feel consistency of dough product while machine is in operation.

(3) Never attempt to clean out a bowl in the tilt position by reaching in unit while the agitator is revolving.

(4) Check safety switch to lid cover for proper functioning in accordance with PMS.

c. **Food Mixing Machine**

(1) Use proper machine speed for the specific operation.

(2) Never place hands into the bowl while machine is in operation.

d. **Vegetable Cutting and Slicing Machine**

(1) Always use plunger when applying pressure on vegetables being fed into the hopper.

(2) Do not use loose-fitting gloves when operating the machine.

e. **Meat Slicing Machine**

(1) Never operate the machine unless the blade guard is secured in place.

(2) Do not use hands to press down food.

(3) Never touch the blade when it is running or exposed for slicing.

(4) Set index at zero and secure power at the distribution box or by pulling the plug when cleaning blade.

(5) Ensure slicing machines are provided with a toggle switch guard.

(6) Always disconnect power cord prior to cleaning and reconnect only when ready to use.

(7) Once deenergized, clean the blade with a clean, detergent-soaked cloth wrapped around a cook's fork or other extension utensil. Rinse the blades following a similar procedure and sanitize them with a disinfectant approved for use aboard submarines, e.g., Disinfectant-detergent, General Purpose, NSN: 6840-00-292-9698.

(8) Reassemble machine after cleaning.

f. **Steam Kettle**

(1) Each day this equipment is used, test the safety relief-valve while under operating pressure by pulling the chain attached to the safety relief valve arm.

(2) Do not tamper with the safety-valve or tie it closed. It is there to prevent the kettle from exploding.

(3) Do not apply steam to an empty kettle; never put water into a hot, dry kettle.

(4) Ensure safety relief-valve levers are equipped with an 18-inch chain to allow activation from a safe distance. Chains must be mounted in such a way that the need to reach over or between/behind hot kettles is eliminated.

(5) Ensure steam-jacketed kettles are hydrostatically tested as required by the equipment Maintenance Requirement Card (MRC).

(6) Piping from relief valves shall extend to just inside the deck coaming.

(7) Lagging under steam kettle shall be removed and replaced with perforated steel or aluminum with approximately 1/2-inch stand off.

g. **Electric Griddle**

(1) Keep griddle turned off when not in use.

(2) Keep cooking surface and grease gutter scraped and wiped clean at all times.

(3) Remove, empty, and clean grease drawer after each use. Do not reach into the drawer area for cleaning unless the griddle is tagged out.

(4) Use griddle guards to keep food from sliding off the cooking surface.

(5) Never use water to clean a griddle surface. Wipe the surface with clean, dry paper towels when the griddle is cold. Use pumice stone block to clean hard-to-remove burn spots.

h. **Coffee Urn**

(1) Do not introduce water too quickly into the boiler.

(2) Do not overfill boiler. Be sure water has stopped rising in the gage glass after the water-inlet valve is closed. Do not turn on activating switch until water-level gage reads full or the pressure control dial reads 36 ounces.

(3) Do not open urn cover while siphon valve is open. Do not agitate coffee while cover is open. Do not remove leacher from the urn body until it is completely drained.

(4) Do not obstruct safety-valve outlet. Keep equipment clean. Clean the urn immediately after use to prevent development of rancid taste.

i. **Ranges and Ovens**

(1) Do not allow grease to collect in oven.

(2) Do not clean oven while it is hot.

(3) Clean oven thoroughly once a week in addition to normal daily cleaning.

(4) Turn off surface units when not in use.

(5) Keep range drip-pan and grease trough clean. Never allow grease to accumulate since it is a serious fire hazard.

(6) Observe the electrical wiring under the range griddle/hot plate to see if wiring is secured in place and not chafed or in contact with the grease drip-pan. Tag-out the power source prior to cleaning under the range, griddle, or hot plate. DO NOT attempt to correct faulty wiring yourself. Call an electrician to do it.

j. **Proofer**

(1) Only authorized personnel are permitted to operate this equipment.

(2) Clean the proofer after each use.

k. **Dish Washing Machine**. Observe operating instructions and safety precautions.

l. **Steam Table**

(1) Use the proper implements, such as pot holders and tongs, for handling the containers.

(2) Tilt containers away from you when inserting them into the wells.

(3) Carry hot liquids in covered containers with the covers securely in place.

(4) Promptly mop up grease which is spilled on the deck. Greasy decks are doubly hazardous. They can cause fires as well as falls.

m. **Garbage Grinder (not applicable to pre-726 class submarines)**

(1) Do not put hands into grinder when in operation.

(2) Start grinder and turn on water before feeding waste.

(3) Feed food waste gradually.

(4) Do not feed metal, wood, cloth, rubber, plastics, or corn husks into the garbage grinder. If such material is fed accidentally, stop grinder immediately and remove object after disconnecting power. Do not feed bones

larger than 1/4 inch in diameter for the 400-pound/hour model or larger than 1 inch in diameter for the 1,600-pound/hour model into the grinder.

n. **Gaylord Exhaust Hoods**

(1) The fire extinguisher control box contains a live electrical circuit. Prevent water or other cleaning fluids from entering this box.

(2) The baffle blades and interior of hood should be cleaned at least once a day to prevent fires from accumulation of grease.

(3) Keep the access doors closed during the wash and rinse cycles to prevent hot water from splashing personnel.

(4) Keep hood drains clear at all times.

o. **Trash Compactor**. Refer to chapter D8 for precautions on the operation of the trash compactor.

p. **Meat Chopping Machine**

(1) Never feed this equipment by hand. Use a pestle (stomper).

(2) Never attempt to remove anything from these machines while they are operating.

(3) Always disconnect the machines before cleaning them.

r. **Meat Tenderizing Machine**

(1) Never place your hands near the feed slot when feeding material into this machine.

(2) Avoid wearing loose fitting gloves.

s. **Potato Peeler**

(1) Make sure water is running before operating this equipment.

(2) Never put your hand in this machine while it is operating.

CHAPTER D13

REFERENCES

D13-1 NAVMED P-5010, "Manual of Preventive Medicine", Chapter 1.

D13-2 COMSUBLANT/COMSUBPAC INST 6000.2, "Standard Submarine Medical Procedures Manual", Chapter 6.

CHAPTER D14

LAUNDRY MACHINES AND PHOTOGRAPHY

D1401. DISCUSSION

Hazards in laundry equipment and the photographic darkroom include mechanical equipment, toxic chemicals, electric power, and heat. Safety precautions contained in this chapter are basic and general. Ships shall provide personnel assigned to work with laundry equipment with a copy of these precautions prior to beginning their assignment.

D1402. PRECAUTIONS RELATING TO LAUNDRY EQUIPMENT

a. **Washer Extractor**

(1) Thoroughly examine all clothes before cleaning; remove all foreign materials such as matches, ink pens, and metallic objects.

(2) Make certain that the cylinder door is firmly latched before operating the machine.

(3) Do not exceed the prescribed loading capacity of the cylinder; doing so may damage the machine or prove hazardous to personnel.

(4) Be sure the machine is entirely disconnected from the circuit before cleaning or servicing. Use safety tag-out procedures as required by PMS and the submarine force tag-out program.

(5) Make sure safety devices, such as the safety interlock on cover, are maintained in proper working condition at all times. If removed or out of order for any reason, replace safety devices before the machine is put into operation.

(6) Do not exceed the recommended detergent amount for load size being washed. Excessive soap may cause skin irritation.

(7) Ensure safety precautions and operating procedures are posted.

b. **Tumbler Dryer**

(1) Turn off power prior to loading and unloading machine.

(2) Never overload the machine.

(3) Never open the door while the tumbler is in motion.

(4) Before servicing or cleaning, be sure the power to the tumbler dryer is entirely disconnected. Use safety tag-out procedures as required by PMS and the submarine force tag-out program.

(5) Maintain safety devices in proper working order at all times. If removed for any reason, replace safety devices before machine is put into motion.

(6) Ensure that the primary lint screen is checked and cleaned as required prior to use and after every drying cycle. Ensure the secondary lint filter is cleaned after every 4 hours of operation.

(7) Ensure someone is watching the machine while it is running. It is a fire hazard.

(8) Ensure safety and fire prevention precautions and operating procedures are posted.

(9) Never allow the dryer temperature to exceed 160 degrees Fahrenheit.

D1403. PRECAUTIONS FOR PHOTOGRAPHIC DARKROOMS

a. Wear chemical goggles, protective gloves, and other appropriate personal protective equipment when mixing and handling photographic chemicals. Follow guidance contained in D-15 for all photographic chemicals.

b. Ensure a method for hand and face wash is provided and used in all chemical mixing areas. For eye-wash requirements, see eye wash data in chapter B5.

c. Avoid skin contact with chemicals.

d. Carry out meticulous housekeeping policies in all chemical mixing areas.

e. Make acid-type hand cleaners available in chemical mixing and chemical handling areas.

f. Use print tongs, clips, hangers, and stirring rods instead of fingers, or wear rubber gloves when handling films and papers in solution.

g. Familiarize yourself with the hazards of E-6 chemistries.

h. Clean rubber gloves and personal clothing at frequent intervals. Replace gloves when leaks, wear or swelling occurs.

i. Properly store photographic chemicals per chapter D15. Ensure spent and excess chemicals are collected for shore disposal as directed by the HM Coordinator.

j. Provide separate storage for chemicals which react violently with each other.

k. Learn the darkroom layout with white lights on.

l. Take care when entering or leaving the area because of the rapid change of lighting and the temporary blindness this causes.

m. Inspect all electrical connections frequently for damage and fraying. Ensure that all electrical equipment is properly grounded, has been safety-checked, and approved electrical plugs are used.

n. Never touch an electrical plug, switch, or any part of an electrically-operated machine with wet hands or while standing on a wet deck.

o. Use rubber mats with appropriate electrical ratings around equipment that could cause electrical shock.

p. Do not use the photographic chemicals, 1,1,2 Trichloroethane and 1,2,2 Trifluoroethane.

q. **Flash Equipment**

(1) Severe electrical shock is the hazard to guard against when using electronic flash equipment. Stored energy in photographic electronic flash units can be lethal (some units operate from voltages as high as 4,000 volts). Use caution whenever operating this equipment.

(2) Repair of electronic flash equipment shall be done only by those thoroughly familiar with the equipment. The storage capacitors may have a large charge at high voltage and can be discharged at high amperage which may be lethal.

CHAPTER D15

SUBMARINE HAZARDOUS MATERIAL CONTROL AND MANAGEMENT STANDARDS

D1501. DISCUSSION

a. Submarine hazardous material control and management (HMC&M) standards address the storage, use, and disposal of all hazardous material (HM). In addition, these standards also provide more stringent control and management guidance for HM since they may be atmosphere contaminants. The breathing of fumes, vapors, or gases from these materials may severely impact the health and safety of submariners and submarine equipment.

b. This chapter provides the detailed guidance that submariners need to properly manage and control HM. It supplements the information contained in chapter B3, specifically addressing submarine HMC&M processes.

c. Special precautions are required for the stowage, handling, and use of HM aboard submarines. Significant hazards include fire, poisoning by breathing toxic substances in unventilated spaces, dermatitis, asphyxiation, and burns of the skin and eyes. Some materials normally thought to be safe may become hazardous under certain use or storage conditions. This chapter contains general stowage and use standards for all HM, precautions for subcategories of HM (flammable materials, toxic materials, corrosive materials, oxidizers, aerosol containers, and compressed gases) and specific precautions for certain selected materials. Chapter B3 provides information on HM spill response and training.

D1502. GENERAL HMC&M STANDARDS

a. **HM Allowed Aboard Submarines.** Only HM listed in the Submarine Material Control List (SMCL) is allowed aboard submarines. The SMCL is the authorized use list (AUL) for submarines. Personnel shall consult the SMCL to verify that HM is allowed aboard or to identify any use restrictions associated with the HM. HM not listed in the SMCL is considered **prohibited** and shall not be ordered. If a requirement exists for a HM item and the material is not listed in the SMCL, the submarine shall complete a SMCL Feedback Report (SFR) (NAVSUP 4400/1, see appendix D15-A) and submit it to NAVICP Code 07122 with a copy to NAVSEA 05L23, the appropriate type commander, and procurement department per reference D15-1. NAVICP shall coordinate with Naval Sea Systems Command (NAVSEASYSCOM) and the Submarine Material Review Board (SMRB) to respond to the SFR.

Each SMCL item is marked with a HM use category. NAVSEASYSCOM assigns these use categories based on a technical and safety and health assessment of the product. These use categories are:

(1) **Permitted (N)**. No restriction on use of this HM on submarines.

(2) **Prohibited (X)**. HM not allowed aboard submarines at **any time**.

(3) **Restricted (R)**. HM not allowed aboard submarines while underway, except under specific exemptions authorized by the submarine's Executive Officer. Restricted material may be used onboard in limited quantities ***while in port and ventilating outboard***.

(4) **Limited (L)**. HM that may be used underway for a specific purpose and for which no non-toxic substitute exists. This HM shall not be carried aboard submarines in excess of required quantities.

b. **HM Requisition.** Personnel requiring HM shall only obtain this material through the submarine's supply department. Supply department personnel shall ensure that requisition material is in the SMCL . If the requisitioned HM is assigned a restricted use on the SMCL, written permission from the executive officer will be required to carry or use the material onboard during an underway period.

NOTE:

SERVMART purchases of HM shall specifically list the HM to be purchased. All HM purchased through a SERVMART shall be provided to the supply department for recording in the Submarine Material Control Log prior to storage.

c. **HM Open Purchase.** Navy policy is that, to the maximum extent feasible, submarines shall only procure and use standard stock HM.

(1) In the exceptional case for which the stock-numbered product can be clearly demonstrated to be inferior, or due to the urgency of need cannot be satisfied from supply system stock, Commanding Officers may justify and authorize open market purchases of HM for those items. The submarine shall obtain an MSDS from the manufacturer or supplier and include with a SFR submitted to NAVICP Code 07122, with copies to NAVSEA 05L23, the appropriate type commander and procurement department.

(2) If a commercial vendor approaches submarines or support commands offering HM not listed in the SMCL for submarine use or for substitution for stock-numbered HM, they shall refer vendors to NAVSEA 05L23, per reference D15-1.

d. **HM Receipt.** The supply department will receive all HM brought aboard the submarine. The supply department shall check all containers of HM obtained through open purchase upon receipt to ensure that they contain a manufacturer's label as described in paragraph D1502e. They shall refuse a container if not so marked. Upon receipt, the receiving person shall check the received material against the SMCL by stock number, manufacturer, and nomenclature to ensure that the material is allowed and determine if any HM use category other than allowed is assigned.

(1) If the material is permitted (N), entry in the Submarine Material Control Log is not required.

(2) If the material is assigned a limited use category, the receiving person shall enter the material into the Submarine Material Control Log (this entry may be made through the use of form similar to that provided in appendix D15-B). and make out an Atmosphere Contaminant Tag, (a sample format for the tag is provided in appendix D15-C). The supply officer/HM coordinator shall sign the Atmosphere Contaminant Tag. The supply officer/HM coordinator shall review the Submarine Material Control Log entry.

(3) If the material is assigned a restricted (R) use category, the receiving person shall enter the material into the Submarine Material Control Log and make out an Atmosphere Contaminant Tag. The supply officer/HM coordinator shall sign the Atmosphere Contaminant Tag. The executive officer shall review the Submarine Material Control Log entry.

(4) If the material is assigned a prohibited (X) use category, do not bring the item aboard.

e. **Container Marking**

(1) Manufacturer's labels for shipboard identification of HM containers must clearly identify the material name, the manufacturer's name and address, and the nature of the hazard presented by the HM including the organ potentially affected by the material. A manufacturer's label may be a tag, sign, placard, or gummed sticker. When HM is dispensed from the shipping container to another container, the person dispensing the HM shall annotate the receiving container to indicate the material name, manufacturer name and address, and the nature of the hazard (including target organ) as specified by the manufacturer to preserve the continuity of information. To mark unlabeled containers or containers where the label has been destroyed or damaged, ships may use the Department of Defense (DOD) Hazardous Chemical Warning Label. The Hazardous Material Information System (HMIS) (reference D15-2) provides this label and label information at the end of each MSDS. Personnel can print the label on plain paper or the pre-printed color forms: DD 2521 (12/88) (8.5"x11") (S/N 0102-LF-012-0800) or DD 2522 (12/88) (4"x7") (S/N 0102-LF-012-1100).

NOTE:

If the material is transferred into a small container, such as a dropper bottle for boiler water chemistry, and there is insufficient room to place the above information on the label, the label shall contain the material name, manufacture's name, and stock number at a minimum. The remaining information shall be provided on a card in a location known to the users, that is in close proximity to the container, so that it can be readily referred to. In addition, supplemental label information shall be keyed, using numbers or letters, to the smaller containers.

(2) Submarine supply departments shall label HM items that are restricted or limited with an Atmosphere Contaminant Tag (see appendix D15-C) per paragraph D1502d prior to issue. They will assign these tags a sequential number preceded by a letter (R or L) to indicate restricted or limited. If a restricted or limited HM is transferred to another container for use, the new container shall also be labeled with the Atmosphere Contaminant Tag. The department transferring the material to the new container shall obtain the tag (and number) from the supply department.

f. **HM Issue.** The supply department retains only limited quantities of HM as storeroom items. The remainder is distributed to responsible workcenters as operating space items. The receiving workcenter is responsible for proper stowage of HM in assigned lockers.

g. **HM Reutilization.** Submarines shall practice HM reutilization. This means that submarines will implement efforts to ensure that personnel make all beneficial uses of HM prior to offload as used/excess HM. This requires that material with the earliest expiring shelf-life limitations is used first. In instances in which a HM is used by more than one workcenter, submarines may choose to institute procedures whereby one workcenter is responsible for ordering and storing the HM. This action also includes increasing the useful life of the material by extending the shelf life per approved procedures outlined in references D15-3 and D15-4.

h. **Used/Excess HM Disposal.** When workcenters have completely used a HM or have excess HM, they shall return the container plus any residue to the supply department for disposal. Appendix L of reference D15-5 and Maintenance Requirement Cards (MRCs), as applicable, provide guidance for determining which types of used HM must be collected and held for treatment by shore disposal facilities. The receiving person shall annotate in the Submarine Mate-

rial Control Log and process the used HM for offload per the procedures of section D1502h(4).

(1) Used HM shall be **segregated**. A container shall normally be filled with one type of HM, i.e., all the used HM in a container shall normally be of only one stock number. Used HM shall either be placed in the container for the original material or in an impervious container specified in appendix D15-D. The container shall be securely sealed using the installed or provided closure devices to ensure the container does not leak during transportation. The container shall be properly labeled (refer to paragraph D1502h(4)(a) for labeling requirements) to indicate content, and stowed in appropriate locations following the stowage precautions in this chapter for comparable HM.

(2) If the contents of an HM container are unknown, the label must state so, and the fleet must pay, from its own account, the costs of chemical analysis to determine specific content. The workcenter originating the HM for offload shall provide any information that may be useful in identifying the origin or composition of the material in the container. If the contents are unknown and the originating workcenter can determine by experience that the material is flammable or combustible, reactive, toxic, or corrosive, that information shall be supplied on the container to allow proper stowage aboard ship and at the receiving shore activity.

(3) Used lube oils shall be collected, stored, and labeled for eventual shore recycling. Synthetic lube oils and hydraulic oils shall be collected separately from other oils.

(4) **Procedures for Off-Loading Used or Excess HM to a Naval Shore Activity**. The supply officer shall be responsible for the receipt and consolidation (as appropriate) of all used/excess HM for offload. Used or excess HM shall be turned over to the shore facility HM offload activity per the requirements of reference D15-5.

(a) **Processing Used HM**

1. The workcenter generating used HM shall ensure that it is properly packaged in the original container or in a container specified for the material in appendix C23-A. If there is any question regarding the integrity of the original container (e.g., badly rusted, badly dented, or poorly sealed), the contents shall be transferred to a new container. If the material is not in its original container, the workcenter shall ensure that the material is labeled per paragraph D1502e. In addition, a label identifying the material as used HM (see appendix D15-D) shall be completed and attached to the container. This label shall contain information on the process in which the material was used (e.g., used air compressor lube oil, circuit board cleaning solvent, spent OBA canisters, etc.). It should also identify any known impurities that the material might contain based on routine analysis that may be conducted for PMS (e.g., Naval Oil Analysis Program (NOAP) test results) and any special storage requirements. This information is necessary to assist the shore activity in properly storing the used HM as well as in filling out disposal documentation if the material is processed as waste.

2. The supply department shall ensure that a DD 1348-1 is prepared for each container of used HM. The following information shall be clearly identified (where known) on the DD 1348-1: the NSN, the material name, and the manufacturer's name and address. The individual filling out the DD 1348-1 shall ensure that the container is properly labeled with information required by paragraph D1502e and with the Used Hazardous Material label specified above.

(b) **Transferring Used HM Ashore**

1. The submarine's supply officer/HM coordinator shall contact the shore activity point of contact to request a pick-up. For used HM which can be identified by a stock number and manufacturer and for which a MSDS is available in the SMCL, the submarine need not provide an MSDS to the receiving activity (one will probably be required if transferring to a non-Navy activity or overseas). Used HM for which a MSDS does not exist in the SMCL or which has been open-purchased shall be accompanied by a hard copy of the MSDS. In situations where compatible materials are inadvertently mixed, the used HM shall be accompanied by the MSDSs of each material in the mixture. If the contents are unknown, the submarine need not include a MSDS, but shall supply information, such as whether the material is flammable, reactive, toxic, or corrosive, in the "Special Stowage Requirements" item of the Used HM label to allow proper stowage at the receiving shore activity.

2. Shore activities shall only require that ships provide used HM that is properly packaged in the original container or in a container specified for the material in appendix C23-A, properly secured, properly labeled, with a properly filled out DD 1348-1, and with a MSDS, if the material originated outside the supply system or a MSDS is unavailable in the SMCL. Material that is non-compliant shall be returned to the originating submarine. Problems experienced with material received from a submarine shall be reported to the command and, if flagrant or repeated, to the submarine's immediate superior in command (ISIC). If any additional requirements (e.g., waste profile sheets) are placed on the shore activity by Federal or State laws and regulations or by the supporting Defense Reutilization and Marketing Office (DRMO), the receiving shore activity shall ensure that these requirements are met using information supplied by the submarine on the DD 1348-1 and container label. When required, analysis of unknown material shall be charged to fleet accounts.

(c) **Excess HM**. A workcenter shall turn in full, properly sealed containers of usable HM in excess of its needs to the supply department. Supply department personnel shall determine if this material may be used elsewhere in the submarine or if it exceeds the submarine's needs. If the material exceeds the submarine's needs, supply department personnel shall transfer it to the supporting FISC with a properly completed DD 1348-1 for each S/N of material being transferred.

D1503. GENERAL STORAGE STANDARDS

Submarines shall observe the following general standards to minimize hazards inherent in the handling and storage of HM:

a. Mark stowage locations (including lockers) to identify type of HM stored and keep the location/materials clean and dry at all times. Submarines shall post HM stowage locations with a CAUTION sign that states:

HAZARDOUS MATERIAL STORAGE AREA

Submarines should obtain these signs through the Navy supply system using National Stock Number (S/N) 9905-01-342-4851 (10" X 7") or 9905-01-342-4859 (3" X 5").

b. Provide ventilation in HM stowage areas, where appropriate.

c. Entry of tanks where HM is stowed shall be certified as safe to enter by the gas free engineer.

d. Allow only authorized personnel access to stowage locations, where appropriate.

e. When transferring material from one container to another, ensure that existing precautionary labeling is retained and that subsequent containers are marked with appropriate precautionary labeling. DD Form 2521 or DD 2522 may be used for labeling of containers into which HM is transferred. Subsequent containers should also contain proper Atmosphere Contaminant Tags.

f. Do not transfer material to a container that has previously stored a different material without first checking the materials' compatibility.

g. Stow HM only in a container which is compatible to the material (e.g., do not place corrosive materials in metal drums).

h. Stack containers in such a way that they will not crush lower containers, become imbalanced, or be difficult to access.

i. Use material on a first-in, first-out basis, considering shelf life.

j. Prohibit smoking, eating, or drinking in stowage areas. Signs shall be posted indicating these requirements.

k. Ensure that open flames or spark producing items are not permitted in stowage areas.

l. When not in use, seal and protect all containers against physical damage and secure for heavy seas.

D1504. GENERAL HANDLING AND USE STANDARDS

For specific handling and use standards, refer to the material/item MSDS. Observe the following general standards when handling HM:

a. Workcenter supervisors shall ensure that, prior to using any HM, personnel under their supervision are trained on the hazards associated with that material and that they have been provided with necessary protective clothing and equipment (i.e., eye protection, respiratory devices, and gloves impermeable to the HM in use).

b. Workcenter supervisors shall ensure that spaces are well-ventilated in areas where HM is used.

c. Upon completion of HM use, return surplus material to its appropriate storage location.

d. Avoid breathing vapors or dust when using HM.

e. Avoid contact with the eyes or prolonged contact with skin when using HM.

f. Prohibit smoking, drinking, or eating in areas where open containers of HM is being used.

g. Ensure personal protective equipment (eye protection, respiratory devices, gloves impermeable to the HM in use, etc.) is in good operating condition and is readily available to all personnel working with HM.

h. Use a respirator with appropriate filter when potentially exposed to particulate matter, hazardous gases, or vapors. Consult the MDR for specific guidance in this regard, and for a determination of the need for more stringent respiratory protection requirements.

i. Do not add incompatible materials to the same collection container.

D1505. FLAMMABLE AND COMBUSTIBLE MATERIAL

A flammable material is any solid, liquid, vapor, or gas that will ignite easily and burn rapidly with a flash point less than 1500°F. The National Fire Protection Association (NFPA) defines a flammable liquid as a liquid with a flash point below 100°F. Liquids having a flash point at or above 100°F are combustible liquids. All flammable and combustible liquids present some danger to personnel and the ship, of prime concern are those liquids having flash points below 200°F. Never carry flammable or combustible liquids aboard the submarine in quantities in excess of that required. Stow flammable and combustible liquids in approved locations. Dispense flammable and combustible liquids from shipping containers only into safety cans or other approved portable containers. Never use flammable or combustible liquids near a heat source or spark-producing device.

a. **Storage Standards**

(1) Store flammable and combustible materials following precautions listed in paragraph D1503.

(2) Store flammable and combustible materials separately from oxidizing materials (i.e., sodium nitrate, calcium hypochlorite, potassium permanganate, peroxides, and strong inorganic acids (nitric, hydrochloric, and sulfuric acids)), (see appendix D15-E: Hazardous Material Compatibility Storage Diagram).

(3) Store a maximum quantity of 12 gallons of any one type of material with a flash point greater than 200°F, but less than 1500°F (excluding grease), in an area designated by the engineer officer. The containers shall not be stowed within 3 feet of any surface where the temperature may exceed 140°F. More than 12 gallons of grease may be stowed in one location (in original containers and greater than 3 feet from 140°F surfaces).

(4) Submarines not having flammable/combustible liquid lockers shall store all items with a flashpoint less than 200°F, solids and semi-solids which give off flammable vapors, solids which burn with extreme rapidity because of self contained oxygen, and materials which ignite spontaneously when exposed to air in a manner that minimizes fire hazards until such time as flammable/combustible liquid lockers available.

(5) Do not stow combustible materials such as rags, paper and wood in the same area as flammable materials; however, submarines may stow oily rags in these areas after placing in suitable containers.

(6) Prohibit open flames or spark-producing items in the vicinity of flammable stowage locations.

(7) Ensure containers are secured with metal banding or other approved tie-downs vice manila line.

b. **Handling and Usage Standards**

(1) Handle and use flammable materials per the precautions of paragraph D1504. Many flammable and combustible materials have additional hazardous properties, such as toxicity. See also Section D1506.

(2) Never use flammable material near a heat source or a spark-producing device. Do not smoke in an area in which flammable material is being used. Designate spaces in which flammable materials are being used as **NO SMOKING** areas.

(3) Keep scrapings and cleaning rags soaked with flammable or combustible liquids in a covered metal container until the HM is disposed of properly.

(4) Keep suitable fire extinguishing equipment and materials ready at all times for instant use.

(5) Ensure that containers of partially used flammable materials are returned to proper stowage facilities, are tightly closed, and are properly labeled.

D1506. TOXIC MATERIAL

A toxic substance has the inherent capacity to produce personal injury or death through ingestion, inhalation, or absorption through any body surface. Toxic materials are considered, and often marked by the manufacturer as being, poisonous. Avoid contact with toxic materials by using suitable protective clothing and following safe handling procedures. Submarines must, to achieve their missions, carry some toxic material, and personnel will be called upon at times to use them. Solvents, degreasers, and refrigerants are but a few of the toxic materials that may be found aboard submarine. If stowed, handled, and used in the proper manner, toxic materials present little or no danger.

a. **Storage Standards**

(1) Store all toxic material per the standards of paragraph D1503. Many toxic materials have additional hazardous properties, such as flammability or combustibility. See also section D1505.

(2) Store all toxic material in cool, dry, well ventilated locations separated from all sources of ignition, acids and acid mists/vapors, caustics, and oxidizers, (see appendix D15-E: Hazardous Material Compatibility Storage Diagram).

(3) Seal all containers and protect them against physical damage.

b. **Handling and Usage Standards**

(1) Handle and use toxic materials per the precautions listed in paragraph D1504.

(2) Use appropriate gloves and protective clothing when handling sensitizers or potential skin irritants such as epoxy and polyester resins and hardeners where significant skin contact is likely. Protective skin cream shall only be used to supplement, but not replace impermeable gloves for any operation where significant contact work with potentially toxic/irritant/sensitizing materials is likely.

c. **Halocarbons (Refrigerants)**. Liquid or gaseous halocarbons have multiple applications in the Navy. They are used as refrigerants, solvents, and dielectric fluids and as line flushing, and degreasing agents. With common names of refrigerant R-11, R-12, R-22, R-113, R-114, and R-116, these products may be better known by names such as FREON , ISOTRON , FRIGEN , FLUORANE , FREON MF , FREON TF , GENSOLV D , BLACO-TRON TF , and ARKLONE P-113 .

NOTE:

Due to changes in the Clean Air Act, the use of halocarbons is being phased out; however, they are still used in the Navy.

(1) To minimize the size of spills, procure, store, and use halocarbons in the smallest amount and container possible for an operation.

(2) The Naval Supply System stocks all normally used halocarbons, and submarines should procure them only through that system.

(3) Prohibit smoking and hot work in areas or vicinity where halocarbons are being used.

(4) Prohibit storage and consumption of food and tobacco in areas where halocarbons are being used.

(5) Some types of FREON are nearly odorless and can numb the sense of smell.

(6) Only use FREON-113 as a solvent when specified and when such use is essential. It may not be stored or carried aboard (see 1,1,1-trichloroethane below).

d. **Toxic Cleaning Solvents**. Toxic cleaning solvents such as 1,1,1-Trichloroethane shall not be stored or carried aboard. Submarines shall not attempt solvent cleaning except alongside a pier or tender. Submarines shall not use solvent cleaning until mechanical cleaning has failed or is technically impossible (for example, FREON flushing of O_2 piping). Use only prescribed cleaning solvents with a flashpoint greater than 140°F . Do not spray diesel fuel or other solvents as a cleaning agent. When cleaning solvents are used, use explosion-proof mechanical exhaust ventilation to exhaust vapors overboard to prevent reentry and recirculation. The ventilation rate (cubic feet per minute) and any other control measures will be determined by the cognizant tender industrial hygienist (Safety Officer) or the supporting shore activity's Shore Maritime Gas Free Engineer.

e. **Polychlorinated Biphenyls**

(1) In general, PCBs, if properly managed, do not present a major health hazard. The Environmental Protection Agency banned PCBs in most manufacturing processes in 1979. However, PCBs may be found as a fire retardant in many materials used in ship construction where stocks of PCB material purchased prior to the ban were installed. Some examples of materials used in submarine construction that may contain PCBs include: sound dampening on reduction gears; electrical cable insulation; foam hull insulation; rubber (used as banding and sheet rubber for cableways, pipe hanger liners, isolation mount, and vent gaskets); packing and grommets for electrical cable stuffing boxes; and pipe insulation and lagging.

NOTE:

PCB-containing construction materials installed in Navy submarines need not be removed just because they contain PCBs. Installed PCB-containing construction materials normally need not be labeled.

(2) Label PCB-containing electrical/electronic components (primarily capacitors) per the guidance provided in reference D15-6. Label PCB-contaminated tools and waste materials (such as dust from ventilation ducting which are known to contain PCB-impregnated felt gaskets) per appendix D15-F.

(3) With the exception of ventilation duct cleaning, work involving known or potential PCB-containing materials shall normally be accomplished in port. Obtain assistance through the nearest naval shipyard environmental program office, Navy medical treatment facility, or NAVENPVNTMEDU prior to such action.

(4) For situations not involving unprotected PCB skin contact, employ routine work and personal hygiene measures (such as washing hands and other exposed skin surfaces with soap and water when work is completed) appropriate for any occupational setting.

(a) When working with PCB-impregnated materials such as insulating felts or with articles that contain liquid PCB solutions, strictly observe good housekeeping procedures to avoid the possibility of secondary surface contamination.

(b) Personnel involved in PCB-related work activities shall not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the space in which work is being performed.

(c) Collect and dispose of PCB-containing waste, scrap, and debris; dust collected from ventilation systems known or suspected of containing PCB-impregnated felt gaskets; and PCB-contaminated clothing (consigned for disposal) in sealed impermeable containers specified in appendix C23-A and labeled with the large label described in appendix D15-F. Disposal should be per the procedures of section D1502e. Specifically notify the receiving activity that PCBs or material containing PCBs is being transferred.

(d) Do not perform hot work in the immediate area when work is performed with PCBs or PCB-containing material. Do not perform hot work, including welding, torch cutting, brazing, grinding, and sawing on ventilation systems components within 12 inches of either side of a flange containing felt gaskets.

(e) Specific work practices for the removal and handling of PCB felt, maintenance and cleaning of ventilation ducting containing PCB felt, and maintenance and handling of other shipboard PCB materials are provided in reference D15-6.

(f) Label all reusable cleaning equipment employed in cleaning systems potentially contaminated with PCBs with PCB labels described in appendix D15-F. Use the large label whenever practicable. If the large label does not fit, use the small label. Equipment to be labeled includes vacuum cleaner, vacuum hoses and working end tools, brushes, Vent Duct Cleaning System components, dust pans, scrapers, and putty knives. Label; bag, where possible; and stow this equipment in a location where it will not be accidentally used for other purposes.

(5) The baseline industrial hygiene survey shall specify personal protective equipment and medical surveillance for any potential PCB-related work.

D1507. CORROSIVE MATERIALS

Corrosive materials are chemicals, such as acids, alkalis, or other liquids or solids which, when in contact with living tissue, will cause severe damage to such tissue by chemical action. In case of leakage, corrosive material will materially damage surfaces or cause fire when in contact with organic matter or with certain chemicals.

a. Storage Standards

(1) Store all corrosive materials per the precautions listed in paragraph D1503.

(2) Store corrosive materials in their original containers.

(3) Ensure that corrosive materials are not stored in the vicinity of oxidizers or other incompatible materials, (see appendix D15-E: Hazardous Material Compatibility Storage Diagram).

(4) Ensure that acids and alkalis are stowed separate from each other.

b. **Handling and Usage Standards**

(1) Handle and use corrosive materials per the precautions listed in paragraph D1504 or as directed by Maintenance Requirement Card, NSTM, industrial hygiene survey, or manufacturer's instructions.

(2) As a minimum, wear chemical goggles, full face shield, and acid resistant gloves when handling acids or other corrosive materials. Greater protection may be required as specified by Maintenance Requirement Card, NSTM, industrial hygiene survey, or manufacturer's instructions.

(3) Never allow corrosive materials or their vapors to come in contact with the skin or eyes.

(4) Submarine nucleonic chemistry rooms and secondary analysis stations are authorized to utilize eyewash bottles in lieu of plumbed or portable eyewash stations provided personnel comply with paragraph 1507b2 of this instruction.

c. **Inorganic Acids**

(1) Stow liquid inorganic acids such as hydrochloric, sulfuric, nitric and phosphoric acids bottled in glass or plastic in such a manner that they are cushioned against shock. They should be kept in their original shipping carton or box inside suitable acid-resistant lockers, cabinets, or chests.

(2) Maintain hydrofluoric acid in acid-proof polyethylene or ceresin-lined bottles at all times and never allow them to come in contact with skin or eyes.

(3) Do not stow inorganic acids in the vicinity of flammable liquids.

d. **Organic Acids**. Do not permit liquid and solid organic acids such as glacial acetic, oxalic, carbolic, cresylic, and picric acids to come in contact with the eyes or skin. These acids are corrosive to aluminum and its alloys, to zinc, and to lead. Keep these acids, usually packaged in glass bottles, from freezing and physical damage. Stow these acids in an approved acid locker lined with acid-resistant material, separated by at least 3 feet from all other material. Lockers shall be separated by a partition, or by at least 3 feet from all other material.

e. **Alkalis**. Stow alkalis (bases), such as lithium hydroxide, sodium hydroxide, potassium hydroxide (lye), disodium phosphate, trisodium phosphate, sodium carbonate, and ammonium hydroxide (ammonia water) in designated lockers, cabinets, or chests. Keep alkalis separated from acids, oxidizers, and other incompatible materials. Ensure the stowage area is dry.

NOTE:

Many submarine cleaning agents and laundry materials contain alkalis in very strong concentrations. Specified stowage and handling precautions for these materials must be observed.

D1508. OXIDIZERS

An oxidizer is a material such as chlorate, perchlorate, permanganate, peroxide, or nitrate which yields oxygen readily to support the combustion of organic matter, or which may produce heat or react explosively when it comes in contact with many other materials. Higher temperatures increase the possibility of oxygen release from oxidizers and the possible initiation of fire. Heat shall be avoided when handling and storing oxidizers. Oxygen candles are oxidizers.

a. **Storage Standards**

(1) Store oxidizers following precautions listed in paragraph D1503.

(2) Do not store oxidizers in an area adjacent to a torpedo room or small arms ammunition storage or heat source or where the maximum temperature exceeds 100°F under normal operating conditions.

(3) Ensure that oxidizers are not stored in the same compartment with easily oxidizable material such as fuels, oils, grease, paints, or cellulose products. Do not remove or obliterate labels.

b. **Handling and Usage Standards**

(1) Handle and use oxidizers per precautions listed in paragraph D1504.

(2) When transferring oxidizers to second containers, **ensure that the second container is compatible with oxidizing material**. Place appropriate hazardous material labels on the second container.

(3) Do not remove or obliterate warning labels from containers.

(4) Ensure oxidizing materials are only handled or used by authorized personnel.

c. **Calcium hypochlorite** is a chemical substance used to provide the sanitizing and bleaching property of chlorine without requiring the handling of liquid or gaseous chlorine.

(1) The following standards apply to the stowage of calcium hypochlorite:

(a) The ready usage stock of 6-ounce bottles issued to the Medical and Engineering Departments shall be stowed in a Medical Instrument and Supply Set Case, S/N 6545-00-131-6992, which shall be kept in a secured locker with ventilation holes, preferably located in the cognizant department office space. Under no circumstances shall the stock of calcium hypochlorite bottles be stowed in a machinery or nuclear space, berthing space, storeroom, or in the nucleonics laboratory areas.

(b) Label all lockers, bins, and enclosures with red letters on a white background:

HAZARDOUS MATERIAL, CALCIUM HYPOCHLORITE

(c) Dispose of containers as used/excess HM and replace when they exceed 2 years from the date of manufacture.

(2) The following precautions apply when using calcium hypochlorite:

(a) Mix only with water.

(b) Do not allow to come into contact with paints, oils, greases, wetting agents, detergents, acids, antifreeze, alkalis, or organic and combustible materials.

(c) Do not remove or obliterate warning labels.

(d) Dispense only in clean, dry utensils and only in amounts required for immediate use.

(e) Avoid contact with skin and eyes.

(f) Ensure containers are not used for any other purpose.

(g) For external contact or if taken internally, follow the instructions printed on the container label or on the material safety data sheet (MSDS).

(h) No special firefighting precautions are required for fires caused by calcium hypochlorite.

D1509. AEROSOLS

Aerosol spray cans are prohibited aboard submarines except as specifically allowed by the SMCL.

D1510. COMPRESSED GASES

Submarines carry numerous cylinders of compressed gases. Compressed gases are used for welding operations (oxygen and acetylene), in refrigeration and air conditioning systems (FREON), and for purging various systems (nitrogen). Cylinders of compressed gases are potential explosion, fire, and health hazards if strict compliance with applicable requirements is not followed.

a. **Storage Requirements**

(1) General

(a) Only stow compressed gases in compartments and locations designated for cylinder storage, as shown in applicable plans for each submarine. Whenever practical, stowage shall permit removal of any cylinder without disturbing other cylinders. Such locations shall:

1. Be kept free of flammable materials (especially greases and oils).

2. Be maintained at temperatures below 130 degrees Fahrenheit.

(b) Ensure that cylinder valve protection caps are in place.

(c) Stow cylinders by date of receipt, and place into service in the order of receipt.

(d) Tag empty cylinders **EMPTY**, mark **MT**, and segregate from full or partially full cylinders.

(2) Ready Service

(a) The following gas cylinders are found aboard submarines:

1. Fire extinguishers (portable).

2. Fire-extinguishing cylinders permanently connected to fixed fire-extinguishing systems.

3. Gas and chemical canisters for oxygen breathing apparatus.

4. Welding cylinders.

5. Medical gas cylinders.

6. Cylinders containing refrigerants.

7. Disposable cylinders supplied as repair kit accessories (halide leak detector kits, for example).

8. Gas cylinders for the propulsion plant operations.

9. Diving air (SCUBA) tanks.

(b) Welding Cylinders. Observe the following special instructions and precautions regarding oxygen and fuel gas cylinders in ready service:

1. Install cylinders of gas per approved plans or specifications.

2. Fasten cylinders securely in a rack. Ensure acetylene cylinders are always stowed vertically. Securely fasten the rack, in turn, at the designated locations.

3. Never leave unstowed equipment unattended.

4. Return welding units to designated stowage as soon as work is complete.

5. Attach a card to each welding unit with the following instructions:

Return to (designated location) immediately on completion of work.
Unit shall not be left unattended while away from above location.
Unit is **NOT SECURE** while pressure shows on gauges, or cylinders are not firmly fastened to rack and properly stowed.

b. **Handling and Usage Requirements**

(1) Never drop cylinders nor permit them to strike against one another violently.

(2) Never use a lifting magnet or a sling (line or chain) when handling cylinders. If a crane or hoist is used, provide a safe cradle or platform to hold cylinders. Do not lift cylinders by valve protection caps.

(3) When returning empty cylinders, be sure that valves are closed and that valve outlet, if provided, and cylinder valve protection caps are in place.

(4) Ensure that all cylinders are approved under DOT regulations. Non-magnetic cylinders are an exception.

(5) Only refill cylinders when the command specifically approves such action.

(6) Fill a cylinder only with the gas for which the cylinder has been specifically designated.

(7) Do not remove or change the numbers or marks stamped into cylinders without the specific approval of the Defense General Supply Center.

(8) Never use cylinders for rollers, supports, or for any purpose other than to carry gas.

(9) Never tamper with the safety devices on valves or cylinders.

(10) Never hammer or strike the valve wheel in attempting to open or close valves. Use only wrenches or tools provided and approved for this pur-

pose. If valve cannot be turned using hand or proper tool, return the cylinder to supply activity.

(11) Be sure that the threads of regulators or other auxiliary equipment are the same as those on cylinder valve outlets. Never force connections that do not fit.

(12) Do not use regulators, pressure gauges, manifolds, and related equipment that are provided for a particular gas on cylinders containing different gases.

(13) Only repair or alter cylinders or valves when authorized by NAVSEASYSCOM. If trouble is experienced, remove cylinder from service, tag as defective, and return to supply activity. Do not remove the stem from a diaphragm-type cylinder valve.

(14) Never subject compressed gas cylinders, either in stowage or in service, to a temperature in excess of 130°F. Never permit a direct flame to come in contact with any part of a compressed gas cylinder.

(15) Handle cylinders carefully. Rough handling, knocks, or falls are liable to damage the cylinder, valve, or safety devices and may cause leakage. Protect cylinders from objects that will cut or otherwise abrade the surface of the metal.

(16) When testing for leaking gas cylinders, use soapy water or leak-detection compound conforming to MIL-L-25567.

(17) Only use a gas cylinder that is properly marked (by color of paints or with the name of the gas stenciled on cylinder and valve). Return all mis-marked cylinders to the nearest Naval Supply Depot.

(18) Work center supervisors shall ensure that supply and exhaust ventilation exists in compartments where compressed gases are stored or in use, systems are in good operating condition, and have been evaluated as adequate by an industrial hygiene survey team.

(19) To thaw out valve outlets that are clogged with ice, use warm (not boiling) water. The use of boiling water will melt the fusible plugs, if present, and vent the cylinders.

(20) Never discharge a cylinder into any device or equipment in which the gas will be entrapped and create pressure. The only exception is a cylinder equipped with a pressure regulator set to control the pressure.

(21) Never use oil-tolerant gases when oil-free gases are required. Non-interchangeable valve outlets discourage this practice.

(22) Close the cylinder valve and release the gas from the regulator before removing the regulator from a cylinder valve.

c. **Recharging Cylinders Aboard Ships**

(1) Recharging of diving air (SCUBA) cylinders: The charging of divers' scuba tanks from the ship's air system shall meet the purity requirements of paragraph 5.2.1.2 of reference D15-7. Commanding Officers may omit this requirement during emergency situations.

(2) Personnel may refill small cylinders of hydrogen routinely used for nuclear propulsion plant operations per the Reactor Plant Manual.

(3) Personnel may recharge fire extinguishers and fire extinguishing system cylinders per NSTM 555.

(4) Recharge a cylinder only if less than 5 years have passed since its last hydrostatic test date. The only exceptions are 3A and 3AA cylinders having water capacities under 125 pounds, for which a 10-year hydrostatic test frequency is approved. For fire extinguisher and fire extinguishing system cylinder hydrostatic test requirements, see NSTM 555.

(5) Never attempt to mix gases in a cylinder. Unauthorized personnel should never refill a cylinder.

d. **Welding Cylinders**

(1) Place cylinders a safe distance away from the actual welding or cutting operation so that sparks, hot slag, or flame will not reach them. Use fire-resistant shields.

(2) Do not place cylinders where they might become part of an electric circuit. Avoid contact with energized equipment. Keep cylinders away from piping systems that may be used for grounding electric circuits, such as for arc welding machines. Any practice, such as the tapping of an electrode against a cylinder to strike an arc, is prohibited.

(3) Unless connected to a manifold, do not use oxygen from a cylinder without first attaching an oxygen regulator to the cylinder valve. Before connecting the regulator to the cylinder valve, open the valve slightly for an instant and then close. Always stand to one side of the outlet when opening the cylinder valve.

(4) Always place the fuel-gas cylinders with valve end up. Store and ship liquefied gases with the valve end up. Prior to use, store acetylene cylinders in a vertical position for a minimum of 2 hours to stabilize the gas. If acetone flows from the cylinder, put aside the cylinder for an additional period.

(5) Do not place anything on top of an acetylene cylinder that may damage the safety device or interfere with the quick closing of the valve.

(6) Never use fuel gas from cylinders through torches or other devices equipped with shutoff valves without reducing the pressure through a regulator attached to the cylinder valve or manifold.

(7) Do not use copper tubing with acetylene gas cylinders due to the increased potential for an explosive chemical reaction.

(8) Back off on the regulation screws, and then open the cylinder valves slowly. Open the acetylene valve one-fourth to one-half turn. This will allow an adequate flow of acetylene, and the valve can be closed quickly in an emergency (never open the acetylene cylinder valve more than one and a half turns). The oxygen cylinder valve should be opened all the way to eliminate leakage around the stem.

CHAPTER D15

REFERENCES

D15-1 NAVSEA S9510-AB-ATM-010/(U), Nuclear Powered Submarine Atmosphere Control Manual (NOTAL)

D15-2 Hazardous Material Information System (HMIS)

D15-3 NAVSUP Publication 4105, List of Items Requiring Special Handling (NOTAL)

D15-4 NAVSUPINST 4410.52B, Shelf-Life Item Identification, Management, and Control (NOTAL)

D15-5 OPNAVINST 5090.1B, Environmental and Natural Resources Program Manual (NOTAL)

D15-6 NAVSEA S9593-A1-MAN-010, *Shipboard Management Guide to PCBs* and associated NAVSEA issued PCB Advisories (NOTAL)

D15-7 NAVSEA 0944-LP-001-9010, U.S. Navy Diving Manual (NOTAL)

Appendix D15-A
SUBMARINE MATERIAL CONTROL LIST (SMCL)
FEEDBACK REPORT (SFR)

ACTIVITY INFORMATION

Submarine/Hull No.: _____ UIC: _____
Ship's Point of Contact: _____ Telephone: _____
Recommended Action: Add/Delete/Other: _____

Hardcopy submission:

Forward Original SFR to:
Commanding Officer:
Naval Inventory Control Point
Code 07122
5450 Carlisle Pike
Mechanicsburg, PA 17055-0788

Copy To:
Commanding Officer
Naval Sea Systems Command
Code 05L23
2531 Jefferson Davis Highway
Arlington, VA 22242-5160

MANUFACTURER DATA

NSN: _____ Trade Name/Nomenclature: _____
Part No.: _____ Specification No.: _____ UI: _____
Manufacturer: _____ Cage: _____
Address:_____
City: _____ State:_____ ZIP:_____
Point of Contact: _____Phone: _____

TECHNICAL DATA

System/Equipment/Material Use (including typical/average/maximum ambient and surface temperatures where material will be used.): _____
_____
_____
_____

Method of Application: _____
_____

Proposed Usage: _____
_____

Negative Impact of Not Having Material Available: _____
_____

Special Training Requirements: _____
_____

Precautions (including local/general ventilation, personal protection equipment, including respiratory protection to be used): _____
_____

Properties (i.e. corrosivity; reactivity; toxicity, etc.): _____
_____

MSDS Attached: Yes_____ / No _____
Advantages of Using this Material over Materials used in the Past:_____
_____

Comments: _____
_____

Appendix D15-A
INSTRUCTIONS FOR SMCL FEEDBACK REPORT

ACTIVITY INFORMATION

Submarine/Hull no.: Enter submarine name and hull number.

UIC: Enter the reporting activity's Unit Identification Code.

Ship's Point of Contact: Enter name, rank and telephone number for ship's point of contact.

Recommended Action: Enter appropriate item for addition, deletion or other, such as substitution.

Hardcopy Submission: Mail original to NAVICP and one copy to NAVSEA.

MANUFACTURER DATA

NSN: Enter the National Stock Number for the item listed on the SFR request.

Trade Name/Nomenclature: Enter item nomenclature such as detergent, general-purpose window cleaner, etc.

Part Number: Enter the manufacturer's product number or designator.

Specification No.: Enter Military or Federal specification number (if applicable).

UI: Enter the Unit of Issue.

Manufacturer: Enter the manufacturer's name.

CAGE: Enter the Commercial and Government Entity Identifier, a 5-digit number used to identify the item's manufacturer. CAGE numbers are found in the Defense Logistic Agency (DLA) Handbook.

Address: Enter the manufacturer's complete address as shown on the product.

Point Of Contact: Enter the name and phone number of manufacturer's POC (if known**).**

TECHNICAL DATA

System/Equipment/ Material Use: Enter description of system, equipment or application where material will be used. Identify ambient and maximum temperature the material will be exposed to.

Method Of Application: Provide information on the application of the material.

Proposed Usage: Specify when (in port and/or underway) and how much material is required(quantity and frequency of use, both in port an/or underway).

Negative Impact Of Not Having Material Available: Enter negative effects of not having the item for use.

Special Training Requirements: Enter any special training needed for prospective users.

Precautions: Enter any precautions (i.e., local/general ventilation, personal protection equipment and respiratory protection to be used) that should be followed when applying, storing, or disposing this product.

Properties: Enter any properties (i.e. corrosiviety, reactivity; toxicity, etc.) that the item has.

MSDS Attached: Check box as to whether or not a Material Safety Data Sheet is included in package.

Comments: Enter any comments not covered in other sections concerning item.

Appendix D15-B

SUBMARINE MATERIAL CONTROL LOG

_____ MATERIAL

TAG NO.	USE DATE DAY/MO/YR IN	OUT	MATERIAL DESCRIPTION(1)	STORAGE LOCATION	DEPT./ DIV.	VOLUME/ TYPE OF CONTAINER	QUANTITY	STATUS	SHELF LIFE	HM COORD/ XO INITIALS

NOTES:
(1) ITEM NAME, NSN, AND MANUFACTURER
(2) X – PROHIBITED; R – RESTRICTED; L – LIMITED
(3) PROHIBITED ITEMS ARE NOT ALLOWED ON BOARD AT ANY TIME
(4) RESTRICTED ITEMS REQUIRE THE EXECUTIVE OFFICER'S SIGNATURE TO CARRY OR USE ONBOARD DURING AN UNDERWAY OPERATION OF 24 HOURS OR GREATER
(5) LIMITED ITEMS REQUIRE THE HM COORDINATOR'S INITIALS
(6) PERMITTED ITEMS DO NOT REQUIRE ATMOSPHERE CONTAMINANT TAGS, SIGNATURE OR LOGGING

Appendix D15-C

ATMOSPHERE CONTAMINANT TAG

NAME OF ITEM:
_____

DATE:
_____ **TAG:** _____

USAGE CATEGORY:
_____

STORAGE LOCATION:
_____

SIGNATURE OF
SUPPLY OFFICER/
HM COORDINATOR: _____

Appendix D15-D

NAVY USED HAZARDOUS MATERIAL IDENTIFICATION LABEL

USED

SHIP_____ WORK CENTER _____

NAME OF MATERIAL _____

PROCESS IN WHICH MATERIAL USED _____

_____

ANY KNOWN IMPURITIES _____

SPECIAL STOWAGE REQUIREMENTS _____

_____

_____

DIVISION OFF. SIGNATURE _____

DATE _____

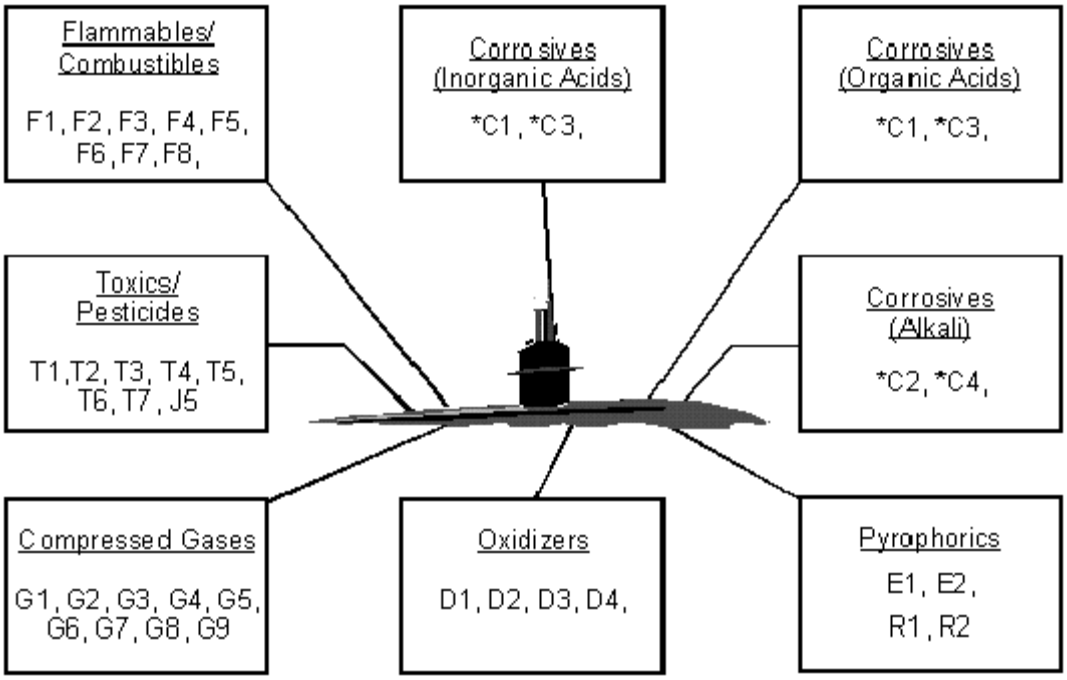
HAZARDOUS MATERIAL

OPNAV 5100/18 (12-93) S/N 0107-LF-016-9100

Appendix D15-E

HAZARDOUS MATERIAL COMPATIBILITY STORAGE DIAGRAM
(USING HAZARD CHARACTERISTIC CODE (HCC))

The Hazardous Characteristic Code (HCC) for each item can be found in the MSDS located in the Submarine Hazardous Material Control List (SMCL).



Instructions:

1. Each block represents a separate stowage location. The codes in the boxes are grouped with other codes with which they are compatible for storage. Generally, materials with different codes will not be stowed together unless specified below:

a. Inorganic acids may be stowed in a flammable liquid storeroom inside a designated locker, separated by at least three feet from all other material.

b. Organic acids may be stowed in a flammable liquid storeroom inside a designated locker, separated by at least three feet from all other material.

NOTES:

*C1, C3 - HM identified with the C1 or C3 code may be either an inorganic or an organic acid. See page D15-E-2 for examples of inorganic and organic acids.

Appendix D15-E

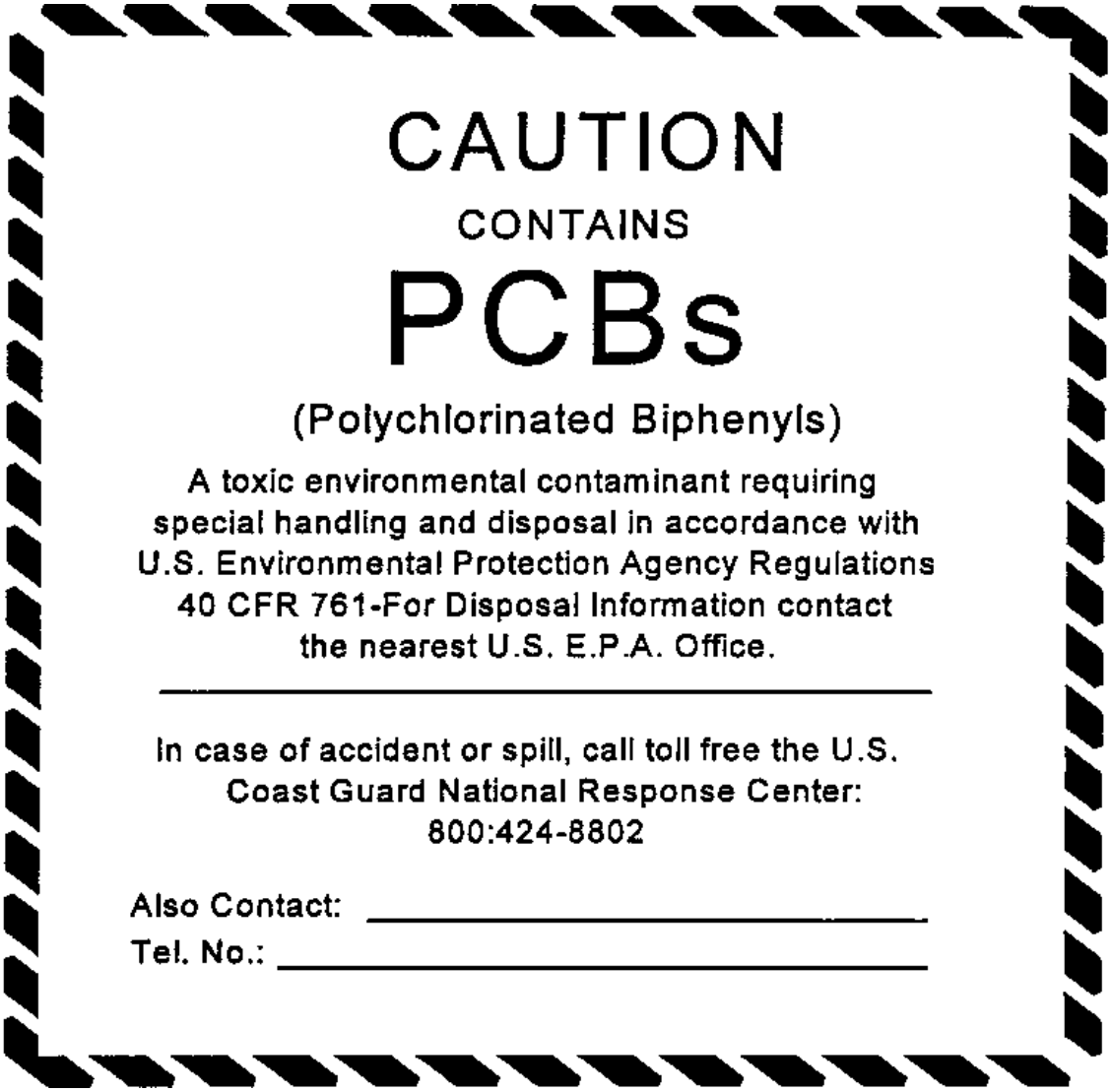
ACID AND ALKALI EXAMPLES

The table below lists common examples of inorganic acid, organic acid, and alkali. Acids identified with the HCC code C1 or C3 may be either inorganic or organic, check carefully before storing.

Inorganic acid (C1, C3)	Organic acid (C1, C3)	Alkali (C2, C4,)
Alodine	Acetic acid	Ammonia
Aqua fortis	Citric acid	Ammonium hydroxide
Boric acid	Cresol	Barium hydroxide
Chromic acid	Cresylic acid	Calcium hydroxide
Hydrochloric acid	Glacial acetic acid	Caustic soda
Hydrofluoric acid	Oxalic acid	Caustic potash
Muriatic acid	Sulfosalicylic acid	Diethylenetriamine
Nitric acid	Trichloroacetic acid	Lithium hydroxide
Oil of Vitriol (sulfuric acid)	Vinegar	Monoethanolamine
Orthotolidine solution		Morpholine
Phosphoric acid		Potassium carbonate
Sodium bisulfate		Potassium hydroxide
Sulfamic acid		Soda lime
Sulfuric acid		Sodium sulfide
		Sodium hydroxide
		Sodium metasilicate
		Sodium phosphate
		Sodium silicate
		Sodium hypochlorite
		Tetraethylenepentamine

Appendix D15-F

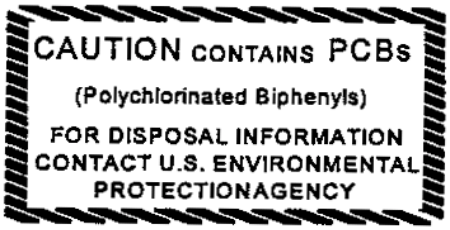
LARGE PCB LABEL



This label is available in the following sizes:

Size	Stock Number
6" X 6"	0116-LF-008-6500
4" X 4"	0116-LF-050-9021

Small PCB Label



This label is available in the following size:

Size	Stock Number
1" X 2"	0116-LF-050-9011

Appendix D15-G
Incompatible Materials Chart

HMUG GROUP	HCC see note 2	GROUP NAME	EXAMPLES	INCOMPATIBLE MATERIALS	EXAMPLES	REACTION IF MIXED
1	C1, C2, C4, C5	ACIDS	Battery Acid Paint Removers De-Rust Spray	FLAMMABLES/ COMBUSTIBLES ALKALIS/BASES/CAUTICS OXIDIZERS (HMUG Groups 2, 3, 6, 7, 9, 10 ,11, 12, 13, 14, 16, 17, 18, 20, 22)	Degreasers, Carbon Removers, Anti-Fogging Compounds	HEAT Gas Generation VIOLENT REACTION
2	F1 to F7, P1, T6, V3, V4	ADHESIVES	Epoxies Isocyanates Diethylenetriamine	ACIDS ALKALIS/BASES/CAUSTICS OXIDIZERS (HMUG Groups 1, 3, 18)		HEAT FIRE HAZARD
3	B1, B2	ALKALIES BASES/ CAUSTICS	Ammonia Sodium Hydroxide Cleaners	ACIDS/OXIDIZERS FLAMMABLES/COMBUSTIBLES (HMUG Groups 1, 2, 9, 10, 14, 18, 20)	Battery acid, Paint Removers, De-Rust Sprays, Paints, Solvents	HEAT Gas Generation VIOLENT REACTION
4	C1-C4, B1-B3, F2 to F7, T4, T6, V2-V4	CLEANING COMPOUNDS	Degreasers Carbon Removers Antifogging Compounds	DETERGENTS/SOAPS OXIDIZERS (HMUG Groups 7, 18)	Calcium Hypochlorite, Sodium Nitrate, Hydrogen Peroxide	HEAT FIRE HAZARD
5	G1 to G9	COMPRESSED GASES	Acetylene, Propane, Nitrogen, Argon, Helium, Oxygen	HEAT SOURCES Consult paragraph C23 and NSTM 670 for specific handling and stowage guidance (HMUG Groups 8, 9, 10, 11, 12, 15, 18, 19)		FIRE HAZARD EXPLOSION HAZARD
6	F2 to F5, T6, V2, V3, V4	CORROSION PREVENTIVE COMPOUNDS	Corrosion Inhibitors Chemical Conversion Compounds	ACIDS/BASES OXIDIZERS IGNITION SOURCES (HMUG Group 1, 18)		FIRE HAZARD
7	B3	DETERGENTS/ SOAPS	Trisodium Phosphate Scouring Powders Disinfectants	ACID-CONTAINING COMPOUNDS (HMUG Groups 1, 18)	Battery Acid, Paint Removers De-Rust Sprays	VIOLENT REACTION HEAT
8	F8, V6, V7	GREASES	Lithium Grease Silicone Molybdenum	OXIDIZERS ALKALIS/BASES/CAUSTICS (HMUG Groups 5, 18)		FIRE HAZARD HEAT
9	T6, V4, V6, V7	HYDRAULIC FLUIDS	Petroleum-Based Synthetic Fire-Resistant	CORROSIVES, OXIDIZERS (HMUG Groups 1, 3, 5, 18)		VIOLENT REACTION
10	F2 to F4, T4, T6, V2-V6	INSPECTION PENETRANTS	Petroleum-Based Dyes	CORROSIVES, OXIDIZERS (HMUG Groups 1, 3, 5, 18)	Battery Acid Caustic Soda Chlorine laundry bleach Calcium Hypochlorite Hydrogen Peroxide OBA Canisters Paint Removers	
11	F4, T6, V2, V3, V4, V6	LUBRICANTS/ OILS	General Purpose, Gear, Turbine, Weapons			EXPLOSION HAZARD
12	F2 to F6, P1, T3, T4, T6, V1-V4	PAINT MATERIALS	Primers, Enamels, Urethanes, Lacquers, Varnishes, Non-Skid, Thinners	ACIDS, OXIDIZERS (HMUG Groups 1, 5, 18)		HEAT FIRE HAZARD
13	C1-C4, B1-B3, D1	PHOTO CHEMICALS	Developers, Stopbath, Toners, Bleaches, Replenishers	ACIDS HEAVY METALS (HMUG Groups 1, 18, 20)		HEAT FIRE HAZARD
14	F4	POLISH/WAX COMPOUNDS	Buffing Compounds Metal Polishes General Purpose Waxes	CORROSIVES OXIDIZERS (HMUG Groups 1, 3, 18)		HEAT, FIRE HAZARD VIOLENT REACTION
15	F2 to F6, T3, T4, T6, V1-V4	SOLVENTS	Methyl Ethyl Ketone (MEK) Toluene, Xylene Acetone	CORROSIVES OXIDIZERS BATTERIES (HMUG Groups 5, 18, 21, 22)	Battery Acid Calcium Hypochlorite Sodium Nitrate Sodium Hydroxide	HEAT FIRE HAZARD
16	T6, T7, Z1	THERMAL INSULATION	Asbestos Fiberglass Glass Wool	**MATERIAL IS NOT REACTIVE KEEP DRY**		**NO REACTION**
17	C1-C4, B1-B3, D1	WATER TEST/ TREATMENT CHEMICALS	Nitric Acid Mercuric Nitrate Caustic Soda	CORROSIVES OXIDIZERS HEAVY METALS (HMUG Groups 1, 3, 18, 20)		HEAT VIOLENT REACTION
18	D1 to D4	OXIDIZERS	Calcium Hypochlorite Laundry Bleach OBA Canisters	PETROLEUM BASED MATERIALS FUELS, SOLVENTS, CORROSIVES, HEAT (HMUG Groups 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22)		FIRE HAZARD TOXIC GAS GENERATION TOXIC
19	F1 to F4, V4, V5, V6	FUELS	JP4, JP5 Gasoline Diesel Fuel	CORROSIVES OXIDIZERS (HMUG Groups 1, 3, 18)	Battery Acid Calcium Hypochlorite Sodium Nitrate Sodium Hydroxide	FIRE HAZARD TOXIC GAS GENERATION
20	T6, V7, Z2	HEAVY METALS	Mercury Lead Beryllium	CORROSIVES OXIDIZERS WATER TREATMENT/PHOTO CHEMICALS (HMUG Groups 1, 3, 6, 13, 17, 18, 21)		VIOLENT REACTION GENERATION OF TOXIC AND FLAMMABLE GAS
21	Z4 to Z7	BATTERIES	Lead-Acid Dry-Cell Alkaline	SOLVENTS HEAVY METALS OXIDIZERS (HMUG Groups 15, 18, 20)	Xylene Toluene Alcohol	HEAT VIOLENT REACTION TOXIC GAS GENERATION TOXIC
22	T2 to T6	PESTICIDES	Insecticides, Fungicides Rodenticides Fumigants	CORROSIVES OXIDIZERS (HMUG Groups 1, 3, 18)		TOXIC GAS GENERATION

1. This chart is to be used as a *GUIDE ONLY!*
2. Compare the desired HCC in the left column with the Incompatible Material(s) of that Group in the center column on the same row. Mixing of the HCC with the Incompatible Material(s) will result in the reaction(s) listed in the right column.
3. Not all applicable HCCs are listed; only the most frequently encountered HCCs (except N1) are listed.

GLOSSARY

GLOSSARY

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.

Abate - To eliminate or reduce permanently an unsafe or unhealthful working condition by coming into compliance with the applicable NAVOSH standard.

Abrasive-blasting Respirator - A continuous flow airline respirator constructed so that it will cover the wearer's head, neck, and shoulders and protect the wearer from abrasives and other related materials.

Acid - Any corrosive having a pH less than 7.

Acid Locker - A locker specifically designed and authorized for storing HM with a
pH less than 7.

Action Level - Unless otherwise specified in a NAVOSH standard, one-half the relevant Permissible Exposure Limit (PEL) or Threshold Limit Value (TLV).

Acute - Severe, usually crucial, often dangerous in which rapid changes are occurring. An acute exposure runs a comparatively short course.

Administrative Control - Any procedure which limits daily exposures to toxic chemicals or harmful physical agents by control of the work schedule.

Aerosol - Any material dispensed from a pressurized container using a gas propellant.

Afloat Mishap - Any mishap caused by DoD operations resulting in injury or death to anyone aboard the ships (craft) listed below whenever the ship is underway; ship's military and Federal civilian mariners assigned as a crew member (permanent or under temporary orders) aboard the ships listed below, on- or off-duty ashore; or material loss or damage, occurring to the ships listed below at all times, both underway and moored:

a. Commissioned, U.S. Navy ships and their embarked boats and landing craft or leased boats

b. Pre-commissioned, U.S. Navy ships and their embarked boats and landing craft or leased boats beginning when the ship gets underway for Acceptance Trials

c. Landing Craft, Air Cushioned (LCAC)

d. All USNS ships manned by Federal civilian mariners assigned to Military Sealift Command.

Afloat Special Case Mishaps - For data collection and analysis purposes, the following special case mishaps are reportable to COMNAVSAFECEN in a MR:

a. All cases of electric shock. (Include the voltage in the report.)

b. All cases of hazardous material, chemical, or toxic exposure requiring medical attention.

c. All cases of back injury requiring medical attention.

d. All mishaps involving explosives, oxidizers, incendiaries, explosive systems, or chemical warfare agents. They include the detonation, accidental launch, malfunction, dangerous defect, improper handling, damage to a launching device, weapon impact off-range or other unusual or unexpected weapons-related occurrence. They shall be reported using the information provided in appendix A6-F. If the explosive mishap meets the criteria for an afloat Class A mishap, a mishap investigation board shall conduct a formal mishap investigation and submit an MIR.

ALARA - As Low as Reasonably Achievable.

Alternate Standards - Proposed standards giving equal or better protection than existing NAVOSH standards. Proposed alternate standards shall be submitted to CNO (N45) through the chain of command for approval.

ANSI - American National Standards Institute, a national consensus standard-developing organization.

Atmosphere Immediately Dangerous to Life or Health (IDLH) - The concentration of a contaminant which can produce an immediate irreversible debilitating effect on health, or which can cause death.

Asbestos - A fibrous mineral, which can be produced into a material that is fireproof and possesses high tensile strength, good heat and electrical insulating capabilities, and moderate to good chemical resistance.

Asbestos Medical Surveillance Program (AMSP) - A program consisting of a periodic medical screening examination which may include special purpose histories, physical examinations and laboratory tests. Directed at detecting early changes in specific organ systems which have been identified with asbestos diseases.

Audiogram - A graph or table showing hearing threshold levels as a function of frequency.

Audiometer - Instrument used to measure hearing sensitivity using pure tones.

Aviation Bends (Altitude Decompression Sickness) - Aviators exposed to altitude may experience symptoms of decompression sickness similar to those experienced by divers.

A-Weighted Sound Level - Sound level in decibels as measured on a sound level meter using an A-weighted network. This network attempts to reflect the human ear's decreased sensitivity to low frequency sounds.

Authorizing Officer - Officer in the tag-out program who has authority to sign tags/labels to be issued or cleared.

Base - Any corrosive having a pH greater than 7.

Baseline Survey - Initial survey (after construction or overhaul) to identify hazardous workplace conditions or unsafe work practices.

Biological Monitoring - Periodic examination of blood, urine or any other body substance to determine exposure to toxic substances.

Bound Asbestos - Asbestos which is tightly compacted and is not normally a health hazard unless worked by punching, grinding, machining or sanding or when the material is deteriorated.

Canister, Oxygen-Generating - A container filled with a chemical which generates oxygen by chemical reaction.

Capture Velocity - That velocity at a distance from a hood, necessary to overcome dispersive forces and capture the contaminant.

Carbon Dioxide Fixed Flooding Systems - Fire extinguishing systems that may be used to protect spaces such as paint lockers, generator rooms, pump rooms, engine rooms, and flammable liquids storerooms.

Cartridge, Air-Purifying - A container with a filter, sorbent, or catalyst, or any combination of these which removes specific contaminants from the air drawn through it.

Caustic - Any corrosive having a pH greater than 7.

Caution Tag - Yellow tag used as precautionary notification to indicate that caution must be exercised in operating tagged equipment.

Chemical Agent - A chemical compound intended for use in military operations to kill, seriously injure, or incapacitate people through its chemical properties. Excluded are riot control agents, chemical herbicides, pesticides, and industrial chemicals unrelated to chemical warfare.
Chronic - Persistent, prolonged, repeated.

Class A Mishap (afloat) - The total cost of reportable damage is $1,000,000 or more; or any injury or work-related illness resulting in death or permanent total disability. All Class A mishaps occurring on a ship specified in paragraph A0601 require investigation by a mishap investigation board (MIB) and submission of a Mishap Investigation Report (MIR). Class A mishaps occurring ashore or as a result of motor vehicle mishaps shall be reported by Mishap Report (MR) or Motor Vehicle Mishap Report (MV) and do not require a mishap investigation board.

Class B Mishap (afloat) - The total cost of reportable property damage is $200,000 or more, but less than $1,000,000; an injury or work-related illness resulting in permanent partial disability; or a mishap resulting in the hospitalization of five or more people.

a. Type commanders shall direct the investigation of shipboard Class B or other mishaps or near mishaps by a mishap investigation board if the investigation may reveal vital safety information.

b. Class B mishaps not investigated by a mishap investigation board shall be investigated and reported using a MR, DV, MV, or RAHS.

Class C Mishap (afloat) - The total cost of reportable property damage is $20,000 or more, but less than $200,000; or an injury preventing an individual from performing regularly scheduled duty or work beyond the day or shift on which it occurred; or a nonfatal illness or disability causing loss of time from work or disability at any time (lost time case). For data collection and

analysis purposes, Class C mishaps shall be reported to COMNAVSAFECEN by MR, DV, MV, or RAHS if:

a. The total cost of reportable property damage is $10,000 or more, but less than $200,000.

b. There is an injury preventing an individual from performing **regularly scheduled duty or work** 5 days beyond the day or shift on which it occurred.

Collection, Holding and Transfer (CHT) System - A type of marine sanitation device installed aboard naval ships. This system employs waste holding tanks for use when transiting restricted zones. It is only installed on ships of sufficient size to accommodate the tanks without reducing military capabilities.

Combustible Liquid - A liquid having a flash point at or above 100°F.

Compressed Gas - Material, which may or may not be HM in itself, which is stored in pressurized containers.

Concentration - The quantity of a substance per unit volume (in appropriate units).

Examples of concentration units are provided below:

- mg/m^3 milligrams per cubic meter for vapors, gases, fumes or dusts
- ppm parts per million for vapors or gases
- fibers/cc fibers per cubic centimeter for asbestos

Confined Space - A compartment such as a double-bottom tank, cofferdam or void, which because of its small size, limited access, or confined nature can readily create, aggravate, or result in a hazardous condition due to the presence of toxic gases or lack of oxygen.

Contaminant - A material that is not normally present in the atmosphere, which can be harmful, irritating or a nuisance to anyone who breathes it.

Contractor Caused Mishaps - Injuries or work-related illnesses of DoD personnel caused by contractor operations. The parent command of affected DoD personnel shall report these mishaps. Mishaps involving civilian contractor personnel caused by contractor operations shall be referred to COMNAVSAFECEN for guidance.

Conventional Ordnance Deficiency - A malfunction, observed defect, or induced defect involving conventional ordnance, explosives, ammunition, explosives systems or devices, support and handling equipment used to handle, load, store, or transport ordnance.

Corrosive Material - Any HM that will cause severe tissue damage by chemical action or materially damage surfaces or cause a fire when in contact with organic material or certain other chemicals.

Current Ships Maintenance Project (CSMP) - A computerized report which lists the deferred maintenance reported by a command. Such reports are also provided to the type commander. Reports can provide either a detailed or summary listing of deferred maintenance information. The CSMP is used for generating

Board of Inspection and Survey packages and automated work requests (AWRs) prior to overhaul or availabilities.

Damage - The partial or total loss of hardware caused by component failure. Exposure of hardware to heat, fire or other environments; human errors; or other inadvertent events or conditions.

Danger Tag - Red tag prohibiting operation of equipment that endangers safety of personnel or equipment, systems, or components.

Decibel-dB - A unit used to express sound pressure levels; specifically, 20 times the logarithm of the ratio of the measured sound pressure to a reference quantity, 20 micropascals (0.0002 microbars). In hearing testing, the unit used to express hearing threshold levels as referred to audiometric zero.

Designated Safety and Occupational Health Official - The individual at the Secretary of the Navy level who is responsible for the administration of the Navy safety and occupational health program.

Detector Tube - A glass tube which utilizes a sensitive chemical (in a suspension of silica gel) which produces color change whenever contaminated air is pulled through the tube.

Disabling Work/Duty Injury - Any impairment resulting from an accident or occupational disease which prevents a military person from performing his or her regularly established duty or work for a period of 24 hours or more, subsequent to 2400 on the day of injury.

Diving Mishap - Injury, recompression therapy, or death resulting from an incident occurring while breathing compressed gases (for example, air, HeO_2, or oxygen) before, during, or after entering or leaving the water.

DoD Personnel - Defined as:

a. On-duty, DoD civil service employees (including National Guard and Reserve technicians, unless in military duty status); non-appropriated fund employees (excluding part-time military); Corps of Engineers civil works employees; Youth or Student Assistance Program employees; foreign nationals employed by DoD components; and Army-Air Force Exchange Service employees.

b. All U.S. military personnel on active duty; U.S. Military Reserve or National Guard personnel on active duty or in a drill status; Service Academy cadets or midshipmen; Reserve Officer Training Corps (ROTC) cadets or midshipmen when engaged in directed training activities; Officer Candidate School students when engaged in directed training activities; and foreign national military personnel assigned to DoD components.

Dosimeter - A device for cumulatively measuring radiation or noise exposure of an individual over a period of time.

Dust - Small solid particles created by the breaking up of larger particles by processes such as crushing, grinding, or explosion.

Examples of processes that generate dust: use of machine shop tools, paint chipping, sanding, woodworking, abrasive blasting.

EEBD (Emergency Escape Breathing Device) - A respirator that provides the user with oxygen through a chemical reaction. Only to be used in emergency escape procedures.

Effectiveness of Corrective Action - The degree to which the proposed hazard abatement system can be expected to reduce the cited hazard. For health hazards, this would typically be expressed as the intensity of the hazardous chemical or physical agent remaining, in appropriate units, after the proposed abatement measure is operational. For safety hazards, effectiveness is expressed as "in full compliance" or "not in full compliance" with the applicable standard, if any.

Electric Shock - The passage of direct or alternating electrical current through the body or a body part.

Electrical Safety Officer - Person who is responsible to the commanding officer in conducting an effective ship-wide electrical safety program.

Emergency Repair - A repair necessary to protect life or the ship.

Employment Mishap - A mishap occurring as a result of work performance exposure to the work environment.

Enlisted Safety Committee - A committee consisting of the safety officer, division safety petty officers, and the chief master-at-arms. Identifies and discusses NAVOSH problems, enhances interdepartmental communication in mishap prevention, and submits issues and recommendations to the Safety Council.

Explosion - The unintentional or inadvertent initiation, detonation, deflagration, reaction, or burning of ordnance material resulting in damage, death, or injury.

Explosive Material - A chemical, or a mixture of chemicals, which undergoes a rapid chemical change (with or without an outside supply of oxygen) liberating large quantities of energy in the form of blast, light, or hot gases. Incendiary materials and certain fuels and oxidizers which can be made to undergo a similar chemical change are also explosive materials. Examples of explosive materials include:

a. Explosives. TNT, PBXN, PETN, PBXC, RDX, compositions, Explosive D, tetryl, fulminate of mercury, black powder, smokeless powder, flashless powder, and rocket and missile propellants.

b. Fuels and Oxidizers. OTTO fuel, mixed amine fuel, inhibited red fuming nitric acid, and ethylene oxide.

c. Incendiaries. Napalm, magnesium, thermite, and pyrotechnics.

Explosive Mishaps - An incident or accident involving conventional ordnance, ammunition, explosives, or explosive systems and devices resulting in an unintentional detonation, firing, deflagration, burning, launching of ordnance material (including all ordnance impacting off-range), leaking or spilled propellant fuels and oxidizers, or chemical agent release. Even if an ordnance system works as designed, if human error contributed to an incident or accident resulting in damage, injury, or death, the event is reported as an explosive mishap. Explosive mishaps include:

a. An unintentional or inadvertent initiation, explosion, or reaction of an explosive material, component, or system. Accidental discharge of all guns, including small arms.

b. An unintentional launching of a weapon.

c. Any unintentional or uncontrolled release of a chemical agent.

d. Leaking or spilled propellant fuels and oxidizers (less OTTO II fuel).

e. Ordnance impacting off-range.

Explosive System - A weapon, device, or tool using explosive materials. Also includes its components and the operationally adjacent mechanisms. Examples are: small arms, projectiles, bombs, missiles, rockets, targets using explosive material, mines, torpedoes, grenades, charges, rounds, cartridge activated devices (CADs), explosively operated stud drivers, flares, and smoke grenades.

First Aid - Any one-time treatment, any follow-up visit for the purpose of observation, of minor scratches, cuts, burns, splinters, and so forth, which do not ordinarily require medical care. Such one-time treatment, and follow-up visit for the purpose of observation, is considered first aid even though provided by a physician or registered professional personnel.

Flammable Liquid - A liquid with a flash point below 100°F and having a vapor pressure not exceeding 40 lbs./square inch.

Flammable Liquids Cabinet - A cabinet specifically designed and authorized for storing flammable in-use material.

Flammable Liquids Storeroom - A space specifically designed and authorized for storing flammable liquids.

Flashpoint - The minimum (lowest) temperature at which the vapors given off from a material will support combustion provided an ignition source.

Frequency - The rate at which a sound source vibrates or makes the air vibrate determines frequency. The unit of time is usually one second and the term Hertz (Hz) is used to designate the number of cycles per second. Frequency is related to the subjective sensation of pitch. High frequency sounds (2000, 3000, and 4000 Hz) are high pitched.

Friable Asbestos - Loosely bound asbestos whose fibers may easily crumble or pulverize. A health hazard because it easily releases contaminants into the air.

Fume - Very small particles (1 micrometer or less) formed by the condensation of volatilized solids, usually metals.

Examples of processes that generate fumes: zinc socket pouring, smelting, furnace work, foundry operations, and welding.

Gas - A material that under normal conditions of temperatures and pressure (20 degrees Celsius and 760mmHg, respectively) tends to occupy an enclosed space uniformly.

Gas Free Engineer - Person who is responsible for testing spaces to be entered by personnel for the presence of harmful vapors or vapor density content.

General Use Safety Mishap Investigation Reports (MIRs) - Safety reports prepared to record data concerning all reportable DoD mishaps not covered by Limited Use Safety MIRs. Their primary use is mishap prevention. Although they may be used for other purposes, DoD components are required to take

reasonable measures to protect the information and to encourage the cooperation of essential witnesses.

Government Motor Vehicle - A motor vehicle owned, leased, or rented by the U.S. government (not individuals), and primarily designed for highway use to transport cargo or personnel. Under this definition, government-owned mopeds and all terrain vehicles (ATVs) are motor vehicles. Any object such as a trailer being towed by a motor vehicle is a part of the vehicle, including such devices when detached while in motion or set in motion by a motor vehicle (for example, pushing). Motor vehicle equipment designed primarily for off-the-highway operation such as tracked or half-tracked vehicles, forklifts, road graders, agricultural tractors, and aircraft tugs are special purpose or combat vehicles according to their use.

Ground - Base (zero) potential. To make an electrical connection between an object and the ship or from ship to dry dock to ensure that no potential difference exists.

Hazard - A workplace condition that might result in injury, health impairment, illness, disease, or death to any worker who is exposed to the condition, or which might result in damage to or loss of property/equipment. Mishap investigators use the term to explain causes of mishaps. Hazards are detected through inspections, industrial hygiene surveys, observations of near-mishaps, safety program evaluations, or from reports by others.

Hazard Abatement Log - A record of identified deficiencies in chronological order by department.

Hazard Severity - An assessment of the worst potential consequence which is likely to occur as a result of deficiencies. Hazard severity categories are:

a. Category I - Catastrophic: the hazard may cause death or loss of a facility.

b. Category II - Critical: may cause severe injury, severe occupational illness, or major property damage.

c. Category III - Marginal: may cause minor injury, minor occupational illness, or minor property damage.

d. Category IV - Negligible: probably would not affect personnel safety or health, but is nevertheless in violation of specific criteria.

Hazardous Material (HM) - Any material that because of its quantity, concentration, or physical or chemical characteristics may pose a substantial hazard to human health or the environment when purposefully released or accidentally spilled. This definition includes the following:

- Aerosol Containers
- Flammable Materials
- Toxic Materials
- Corrosive Materials (including acids)
- Oxidizing Materials

- Compressed Gases

For this manual the definition does not include ammunition, weapons, explosives, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical wastes, infectious materials, bulk fuels, and radioactive materials.

Hazardous Material Control and Management (HMC&M) Hazardous Material Information System (HMIS) - A computer based information system distributed Navy-wide on compact disk - read only memory (CD-ROM) which provides right-to-know information found in the MSDS written by the manufacturer for HM used throughout the DoD.

Hazardous Waste - Any discarded material (liquid, solid or gas) which meets the above definition of hazardous material and/or is designated as a hazardous waste by the Environmental Protection Agency or a State hazardous material control authority.

Hearing Level - Amounts in decibels by which the threshold of audition for an ear differs from zero decibels (dB) for each frequency - a standard audiometric threshold derived from normal-hearing young adults.

Heat Exhaustion - A heat illness caused by salt depletion and dehydration, which is evidenced by profuse sweating, headache, nausea, vomiting, and tingling sensations, leading to unconsciousness.

Heat Stress - Any combination of air temperature, thermal radiation, humidity, air flow, and work load which may stress the body as it attempts to regulate body temperature. Heat stress becomes excessive when the body's capability to adjust is exceeded, resulting in an increase of body temperature.

Heat Stroke - Heat illness where the thermo-regulatory system fails to function, so the main avenue of heat loss is blocked resulting in unconsciousness, convulsions, delirium and possible death.

Hertz (Hz) - Unit of frequency.

Hospitalization - Formally admitted to the hospital or sick bay for treatment of an injury or exposure.

Hyperbaric - Pressure greater than that normally measured at sea level. High gaseous pressure found in a diving environment.

Hypobaric - Pressure less than that normally measured at sea level. Low gaseous pressure found at altitude as in flight or a chamber flight simulator (hypobaric chamber).

Illness - Any abnormal condition or disorder, other than one resulting from an injury, caused by exposure to conditions associated with the occupational environment.

Imminent Danger - A condition that **immediately** threatens the loss of life or serious injury or illness of an employee.

Impulse or Impact Noise - Sound of short duration, usually less than 1 second, with an abrupt onset and rapid decay.

Incompatible HM/HW - Any materials that react with each other to produce undesirable products. Mixing incompatible hazardous material can produce heat or pressure, fire or explosion, or toxic, irritating, or flammable dusts, mists, fumes, or gases.

Industrial Hygiene - The science that deals with the recognition, evaluation and control of potential health hazards in the work environment.

Industrial Hygiene Officer (IHO) - Medical Service Corps officer with a subspecialty and trained in the area of industrial hygiene. Trained to identify, evaluate, and prescribe controls for workplace hazards. Assigned as safety officer aboard tenders and as assistant safety officer aboard aircraft carriers. Some staffs are designated to have IHOs assigned.

Injury - Traumatic bodily damage, such as a cut, fracture, burn or poisoning, caused by a single or acute (short-term) exposure to an external force, toxic substance, or physical agent.

Inspection - Careful and critical workplace monitoring for safety hazards and deficiencies conducted by ship's force and outside commands (type commander, group commander, squadron commander, Inspection and Survey (INSURV) Board). Ensures that standards are being observed.

Interim Controls - Those measures meeting or exceeding minimum requirements for temporary protection of personnel or operations pending full and complete corrective action.

In-Use Material (IUM) - The minimum quantity of HM required to be ready for a 1-week's use by Maintenance Requirement Cards (MRCs) Job Process, etc.

Ionizing Radiation - Radiation with sufficient energy to strip electrons from atoms in the media through which it passes. Examples include alpha particles, beta particles, X- and gamma-rays.

Isolation - The physical separation of a hazard from potential personnel contact by the use of a barrier or limiter.

Laser - A device which generates coherent electromagnetic radiation in the ultraviolet, visible, or infrared regions of the spectrum.

LCAC Mishap Categories - Mishaps involving LCACs including:

a. Operational Mishap (OM) - Mishaps in which the intent for operation of the craft existed at the time of occurrence. Intent for operation exists when an LCAC engine is started to commence authorized operations. An engine is started the instant an attempt is made to set it in motion from within or outside the craft. The intent for operation continues until the LCAC comes to rest at the intended landing site with the engines and propellers stopped.

b. Non-operational Mishap (NOM) - Mishaps in which there was no intent for operation of the craft at the time of occurrence.

Limited Use Safety MIRs - Safety reports used only by DoD activities. Their sole use is for mishap prevention within DoD. Individuals providing information to mishap investigators for a Limited Use Safety Mishap Investigation, do so with a promise of restricted access to and use of the privileged information they provide.

a. For afloat mishaps, only a mishap investigation board may write a Limited Use Safety MIR.

b. Limited Use reports shall not be used as evidence for disciplinary action; misconduct or line-of-duty investigations; in evaluation boards; or to determine liability in administrative or legal claims for or against the government.

c. To the maximum extent permissible under the law, no one shall release Limited Use reports outside DoD. DoD will use its best efforts in court to prevent their release.

Lost Workday Case - A reportable lost-work-time case in a Class C mishap is one preventing a person from performing duty or work for 5 days or more after 2359 on the day of injury or onset of illness. This includes assignment to the Binnacle List or sick in quarters (SIQ). It does not include in port weekends, regular leave, or holidays, when not scheduled for duty. However, if the person is in a light-duty status or performs some work (even though not his or her normal job) it is not lost-work-time. All lost time while underway is considered lost-work-time.

Man-made Vitreous Fibers (MMVF) - are a group of fibrous inorganic materials, generally aluminum or calcium silicates, that are derived from rock, clay, slag, and glass and used for thermal and acoustical insulation and as reinforcement materials.

Material Safety Data Sheet (MSDS) - Written or printed data concerning a HM prepared by the manufacturer of the HM in accordance with paragraph (g) of 29 CFR 1910.1200 - Hazard Communication.

Medical Attention - An injury or exposure requiring treatment by the ship's medical department representative (physician, nurse, or corpsman) and a medical record entry.

Medical Surveillance - An effort to monitor the health of individuals for job certification/recertification, for ensuring the effectiveness of hazard limiting programs, for indication of excessive exposure in the workplace and for compliance with NAVOSH standards.

Medical Treatment - Treatment administered by a physician or by registered personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even though provided by a physician or registered professional personnel.

Mercury Control Officer - Appointed in writing by the commanding officers of afloat IMAs to ensure the requirements of this directive are implemented.

Military Personnel - All Navy military personnel on active duty (USN/USNR); Naval Reserve personnel (USNR-R) on active duty or in a drill status; Naval Academy midshipmen; Reserve Officer Training Corps (ROTC) midshipmen when engaged in directed training activities; and other DoD and Foreign National military personnel assigned to the Navy or embarked in Navy or Military Sealift Command ships.

Mishap - Any unplanned or unexpected event causing personnel injury, occupational illness, death, or material loss or damage or an explosion of any kind whether damage occurs or not.

Mishap Causes - Conditions or events explaining why a mishap occurred.

Mishap Costs - Include all DoD property damage, other property damage, and injury costs.

a. DoD Property Damage Costs. The cost of repair or replacement of all DoD property involved in the mishap by basing estimates on the actual cost of materials and $16 for each hour for labor.

b. Other Property Damage Costs. The actual cost of repair or replacement, if possible.

c. Injury Costs. The cost based on the extent of injury reported and current costs estimates. Calculated by COMNAVSAFECEN.

d. Written Estimates. When prepared in written form, all estimates must conspicuously state:

"This estimate is prepared solely for the purposes of OPNAVINST 5100.19C. It is not intended to reflect, in any way, the extent of any party's damages or liability for purposes of administrative claims or litigation."

e. Assistance With Damage Issues. In all matters related, in any way, to damage to civilian or foreign ships on navigable water, to damage to any property or cargo on board such ships, or to injuries of persons on board such ships, refer to chapter XII of the NAVJAGMAN and/or contact the Office of the Judge Advocate General, Admiralty Division (Code 31).

Mishap Investigation - The investigation conducted into the facts surrounding the causes of a mishap.

Mishap Investigation Board (MIB) - A formal investigating body appointed to determine the primary cause(s) of Class A shipboard mishaps. The board consists of a minimum of three members. The immediate superior in command (ISIC) of the ship or craft involved in the mishap normally appoints the senior member of the mishap investigation board.

Mishap Investigation Report (MIR) - A Limited Use report written by a mishap investigation board as a result of Class A and selected Class B and other mishaps or near mishaps. An MIR contains privileged information. See appendix A6-A for information on the concept of privilege and appendix A6-C for the MIR format.

Mishap Probability - The likelihood that a deficiency 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. Represented by 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.

Mishap Report (MR) - A General Use report containing no privileged information. Surface ships, LCACs, and submarines submit a MR for all reportable shipboard mishaps not investigated by a MIB.

Mist and Fog - Finely divided liquid droplets suspended in air and generated by condensation or atomization. A fog is a mist of sufficient concentration to obscure vision. Examples of materials and processes that produce mists: acid sprays used in metal treatment (e.g., electroplating) organic solvent sprays, and spray painting).

Monitoring Industrial Hygiene - Measurement of the amount of contaminant or physical stress reaching the worker in the environment.

Monitoring (Medical Surveillance) - The preplacement and periodic evaluation of body functions to ascertain the health status of personnel exposed to significant concentrations of toxic substances (e.g., decreased lung function, dermatitis, abnormal blood count) allowing early detection of adverse health effects on the individual.

Monitoring Hearing Tests - Periodic hearing tests, obtained subsequent to the reference hearing test, which are used to detect shifts in the individual's threshold of hearing.

Moored - Secured alongside a pier, wharf, quay, or causeway; to a mooring buoy; or at anchor.

Motor Vehicle Mishap - A mishap entailing the operation of a motor vehicle or motorcycle involving collisions with other vehicles, objects, or pedestrians; fatality, personal injury, or property damage; fatality or personal injury in moving vehicles or by falling from moving vehicles; towing or pushing mishaps; and other injury and property damage. Collisions involving pedestrians or bicyclists when struck by a motor vehicle or other vehicular objects are to be included if other reporting requirements are met.

MSHA - Mine Safety and Health Administration.

NAVOSH - Navy Occupational Safety and Health.

Navy Environmental and Preventive Medicine Unit (NAVENPVNTMEDU) - A Navy Medical Command activity which provides training and technical assistance in environmental and occupational health to Navy commands, afloat and ashore.

Navy Occupational Safety and Health (NAVOSH) Standards - Occupational safety and health standards published by the Navy which include, are in addition to, or are alternatives for, the OSHA standards which prescribe conditions and methods necessary to provide a safe and healthful working environment. Afloat standards are given in section C of this manual and submarine standards are given in section D of this manual.

Navy Personnel - Includes the following categories:

a. **Civilian** - General Schedule and Wage Grade employees; Youth/Student Assistance Program employees, Foreign Nationals directly employed by Navy commands; and non-appropriated fund employees.

b. **Military** - All U.S. Navy personnel on active duty; U.S. Military Reserve or National Guard personnel on active duty or in drill status; Service Academy midshipmen/cadets; Reserve Officer Training Corps midshipmen when engaged in directed training activities; Foreign National military personnel assigned to Navy commands. Personnel of other branches of the Armed Forces serving with the Navy.

Near Mishap - An act or event in which injury or damage was avoided merely by chance. The situations are reported internally by Safety Hazard Report (OPNAV 3120/5) or Internal Mishap/Near Mishap Report; and externally, when there is a lesson learned, by SAFETYGRAM, (OPNAV 5102/4) to COMNAVSAFECEN.

NIOSH - National Institute of Occupational Safety and Health.

NIOSH/MSHA Certified Equipment - Respirators or other equipment that have been tested by NIOSH or MSHA and jointly approved as meeting certain minimum requirements of protection against specified hazards.

Noise Exposure - Personal interaction to a combination of effective sound level and its duration.

Non-ionizing Radiation - Radiation which is not capable of stripping electrons from atoms in the media through which it passes. Examples include radiowaves, microwaves, visible light, and ultraviolet radiation.

Normal Working Population Exposed to Hazard - The number of people whose authorized activities cause them to be exposed to the specified hazardous condition on a significant number of occasions during a work year; no one should be included in this estimate who is exposed to the cited hazard so infrequently or at such low exposure concentrations that it can be considered insignificant. Do not count as exposed those persons who only occasionally pass by the door of a room where a hazard is present.

For specific chemical or physical agents, the population exposed is dependent on the numbers of personnel involved in the specific activity, the effectiveness of confinement or containment systems, and the process steps involved. For agents requiring extensive processing, potential exposure may be ship-wide, but will vary in intensity. If isolation is practiced, the exposed population may be only one person per shift or watch. If collection systems are not used to confine potential emissions, personnel not actively engaged in the operation may also be exposed to hazardous substances.

Populations exposed to a specific safety hazard will vary with the type of hazard and its locations. If the safety hazard is associated with a specific piece of equipment, only the operator may be exposed. For a grinder, the population exposed could differ according to the safety features of the equipment. If the grinder has a guard, only the operator might be injured through contact with the grinding wheel; on the other hand, if a grinder is without an adequate guard, shattering of the grinding wheel could injure other personnel in the immediate vicinity.

Occupational Health - That multidisciplinary field of general preventative medicine which is concerned with the prevention and/or treatment of illness

induced by factors in the workplace environment. The major disciplines involved are: occupational medicine, occupational health nursing, epidemiology, toxicology, industrial hygiene, and health physics.

Occupational Medicine Services - Occupational medicine services shall include medical examinations and tests related to preemployment, preplacement, periodic, and pretermination; tests required for protecting the health and safety of naval personnel; job-related immunizations and chemoprophylaxis; education and training related to occupational health; and other medical services provided to avoid lost time or to improve employee effectiveness.

Off-Duty - Applicable to DoD personnel. Such personnel are off-duty when they are not on-duty as defined below.

On-Duty. DoD personnel are on-duty when:

a. Physically present at any location (area under the control of a DoD component) where they are to perform their officially assigned work. (This includes those activities incident to normal work activities that occur on DoD installations, such as lunch, coffee, or rest breaks, and all activities aboard vessels.)

b. Being transported by DoD or commercial conveyance for the purpose of performing officially assigned work. (This includes travel in private motor vehicles for performing official duty, but not routine travel to and from work.)

c. Participating in compulsory physical training activities (including compulsory sports and command-sponsored activities during work hours).

d. Ready Reservists performing inactive duty training (drill) and are between departure and return home without diversion.

e. On temporary duty or temporary additional duty (TDY/TAD). Personnel on assignment away from the regular place of employment are covered 24 hours a day with respect to any injury that results from activities essential or incidental to the temporary assignment. However, when personnel deviate from the normal incidents of the trip and engage in activities, personal or otherwise, which are not reasonably incidental to the duties of the temporary assignment contemplated by the employer, the person ceases to be considered on-duty for reporting purposes of occupational injuries or illnesses.

Operational Readiness Repair - A repair necessary to accomplish ship’s mission.

OSHA - Occupational Safety and Health Administration, Department of Labor.

OSHAct - The Williams-Steiger Occupational Safety and Health Act of 1970 (Stat. 1590 et seq., 29 U.S.C. 651 et seq.).

OSHA Standards - OSHA standards are those standards issued by the Department of Labor's Occupational Safety and Health Administration under Section 6 of the OSHAct.

Oxidizers - Any material that readily yields oxygen to support combustion.

Oxygen Breathing Apparatus (OBA) - Respirator that provides the user with oxygen through a chemical reaction. OBA's are for emergency or damage control use only.

Oxygen Deficient Atmosphere - Atmosphere with insufficient oxygen (O_2) to support life. This deficiency is generally caused by oxidation, dilution, or by the displacement of oxygen by other gases.

Examples: Oxidation can consume O_2 either very quickly as in a fire or quite slowly as rusting in a confined space. Dilution/displacement of O_2 may occur in one of three ways: (a) deliberately, as in suppressing a fire using carbon dioxide (CO_2) or a halocarbon; (b) deliberately, as in inerting to prevent rusting or for inerting prior to hot work, using nitrogen (N_2) or another inert gas; or (c) accidentally, as when a halocarbon solvent, such as "Freon"-113, is spilled and vaporizes in a confined space.

Particulate Matter - Any fine solid or liquid particles such as dust, fog, fumes, mist, smoke or spray. Particulate matter suspended in air is commonly known as an aerosol.

Permanent Partial Disability. An injury or occupational illness that does not result in death or permanent total disability but, in the opinion of competent medical authority, results in permanent impairment through loss, or loss of use, of any part of the body, with the following exceptions:

a. Loss of teeth.

b. Loss of fingernails or toenails.

c. Loss of tips of fingers or tips of toes (less than one joint).

d. Inguinal hernia, if it is repaired.

e. Disfigurement.

f. Sprains or strains that do not cause permanent limitation of motion.

Permanent Total Disability - A nonfatal injury or occupational illness that, in the opinion of competent medical authority, permanently and totally incapacitates a person to the extent that he or she cannot follow any gainful occupation.

NOTE:

The loss, or loss of use, of both hands, both feet, both eyes, or a combination of any of these parts of the body as a result of a single mishap, shall be considered as a permanent total disability.

Permissible Exposure Limit (PEL) - The legally established time-weighted average (TWA) concentration or ceiling concentration of a contaminant or exposure level of a harmful physical agent that shall not be exceeded.

Personal Information - Information exempt from release under exemption (b)(6) of the Freedom of Information Act.

Personal Protective Equipment (PPE) - A device or item to be worn, used, or put in place for the safety or protection of an individual or the public at large, when performing work assignments or in entering hazardous areas or under hazardous conditions. Equipment includes hearing protection,

respirators, electrical matting, barricades, traffic cones, lights, safety lines, and life jackets.

Pesticide - Any chemical used to kill pests, such as insects.

Examples: Baygon (propoxur), Killmaster (dursban), d-phenothrin, Malathion.

pH – A number specifying the acidity or alkalinity of a solution.

Physiological Heat Exposure Limit (PHEL) - A set of curves that compare the Wet Bulb Globe Temperature (WBGT) index and the degree of effort or work rate to determine the maximum permissible exposure to the heat stress environment.

Potentially Hazardous Noise - Exposure to 85 dB (A-weighted) or greater sound level or 140 dB peak sound pressure level for impact or impulse noise. The safe exposure time (T) for periods of less than 16 hours in any 24-hour period may be determined using the equation:

$$T = \frac{16}{2^{\frac{L-80}{4}}}$$

where T = Time in hours and L = Effective sound level in dBA.

Potentially Hazardous Noise Area -

a. Any work area where the A-weighted sound level (continuous or intermittent) is routinely 85 dB or greater.

b. Any work area where the peak sound pressure level (impulse or impact noise) routinely exceeds 140 dB.

Private Motor Vehicle - A motor vehicle (not government owned), primarily designed for highway use to transport cargo or personnel. Under this definition, a moped is a motor vehicle. Although not designed primarily for highway use operation, ATVs and trail bikes are included in this definition. Any object such as a trailer being towed by a motor vehicle is a part of the vehicle, including such devices when detached while in motion or set in motion by a motor vehicle (for example, pushing).

Privileged Information - The information given under the promise of confidentiality is protected from release under executive privilege. Promises of confidentiality are given to witnesses and members of the MIB. Therefore, witness statements and the deliberative analyses of findings, conclusions, and recommendations of the MIB are privileged. Any information that the MIB would not have discovered, except as a result of information provided under a promise of confidentiality, is also privileged. Information calculated or developed by the MIB, when disclosing that information would reveal the MIB's deliberative process, is also deemed privileged. The promise of confidentiality guarantees that the information provided will be used solely for safety purposes. Appendix A6-B thoroughly discusses privileged information.

Property Damage - DoD and civilian or foreign facilities, equipment, property, or material destroyed or made inoperable in a DoD mishap. DoD expresses property damage severity in terms of cost. Total costs determine whether a mishap is reportable.

Protective Clothing - An article of clothing furnished to an employee at government expense and worn for personal safety and protection in the performance of work assignments in potentially hazardous areas or under hazardous conditions.

Qualitative Fit Testing - A simple procedure of fitting an individual with a respirator face mask.

Quantitative Fit Testing - Respirator fit test procedure involving the use of a special enclosure filled with sodium chloride mist or other chemicals, a sensor attached to the mask to be tested, and a monitoring device to detect leakage of the chemical into the mask.

Radiation Safety Officer - An officer assigned by the commanding officer to be the technical manager of the radiation protection program.

Rate of Exposure - The estimated number of hours per year that an average member of the exposed population is exposed to the cited hazardous condition. This figure should be an estimate by someone familiar with the work situation, based on the best available existing information. Special studies to obtain these data are not required.

The estimate should be based on net working days per year (e.g., total working days per year minus leave and holidays. Usually, net working days is 40 hours per week and 50 weeks per year (e.g., 2,000 hours per year).

For an exposure to a health hazard, the rate of exposure may be easily calculated if the individual works only at the operation in question. However, an employee will generally work in an area of potential exposure for a period of time and move to another location. If the transiency follows a predictable routine, the rate of exposure can be assessed by determining the degree of hazard at all work locations and eliminating those where the potential hazard is minimal.

The rate of exposure to safety risks may also vary. As an example, in general traffic areas, the lack of a guard rail on platforms or hand rails on stair steps may create brief repetitive exposures to several people, including operators, inspectors, and occasional casual personnel. In such cases, calculate average use of the steps or the platforms to determine the rate of exposure.

Recompression Therapy - Treatment to compress gas bubbles in the blood to a small volume to relieve local pressure and restart blood flow, allow sufficient time for gas bubble resorption, and increase blood-oxygen content and improve oxygen delivery to injured tissues.

Recovery - The principle by which removal from noise allows the inner ear hair cells to regain their pre-noise exposed condition.

Reference Hearing Test - A hearing test performed when an individual is not experiencing a temporary threshold shift in hearing or other transient otologic pathology. The resulting audiogram will be used as a reference in computing any possible future threshold shift. Normally, this reference audiogram will be the first performed for hearing conservation purposes.

Respirator - Device used for protecting the respiratory tract from harmful contaminants.

Risk Assessment Code (RAC) - A simple expression of risk which combines the elements of hazard severity and mishap probability. This assessment will be used to help prioritize abatement projects. Investigators may include RACs in the MIR and MR.

Safety - Freedom from those conditions that can cause death, injury, occupational illness, or damage to or loss of equipment or property.

Safety Committee - Consists of the safety officer, chief master-at-arms (CMAA), and divisional safety petty officers. The committee identifies and discusses NAVOSH problems and makes recommendations to the Safety Council.

Safety Council - Consists of the commanding officer, safety officer, training officer, all department heads, medical officer/representative and the ship's command master or senior chief petty officer. The Council develops specific NAVOSH policies and analyzes the progress of the overall program.

Safety Data File - The computer file, developed as part of the HMIS, used to store the hazardous material characteristics relevant to their safe handling, use, and disposal.

Safetygrams - A form submitted to the Naval Safety Center by personnel identifying a new or potential safety hazard or a near mishap.

Safety or Health Professional - Persons who meet the Office of Personnel Management standards for Safety and Occupational Health Manager GS-018, Safety Engineer, GS-803, Safety Technician GS-019, Aviation Safety Officer GS-1825, Air Safety Investigating Officer GS-1815, Fire Protective Engineer GS-0804, Fire Protection Specialist/Marshall, GS-0081, Medical Officer GS-602, Health Physicist GS-1306, Industrial Hygienist GS-690, Occupational Health Nurse GS-610, Industrial Hygiene Technologist, or comparably qualified personnel as determined by appropriate Navy authority.

Safety Stand-down - A period during which command's normal work is curtailed and a concerted effort is made to correct safety deficiencies or train personnel on safety.

Safety Zone Inspection - A special zone inspection which specifically identifies safety hazards and deficiencies for baseline workplace surveillance.

SEED - Supplemental Emergency Escape Device. An emergency self-contained air supply for main propulsion watchstanders.

Self-Contained Breathing Apparatus (SCBA) - Breathing apparatus where compressed air is carried in a tank on the user's back.

Serious Physical Harm - Permanent, prolonged, or temporary impairment of the body in which part of the body is made functionally useless or is substantially reduced in efficiency on or off the job. Illness could shorten life or significantly reduce physical or mental efficiency by inhibiting the normal function of part of the body. Examples of such illnesses are silicosis, asbestosis, hearing impairment, radiation exposure, and visual impairment.

Sewage Disposal Operational Sequencing System (SDOSS) - Operating instructions for collection, holding and transfer (CHT) tanks tailored for each ship.

Ship's Hazardous Materials List (SHML) - A list of hazardous materials authorized for use aboard surface ships. This list can be found in the HMC&M HMIS on CD-ROM.

Significant Threshold Shift - A change of hearing threshold level of 15 dB or greater, in either ear, at any frequency (1,000 to 4,000 Hz) between the reference audiogram and any subsequent audiogram.

Smoke - Carbon or soot particles less than 0.1 micrometer in size resulting from the incomplete combustion of carbonaceous materials such as coal or oil.

Solvent - A substance, most commonly water, but often an organic compound which is used to dissolve another substance.

Specific Hazard (Safety or Health) - A word or words constituting the distinctive designation of the cited hazard; for example, the name of the safety hazard might be "unguarded flywheel" or "lack of fire exit"; the name of the health hazard might be "asbestos fibers in the air," "mercury," or "noise." General terms are not acceptable for health hazards.

For chemical hazards, the specific name of the dangerous chemical is required. As an example, if a solvent is being used, its chemical name, i.e., "trichloroethylene" must be given; the word "solvent" is not adequate. If more than one chemical is involved in the work operation, or a chemical mixture is being used, give the chemical name of the single most hazardous chemical involved. If the specific hazard is a chemical by-product or by-product mixture resulting from the work operation, give the chemical name of the single most hazardous by-product.

For noise hazards, specify whether they are steady-state or impulse. When the cited health standard is one that details ventilation requirements for a particular type of operation, such as spray painting or arc-welding, the specific hazard name should be "insufficient ventilation to control _____." Terms such as spray paint, welding fumes, etc., are adequate only in cases relating to ventilation standards.

Standard - A rule, established by a competent authority, which designates safe and healthful conditions or practices under which work must be performed to prevent injury, occupational illness, or property damage.

a. **Criteria** - Those parts of a standard that establish a measurable quality, i.e., specifications, inspection intervals, etc.

b. **Equivalent Criteria** - The measurement of equivalency shall be a judgment based on the preponderance of information available. Generally, they must provide protection at least as effective as the criteria they replace.

Submarine Material Control List (SMCL) - A list of hazardous materials authorized for use aboard submarines. This list is issued quarterly on CD-ROM.

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.

Supervisor - One who immediately directs the job efforts of a working group or individual.

Survey - An examination of the condition of industrial hygiene and occupational health of a command. This examination is performed by industrial hygienists or technicians under the supervision of an industrial hygienist.

Surveys of Damages - A formal procedure relevant to admiralty claims and litigation. Only the Judge Advocate General may accept survey invitations from potential claimants, extend survey invitations to persons responsible for damage to naval property, or request representation of the United States by a marine surveyor. In no case shall any person involved in mishap investigating or reporting accept or offer an invitation for a survey of damages on behalf of the United States. In any instance of receipt of invitation to a survey, refer to Chapter XII of the NAVJAGMAN and notify the Office of the Judge Advocate General, Admiralty Division (Code 31).

Threshold Limit Value (TLV) - An atmospheric exposure level under which nearly all workers can work without harmful effects. TLVs are established by the American Conference of Governmental Industrial Hygienists (ACGIH).

Time-Weighted Average (TWA) - The average concentration of a contaminant in air during a specific period of time, usually an 8-hour work day or a 40-hour work week.

Toxic Material - A substance which when ingested, inhaled, or absorbed through the skin in sufficient amounts can produce harmful effects such as changes in living tissue, impairment of the central nervous system, severe illness or, in extreme cases, death.

Transportation Data File - The computer file, developed as part of the HMIS used to store the hazardous material characteristics relevant to their safe transportation and handling.

Underway - A vessel not made fast to the ground in any manner. She may or may not have way on (that is, she may be hove to), but she is free floating in the sea, subject to wind, currents, and of course her own propulsion system.

Vapor (inorganic or organic) - The gaseous state of a substance which is normally a liquid or solid at room temperature.

Examples of substances that produce vapors: degreasers, fuels, hydraulic fluids, paints and thinners, and dry cleaning fluids.

Variances - When and if a NAVOSH standard is found to be impossible to comply with, variances can be requested from the type commander, via the chain of command. Variance requests shall explain why compliance is impossible and describe actions taken to achieve the maximum degree of protection possible.

Ventilation - The control of potentially hazardous airborne substances through the movement of air.

Wet Bulb Globe Temperature (WBGT) Index - A measurement of environmental conditions (heat stress). Consists of a weighted average of dry-bulb, wet-bulb, and globe temperatures. Expressed in the following equation:

WBGT = (0.1 x dry-bulb) + (0.7 x wet-bulb) + (0.2 x globe temperature)

WBGT Meter - Instrument used for measuring heat stress. Measures dry-bulb, wet-bulb and globe temperatures and integrates these values into the WBGT index.

Workplaces -

a. **Applicable Workplaces and Operations** - Navy workplaces and operations generally comparable to those of business and industry in the private sector.

b. **Unique Military Equipment, Systems and Operations** - Navy equipment and systems which are unique to the national defense mission. Examples include military aircraft, ships, submarines, and missiles; and includes operations that are uniquely military such as naval operations, flight operations, associated research test and development activities and actions required under emergency conditions.

Workplace Monitoring - The evaluation of each Navy workplace to accurately identify and quantify all potential hazards. This will consist of internal command routine inspections and industrial hygiene surveys.

Zone Inspections - Command inspections which ensure that proper measures are taken to keep machinery, spaces, and equipment operational, clean, and in a satisfactory state of preservation.

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