



DEPARTMENT OF THE NAVY

NAVAL SEA SYSTEMS COMMAND
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IN REPLY TO:

4730
Ser 04X/004
08 Jan 2009

From: Commander, Naval Sea Systems Command

Subj: INDUSTRIAL SHIP SAFETY MANUAL FOR SUBMARINES,
S9002-AK-CCM-010/6010; ISSUANCE OF

Ref: (a) NAVSEA Manual 0905-485-6010, Control of Testing and
Ship Conditions
(b) NAVSEA Manual 9092-AC-ADM-010, Industrial Test
Program Administration (ITPAM)
(c) NAVSEA ltr 4730 Ser 04X/080 of 9 May 06

Encl: (1) INDUSTRIAL SHIP SAFETY MANUAL FOR SUBMARINES,
S9002-AK-CCM-010/6010

1. Purpose. This letter issues the major rewrite of the
"6010" manual as the new Industrial Ship Safety Manual for
Submarines.

2. Discussion.

a. Enclosure (1) supercedes reference (a) upon
implementation of reference (b). Reference (a) is not cancelled
due to the inability to implement reference (b) in the short
term at private shipyards at minimal cost or without many
changes. The long term goal is to have private sector implement
reference (b), and only then cancel reference (a).

b. Reference (c) explained that reference (a) would be
modified to refer to reference (b) for renaming positions and
qualifications, additional test personnel qualifications, roles
and procedures. In addition, interpretation issues and
expectations have been clarified, and standardized procedures
have been incorporated.

c. Enclosure (1) will be hosted electronically at
<http://www.submepp.navy.mil/jfmm> and at
<https://mercury.tdmis.navy.mil>. Naval Systems Data Support
Activity (NSDSA) is also providing initial distribution for new
publications and revisions via Compact Disk(s) to all ships on a
monthly basis.

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3. Action.

a. Naval Shipyards. Replace reference (a) with enclosure (1) in its entirety.

b. Private Shipyards. This letter authorizes implementation of enclosure (1) at public shipyards only. Private shipyard implementation will be addressed via separate correspondence.

c. Request the Joint Fleet Maintenance Manual Manager at SUBMEPP and the NSDSA update their applicable sites with this new manual, and NSDSA include it on their next edition of Monthly Ship Initial Distribution CD-ROMs. The electronic file will be emailed/uploaded separately.

4. Implementation. Naval shipyards shall implement the changed requirements as soon as practical to insure implementation does not create delay and disruption or unnecessary costs for ongoing ship maintenance work.

5. The Engineering Manager for Industrial Ship Safety for Submarines and Test is Mr. Paul Mieszczanski, SEA 04XQ1M, at (202) 781-4472 or Paul.Mieszczanski@navy.mil.



PAUL T. COLAHAN

By direction

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REVISION 00

NAVSEA TECHNICAL PUBLICATION
**INDUSTRIAL SHIP SAFETY
MANUAL FOR
SUBMARINES**



DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

THIS PUBLICATION SUPERSEDES 0905-485-6010, DATED SEPTEMBER 1988 UPON IMPLEMENTATION OF NAVSEA S9092-AC-ADM-010, Industrial Test Program Administration Manual (ITPAM)

Published by direction of Commander, Naval Sea Systems Command

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This manual is a major revision to and supersedes NAVSEA 0905-485-6010 of September 1988 with 13 Changes through March 2006. This manual has been renumbered and issued as Revision 00 in order to incorporate a new Technical Manual Identification Number in accordance with the Technical Manual Management Program requirements.

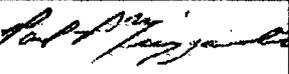
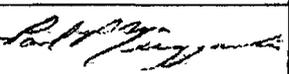
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Continue on reverse side or add pages as needed.

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List of Effective Pages	iii		Original
Record of Changes	iv		Original
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List of Illustrations	vii		Original
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RECORD OF CHANGES

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CHAPTER I

GENERAL/REFERENCES

REFERENCES

- (a) NAVSEA 0989-028-5000, Manual for the Control of Testing and Plant Conditions
- (b) NAVSEA S9092-AC-ADM-010, Industrial Test Program Administration Manual (ITPAM)
- (c) NAVSEAINST 4730.1, Shipyard Inspection and Required Conditions of Propulsion Plant Systems (Non-Nuclear) on Nuclear Powered Submarines
- (d) NAVSEA S0400-AD-URM-010/TUM, Tag-out Users Manual (TUM)
- (e) NAVSEA 0902-018-2010, General Overhaul Specifications For Deep Diving SSBN/SSN Submarines (DDGOS)
- (f) NAVSEA/SSPINST 9780.17, Shipyard Level Organization for Work on Trident Strategic Weapon System (SWS) and Strategic Weapons Support Systems (SWSS) on Fleet Ballistic Missile (FBM) Submarines; Including SSP Work on Attack Weapons System (AWS) and Attack Weapons Support Systems (AWSS) on SSGN Submarines
- (g) NAVSEA TL855-AA-STD-010, Naval Shipyard Quality Program Manual
- (h) COMFLTFORCOMINST 4790.3, Joint Fleet Maintenance Manual (JFMM)
- (i) Reserved For Future Use
- (j) MIL-STD-1625, Safety Certification Program for Drydocking Facilities and Shipbuilding Ways for U.S. Navy Ships
- (k) NAVSEAINST 4700.17, Preparation and Review of Trouble Reports
- (l) UIPI 0900-453, Critique and Problem Analysis Matrix Processes; Problem Identification and Investigation
- (m) NAVSEA S9213-26-MMA-000 (N), The Defueled Reactor Compartment Disposal Technical Manual
- (n) NSTM S9086-CH-STM-010, Chapter 074, Volume 1, Welding and Allied Processes
- (o) NAVSEAINST 4740.9, Towing of Unmanned Defueled Nuclear Powered Submarines
- (p) NAVSEA T9041-AA-MAN-010, U.S. Navy Towing Manual

1.1 PURPOSE

The purpose of this manual is to provide specific requirements for submarines for the control of work and testing, which could affect ship conditions or ship safety, is a High Risk Evolution (HRE), or requires interface with reactor plant work and testing, during periods of construction, conversion, overhaul, and other availabilities. Requirements specific to availabilities on submarine NR-1 are contained in Appendix A.

1.2 SCOPE

1.2.1 The requirements of this manual apply during Chief of Naval Operations (CNO) scheduled availabilities, when specifically invoked by applicable contracts, and remain in effect until start of Fast Cruise. The requirements of this manual may also be invoked during pre-availability periods assigned to Shipyards immediately prior to CNO scheduled availabilities to provide for an orderly transition to the CNO scheduled availability and provide maximum training benefit for Ship's Force. This manual may also be invoked, in whole or in part, for New Construction or other availabilities, whenever the Program Office, Type Commander, NSA and/or Shipyard Management determine that the scope of work and testing warrants implementation. For public shipyards, this is accomplished by an availability specific Shipyard Memorandum of Agreement with the ship.

1.2.2 It is the intent of this manual to include within its scope, all shipboard nuclear and non-nuclear work and testing which could affect ship conditions, ship safety or are High Risk Evolutions, as defined herein. The requirements of this manual, when invoked in whole or in part, are mandatory.

1.2.3 The requirements for reactor plant testing and evolutions are set forth in reference (a) and (c). Prior to the commencement of a reactor plant evolution that will affect ship conditions, ship safety or is a High Risk Evolution, as prescribed herein, the Nuclear Chief Test Engineer (CTE) is required to obtain Ship Safety Council (SSC) approval on the Ship Plan of the Day (SPOD). Refer to Chapter IV for documentation requirements related to testing.

1.2.4 The requirements for non-nuclear testing are set forth in reference (b) with additional submarine requirements set forth in this manual.

1.3 GLOSSARY OF TERMS/ACRONYMS USED

ASSISTANT CHIEF TEST ENGINEER (ACTE) - See reference (b).

ALTERATION INSTALLATION TEAM (AIT) - A unit (military, civilian or contractor) under the direction of the AIT Manager or designated agent of the AIT Manager, that is trained and equipped to accomplish specific alterations on specific ships.

CHIEF TEST ENGINEER (CTE) - See reference (b).

CHIEF OF NAVAL OPERATIONS (CNO) - When used in the text of this manual in reference to CNO Availabilities: Regular Overhaul, Complex Overhaul, Engineered Overhaul, Refueling Overhaul, Refueling Complex Overhaul, Engineered Refueling Overhaul, Depot Modernization Period, Planned Incremental Availability, Docking Planned Incremental Availability, Selected Restricted Availability (SRA), Docking SRA, Phased Maintenance Availability, Docking Phased Maintenance Availability, Extended SRA, Extended Docking SRA, Incremental SRA, Interim Dry Dock Availability (IDD), Pre-Inactivation Restricted Availability (PIRA) and Inactivation Availability.

COMBAT SYSTEMS (C/S) - Those systems normally in the 400 and 700 series Ship Work Authorization Boundaries (SWABs).

COMBAT SYSTEMS OFFICE (CSO) - The office responsible for shipboard electronics and weapons systems. Equivalent to WEAPONS (W).

DAILY TEST SCHEDULE (DTS) - See List of Authorized Tests.

HIGH RISK EVOLUTION (HRE) - See paragraph 4.5.

HULL, MECHANICAL AND ELECTRICAL (HM&E)/HULL, PROPULSION AND AUXILIARIES (HP&A) - Terms used interchangeably to describe the non-nuclear portion of the ship exclusive of COMBAT SYSTEMS and Strategic Weapons Systems. Covers those systems in the 100, 200, 300, 500 and 600 series SWABs.

IN COMMISSION - Ships normally are placed in commission concurrent with delivery.

IN SERVICE - Submarines in construction are assigned an active status of "in service" during the period from approximately two weeks before commencement of first sea trials until delivery of the ship.

JOINT TEST GROUP (JTG) - See paragraph 2.3.2.

LIST OF AUTHORIZED TESTS (LAT) - See paragraph 4.2.1.

LEAD MAINTENANCE ACTIVITY (LMA) - The single activity responsible for integrating all maintenance and modernization on U.S. Naval ships during any type availability.

LEAD TEST ENGINEER (LTE) - See reference (b).

MAXIMUM CALCULATED DRAFT (MCD) - The maximum draft, calculated based on the criteria of this manual, during the effective period of the SPOD. It represents the "worst case" cumulative effect at any one time on trim, list, or draft for the proposed weight changes which are approved by the SSC on the SPOD. See paragraph 3.3.7.2.

NAVSEA SHIPYARD REPRESENTATIVE'S OFFICE (NSRO) - The NAVSEA Shipyard Representative's Office in the Shipyard.

NAVAL SUPERVISING AUTHORITY (NSA) - The officer designated by the Commander, Naval Sea Systems Command, to represent the Navy Department at a Shipyard; normally, this is the Supervisor of Shipbuilding (SUPSHIP), Conversion and Repair, USN, or the Commander, Naval Shipyard.

OFFICER-IN-CHARGE (OIC) - Where the term OIC is used, Prospective Commanding Officer (PCO) is implied for systems transferred to Ship's Force. For a new construction ship the PCO becomes the OIC when the ship's status changes to "in service".

OPERATIONAL - The system is capable of performing its design function as necessary to support the specified event including appropriate indications, interlocks, alarms, instrumentation, etc.

OUTSIDE ACTIVITY (OA) - Any AIT, Fleet Maintenance Activity (FMA), contractor, vendor or another Shipyard's contracted personnel (e.g., TIGER TEAM), that works shipboard for the LMA organization.

PREREQUISITE LIST (PRL) - A list of requirements that must be satisfied/certified prior to performing an event or evolution. In the text of this instruction, a PRL is used for all High Risk Evolutions (see paragraph 4.5) and all nuclear/non-nuclear events of reference (c).

PROJECT SUPERINTENDENT - The single LMA representative, assigned by senior Shipyard Management, who is accountable and responsible for the overall safe and proper execution of the ship's availability.

REPAIR ACTIVITY/REPAIR ACTIVITY REPRESENTATIVE (RA/RAR) - Non-S/F Activity accomplishing work. In the context of work control, the RAR is the person qualified and designated to sign Work Authorization Forms (WAFs) and tag-outs for various critical steps.

SAFETY DRAFT MARK (SDM) - See paragraph 3.3.9.

SENIOR SHIPYARD OFFICIAL - Department/Division Head or equivalent that is the certifying official for positions related to this manual.

SHIP CLASS - The term "ship class" and "class of ship" refers to the general configuration groups (e.g., SSN 688 Class, SSBN Class, SSGN Class, SSN 774 Class, SSN 21 Class, etc.). For the purposes of qualification, replaces "type ship" (SSN/SSBN).

SHIP CONDITIONS - The status of the following ship parameters: Buoyancy, Trim, List, Watertight Integrity and Stability.

SHIP PLAN OF THE DAY (SPOD) - See paragraph 4.2.2.

SHIP SAFETY - Maintaining the control of ship conditions, High Risk Evolutions and prevention/control of fire and flooding.

SHIP SAFETY COUNCIL (SSC) - See paragraph 2.2.5.

SHIP SAFETY MANAGER (SSM) - See paragraph 2.2.1

SHIP SAFETY OFFICER (SSO) - See paragraph 2.2.2.

SHIP SAFETY SUPERINTENDENT (SSS) - See paragraph 2.2.3.

SHIP SAFETY WATCH (SSW) - See paragraph 2.2.4.

SHIP'S FORCE (S/F) - Members of ship's company who have been vested with authority by the Commanding Officer (OIC/PCO) of the ship to direct or carry out designated tasks or evolutions.

SHIPYARD - Activity responsible for accomplishing work incident to construction, modernization, conversion, overhaul, or other availability of ships. In the text of this manual, "Shipyard" means a private or public Shipyard.

SIMULATED WATERBORNE CONDITION - An evolution requiring the dry dock to be partially flooded with the dry dock floodgates closed while the ship is supported by the keel blocks.

SYSTEM CONDITIONS - The status of principal system parameters and conditions (for example, steaming, shutdown, drained, filled, fresh water lay-up, etc.).

SYSTEM STATUS - The compilation of individual system lineups in effect for a system at a specific time or for a specific reason. The specific lineup of system valves, circuit breakers, fuses, blank flanges, etc., in sufficient detail for each work item to be performed or to assure the scheduled testing or work can be accomplished safely.

TAG-OUT USERS MANUAL (TUM) - Reference (d) is used by all activities to ensure system and equipment isolation so that work and testing may be safely performed.

TECHNICAL WORK DOCUMENT (TWD) - Task Group Instruction, Deficiency Log, Deficiency Report, Controlled Work Package, Formal Work Package, or other unique document.

TELCON - Telephone Conversation. Documentation of Telcon approval shall be per local shipyard directive.

TEST DIRECTOR (TD) - See reference (b).

TESTING - When used in this manual, testing refers to equipment tests, system tests, and consolidated systems tests conducted on board the submarine.

TEST PROGRAM - Any or all shipboard testing conducted on a submarine's systems/components.

TON - As defined in this manual always refers to a Long Ton (2240 lbs)

WATERBORNE - Ship afloat, i.e., not resting on keel blocks.

WATERLINE - In the text of this manual, the term "waterline" refers to the "Condition N" Diving Trim waterplane as established by the reference trim dive immediately preceding entry into the Shipyard for overhaul or as established by a calculation of the maximum draft during the availability, whichever is greater.

WATERTIGHT INTEGRITY - The boundary between the ship and its outside environment, which protects the ship against flooding from the sea, or inadvertent or unauthorized introduction of water or other liquids across the boundary into the ship.

WORK CONTROL TEAM (WCT) - See paragraph 2.3.4.

WORK AUTHORIZATION FORM (WAF) - See paragraph 4.3.2.

1.4 RESPONSIBILITIES

The responsibility for ship safety is stated in U.S. Navy Regulations, OPNAV instructions, applicable Force Regulations, and NAVSEA instructions. During new construction, the process by which the Prospective Commanding Officer (PCO) assumes responsibility for a system, and eventually the entire ship, is described in paragraph 4.3.2.2. Additionally, the PCO is represented on the SSC and JTGs as a member for all systems transferred to the ship and as an advisor for systems not yet transferred. This manual has been developed to assist the Commanding Officer (OIC/PCO), Shipyard Commander, or Supervisor of Shipbuilding (SUPSHIP), in carrying out their assigned responsibilities regarding ship safety. The contents of this manual, however, should in no way be construed as relieving any activity from their assigned responsibilities for ship safety as invoked under the terms of the applicable contract.

1.5 CHANGE PROCEDURES

Conflicts with existing directives or proposed changes to this manual shall be submitted via the NAVSEA/SPAWAR TECHNICAL MANUAL DEFICIENCY/EVALUATION REPORT (TMDER) in the back of this manual.

CHAPTER II

ORGANIZATIONAL REQUIREMENTS AND PERSONNEL QUALIFICATIONS

2.1 GENERAL

An organization shall be constructed as outlined herein to achieve and maintain the standards prescribed by this manual and to achieve individual responsibility and accountability for actions that must be taken to ensure the control of ship safety. Accordingly, authority commensurate with the assigned responsibilities shall be delegated to these personnel. In adhering to these policies, each shipyard should normally assign personnel from within existing shipyard organizations carrying out similar responsibilities.

2.2 SHIP SAFETY ORGANIZATION

The Shipyard shall establish an organization with necessary implementing instructions for the control of ship safety as prescribed herein.

2.2.1 SHIP SAFETY MANAGER (SSM)

2.2.1.1 General. The SSM is the Shipyard Manager for ship safety matters, who is responsible for the administration and execution of the requirements of this manual.

2.2.1.2 Duties and Responsibilities:

1. Maintain the overall administration of the Shipyard submarine fire and flooding drill program.
2. Provide direction and guidance to the Ship Safety Organization concerning the maintenance of ship safety.
3. Provide oversight of Ship Safety Program related critiques and concur on corrective actions for the Ship Safety Program violations.
4. Provide oversight for the maintenance of ship safety on all availabilities.
5. Oversee the Ship Safety Surveillance Program.
6. Responsible for the implementation of the Ship Safety Program requirements into shipyard instructions.
7. Responsible for maintaining the qualification program, including the administration of tests and/or oral boards for SSO, SSS and shipyard SSW candidates, and maintenance of qualification record Objective Quality Evidence (OQE).

2.2.2 SHIP SAFETY OFFICER (SSO)

2.2.2.1 General. The Shipyard responsibility for safe execution of work performed by their activity, as delineated in Navy Regulations or invoked by contract, should normally be controlled at the working level by the SSO. An SSO, qualified in accordance with paragraph 2.6.4.1, shall be appointed in writing to each submarine by the Operations Officer in Naval Shipyards or by the equivalent Operations Manager in private Shipyards. The SSO should not be assigned to more than one submarine concurrently, unless their assigned ships are undergoing short availabilities where the nature of the work and testing would permit such assignment. The SSO shall be responsible for implementing the safety requirements of this manual for their ship. In this regard, the Shipyard directive (SSO Assignment Memorandum) assigning the SSO to a specific availability shall describe their duties and responsibilities, and be given adequate distribution to ensure that their authority in matters of ship safety is recognized. Adequate distribution of the SSO Assignment Memorandum shall be, as a minimum: Ship's Commanding Officer, SSM, Code 300N (Nuclear Production), Project Superintendent, Project CTEs, NSRO, NSA (private shipyards), and NRRO, or their equivalents. The assignment of an SSO in no way relieves the Commanding Officer of the ship of responsibilities as prescribed in Navy Regulations.

2.2.2.2 Duties and Responsibilities. The following are the duties and responsibilities of the SSO. Management may assign additional duties and responsibilities to the SSO, provided they do not conflict with those listed herein:

1. Act as chairman of the Ship Safety Council (SSC) (paragraph 2.2.5).
2. Maintain knowledge and administrative control of ship safety and system status related to ship safety; provide for the preparation, issue and maintenance of the Ship Plan of the Day (SPOD) (paragraph 4.2.2).
3. Ensure lines of communication exist between Ship's Force, Trade Supervisors, Chief Test Engineers, Outside Activities, and the Shipyard scheduling activity to ensure that all nuclear and non-nuclear Technical Work Documents (TWDs), Test Procedures, Operating Procedures, High Risk Evolutions and prerequisite lists which affect ship safety, are approved by the SSC. These lines of communication must be adequate to ensure the SSO is informed, in advance, of any production work or testing which could cause a change to ship safety.
4. Identify hazardous conditions created by proposed actions, resolve conflicts, and disapprove actions as necessary to maintain ship safety; submit proposed changes to ship safety to the SSC. SPOD changes may be documented via TELCON approval by SSC members in cases that arise after normal working hours.
5. Act as the Shipyard point of contact with the Ship's Commanding Officer and representatives concerning ship safety except for nuclear plant conditions.

6. Be responsible for the actions of all Ship Safety Superintendents (SSS) assigned to their ship while they are on duty. SSO assumes duties and responsibilities of SSS when SSS is not assigned.

7. Ensure Ship Safety Watch (SSW) turnover logs/instructions are complete, thorough, and accurate.

8. Supervise the conduct of the SSW when Shipyard personnel are assigned those duties. For ships in commission or in service, confer with the Ship's Force SSWs during routine inspections.

9. Schedule, supervise and monitor scheduled fire and flooding drills to test the ability of Ship's Force and the Shipyard organization to respond to shipboard emergencies.

10. Inspect the ship at regular intervals to ensure work and testing in progress are being performed in a safe manner.

11. Ensure that emergency communications systems and temporary damage control equipment/systems are inspected at intervals specified in the TWDs and reference (e).

2.2.3 SHIP SAFETY SUPERINTENDENT (SSS)

2.2.3.1 General. The SSS reports to the SSO and is the representative for the particular shift assigned. An SSS shall normally be assigned to each shift whenever the nature of scheduled work or testing is such that, in the opinion of the SSO, the assignment is warranted. When assigned, the SSS is expected to inspect the ship at least twice on the shift assigned. The SSS should not be assigned to more than one submarine concurrently, unless their assigned ships are undergoing short availabilities where the nature of the work and testing would permit such assignment. During periods when an SSS is not assigned, there must be a designated point of contact within the Shipyard who can respond to problems related to ship safety. In addition to the duties as described herein, the SSS may be assigned other functions, such as those related to ship production or testing, provided that such functions do not interfere with the primary responsibilities for ship safety. The SSS must be qualified as prescribed in paragraph 2.6.4.2.

2.2.3.2 Duties and Responsibilities. The following duties and responsibilities are mandatory when an SSS is assigned. The SSS shall:

1. Act as the direct representative of the SSO; carry out duties assigned by the SSO and monitor the conduct of HREs listed in paragraph 4.5 whenever the Shipyard has not designated another qualified responsible person to perform this function for the specific evolution being executed.

2. Ensure specified procedures are carried out as approved by the SSC on the SPOD and that all HRE Prerequisite List requirements are met prior to proceeding. Document unsatisfactory conditions found and actions taken per local Shipyard directives.
3. Prevent or stop work or testing which jeopardizes watertight integrity, personnel or ship safety, or which is not in accordance with procedures or HRE Prerequisite Lists which have been approved by the SSC.
4. When work or testing has been stopped due to unsafe or potentially unsafe condition, the SSS has the responsibility to take all necessary steps to resolve the unsafe condition before work or testing may resume. If no change to the SPOD is required, the SSS shall authorize continuation of the work/testing as soon as safe conditions have been restored or potentially unsafe conditions eliminated.
5. When conditions are such that a change to the SPOD is required to ensure the safe and orderly execution of work or testing, obtain approval of the members of the SSC to change the SPOD as required.
6. Maintain a close liaison with the Ship's Duty Officer and Engineering Duty Officer (when assigned) for all matters affecting ship safety.
7. Act for the SSO in concurring in Ship Safety WAFs (see paragraph 4.3.2.1.1).

2.2.4 SHIP SAFETY WATCH (SSW)

2.2.4.1 General. At least one SSW, qualified in accordance with paragraph 2.6.4.3, shall be continuously assigned to each new construction ship starting at least 1 week prior to launch and continuing to Fast Cruise. For In-Service or commissioned ships, SSWs shall be trained in accordance with paragraph 2.6.4.3.2 and the functions of the SSW should be carried out by the Ship's Force duty section as directed by the Ship's OIC/Commanding Officer in accordance with responsibilities delineated in Navy Regulations. The Casualty Control (CASCON) Station shall be manned at all times. The duties of this watch are related to ship safety. Shipyard SSW's shall be assigned by the Operations Officer or Operations Manager (Private Shipyards) when shipyard personnel are assigned these duties. While on duty, the watch shall immediately report all deviations from prescribed procedures or other abnormalities to the Ship's Force Duty Officer, if assigned, and to the SSO or SSS. The Shipyard's SSW will be assigned no other duties or responsibilities while on watch.

2.2.4.2 Duties and Responsibilities. For duties and responsibilities and use of Shipyard SSW Logs, see Chapter IV, Attachment (2).

2.2.5 SHIP SAFETY COUNCIL (SSC)

2.2.5.1 General. The Ship Safety Council (SSC) is a term used to describe collectively the persons assigned by their parent organizations to take required local approval actions for each specific submarine on TWDs/WAFs, High Risk Evolution Prerequisite Lists, schedules, etc., that affect the maintenance of ship safety. Decisions of this group shall be unanimous and in writing. The SSC shall convene at the call of the SSO, however, any member may request a meeting if a need exists. The initial meeting of the SSC shall not be later than one week prior to launch for new construction ships. After launch, the SSC shall meet as frequently as conditions dictate subject to agreement of the SSC. For commissioned ships, the initial meeting of the SSC shall be convened commencing with implementation of the requirements of this manual. A SPOD shall be issued as a result of the initial meeting of the SSC. The SPOD is described in greater detail in paragraph 4.2.2. Subsequent meetings shall be held as frequently as conditions dictate. The SSC may be disestablished upon commencement of Fast Cruise.

2.2.5.2 Members. The SSC consists of one qualified member, designated in writing, from each of the following organizations (each organization represented on the SSC is further required to designate in writing one or two qualified alternate(s) who can act in the member's absence):

1. Shipyard - the SSO for that ship, who serves as chairman.
2. Supervisor of Shipbuilding, Conversion, and Repair - representative (when a private shipyard is the LMA).
3. Ship's Force - Commissioned officer, as designated by the Ship's Commanding Officer. For new construction ships, prior to in service, the Ship's Force representative serves in an advisory capacity and participates in SSC meetings, except that the Ship's Force representative is a member only for systems which have been transferred to the ship.
4. NAVSEA Shipyard Representative's Office (NSRO) – representative, if assigned (when a naval shipyard is the LMA).

Other cognizant personnel (such as CTEs, Ship Scheduler, Zone Manager, Shop Supervisor, Shipyard Ship Safety Manager, AIT Managers/On-Site Installation Coordinators, etc.) may be requested to attend selected sessions to furnish expertise related to specific evolutions. Such persons may also request that they attend a specific meeting in order to present a specific question, problem, or proposal to the SSC. The attendance of these personnel does not constitute membership in the SSC.

2.2.5.3 Authority. Each member of the SSC has the authority to:

1. Stop an operation any time an unsafe condition exists; immediately inform the SSO of the unsafe condition and recommend appropriate corrective action.
2. Request a meeting of the SSC.

2.2.5.4 Responsibilities. The members of the SSC have the responsibility to:

1. Approve the SPOD including changes thereto.
2. Approve prerequisite lists (paragraph 4.5).
3. Witness and evaluate fire and flooding drills.
4. The Ship's Force representative on the SSC shall be responsible to provide input to the SPOD as a result of Ship's Force work that is to be accomplished, that could affect ship safety as described herein during the period covered by the SPOD.
5. Approve SSW logs for use.

2.3 SHIP TEST ORGANIZATION

2.3.1 GENERAL. This paragraph prescribes, clarifies and interfaces the requirements for a test organization beyond references (a) and (b). Prior to the commencement of any evolution that will affect ship safety as prescribed herein, the applicable Nuclear and/or Non-Nuclear cognizant CTE is required to obtain SSC approval on the SPOD. Refer to Chapter IV for documentation requirements related to testing.

2.3.2 JOINT TEST GROUP (JTG). It is the responsibility of the CTE to ensure testing that affects ship safety and HREs are presented to the SSC. JTGs must review Test Procedures that could affect ship safety. CTEs must ensure that any tests on the LAT that will affect ship safety are appropriately indicated and that SSC concurrence via the SPOD is received prior to the start of those tests and HREs. In addition, any test or HRE prerequisites which will affect ship safety must be identified and authorized for accomplishment on the SPOD.

2.3.2.1 For Strategic Weapons Systems (SWS/SWSS) and Combat Systems (CS/CCS) Weapons Systems, the organization of the Combat Systems Test Organization shall meet the requirements of reference (f) series and be represented on the JTG-W. This may be accomplished by establishing two sections of the JTG-W, one having primary cognizance of torpedo support systems and the other for missile support systems. The Strategic Weapons Support Group shall utilize the Overhaul/Integrated Test Requirements Outline and the CS/CCS Group shall utilize the overhaul/ship specifications that identify tests that could affect ship conditions as defined herein (see paragraph 4.4). Functional assignments shall be made so that all testing is covered and that responsibilities do not overlap.

2.3.3 SHIP'S FORCE. Reference (b) provides general responsibilities. In addition:

2.3.3.1 For CS/CCS and Strategic Weapons Systems Testing, the Overhaul Test Requirements Outline (OTRO), the Integrated Test Requirements Outline (ITRO), standardized class CS/CCS Test Program, and corresponding Test Procedures (as applicable) specify Ship's Force responsibilities for equipment operation and witnessing of tests.

2.3.3.2 For new construction ships, the Shipyard may formally transfer operational control of systems to Ship's Force when each system is completed and deficiencies corrected. For systems not yet transferred, Ship's Force plays an advisory role in meetings of the JTGs.

2.3.3.3 The Ship's Force representative shall be responsible for providing information to the JTG relative to Ship's Force testing and to the SSO relative to significant Ship's Force production events to be accomplished during the period covered by the LAT and/or SPOD.

2.3.4 WORK CONTROL TEAM. Shipyards shall establish a centralized Work Control Team to process work by the Shipyard, Ship's Force, Outside Activities and all Repair Activities during the availability, to ensure that ship safety, system status and tag-outs are adequately controlled in accordance with the requirements of this manual. The LMA Shipyard will lead the Work Control Team. Ship's Force is an integral part of the centralized Work Control Team and should man the team with experienced officers or senior petty officers. The existence of such an organization shall not waive any responsibilities of the SSC with regard to control of ship safety.

2.4 RELATIONSHIP TO SHIPYARD PRODUCTION ORGANIZATION

2.4.1 TRADE SUPERVISORS. Trade supervisors assigned to a ship shall be responsible to the SSO for work that could affect ship safety. The trade supervisors shall advise the SSO of the significant production events to be conducted during the period covered by the next SPOD.

2.4.2 PRODUCTION TRADE PERSONNEL. Only those experienced personnel, as determined by the cognizant shop superintendent, shall be assigned to shipboard work and/or testing that could affect ship safety. Other personnel may be assigned to assist the experienced personnel as required on the job site.

2.5 SUMMARY OF ORGANIZATIONAL RELATIONSHIPS

The organizational relationships of personnel who have responsibility for shipboard work, testing, safety, and watertight integrity, is shown in Figure 2.1. The solid line implies a direct relationship as defined by the responsibilities outlined herein. The dotted line implies a relationship that exists for matters pertaining only to ship safety.

2.6 TRAINING AND QUALIFICATION REQUIREMENTS

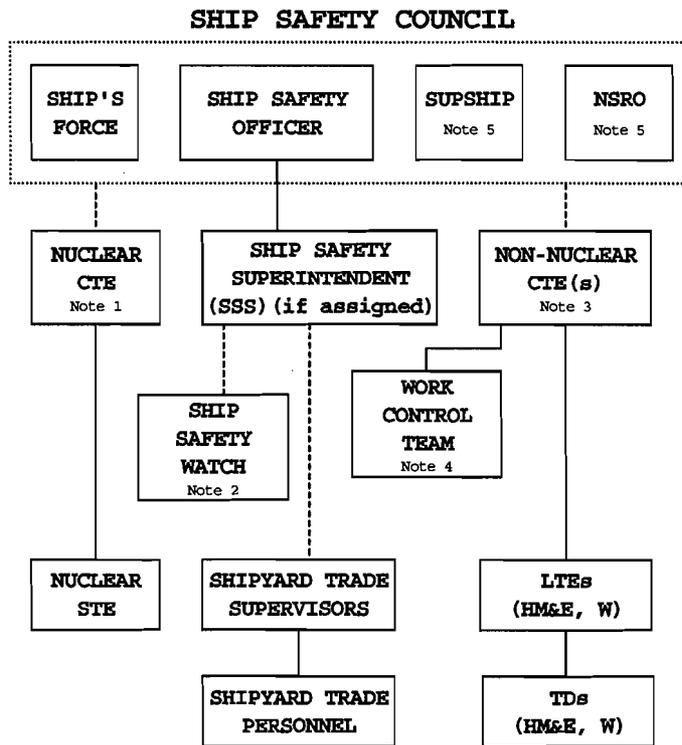
2.6.1 GENERAL. This section establishes training and qualification requirements for SSO, SSS, SSW, and shipyard Work Control (WC) personnel, and indoctrination requirements for all personnel working on submarines. SSOs, SSSs, SSWs, and shipyard WC personnel assigned duties in accordance with this manual shall meet the qualification requirements of this section on the class of ship to which they are assigned. Each Shipyard is responsible for the training and/or qualification of personnel assigned. The standards established by this section do not relieve the Shipyard of responsibility for the personnel employed by the Shipyard to ensure ship safety.

NOTE: See reference (b), Appendix C, for training and qualification requirements of test personnel.

2.6.2 PERSONNEL QUALIFICATION. Shipyard personnel assigned duties in accordance with this manual shall meet the qualification requirements of this section on the ship class to which they are assigned.

2.6.3 LIST OF CURRENTLY QUALIFIED PERSONNEL. Each shipyard is required to maintain current lists of shipyard personnel qualified in accordance with this manual. These lists shall indicate the ship class for which each person is qualified.

Figure 2.1. Ship Safety Council Functional Interfaces



- Note 1. Reports to SSC for ship safety matters not including reactor safety.
- Note 2. Reports to SSS/SSO and S/F Duty Officer for ship safety matters.
- Note 3. Depicts situation where a single non-nuclear CTE covers both HM&E and Weapons functions.
- Note 4. Provides input for work or isolations which could affect ship safety.
- Note 5: SUPSHIP (Private Shipyards), NSRO - If Assigned

2.6.4 QUALIFICATION PROGRAM.

2.6.4.1 Ship Safety Officer (SSO). The SSO shall establish and maintain qualification as SSS for the class of submarine under their supervision. Additionally, training given a candidate for SSO qualification shall provide adequate knowledge in the following areas:

1. Responsibilities of shipyard shops, codes and Ship's Force and their inter-relationships.
2. Knowledge of electrical safety, confined space safety, system isolation barrier criteria, shipboard and shipyard emergency procedures, freeze protection precautions (where applicable), shipboard security, service lead controls, destructive weather procedures and preparations for conducting HREs.
3. Knowledge of specifications and requirements dealing with submarines, specifically: Reference (e) or contract specifications for new construction project SSOs; Reference (g) (or private shipyard equivalent); Reference (c) for major CNO Availabilities); services, accesses and facilities for overhaul, steam plant cleanliness control, technical control and quality requirements.

2.6.4.2 Ship Safety Superintendent (SSS). A SSS candidate shall have a minimum of six months experience as either an Assistant Project Superintendent (APS), Zone Manager, Trade Supervisor, Test Engineer/Technician, shipyard WC Representative, or their equivalents in a private shipyard while assigned to shipboard work on the class of submarines assigned, or acting in a capacity directly under the supervision of a qualified SSS for six months, or hold a Navy qualification in submarines. The SSS shall be knowledgeable of the characteristics, arrangement of compartments, tanks and accesses, and shipyard regulations, instructions, and orders pertaining to ship safety of the class of ship to which assigned. The SSS shall have satisfactorily completed the Ship Conditions, Safety, and Systems Course (paragraph 2.6.4.5) for the class of submarine to which assigned. In addition, the SSS shall have demonstrated by practical or oral examination, the ability to use onboard emergency communication systems, alarms, quick-disconnects, emergency pumping systems, and knowledge of systems affecting ship safety.

2.6.4.3 Ship Safety Watch (SSW)

2.6.4.3.1 Shipyard Personnel. The SSW shall have a minimum of two years experience in work or testing involving submarine systems, or have held a Navy qualification in submarines. The SSW shall possess the physical capabilities (i.e., good eyesight, hearing, sense of smell, and agility) that are required to stand watch. Prior to certification, the SSW shall satisfactorily complete a course of instruction and written and practical examination by the Shipyard covering the following aspects of the ship class to which assigned:

1. Ship systems related to watertight integrity, including proper lineups to ensure such integrity.
2. Fire fighting and damage control procedures.

3. Shipyard regulations pertaining to ship safety.
4. Shipboard and shipyard communication and alarm systems.
5. Shipboard pumping and blowing systems.
6. Ability to check the battery ventilation system for proper operation.
(Not applicable to ships with the Submarine Valve Regulated Lead Acid (SVRLA) battery.)
7. Electrical power and lighting distribution and isolation.
8. Ship's installed draft markings and safety draft warning marks.
9. Ability to operate quick-disconnects.

2.6.4.3.2 Ship's Force Personnel. Ships' Commanding Officers should assign SSWs from personnel who have received their qualification in submarines. Ship's Force SSWs shall complete a course of instruction provided by the Shipyard no more than 30 days before implementation of the requirements of this manual, covering the following aspects:

1. Shipyard fire fighting organization and damage control procedures.
2. Shipyard regulations pertaining to ship safety.
3. Shipyard communications and alarm systems and their use, including the Casualty Control (CASCON) Station(s).
4. Shipyard-provided temporary safety systems, including shipboard pumping and blowing systems.
5. Shipyard-provided safety draft warning marks.
6. Shipyard housekeeping and equipment protection procedures.
7. Ability to operate quick-disconnects.

2.6.4.3.3 SSW refresher training shall be conducted by the Shipyard within 30 days prior to undocking with emphasis on the procedures for controlling Ship Safety.

2.6.4.4 Work Control Team (WCT) Qualifications. Shipyard personnel assigned to the WCT defined in paragraph 2.3.4, who signify safe work boundaries on WAFs shall establish qualification by satisfactorily completing the requirements of paragraph 2.6.4.5 on the class of submarine to which they will be assigned. Additional training shall emphasize work authorization and tag-out procedures per references (d) and (h). These requirements apply only to Shipyard personnel. Shipyards should include WCT training as part of pre-availability training provided to Ship's Force. Commanding Officers/Officers-in-Charge should ensure Ship's Force members of the WCT have sufficient experience and understanding of the requirements of this manual prior to being assigned to the WCT.

2.6.4.5 Ship Conditions, Safety and Systems Course. A training course including a minimum of 40 hours of lecture presentation and class work given to provide a basic understanding of submarine systems and arrangements and the requirements of this manual. The course shall cover the following areas:

1. Ship Conditions and Safety.
 - a. Instruction on submarine buoyancy and stability so that trainees are able to predict changes in draft, trim and list which will result from changes in liquid levels of internal tanks, main ballast tanks, or the sonar dome.
 - b. The Ship Safety Organization including duties and responsibilities.
 - c. The Ship Test Organization including duties and responsibilities.
 - d. Work control processes.
 - e. Prevention and control of fire and flooding requirements of Chapter III of this manual.
 - f. Documents and procedures for testing and ship safety assurance (Chapter IV).
 - g. Lessons learned from significant incidents that have or could have affected ship safety of Navy ships in construction and maintenance availabilities.
 - h. For personnel assigned to CNO scheduled availabilities conducted off shipyard, the requirements of Chapter V of this manual.
 - i. For personnel assigned to work on decommissioned submarines, the requirements of Chapter VI of this manual.
2. Ship Systems and Arrangements.

a. Instruction on the function, location, arrangements, special requirements and controls for ship systems and major components including piping systems, ship machinery, electrical systems, weapons systems, hull, tanks and structural bulkheads, including nuclear/non-nuclear interface systems. A candidate that has had 6 months or more experience working on or testing the specific submarine systems listed, or hold a Navy qualification in submarines, may be exempted from attending the class instructions on ship systems and arrangements by written authorization of a senior shipyard official. The candidate must successfully complete the final examination prior to certification.

b. The class work should emphasize propulsion systems (steam, turbines, lube-oil, ASW, MSW, etc.), the main hydraulic plant, high pressure air, the ballasting systems (trim, drain and main ballast tanks), ventilation and air conditioning, and electrical distribution.

c. The class work should emphasize the CS/CCS standardized test program, the weapons installations (fire control, missiles, etc.), and any interface system (such as electronic cooling water, air or hydraulic systems).

3. Shipyard Final Written Examination.

a. A final comprehensive written examination shall be given after completing the course described above, to determine whether a candidate's knowledge and understanding of the design and operation of ship systems and administrative requirements related to maintaining ship safety and ship systems work control, are satisfactory.

2.6.4.6 Subsequent Qualification on Other Submarine Classes. SSO, SSS, shipyard WCT or shipyard SSW personnel who have qualified on one class of submarine may qualify for another class of submarine by satisfactorily completing the practical examination required for the class for which qualification is being sought. All other currently qualified positions may extend qualifications to another class submarine by satisfactorily completing the portion of the requirements of paragraph 2.6.4.5 that are directly related to the ship systems and arrangement for the other class submarine and the written examination on the class for which qualification is being sought.

2.6.4.7 Certification of Qualification. A senior shipyard official shall certify in writing that each successful shipyard candidate has met all requirements for qualification and is considered by the Shipyard to be qualified to discharge the duties and responsibilities of the position for the submarine class assigned. The Shipyard shall retain the results of written and oral examinations administered to individuals to qualify or to maintain qualification. Certification records shall be made available to NAVSEA or SUPSHIP personnel for audits as described in paragraph 4.8, or when requested. Commanding Officers for ships in commission shall maintain the training and certification records for Ship's Force SSWs.

2.6.4.8 Requalification. Requalification requirements are applicable only to shipyard personnel who have not actively engaged in the control of work on submarines for a period of greater

than 6 months. This may be extended to one year if involved with work or testing on other ships. A senior shipyard official shall certify in writing that a candidate has met all the requirements for requalification as follows:

1. SSO. Each previously qualified SSO shall demonstrate by practical or oral examination, the requirements specified in paragraphs 2.6.4.1 (1) – (3) and complete the written examination specified in paragraph 2.6.4.5 (3) to requalify.
2. SSS. Each previously qualified SSS shall demonstrate by practical or oral examination, the requirements specified in paragraph 2.6.4.2 and complete the written examination specified in paragraph 2.6.4.5 (3) to requalify.
3. SSW. Each previously qualified SSW (Shipyard personnel) shall complete the written examination specified in paragraph 2.6.4.3.1 to requalify.
4. WCT Personnel. Each previously qualified WCT person shall complete the final written examination specified in paragraph 2.6.4.5 (3) to requalify.

2.6.4.9 Disqualification. If at any time the Shipyard determines an individual is not qualified to discharge assigned duties and responsibilities, the qualification of that individual shall be revoked. Application for requalification may be made at any time after the cause for revoking qualification has been corrected, as determined by the applicable senior shipyard official. Use reference (b) for test personnel.

2.6.4.10 Loans. A Shipyard may use personnel qualified as SSO/SSS/WCT/SSW from another Shipyard. In that case, the Shipyard to which such personnel are assigned is responsible for ensuring they are adequately prepared to perform assigned duties at that Shipyard. As a minimum, the Shipyard using qualified personnel on loan shall indoctrinate them on administrative procedures and special casualty bills in effect. Any weaknesses identified by this indoctrination shall be corrected prior to their assignment of duty.

2.6.5 INDOCTRINATION PROGRAM. The Shipyard shall ensure that all personnel working on submarines have received sufficient indoctrination on the purpose and applicable requirements of this manual, including a basic knowledge of tag-out and WAF procedures, are able to recognize and initiate alarms, and are familiar with actions they should take to evacuate the ship, assist in isolating flooding, fight fires, and report submerged safety draft warning marks. Personnel shall receive Indoctrination Program refresher training every two years at a minimum.

CHAPTER III

PREVENTION AND CONTROL OF FIRE AND FLOODING

3.1 GENERAL

This chapter contains the minimum requirements for fire and flooding prevention and control.

3.1.1 CASUALTY CONTROL (CASCON) STATION. The Shipyard shall provide a CASCON Station with the facilities and information at the CASCON Station as required by reference (e) or the Detailed Shipbuilding Specifications for New Construction Submarines. In addition, the following shall be at the station:

3.1.1.1 A drawing of any emergency systems installed by the Shipyard for communications, lighting, and alarms, including location of operating switches.

3.1.1.2 Location of temporary fire fighting and pumping facilities.

3.1.1.3 The effective SPOD.

3.1.2 FIRE PREVENTION AND CONTROL. Fire prevention and control measures shall be in accordance with reference (e) or the Detailed Shipbuilding Specifications for New Construction Submarines.

3.1.3 FLOODING PREVENTION AND CONTROL. Ship's Force and the Shipyard shall protect the ship against flooding from the sea, and inadvertent or unauthorized introduction of water or other liquids into the ship. The initial means of controlling flooding on a submarine is to locate and secure the source. In parallel, the means of controlling progressive flooding is inter-compartment isolation.

3.1.4 ALARMS. The alarm systems required by reference (e) shall be used for reporting fire or flooding. Alarm boxes shall be located in each compartment and not more than 50 feet from any point in the compartment. The public address system required by reference (e) shall be used after sounding the alarm to indicate the nature of the emergency and to provide follow-up instructions. The ship's installed alarm and announcing system may be used for these purposes, if operational.

3.1.5 PREPARATIONS FOR DESTRUCTIVE WEATHER. The Shipyard shall produce and maintain a Destructive Weather Procedure that shall be put into effect during times of predicted or actual abnormal conditions of wind and sea. In private shipyards this procedure shall be submitted to the SUPSHIP for approval. The procedure shall cover, as a minimum:

3.1.5.1 Personnel assignments and responsibilities.

3.1.5.2 "Doubling" of mooring lines/cables and securing of the ship against wind and wave action.

3.1.5.3 Closing of hull openings where required.

3.1.5.4 Securing topside openings.

3.1.5.5 Removing any mooring lines/cables attached to caissons.

3.1.5.6 Method for protecting dry dock with a submarine present, including manning pump well/caissons to operate pumping equipment as necessary to prevent/minimize inadvertent flooding.

The Shipyard shall also produce and maintain a procedure for protection against freezing weather, where applicable.

3.1.6 LIGHTING. The ship shall be provided with two sources of lighting to all spaces normally having two sources. The lighting may be the installed normal and emergency lighting systems or a combination of temporary and installed lighting, provided that separate power sources are utilized for each system. The removal of lighting from a space or compartment that could impede damage control efforts shall require SPOD approval as determined by the SSC.

3.1.7 EMERGENCY AIR BREATHING. Emergency Air Breathing shall be operational or temporary system(s) will be provided in sufficient quantity and locations (e.g., Maneuvering, Control, Crew's Mess) in support of watchstanders unable to evacuate immediately and/or those involved with combating the casualty.

3.2 SHIP IN DRY DOCK

3.2.1 DRY DOCK DRY CONDITION. When the ship is in dry dock, Chapter 0872 of Navy Regulations requires the closing of all valves and other openings in the ship at the end of working hours when such closing is practicable. In situations where there is extensive disruption of watertight integrity, making daily closing of openings in the ship impracticable, it is prudent to protect the dry dock, rather than the ship, from inadvertent flooding. To this end, shipyards shall maintain dry docks in accordance with reference (j). Each shipyard shall produce and maintain procedures that shall be initiated as part of the Shipyard's response to destructive weather (see paragraph 3.1.5) and dry dock flooding (electrical/mechanical/minor structural failure or human error during the entire in-dock period). In addition, any system affected by in-dock evolutions which could, through an uncontrolled constant fluid supply, introduce the potential for flooding the ship's interior (e.g., in-dock use of seawater systems), shall be controlled in accordance with the waterborne requirements of paragraphs 3.2.2.a and 3.3.1, for the affected penetrations, and 3.3.8. A constant fluid supply shall be considered a controlled constant fluid supply provided the following controls are invoked as a minimum:

3.2.1.1 The temporary fluid supply shall require two in-line isolation valves, installed external to the hull, between the ship and the fluid source. The two in-line isolation valves shall be located to facilitate rapid isolation (e.g., close to the ship).

3.2.1.2 The temporary fluid supply, up to and including both off-hull isolation valves, shall be transferred, including operation, to Ship's Force. This transfer shall be formal in nature and include temporary system diagrams, valve identification and operating instructions for Ship's Force use. Additionally, Ship's Force shall be trained on how to use the temporary system, and a Shipyard point of contact shall be clearly designated.

3.2.1.3 Installation and removal of the temporary fluid supply shall be controlled in accordance with paragraph 4.3.2.

3.2.1.4 The ship's system, or portion of ship's system receiving the fluid, shall be operational and tested to temporary system operating pressure.

3.2.1.5 Installation of a temporary fluid system external to the pressure hull, outboard of the hull and backup valves, shall also have the hull joint tested to temporary system operating pressure.

3.2.2 DRY DOCK SIMULATED WATERBORNE CONDITIONS. During simulated waterborne conditions the following minimum requirements shall apply:

- a. The event shall be authorized on the SPOD.
- b. Hull openings, as listed on the SPOD, shall be controlled in accordance with the waterborne requirements of this manual.
- c. Seawater valves should normally be operated using ship systems. A temporary system may be used to operate seawater valves. Use of temporary systems to operate seawater hull/backup valves shall be authorized by the SSC and listed on the SPOD.
- d. A 200 GPM bilge pumping capability shall be provided (ship's trim/drain or temporary pump(s)).

3.2.3 DRY DOCK WATERBORNE CONDITIONS. Any in-dock evolution that requires operation of the dry dock floodgates shall be controlled in accordance with the waterborne requirements of this manual.

3.3 SHIP WATERBORNE

3.3.1 HULL PENETRATIONS BELOW THE WATERLINE. The double barrier protection requirements of reference (d) shall apply to hull penetrations located below the waterline. The principle of double barrier protection applies to all hull penetrations except for those mechanical and electrical penetrations (such as Secondary Propulsion Motor (SPM) and cable penetrations) that are designed for single closure. Double barrier protection may be achieved by using installed valves, blank flanges, outside closure plates, or temporary shafting seals. Positive control shall be exercised to maintain closure (shut) through the use of tags, interlocks, gagging devices, chains, mechanical locks, hydraulic locks, blanks, etc., until work and testing on the associated system has been completed. For commissioned ships, Ship's Force maintains operation of all hull and backup valves below the N+4' waterline, ballast tank blow and vent systems, and shipboard bilge pumping systems, while waterborne.

3.3.1.1 Operation of systems that have interlocks (such as torpedo tubes, signal ejectors/launchers, trash disposal unit, etc.), as long as all system testing specified in 3.3.1.2 is complete and interlocks are properly made-up, is not a violation of double barrier protection.

3.3.1.2 Prior to undocking, all sea-connected hull and backup valves below the waterline shall be installed, hydrostatic tests shall have been satisfactorily completed on these valves and interconnection piping, and local valve position indications shall have been proven correct and reliable to Ship's Force.

3.3.1.3 Where schedule, resources, or other constraints prevent accomplishment of the above before undocking, a blank shall be installed and identified external to the hull penetration. Blanks shall be installed and tested per reference (h). The installation of the blank shall be noted on the SPOD. Removal of such blanks shall be approved on the SPOD by the SSC only after the required valves are installed and hydrostatically tested and the local valve position indications have been proven correct and reliable to Ship's Force.

3.3.1.4 Regarding the connection of hydraulic actuator lines on hull/backup valves below the waterline when the inboard piping is not complete:

1. If an external blank is installed per reference (h), any additional precautions shall be resolved by the SSC.

2. If an external blank is not installed, then the hull and backup valves shall have been installed, hydrostatically tested, and local valve position indications proven correct and reliable to Ship's Force.

- a. If the ship's hydraulics systems are not available, a temporary source of hydraulic pressure shall be used to position these valves. When local valve position indication has been proven correct and reliable, the valve shall be in one of the following conditions:

- (1) The temporary pressure source may be disconnected and valve actuator ports plugged.

(2) The temporary pressure source may be disconnected utilizing quick-disconnects in lieu of plugs.

(3) The temporary pressure source may remain connected for valve actuation.

b. Additional safety precautions should be used by the SSC to provide the assurance required to preclude the need for an external blank. These may include not working the actuators for a particular hull/backup valve combination concurrently, shutting and danger tagging both valves at all times, isolating and danger tagging the hydraulic pressure source to the control valve for the specific actuator being worked, and not pressurizing or operationally testing the actuators until the sea-connected system integrity has been reestablished.

3.3.1.5 Any required work or testing not compliant with the above requirements shall not start unless approved by the SSC on the SPOD. It is the responsibility of the Ship's Force SSC representative to obtain the Commanding Officer/Officer-in-Charge permission per reference (d). This will be documented by Ship's Force SSC representative signature on the SPOD.

3.3.2 HULL PENETRATIONS/OPENINGS FROM THE WATERLINE TO FOUR FEET ABOVE THE WATERLINE. All hull penetrations/openings from the waterline to four feet above the waterline that are not in their normal as-built condition, as shown on ship construction plans, shall be listed on the SPOD together with the authorized method of closure.

3.3.2.1 Topside Hatches. Topside hatches should be maintained so they can be shut and secured against flooding within three minutes of the initiation of an alarm. If this is not practical, they shall be protected with cofferdams as prescribed for hull access openings. It is preferred to maintain the hatch four feet above the waterline than to ensure closure in three minutes. Evolutions during which the above criteria cannot be met, such as weapons handling, shall be approved by the SSC on the SPOD. Additionally, the Shipyard shall have written procedures that provide formal control of temporary service lines that pass through topside hatches, missile tube muzzle hatches, hull access openings or watertight doors. In private shipyards this procedure shall be approved by SUPSHIP.

3.3.2.2 Missile Tube Muzzle Hatches. The requirements for topside hatches are applicable except when maintenance platforms or similar structures are installed in the missile tube which would prevent shutting of the hatches within three minutes. In such cases, the missile tube access doors in the ship's interior shall be shut and locked or be capable of being shut and locked within the required three minutes of the initiation of a flooding alarm. It is preferred to maintain the hatch four feet above the waterline than to ensure closure in three minutes.

3.3.2.3 Hull Access Openings

1. Cofferdams shall be installed around all hull access openings/temporary hull cuts that are less than four feet above the waterline at the opening.

a. Cofferdams shall be constructed so as to maintain watertight integrity to at least four feet above the waterline. They shall be attached to the hull by a suitable arrangement to provide a positive seal. They shall be designed to permit personnel access, temporary services, and equipment shipping, as applicable, without violating the required watertight integrity.

b. In utilizing a portion of the ship's topside freeflood structure to achieve the four-foot requirement, all openings to that freeflood structure shall be controlled in the same manner as the cofferdam itself. In this regard, positive control to maintain closure through the use of danger tags, gagging devices, mechanical locks, and/or blanks, shall be exercised by the Shipyard for all hull access openings not in an as-built condition. Peculiarities of the as-built condition of SSN-23: SSN-23 must have its free-flood structure dewatering capability or temporary equivalent available.

c. Cofferdams shall be installed and tested before the ship becomes waterborne or within 72 hours after arrival of the ship in the Shipyard.

d. Removal or changes in status shall be approved by the SSC via the SPOD.

2. Any hull penetration, such as an electrical cable penetration, need not have a cofferdam installed if it is adequately blanked or plugged while the system is under repair.

3.3.2.4 Other Penetrations/Opening from the Waterline to Four Feet Above the Waterline. Penetrations and openings that do not meet the above criteria shall be isolated by type of single closure. If single closure is not practical, the penetration/opening shall be attended at all times and the conditions approved by the SSC on the SPOD.

3.3.3 HULL PENETRATIONS/OPENINGS FOUR FEET OR MORE ABOVE THE WATERLINE. Penetrations/openings not in the normal as-built condition are not required to be watertight but should be provided with protection against fluid entry with status maintained on the SPOD.

3.3.4 MAIN BALLAST TANKS. The condition of the main ballast tanks shall be listed on the SPOD. Main ballast tanks shall be in one of the following conditions:

3.3.4.1 Flood ports maintained clear for blowing. Vent valves installed and locked shut with outside cover plates secured in place. Cover plates fitted with a blow connection suitable for attachment of a dockside air hose. At least two independent sources of air utilizing separate entry points shall be maintained available for blowing tanks.

3.3.4.2 Watertight cover plates installed over flood ports. An additional dewatering capacity of at least 500 GPM capable of being installed and operated in the main ballast tank within 15 minutes receipt of an alarm. A temporary main ballast tank flood alarm system installed near the bottom of the main ballast tank. All openings to any blanked main ballast tank shall be protected in the manner prescribed for hull access openings.

3.3.5 SONAR DOME

3.3.5.1 SPOD approval is required prior to opening the sonar dome. Sonar dome status shall be maintained on the SPOD.

3.3.5.2 If the dome is not completely flooded, then openings less than 4 feet above the waterline shall be protected by a cofferdam or other means as outlined in paragraph 3.3.2.3. This might, among other actions, require that cavity drain piping leading into the sonar dome access line locker be plugged or blanked, regardless of whether the manway accesses are secured or not.

3.3.6 SHIP INTERIOR

3.3.6.1 Interior Tanks. An interior tank greater than 10 tons (30 tons for TRIDENT Class submarines) in capacity without an operational tank level indicating system shall be isolated and tagged as necessary to protect the tank from fluid sources, unless specifically approved by the SSC. Isolation/tag-out may be accomplished by including the tank within the boundaries of an existing tag-out that provides the required protection. Restoration of the tank's level indicating system shall be covered by appropriate Work Authorization Form (WAF).

3.3.6.2 Watertight Doors. Watertight doors shall be maintained so they can be shut and secured against flooding within three minutes of the initiation of an alarm. Temporary service lines without quick-disconnect devices should be installed through alternate accesses that meet the requirements of this manual. If no alternate access exists, then a watch shall be designated the responsibility to remove service lines without quick-disconnects. This watch may be a Ship's Force or Shipyard person. The watch shall be capable of securing services to the line and removing it within three minutes, if required by an emergency situation. For lines that are constantly tended (i.e., brazing) the personnel operating the line shall be so designated to remove the line. In lieu of stationing a watch, a device may be staged to cut the temporary service line or lead when the device is in a central location, personnel are trained on the use of the device, and the temporary service line/lead tag indicates there is no quick-disconnect.

3.3.6.3 Bulkheads. Bulkhead ventilation valves shall either be operational and capable of being shut, or be made watertight with a blank. Bulkhead penetrations shall either be in their normal condition or be rendered watertight if unattended. Temporary closures are permissible.

3.3.6.4 Bilge Alarms. Bilge alarms shall be operational while waterborne/simulated waterborne or temporary bilge alarm(s) will be provided. In the event maintenance will disable the bilge alarm system:

1. This maintenance will be approved on the SPOD.
2. The SSW will increase the frequency of bilge inspections in the affected spaces to twice hourly, at a minimum.
3. Work will be sequenced to minimize the time the alarms are disabled.

3.3.7 CHANGE OF TRIM, LIST, OR DRAFT

3.3.7.1 When waterborne, any change involving main ballast tanks, sonar dome, or hull work associated with main ballast tanks or the sonar dome, shall be approved by the SSC.

3.3.7.2 No work or testing shall be undertaken which adds, removes, or shifts 10 tons (30 tons for TRIDENT Class submarines) of weight on the ship without prior approval by the SSC on the SPOD. This includes addition, removal, or shifting of weight such as liquids, lead ballast, temporary lead shielding, and temporary fixtures or equipment on the ship. The SSC shall review the proposed weight changes prior to approval to ensure they will not cause a Safety Draft Mark to enter the water or violate the Maximum Calculated Draft as listed on the SPOD. To substantiate the review, the following information shall be calculated and documented on the SPOD that authorizes such work or testing:

1. The list and draft at the beginning of the SPOD period.
2. The effect on list and draft of each proposed weight change.
3. The worst-case effect on list and draft, at any one time, of all proposed weight changes accumulating 10 or more tons (30 for TRIDENT Class submarines).

3.3.7.3 For commissioned ships, the Commanding Officer, or his designated representative, shall monitor the conduct of the operation where Ship's Force operation of equipment is specified. For ships not in commission, the SSO is responsible except that, for changes not requiring ballast tank operations, the SSS may be delegated this authority and the PCO/OIC shall monitor these events.

3.3.8 PUMPING

3.3.8.1 Each compartment shall be capable of being dewatered at a rate in excess of 200 GPM with pumping action started within three minutes of the initiation of a flooding alarm at the CASCON or equivalent shipboard station. (This may be accomplished using the trim pump, drain pump, or temporary dewatering pump(s).)

3.3.8.2 In addition to the requirements of paragraph 3.3.8.1 to minimize water damage, the Shipyard shall also maintain emergency dewatering equipment, with a combined dewatering capacity of at least 1000 GPM, in such a state of readiness that effective pumping can be applied at or below the deck plate in the lower level of the affected compartment within 15 minutes of the receipt of a flooding alarm at the CASCON or equivalent shipboard station. Ability to meet this time requirement in each compartment is dependent on the status of the nearest topside access hatch. It is preferred to maintain hatches four feet above the waterline rather than to ensure closure in three minutes.

3.3.8.3 For the pre-undocking flooding drill of paragraph 3.3.10.4 for each ship, the Shipyard/Ship's Force shall demonstrate the installation of the Shipyard provided 1000 GPM pump(s) within 15 minutes of the receipt of the alarm.

3.3.8.4 The requirement for 1000 GPM emergency dewatering within 15 minutes of the receipt of the flooding alarm may be relaxed during ship's movement from berth to dock, dock to berth and berth to berth, with the following restrictions:

(a) No work on sea-connected systems.

(b) A temporary 200 GPM dewatering pump shall be operational shipboard during transit if ship's trim and/or drain pump isn't operational/capable of discharging overboard.

(c) No system work allowed during transit that could impact flood recovery capability or affect watertight integrity of the ship.

(d) Bilge alarm system in service.

(e) A contingency plan is developed and briefed that can be used to get the ship to a location where pumping can be performed in the minimum amount of time should flooding occur.

(f) Exception approved by the SSC on the SPOD.

3.3.8.5 When Trim and Drain System is operational after system work and testing are complete, and no more Ship Safety work or testing is scheduled for the availability (i.e., Crew Certification, Fast Cruise), the emergency dewatering requirements of this manual may be relaxed as approved by the SSC.

3.3.9 SAFETY DRAFT MARK WARNING SYSTEM. A Safety Draft Mark Warning System is required in order to provide a visual method by which adverse, unpredicted changes in draft, trim, or list can be detected which could affect the safety of the ship. The requirements for Safety Draft Marks are as follows:

3.3.9.1 Highly visible Safety Draft Marks shall be applied fore and aft, both port and starboard. The bottom edge of the mark shall be a maximum of 12 inches above the Maximum Calculated Draft (MCD) specified on the SPOD. The SSC shall authorize relocation of Safety Draft Marks when performing evolutions that would result in a Safety Draft Mark entering the water. Safety Draft Marks shall be readjusted when the trim, draft, or list of the ship has been changed which results in a Safety Draft Mark greater than 12 inches above the MCD shown on the SPOD.

3.3.9.2 The Safety Draft Marks shall be applied prior to the ship becoming waterborne or within 72 hours after implementation of the requirements of this manual and shall not be removed earlier than 72 hours before the scheduled commencement of Fast Cruise.

3.3.9.3 The Safety Draft Marks shall be located in the vicinity of the ship's installed draft marks.

3.3.9.4 Draft readings shall be recorded hourly by the SSW in the Ship Safety Log (paragraph 4.6) and compared with the pier side Safety Draft Marks. SSWs shall be instructed on the purpose of the Safety Draft Marks and applicable reporting procedures (paragraph 2.2.4.1).

3.3.10 DRILLS

3.3.10.1 GENERAL. Shipyard drills shall be planned and scheduled by the SSO, and shall be witnessed and evaluated by the SSC. The SSC shall determine the drill grade and issue a formal report documenting the grade. The SSC shall also determine and assign corrective action, and ensure resolution.

3.3.10.2 INITIAL TRAINING DRILL. A satisfactory initial training drill shall be conducted within seven days of Ship's Force acceptance of shipyard installed CASCON system, temporary fire fighting systems and temporary pumping systems, as applicable. For new construction the timing will be determined by the SSC. The purpose of this drill is to determine the adequacy of the CASCON, temporary/installed damage control systems/equipment and its use by Ship's Force, and to observe Ship's Force reaction/interface with the Shipyard's Fire Department.

3.3.10.3 FIRE DRILLS. Fire drills will be conducted at periods not to exceed 90 days after the Initial Training Drill, up to Fast Cruise. Fire drills are conducted in cooperation with Ship's Force to evaluate the response of shipyard personnel and the actions of Ship's Force and the Fire Department in combating the fire/associated casualties. A fire drill due after Phase I Crew Certification may be waived by the SSC.

3.3.10.4 FLOODING DRILLS. When waterborne, satisfactory flooding drills shall be conducted at periods not to exceed 90 days, up to Fast Cruise. A satisfactory flooding drill shall be conducted within 30 days prior to Undocking/Simulating Waterborne. For new construction, a satisfactory flooding drill shall be conducted within 30 days prior to Launch. Compartments shall be randomly selected. The purpose of this drill is to determine the Ship's Force and Shipyard's ability to stop and isolate the flooding source, effect proper inter-compartment isolation, and to apply the pumping and emergency dewatering capacity within the required time, while maintaining ship conditions. The Shipyard shall demonstrate this requirement, including pumping capacity, during the triennial audit of paragraph 4.8.2. A flooding drill due after Phase I Crew Certification may be waived by the SSC.

3.3.10.5 UNSATISFACTORY DRILLS. Unsatisfactory drills should be reconducted as soon as possible, but within 30 days. Remedial drills may be commensurate with the reason for failure, as determined by the SSC.

3.3.10.6 DRILL BRIEFS. The SSO will lead the drill brief for shipyard drills, using the guide provided in attachment (1), to detail shipyard and Ship's Force expectations and grading criteria. Ship's Force will brief specific details of the scenario, how the drill is initiated, simulations, monitor intervention points and expected Ship's Force response.

3.3.10.7 DRILL DEBRIEFS. The SSO will lead the drill debrief for shipyard sponsored drills, immediately upon completion of the drill, using the guide provided in attachment (2). Drill debriefs will be attended by all personnel necessary to properly evaluate the drill. The SSC shall make the final determination of drill results (pass/fail).

3.3.10.8 SHIP'S FORCE DRILLS FOR TRAINING. Drills should be commensurate with the situation, i.e., temporary cabling for power range testing or super shore power should not be disrupted during a drill. Ship's Force shall also notify the SSO, local fire department and RADCON prior to commencement and at completion of the drill.

3.3.11 EXCEPTIONS. Exceptions to the ship waterborne requirements of Section 3.3 shall be listed on the SPOD and approved by the SSC.

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CHAPTER III

Attachment (1): Drill Planning/Briefing

1. **BRIEF EXPECTATIONS.** The SSO shall coordinate the planning of all drills with the SSC, using a Drill Request/Concurrence Form/Memorandum, or similar, to ensure all proper notifications are made and a common understanding exists for drill scenario and expectations.
 - a. The following items should be covered by the SSO during the drill brief, as applicable:
 - 1) Extent of simulation expected, e.g., not simulate personnel evacuation, always simulate disconnecting temporary services through watertight doors, etc. Also, ensure that for a flooding drill, flooding is simulated to the extent that would require the use of the emergency dewatering pump(s).
 - 2) That the drill be conducted in a manner that the casualty will be discovered by a Shipyard person to "test" response and ability to use the CASCON/IMC/4MC.
 - 3) Ship's Force CASCON (also Control and/or Damage Control Central Station if manned) Watch response(s).
 - 4) Assignment of Shipyard monitors.
 - 5) Monitor intervention points, e.g., ensure work/test sites are properly secured including radiological and Hot Work areas. Document shop and badge numbers of personnel who don't actively participate in shipboard drills for corrective action.
 - 6) Specify which personnel, if any, are exempt from the drill.
 - 7) Discuss expected Fire Department response.
 - 8) Lessons Learned from previous drills.
 - 9) Special ship safety considerations for the drill based on the unique condition of the ship.
 - 10) Personnel safety considerations due to potentially hazardous conditions.
 - 11) Preferred evacuation routes.
 - 12) Evacuation and mustering of personnel.
 - 13) Drill termination criteria.
 - 14) Drill evaluation criteria.

- This checklist is not all-inclusive and may be modified by the SSO as desired. It is up to the SSO's discretion to determine which attributes to brief, but as a guide, recent problems/lessons learned, including remedial actions, will be discussed, as well as other selected items on the list.

b. Request comments from Fire Department, Shipyard monitors, or Ship's Force, etc.

c. Turn drill brief over to Ship's Force to discuss scenario and monitor intervention points.

2. DRILL EXPECTATIONS. All Shipboard personnel are expected to participate in drills unless specifically exempted on the Drill Request/Concurrence Form/Memorandum, or similar. Shipyard and Contractor personnel are expected to put their work in a safe condition and evacuate promptly when an alarm is sounded. Fire Watch considerations must be taken into account. Drills will normally terminate once the drill criteria has been met as briefed.

CHAPTER III

Attachment (2): Drill Debrief and Grading

1. GENERAL. Drill debriefs will be conducted immediately after shipyard drills. Drill debriefs will be attended by all necessary personnel to properly evaluate the drill. The SSC shall be present at the drill debrief and will determine the drill grade and corrective actions, using a Fire/Flooding Drill Debrief Form.

2. DRILL GRADING. Failure to properly conduct particular aspects/expectations during a drill is not necessarily reasonable to consider a drill as unsatisfactory. It may be more effective to assign corrective/remedial actions for those deficiencies and ensure correction during the next drill cycle. Failure to execute the following attributes should be cause for an unsatisfactory grade:

2.1 Ship's Force fails to notify the emergency response personnel or fails to make announcements/alarms to the ship.

2.2 Source of fire/flooding not properly extinguished/stopped.

2.3 Compartment not isolated within three minutes of flooding alarm.

2.4 Dewatering efforts do not meet the established criteria (200 GPM within three minutes of the alarm and an additional 1000 GPM within 15 minutes of the receipt of the alarm at the CASCON (or equivalent shipboard) station).

2.5 Firefighting response not initiated in a timely manner. Fire hose(s) not at the scene within a reasonable amount of time, depending on location of casualty.

2.6 Demonstrated proficiency with Damage Control equipment.

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CHAPTER IV

REQUIREMENTS FOR DOCUMENTS AND PROCEDURES FOR TESTING AND SHIP SAFETY ASSURANCE

4.1 GENERAL

The purpose of requiring the documents and procedures specified in this chapter is to provide a positive means for accounting for actions taken in preparation for, or in conjunction with, shipboard work and testing to provide the requisite degree of ship safety. The base requirements for shipboard testing are in reference (b). This should not preclude shipyard initiative to cover other areas not specified herein. The Shipyard's administrative system shall provide Ship's Force copies of all current/revised Operating Procedures, Test Procedures, Work Instructions, etc., for shipboard work, in a timely manner.

4.2 SCHEDULES

4.2.1 LIST OF AUTHORIZED TESTS (LAT). The LAT lists those non-nuclear shipboard tests that are scheduled to be accomplished during a specified period of time. It shall be prepared under the supervision of the CTE and be approved by the JTG. Ship's Force/Outside Activity tests, which are usually received via a WAF/TWD, shall be included on the LAT. The LAT shall specify the ship's name and hull number, date of approval, time period covered, list of all tests (including reference to the specific procedure and revision to be used), test unique serial numbers and JTG test execution approval signatures. All tests on the LAT that could affect ship safety shall be prominently marked. The LAT is not required provided the Shipyard maintains the above requirements in a Daily Schedule, Plan of the Day, or similar document. Use of the LAT may be terminated upon commencement of Fast Cruise.

4.2.2 SHIP PLAN OF THE DAY (SPOD). The SSO shall be responsible for the preparation and issue of the SPOD utilizing the LAT, Test Plan of the Day (TPOD), input from the trade supervisors, input from the Ship's Force SSC representative for Ship's Force work or evolutions that affect ship safety, WAFs and test documents that affect ship safety, exceptions to ship safety or High Risk Evolutions. These ship safety items must be approved on the SPOD prior to release for final authorization of work/test conduct. When a ship safety WAF is revised and the revised information is unrelated to the reason for the ship safety designation, no change to the SPOD to reflect the revision is required. The SPOD shall be in effect from the implementation of the requirements of this manual until commencement of Fast Cruise. The SSC shall determine if a SPOD is required after Fast Cruise or post repair trials. The SPOD shall include:

- 4.2.2.1 All evolutions that affect ship safety.
- 4.2.2.2 Exceptions to ship waterborne requirements of Chapter III.
- 4.2.2.3 Exceptions to main ballast tank/sonar dome requirements of Chapter III.
- 4.2.2.4 Exceptions to ship interior requirements of Chapter III.
- 4.2.2.5 High Risk Evolutions listed in paragraph 4.5.

4.2.2.6 MCD for both fore and aft draft for the period of the SPOD.

4.2.2.7 Effect of proposed weight changes on list and draft, including environmental affects, as applicable.

4.2.2.8 Other evolutions as determined by SSC.

4.2.2.9 A drawing of shipyard installed emergency communications, lighting, and alarms, including locations of operating switches.

4.2.2.10 Location of temporary pumping facilities and temporary fire fighting systems, if used.

4.2.3 SPOD APPROVAL. The SPOD indicates SSC approval to proceed with the conduct of the specific evolutions as scheduled. The SPOD may also be used to document minutes of SSC meetings. The SPOD, with approved changes or modifications, shall be reviewed and approved by all members of the SSC, (approval may be via TELCON after normal working hours) and be distributed as a minimum by the SSO or SSS to the CASCON station, Ship's Force Duty Officer, Engineering Duty Officer, SSC Members, Project CTEs, Project Superintendent/Ship Manager (for private shipyards), Ship's Commanding Officer, and SSM, prior to the start of the listed evolutions.

4.2.3.1 See attachment (1) of this chapter for a sample SPOD form. All shipyard SPODs shall be similar in format, with class exceptions, but must address the minimum applicable requirements contained in this manual.

4.2.3.2 SPOD changes can be filled in manually or computer generated. Ship Safety Council approval is required for any changes under the same guidelines that exist for the original SPOD. The following guidelines apply:

1. Changes will be limited to cover emergent, unplanned work during the scheduled duration of the original SPOD.
2. Calculations for draft need only be modified if the work/test added to the change affects the draft shown on the original SPOD. If the draft is not affected, these columns shall be N/A'd.
3. Changes will be numbered using the serial number of the existing SPOD and CH 001, 002, etc.
4. The expiration date of any change must be the same as the expiration date of the original SPOD.
5. Separate change sheets or changing the existing SPOD and highlighting changes are allowed.

a. If separate change sheets are used, changes are to be added to the front of the existing SPOD by the SSO/SSS in a manner so CH 001 is placed over the existing cover sheet, CH 002 over CH 001, etc.

6. Changes shall get the same distribution as the original SPOD.

4.3 WORK AUTHORIZATION

4.3.1 GENERAL. This section describes documents that are required to preclude:

1. Unsafe operation of a system that could affect ship safety by the Shipyard, Ship's Force or Outside Activities when work or testing is in progress.
2. Violation of the integrity of completed testing on a system without provision for necessary retests.
3. Inadvertent operation of valves, motors, and other components, where such operation could affect ship and/or personnel safety.
4. Violation of watertight integrity when waterborne.

4.3.2 WORK AUTHORIZATION FORM (WAF). Reference (h) is the principal governing document for the use of WAFs. This section amplifies reference (h) for work affecting ship safety.

4.3.2.1 Provisions

4.3.2.1.1 "Safety of Ship" WAFs. All WAFs which affect Ship Safety shall be signed by the SSO/SSS (may be signed per TELCON) to signify concurrence to proceed with the work from an overall scheduling and safety standpoint and that the WAF is approved by the SSC on the SPOD. WAFs shall be identified as "Safety of Ship" for the following cases:

1. Opening in the pressure hull when the ship is in a waterborne or simulated waterborne condition.
2. Work that violates the integrity of any watertight bulkhead when the ship is waterborne or in a simulated waterborne condition.
3. Work that violates double barrier isolation from sea (required below the waterline) or an uncontrolled (see paragraph 3.2.1) constant fluid supply (except those penetrations designed for single closure and those sea-connected systems below the waterline inboard of the backup valve less than 1/2" NPS).
4. Opening any sea-connected tank not double-barrier isolated from sea when the ship is waterborne or in a simulated waterborne condition (includes main ballast tanks and sonar dome).

5. Any operation that disables the operation of a system supporting fire or flooding prevention and control requirements identified in Chapter III.

6. Connecting or disconnecting test equipment or shipyard support systems to ship systems which could affect ship safety, where the connection or disconnection is not a specific step in a TWD.

4.3.2.2 New Construction Ships. For submarines under construction, the use of WAFs shall commence after the system/equipment/area has been accepted by shipyard quality assurance and for items affecting watertight integrity (as required by paragraph 3.3.1) at launch and whenever waterborne. Prior to acceptance by the Ship's Force, the appropriate LTE shall act for Ship's Force in authorizing WAFs. (SSC approval as specified in Chapter III is required.)

4.3.2.3 WAF Review. The Shipyard shall reevaluate open WAFs whenever ship status changes (e.g., prior to floating the ship, conducting in-dock evolutions that simulate a waterborne condition, etc.) to ensure correct "Safety of Ship" designation.

4.4 TESTING REQUIREMENTS

4.4.1 TEST PROCEDURES. All Test Procedures shall be prepared in accordance with reference (b).

4.4.2 Prior to going waterborne, all Test Procedures, which were written for accomplishment in dry dock, and which will be outstanding at undocking shall be comprehensively reviewed by the JTG to ensure each test can be safely conducted waterborne.

4.5 PREREQUISITE LISTS FOR HIGH RISK EVOLUTIONS (HREs). Required Prerequisite Lists may be included in any official shipyard directive (i.e., Process Instruction, Shipyard Instruction, etc.) and shall include steps to ensure the degree of ship safety and watertight integrity as specified elsewhere in this manual. The Prerequisite Lists shall be approved by the SSC, and these evolutions scheduled on the SPOD. HREs may affect ship safety and should be treated as such.

The Shipyard shall prepare Prerequisite Lists for the following HREs:

1. Launching/Undocking (refer to paragraph 3.3.1).
2. Docking.
3. Flooding the dry dock.
4. Propulsion testing of Main Engines including EPM, SPM and thrusters.
5. Oxygen charging/discharging.
6. Battery charging. (Except for ships which have the Submarine Valve Regulated Lead Acid (SVRLA) battery. SVRLA charging is not a High Risk Evolution.)

7. Diesel Fueling/De-fueling.
8. Evolutions/processes involving explosive, toxic, or hazardous materials, which constitute a danger or potential danger to ship safety.
9. Operations involving launching of dummy torpedoes.
10. Tests of Emergency Main Ballast Tank (EMBT) Blow systems.

4.6 SHIP SAFETY LOG

A Ship Safety Log constitutes an official Ship's Force record during the period of the Ship's availability and shall be developed by the Shipyard and used by the Ship Safety Watches. Shipyard provided Ship Safety Logs shall be used from implementation of the requirements of this manual until Fast Cruise. The Ship's Force Member of the SSC shall maintain these logs in an auditable format for the duration of the availability. The following records shall be kept:

4.6.1 RECORD ONCE EVERY HOUR.

1. Fore and aft drafts, and list, while waterborne. Readings shall be compared with the safety draft marks and maximum calculated drafts.
2. Condition of bilges.
3. Condition of cofferdams, temporary hull blanks, hatches, watertight doors, and passageways, while waterborne.
4. Status of battery ventilation. (Not applicable to ships that have the SVRLA battery).
5. While waterborne, tank levels of those tanks whose capacity exceed 10 tons (30 tons for TRIDENT Class submarines) and are not isolated (refer to paragraph 3.3.6.1).

4.6.2 RECORD ONCE EACH SHIFT.

1. Condition of fire extinguishers. Fire extinguishers properly located.
2. Condition of temporary systems installed to support or maintain ship safety (e.g. bridled air system, temporary dewatering pumps, temporary fire fighting).

4.6.3 RECORDED ON A CASE BASIS.

1. Fire hazards.
2. Fire incidents.
3. Flooding incidents.

4. Personnel injury.

5. Equipment damage.

4.6.4 See attachment (2) of this Chapter for a sample of the SSW Log. All logs shall be similar in format with class exceptions, but must address the minimum applicable requirements contained in this manual. The Duty Officer or Duty Chief Petty Officer initials to indicate review per periodicity of their Ship's Organization and Regulation Manual.

4.7 TROUBLE REPORTS

For Naval Shipyards, and when contractually invoked at Private Shipyards, the requirements of reference (k), apply. Also refer to reference (l) for Trouble Report preparation details.

4.8 AUDIT PLAN

4.8.1 LOCAL AUDITS. Shipyards shall audit compliance with the requirements of this manual every 12 months using an audit plan. The audit plan, with all attributes documented as reviewed, shall be maintained in an auditable format for a minimum of four years. Copies of these audits shall be made available for Government inspection in Private Shipyards.

4.8.2 NAVSEA AUDITS. NAVSEA shall conduct audits of each shipyard at 36-month intervals. As a minimum, the following areas of the manual and applicable references shall be examined:

1. Ship Safety organization, training and qualifications.
2. Testing organization, training and qualifications per reference (b).
3. Shipyard Work Control Team organization, training and qualifications.
4. Ship Safety Logs.
5. WAFs.
6. SPOD and LAT.
7. Tag-out procedures, active tag-out records, and available inactive tag-out records.
8. Prevention and control of fire and flooding. (including fire and/or waterborne flooding drills).
9. Test Procedures.
10. Trouble Reports.

11. Other instructions and procedures related to implementation of this manual. A single, well defined set of shipyard-wide instructions is recommended.

The audits shall also include actual inspection of ship's safety conditions, conduct of testing, etc. Shipyards should keep records in auditable form and for the length of availability or new construction, or for the time required by other directives, if longer.

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SHIP PLAN OF THE DAY	Ship/Hull Number (688 Class)		
	NO.	CHG	EFFECTIVE DATES

DEWATERING EQUIPMENT STATUS				LIGHTING				MAIN BALLAST TANK STATUS – Flood Ports Clear					
> 200 GPM		1000 GPM		NORMAL		EMER		MBT	SY AIR	LP BLOW	EMBT	VENTS LOCKED SHUT W/COVERS	
TRIM	DRAIN	TEMP	TEMP	SHIP	TEMP	SHIP	TEMP	1					
								2					
ALARMS		SONAR DOME STATUS		ACCESS		EAB AIR		3					
SHIP	TEMP	FULL	EMPTY	OPEN		SHIP		4					
				SECURED		TEMP		5					
FIRE FIGHTING		COMMUNICATION		BILGE ALARMS				SSO					
SHIP	TEMP	SHIP	TEMP	SHIP		TEMP		SF SSC REP					
								NSRO REP					
INTERNAL TANKS		ACTUAL	CAPACITY	AUTHORIZED CHANGE		DRAFT CHANGES POSITIVE=INCREASE			INCHES				
									FWD	AFT			
FWD TRIM TANK						Ship's N Draft							
AUX 1						Total Draft Changes							
AUX 2						Actual Draft							
AUX 3						Maximum Calculated Draft							
AUX 4						Location of Safety Draft Marks							
AFT TRIM TANK													
RFT #1													
RFT #2													
PW #1													
PW #2													
NOTES:								SSC APPROVAL					
								SSO SIGNATURE & DATE					
								SF SSC REP SIGNATURE & DATE					
								NSRO REP SIGNATURE & DATE					
DISTRIBUTION: CASCON, SDO, EDO, SFM, NSRO, CTE-N/W/HM&E, APS-NUC/NN, 246 WCT, SSM, Ship's CO													

SHIP PLAN OF THE DAY	Ship/Hull Number (688 Class)		
	NO.	CHG	EFFECTIVE DATES

4-10

Shop/Code Document	HIGH RISK EVOLUTIONS	REMARKS	DRAFT CHANGES: FT-IN	
			FWD	AFT
Shop/Code Document	SAFETY OF SHIP WORK:	REMARKS	DRAFT CHANGES: FT-IN	
			FWD	AFT
Shop/Code Document	SAFETY OF SHIP TESTS:	REMARKS	DRAFT CHANGES: FT-IN	
			FWD	AFT
Shop/Code Document	HULL PENETRATIONS BELOW WATERLINE THAT VIOLATE DOUBLE CLOSURE.	REMARKS		
Shop/Code Document	HULL PENETRATIONS ABOVE WATERLINE THAT VIOLATE SINGLE CLOSURE.	REMARKS		
Shop/Code Document	HULL PENETRATIONS GREATER THAN 4 FEET ABOVE WATERLINE, NOT AS BUILT.	REMARKS		

SHIP PLAN OF THE DAY	Ship/Hull Number (688 Class)		
	NO.	CHG	EFFECTIVE DATES

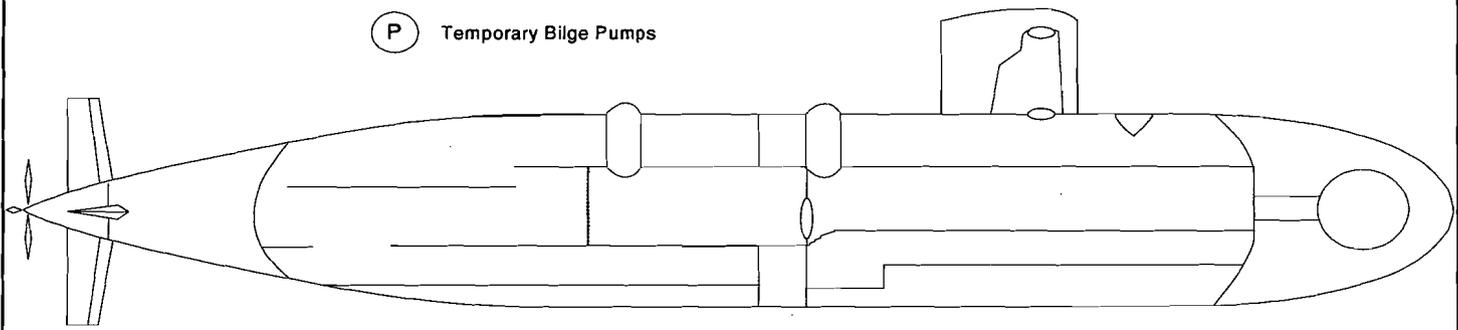
4-11

Shop/Code Document	TOPSIDE HATCHES (CAPABLE OF 3 MINUTE CLOSURE OR PROTECTED TO N+4').	REMARKS
Shop/Code Document	HULL ACCESS OPENINGS PROTECTED TO N+4'.	REMARKS
Shop/Code Document	WATERTIGHT DOORS (CAPABLE OF 3 MINUTE CLOSURE).	REMARKS
Shop/Code Document	BULKHEADS (Ventilation Valves capable of being shut/blanked, other unattended openings blanked).	REMARKS
Shop/Code Document	SHIP INTERIOR.	REMARKS

SHIP PLAN OF THE DAY	Ship/Hull Number (688 Class)		
	NO.	CHG	EFFECTIVE DATES

Location of Temporary Pumps, and/or Emergency Communications, Lighting and Alarms with Operating Switches/Power Panel

- F Fire/Flood Alarm Stations w/ sound powered phones (locations described below)
- F
E Temporary Fire Fighting Station
- S
W Operating Switch/Power Panel
- P Temporary Bilge Pumps



CHAPTER IV**ATTACHMENT (2): Sample SSW Logs with Instructions for Use****1. GENERAL**

- The requirements of this attachment are applicable to all nuclear submarines undergoing CNO availabilities except SRAs, at shipyards. The SSW Logs may be extended to SRAs as determined by the SSC. SSW Logs for other class submarines, similar in format, meeting at least the minimum requirements of this attachment, shall be prepared by the Shipyard. The Ship Safety Logs will be maintained by a qualified Ship Safety Watch (SSW) and will constitute an independent official Ship's Force record during the period of the Ship's availability. Ship Safety Logs are taken during the entire availability (including during Condition II in the Propulsion Plant), until Fast Cruise. Ship Safety Logs for new construction shall be issued/expanded by the SSC at the appropriate times as the ship construction proceeds.

2. RESPONSIBILITIES**2.1 Commanding Officer.**

2.1.1 Ensures the Ship Safety Logs, or customized SSW Logs developed by the Shipyard, are used on his ship. These logs constitute an official Ship's Force record during the period of the availability and shall be maintained by qualified SSW personnel.

2.1.2 Ensures Ship's Force watch standers understand the importance of Standard Naval Log Keeping practices, including the importance of log review for trends/anomalies, especially during watch relief.

2.1.3 Ensures SSWs attend and pass the Shipyard's SSW training as well as determining any additional training, experience and qualification requirements prior to certification to stand SSW.

2.2 Ship Safety Watch (SSW) – Ship's Force - Immediately report any abnormal conditions that could affect ship safety to the Ship's Duty Officer (SDO) and/or Engineering Duty Officer (EDO). The SDO will immediately report the abnormal condition to the SSO or SSS. The functions of the SSW shall normally be carried out by the Ship's duty section as directed by the Ship's Commanding Officer per his responsibilities specified in Navy Regulations. Specific mandatory duties and responsibilities include the following:

2.2.1 Maintain a continuous patrol (at least once every hour) of the ship, topside and below decks (Forward and Aft) and the areas adjacent thereto.

2.2.2 Maintain the Ship Safety Logs per this attachment.

2.2.3 Note and report all violations of prescribed procedures or other abnormalities pertaining to ship safety, security, and watertight integrity. Enter the reason for unsatisfactory reading(s) on logs and the corrective action taken. Particular attention shall be given to the following:

- a. Evidence of smoke, fire or abnormal temperatures.
- b. Leaks in ship or temporary service systems (air, oil, steam, water).
- c. Abnormal collection of water or oil in bilges.

- d. Abnormal odors such as fuel, oil, gas, etc.
- e. Door, hatch and passageway clearance, including quick-disconnects on cables, hoses or lines, where required.
- f. Operability of bilge pumps. (Power available, hoses properly stowed and routed)
- g. Strange looking boxes, packages.
- h. Abnormal noises.
- i. Housekeeping, including accumulation of trash.
- j. Proper protection of ship's equipment from damage by work in progress.
- k. Proper utilization of fire watches during hot work.
- l. Fire extinguishers properly located, with up-to-date weight inspection record (once each shift). (Ship's Force permanent or replacement fire extinguishers only).
- m. Record testing of the Ship's AN/WIC and/or CASCON announcing system daily.
- n. Access/Egress board of reference (e) properly updated. Ensure these boards are properly updated immediately upon change in status of any entry/exit point, including the securing of topside areas.
- o. CASCON remote stations operable and readily accessible.
- p. Exit routes adequately identified and passageways unobstructed for emergency egress.
- q. Verify proper security clearance/badges for personnel on board.
- r. Designated security locks in place.
- s. Status of battery ventilation. (Not applicable to ships that have a SVRLA battery.)
- t. Ship properly moored.
- u. Air bubbles below the waterline.
- v. Brows secured safely.
- w. Main Ballast Tank vent covers properly positioned with no audible leaks.
- x. Sonar dome security.

y. Hoses or welding/electrical leads in the water.

z. When waterborne - fore draft, aft drafts and list. Each draft reading will be compared with the Safety Draft Mark (SDM) locations and the Maximum Calculated Draft (MCD) as specified by the current Ship Plan of the Day (SPOD). The MCD is the maximum trigger-point for notifying the SDO and/or Duty Chief. If the MCD is exceeded, there is a problem, regardless of how far the SDMs are from the actual waterline. (Ship's COs require notification of ANY unexpected change to draft, trim or list, as invoked by SUBFOR CO Standing Orders.) Ensure Topside Ship Safety Watch Log (Ship Waterborne Section) is properly updated/verified immediately upon issue of a new/revised SPOD, i.e., SDMs, cofferdam and hull blank information, etc.

aa. When waterborne - condition of cofferdams and temporary hull blanks listed on the current SPOD and the condition of watertight doors.

bb. When waterborne - tank levels of those tanks whose capacity exceeds 10 tons (30 tons for TRIDENT class) and are not isolated and danger tagged. Ensure the Duty Officer is notified immediately of any out-of-specification tank level reading.

cc. Proper installation of safety lines and devices to prevent personnel from falling overboard.

dd. Personnel injury and hazards.

ee. Equipment damage and/or missing equipment protection.

ff. Bilge temperatures and adequacy of freeze protection systems (where applicable).

2.2.4 In case of fire or flooding, the SSW detecting the casualty shall immediately sound the installed alarm to initiate reporting the casualty to Shipyard emergency units (CASCON Station, fire station, etc.) and the SDO. After reporting the emergency condition, the SSW shall, to the extent possible, take action to control or limit the spread of fire and/or flooding.

2.2.5 Immediately report all other hazardous conditions to the SDO. The SDO will report the hazardous condition to the SSO or SSS.

2.2.6 If the Actual Draft reaches the MCD (or earlier as required by Ship's CO Standing Orders), the SSW shall notify the SDO and/or Duty Chief.

2.2.7 The SDMs should not be allowed to touch the water; corrective actions should be taken before this happens.

2.3 Ship Safety Watch (SSW) – Shipyard, Assigned to Inactivations

2.3.1 All the duties and responsibilities of the Shipyard SSW are the same as listed for the Ship's Force SSW, except as follows:

a. The Shipyard SSW, on an inactivation availability, shall immediately report any problem to the SSO or SSS.

b. The Shipyard SSW shall be trained on the unique features of the inactivation ship safety systems/logs, as part of the Shipyard SSW training program.

c. The Shipyard SSW Log shall be tailored to the unique requirements of the inactivation by the SSO.

d. The Shipyard shall determine additional training, experience and qualification requirements prior to certification to stand SSW.

2.4 Ship Safety Officer (SSO). Ensures personnel within the Ship Safety organization monitor at least daily, the Ship Safety Logs for the ship, maintain contact with SSW personnel, and takes/initiates appropriate action to resolve hazards/discrepancies noted or reported. The SSO/SSS shall initial next to the time for which the review took place.

2.5 Ship Safety Council (SSC). Any problems with the information requested on the logs will be reviewed by the SSC. Deviations to the logs may be approved by the SSC, on the MASTER SSW Log(s), as long as the minimum recording requirements of this attachment are not violated.

SHIP SAFETY WATCH LOG (SHIP WATERBORNE)

(TOPSIDE) (SSN/SSBN/SSGN)

SHIP

DATE

TIME	DO/DCPO INITIAL (A) SAT/UNSAT	FIRE FIGHTING EQUIP STATUS (B) SAT/UNSAT	TOPSIDE SAFETY (C) SAT/UNSAT	CONDITION OF HOSES/LEADS (D) SAT/UNSAT	TOPSIDE CLEANLINESS (E) SAT/UNSAT	FIRE WATCHES STATIONED WHERE REQ'D (F) SAT/UNSAT	STATUS OF WATER-TIGHT HATCHES/Sonar Dome (F) SAT/UNSAT	SECURITY STATUS (G) SAT/UNSAT	TEST AND VERIFY SHIPS/CASCON PA SYSTEM (SAT/UNSAT)	ACTUAL DRAFT (FEET/ INCHES)		MAX CALCULATED DRAFT APPROVED ON SPOD (H)		LOCATION OF SAFETY DRAFT MARKER (FEET/ INCHES) (I)		MCD-AD		MBT VV AIR SUPPLY PRESSURE		COFFERDAMS AND TEMPORARY HULL BLANKS (J) SAT/UNSAT	MBT VENTS (K) SAT/UNSAT	NO AIR BUBBLES BELOW THE WATER-LINE SAT/UNSAT	
										FWD	AFT	FWD	AFT	FWD	AFT	FWD	AFT	FWD	AFT				
0000																							
0100																							
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LOG SAT OR UNSAT IN LOG. EXPLAIN IN REMARKS IF UNSAT.

NOTES:

- (A) DO/DCPO INITIAL TO INDICATE REVIEW OF LOGS.
- (B) FIRE HOSES INSTALLED ADJACENT TO HATCHES. FIRE EXTINGUISHERS TOPSIDE SECURED, SEALS UNBROKEN, WEIGHT CURRENT.
- (C) KICKBOARDS, NETTING, SAFETY LINES AND STAGING CORRECTLY PLACED. TOPSIDE LIGHTING ADEQUATE FOR WORK PASSAGE. BROWS SAFELY PLACED ON THE PIER, SHIP AND BARGES. NO OBSTRUCTIONS ON BROWS THAT ARE PROVIDING PERSONNEL ACCESS. MOORING LINES NOT IN WATER, UNUSED LINES STOWED.
- (D) NO LEAKS IN HOSES TOPSIDE, ALL HOSES AND LEADS PASSING THROUGH TOPSIDE HATCHES ARE SECURE AND PERSONNEL SAFETY AND EVACUATION CONSIDERATIONS ARE NOT JEOPARDIZED. NO HOSES OR WELDING / ELECTRICAL LEADS ARE IN THE WATER AND ALL HOSES AND LEADS PASSING THROUGH TOPSIDE HATCHES HAVE AUTHORIZED HATCH TAGS AND QUICK DISCONNECTS WHEN REQUIRED. HOSES AND LEADS ARE NOT PINCHED.

- (E) TOPSIDE AND FREE FLOOD CLEANLINESS / ACCESSABILITY WILL NOT HAMPER CASUALTY CONTROL OPERATIONS. CLEANLINESS / ACCESSABILITY CONDITIONS ARE NOT CREATING A FIRE HAZARD.
- (F) WATER TIGHT HATCH CLEARANCE AND CLEANLINESS WILL NOT HAMPER CASUALTY OPERATION OF HATCHES.
- (G) ACCESS TO SONAR DOME SECURED UNLESS WORK IS BEING DONE ON THE SONAR DOME. NO STRANGE BOXES, PACKAGES OR ABNORMAL NOISES ARE PRESENT.
- (H) MAX CALCULATED DRAFT TO BE COMPARED TO ACTUAL DRAFT. NOTIFY SSO IF ACTUAL DRAFT REACHES MCD.
- (I) RECORD THE LOCATION OF THE SAFETY DRAFT MARKER BY COMPARING THE LOWER EDGE OF THE SAFETY DRAFT MARKER TO THE SHIPS INSTALLED DRAFT MARKS.
- (J) COFFERDAMS SECURED, TEMPORARY HULL BLANKS WATER TIGHT.
- (K) MAIN BALLAST TANK COVERS POSITIONED IN ACCORDANCE WITH THE SPOD AND ONGOING WORK. TEMPORARY MAIN BALLAST TANK BLOW SYSTEM INSTALLATION SAT (IF INSTALLED).

4-17

ATTACHMENT (2): Sample SSW Log

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CHAPTER V

CONTROL OF WORK, TESTING AND SHIP CONDITIONS DURING OFF-SHIPYARD AVAILABILITIES

5.1 GENERAL

5.1.1 PURPOSE. The purpose of this chapter is to provide specific requirements for the control of work and testing on submarines which could affect ship safety, for areas other than the reactor plant, and for High Risk Evolutions, during CNO scheduled availabilities, as defined in Chapter 1, conducted off-shipyard (e.g., Selected Restricted Availabilities).

5.1.2 SCOPE. Provisions of this chapter extend some of the requirements contained in Chapters I through IV to CNO scheduled availabilities conducted off-shipyard. Only requirements specifically contained or referred to in this chapter are mandatory for off-shipyard CNO scheduled availabilities less than six month durations as defined in paragraph 5.1.1. For CNO scheduled availabilities conducted off-shipyard for durations greater than six months, all the controls required in the previous chapters are required. If the SRA is not conducted at the LMA's home shipyard, the availability is considered to be off-shipyard. Reactor plant work and testing requirements are specified in NAVSEA 0989-037-2000. Terms used are defined in Chapter I.

5.1.3 RESPONSIBILITIES. The responsibility for the safety of ships is stated in U.S. Navy Regulations, OPNAV instructions, NAVSEA instructions, and applicable Force regulations. This section delineates responsibilities of the Commanding Officer/Officer-in-Charge (hereafter referred to as the CO) and the Shipyard, regarding ship safety during CNO scheduled availabilities conducted outside a shipyard.

When shipyard personnel perform maintenance and repair work outside the Shipyard, controls are required to ensure the work is properly coordinated. When work is also being performed by other activities, such as Ship's Force and Industrial Maintenance Activities (IMAs), coordination between participating activities is more complex. Since it is neither practical nor necessary to transfer the entire organizational structure and practices which exist within the Shipyard, necessary controls shall be included in a written agreement(s) which defines functions, assignments and responsibilities of the various participating activities. The Shipyard shall be responsible to prepare and obtain the necessary concurrences to such an agreement. This agreement(s) shall be between the Ship, Shipyard (and SUPSHIP for private shipyard availabilities), and concurred in by other participating activities (e.g., Squadron and IMA).

5.2 ORGANIZATIONAL REQUIREMENTS AND PERSONNEL QUALIFICATIONS

5.2.1 SHIP'S FORCE. For ships in commission or in service, the Ship's CO is responsible for ship safety and inspection of work as prescribed by U.S. Navy Regulations, Submarine Force Regulations, Maintenance and Quality Assurance Manuals, and applicable OPNAV instructions. The Ship Safety Organization, as defined in paragraph 5.2.2 and formalized in the written agreement(s) of paragraph 5.1.3, will support this effort. Ship's Force shall operate all ship's equipment except when "transfer including operation" is specified on a WAF for a specified area/system. (Note: The Type Commander must approve the use of system transfers during off-yard CNO scheduled availabilities.) Ship's Force shall be notified by the Shipyard in advance of impending shipboard tests required to recertify shipyard work so that the ship can schedule personnel as required.

5.2.2 SHIP SAFETY ORGANIZATION. The Ship Safety Organization shall be in accordance with paragraph 2.2, with the following exceptions:

5.2.2.1. The Shipyard shall appoint a Ship Safety Officer (SSO) who will perform the duties of paragraphs 2.2.2.2.1 through 2.2.2.2.6. The SSO shall be qualified in accordance with paragraph 2.6.4.1 and designated in writing. An alternate SSO shall be designated in writing per paragraph 2.2.5.2. The alternate SSO is not required to be on site.

5.2.2.2. The Shipyard may appoint Ship Safety Superintendents (SSSs) as necessary. The SSO or the SSS, when appointed, is responsible for the duties and responsibilities specified in paragraphs 2.2.3.2.1 through 2.2.3.2.7.

5.2.2.3. Paragraph 2.2.4, Ship Safety Watches are not required. The topside and below decks watches fulfill this requirement in the normal performance of their duties.

5.2.2.4. The Ship Safety Council (SSC) defined in paragraph 2.2.5.2 will be expanded to include the TYCOM/ISIC Availability Coordinator whose duties are defined in reference (h). NSRO and SUPSHIPS are not required members of the SSC, but may be assigned.

5.2.2.5. The SSC will meet and issue a SPOD to authorize work and testing from implementation of the requirements of this manual until Fast Cruise.

5.2.2.6. Ship's Force will be responsible for all Fleet Maintenance Activity work and will sign the SPOD, described in paragraph 5.4.2, accordingly.

5.2.3 SHIP TEST ORGANIZATION. Reference (b) applies. Ship's Force, all Shipyards, AITs, FMAs and the CTE shall obtain approval via the SPOD prior to commencing any testing which affects ship conditions/ship safety, and prior to commencing any High Risk Evolution.

5.2.4 CENTRAL AVAILABILITY COORDINATION. The LMA will coordinate all significant work and testing during the availability.

5.2.5 RELATIONSHIP OF SHIPYARD PROJECT PERSONNEL. Relationships are as defined in Section 2.4.

5.2.6 SUMMARY OF ORGANIZATIONAL RELATIONSHIPS. Organizational relationships of personnel who have responsibility for ship testing, safety and watertight integrity are defined in paragraphs 5.2.1 through 5.2.5 and are shown in Figure 5.1. The dotted line implies the minimum relationship necessary for matters pertaining to ship safety and watertight integrity.

5.2.7 TRAINING AND QUALIFICATION REQUIREMENTS. Training and qualification requirements will be as outlined in Section 2.6.

5.3 PREVENTION AND CONTROL OF FLOODING

5.3.1 SHIP IN DRY DOCK. When the ship is in dry dock, Chapter 0872 of Navy Regulations requires the closing of all valves and other openings in the ship at the end of working hours when such closings are practicable. In situations where there is extensive disruption of watertight integrity, making daily closings of openings in the ship impracticable, it is prudent to protect the dry dock, rather than the ship, from inadvertent flooding. To this end, (floating and graving) dry docks shall be maintained in accordance with reference (h). The activity responsible for the dry dock shall produce and maintain procedures that shall be initiated as part of the response to destructive weather (see paragraph 3.1.5), dry dock flooding (electrical/mechanical/minor structural failure or human error during the entire in-dock period) or High Risk Evolutions that could affect ship safety.

5.3.2 SHIP WATERBORNE. Ship's Force and the Shipyard shall protect the ship against flooding. The primary means of controlling flooding on a submarine is to locate and secure the source. In parallel, the means of controlling progressive flooding is inter-compartment isolation. For CNO scheduled off-yard availabilities, ship safety requirements shall be the same for simulated waterborne conditions as for waterborne conditions. Controls for shipboard work and testing will be in accordance with section 3.3 while the ship is waterborne, except that the requirements of paragraphs 3.3.8.2 through 3.3.8.5 and 3.3.10 do not apply. The Shipyard shall provide the Maximum Calculated Draft as defined in paragraph 1.3 in the SPOD. SSO/SSS shall maintain the Safety Draft Marks required by paragraph 3.3.9. Paragraph 3.3.9 does not apply if the waterborne period is projected to be less than four weeks. The ship conditions, as listed in the current SPOD, shall be included in the Topside Log so the Topside Watch can report changes in draft, trim or list beyond the limits specified. Exceptions to Section 3.3 requirements, other than paragraphs 3.3.8.2 through 3.3.8.5, 3.3.9 and 3.3.10, as applicable, shall have prior specific approval of the SSC, with rationale, via the SPOD. For those CNO scheduled off-yard availabilities where a reference trim dive was not accomplished, the waterline shall be calculated by the Ship's Diving Officer.

SHIP SAFETY COUNCIL

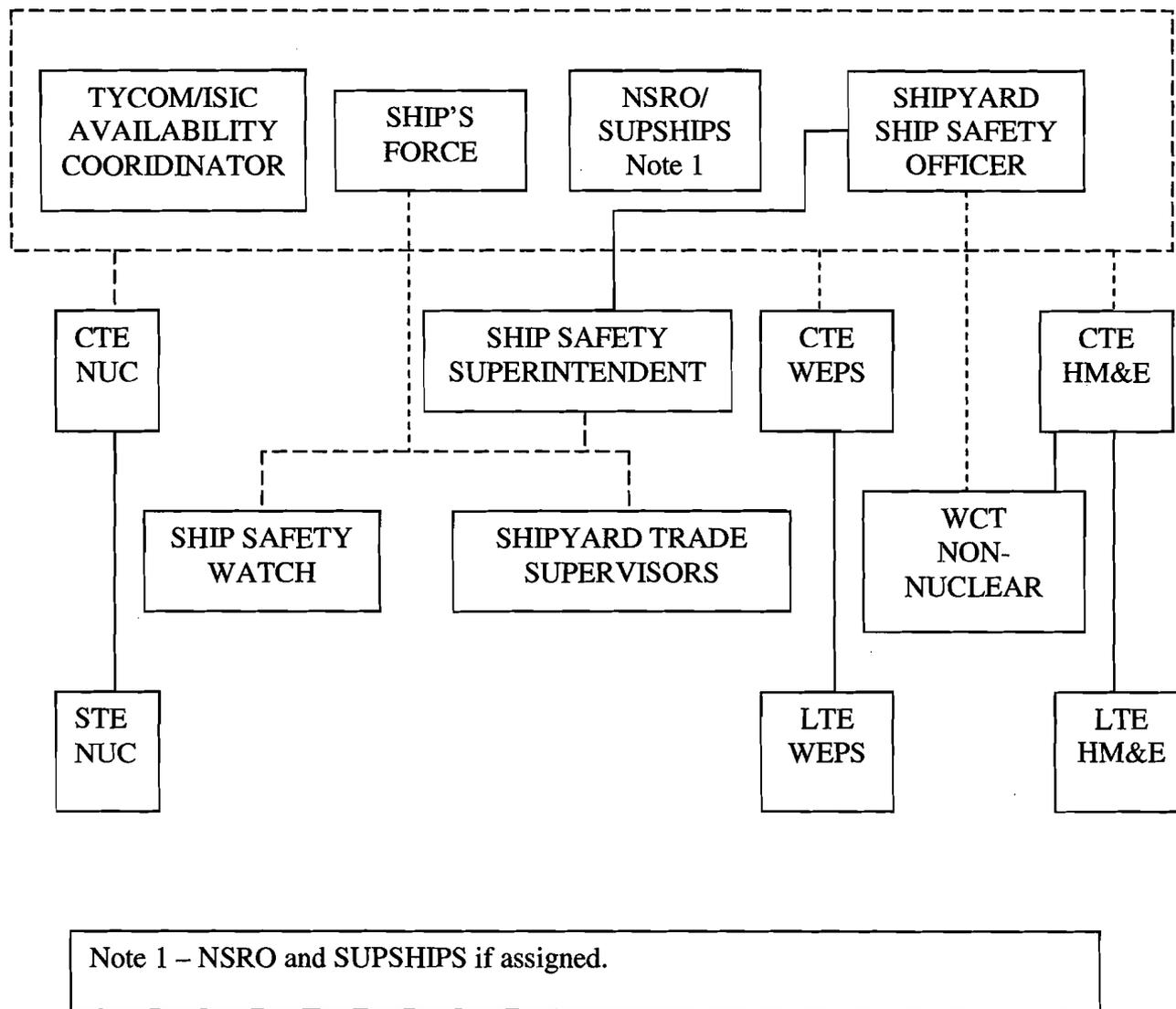


Figure 5.1 Ship Safety Interfaces
(Off-Shipyard Availabilities)

5.4 DOCUMENTS AND PROCEDURES

The purpose of requiring the documents and procedures specified in this chapter is to provide a positive means of accounting for actions that shall be taken in preparation for, or in conjunction with, shipboard work and testing, to provide the minimum requisite degree of safety assurance. This list should not preclude shipyard initiative to cover other areas not specified herein.

5.4.1 PLAN OF THE DAY (POD). The LMA Coordinator shall prepare and issue a POD listing significant shipboard work and test items which are scheduled to be accomplished during the availability, utilizing input from the Shipyard, Ship's Force, IMA, dry dock and any other Outside Activities with authorized work or testing. The POD shall be in effect from the start of the availability until commencement of Fast Cruise.

5.4.2 SHIP PLAN OF THE DAY (SPOD). The SSO shall be responsible for the preparation, issue and maintenance of the SPOD utilizing input via the WAF/TWD from nuclear and non-nuclear shipyard organizations, Ship's Force, IMA, Squadron and other Outside Activities participating in the availability. The SSC shall convene from implementation of the requirements of this manual until Fast Cruise to issue and maintain a SPOD. The SSC shall review all work (by all activities) in progress and planned to start for inclusion on the SPOD. The review will take place at a time that is sufficient to allow the review to be completed and a new SPOD written and approved prior to undocking. The SPOD indicates the SSCs approval to proceed with the conduct of the specific evolutions as scheduled. The SSO must ensure the time spent in excepted conditions is minimized. Meetings of representatives from the activities involved in the availability shall be held as necessary to coordinate work and testing, propose changes and modifications to the SPOD, and improve communication among the various activities. The SPOD, with approved changes or modifications, shall be reviewed and signed by all members of the SSC. The SPOD shall include:

1. Ship conditions in effect for shipyard and Ship's Force work.
2. All evolutions that affect ship conditions.
3. Exceptions to requirements of Section 5.3.
4. High Risk Evolutions listed in paragraph 4.5.
5. MCD for authorized evolutions, for both forward and aft, per paragraph 3.3.7 calculations.

5.4.3 WORK AUTHORIZATION. Same as specified by Section 4.3.

5.4.4 TAG-OUT PROCEDURES. All activities shall comply with the requirements of this manual and reference (d).

5.4.5 TEST REQUIREMENTS. Same as specified by paragraph 4.4.

5.4.6 PREREQUISITE LISTS FOR HIGH RISK EVOLUTIONS. Prerequisite Lists for High Risk Evolutions shall be prepared by the activity with authorized responsibility for accomplishing the evolution. Prerequisite Lists shall include steps to ensure the degree of ship safety and watertight integrity specified elsewhere in this Chapter. Prerequisite Lists may be derived from any official shipyard or Submarine Force directive. Prerequisite Lists shall be signed by all activities supporting the evolution. The activity signature indicates that the status of all work and systems under its cognizance will support the specified evolution. Prerequisite Lists shall be approved by the SSC and these evolutions scheduled on the SPOD. High Risk Evolutions are defined in paragraph 4.5. It is recognized that not all of the evolutions listed in paragraph 4.5 will be executed in a particular CNO scheduled off-shipyard availability. Only those evolutions that are applicable to the availability in progress are covered under the provisions of this paragraph.

CHAPTER VI

CONTROL OF WORK, TESTING AND SHIP CONDITIONS ON DECOMMISSIONED SUBMARINES

6.1 GENERAL

6.1.1 PURPOSE. This chapter establishes requirements for the control of work and testing which could affect ship safety of decommissioned submarines during inactivation, storage following inactivation, and/or recycling availabilities, except as noted.

6.1.2 SCOPE. This chapter applies to all work and testing which could affect ship safety on decommissioned submarines. The requirements of this manual, when invoked by the work package, are mandatory. This chapter is an adaptation of the requirements of Chapters I through IV to provide the appropriate measures to control ship safety on decommissioned submarines during inactivation, storage following inactivation, and/or recycling availabilities. The requirements of Chapters I through IV shall apply to decommissioned submarines only as specified in this chapter. This chapter does not apply to work performed during inactivation prior to decommissioning which is governed by Chapters I through IV of this manual. This chapter does not apply to work performed during Reactor Compartment Disposal (RCD) or ship recycling availabilities in dry dock if the ship will not be re-floated. Reference (m) and local procedures (submitted to NAVSEA for information), specify requirements for RCD and ship recycling work in dry docks.

6.1.3 RESPONSIBILITIES. The responsibility for the safety of ships is stated in U.S. Navy Regulations, and NAVSEA Instructions. This chapter has been developed to assist the Shipyard Commander in carrying out responsibilities for work on decommissioned submarines. Following decommissioning, the Shipyard is solely responsible for ship safety, until turned-over to the tow officer-in-charge (if applicable), or until the ship is recycled.

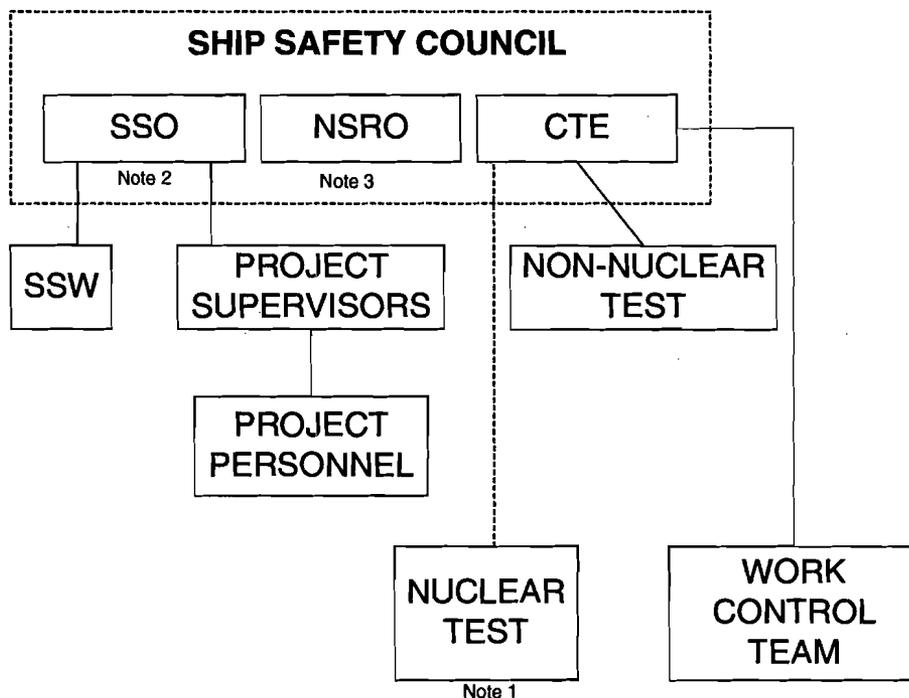
6.2 ORGANIZATIONAL REQUIREMENTS AND PERSONNEL QUALIFICATIONS

6.2.1 SHIP SAFETY OFFICER (SSO). An SSO, qualified on any class submarine, shall be assigned by the Operations Officer/Operations Manager in Private Shipyards, to decommissioned submarine(s) undergoing waterborne work and to decommissioned submarine(s) in dry dock that will be re-floated while in an inactivation/recycling availability. The SSO must have knowledge and understanding of all permanent or temporary systems used to maintain ship safety. The SSO may be assigned to more than one ship at the discretion of the Operations Officer/Operations Manager. The SSO shall be responsible for implementing the safety requirements of this manual on each assigned ship. Formal assignment of the SSO shall be per paragraph 2.2.2.1. Duties and responsibilities of the SSO are identified in paragraph 2.2.2.2.

6.2.2 SHIP SAFETY COUNCIL (SSC). Upon decommissioning, an SSC consisting of the SSO, CTE and a NSRO representative, if assigned, officially designated in writing, shall be established for each submarine that will undergo waterborne work or testing. The SSC may disband when the inactivation availability is complete and the ship is placed in waterborne storage, turned over to the tow officer-in-charge, or the ship is dry docked for recycling and will not be re-floated. Basic duties and responsibilities of the SSC are identified in paragraph 2.2.5.

6.2.3 SHIP SAFETY WATCH (SSW). At least one SSW is required whenever the submarine is waterborne and open for access. While waterborne and open for access, the SSW will patrol the ship topside and below decks and areas adjacent to the ship, at least once every four hours. While in dry dock, for submarines that will be re-floated, the SSW will conduct a below decks inspection at least once every four hours. The SSW will be assigned from shipyard personnel or from the assigned tow crew (if applicable). The SSW will be qualified in accordance with paragraph 2.6. Basic duties and responsibilities of the SSW are identified in paragraph 2.2.4. For storage following inactivation, and/or recycling availabilities, the SSW will be qualified in accordance with paragraph 2.6.4.3.1 Items 1-5,7,8 and 9.

6.2.4 SUMMARY OF ORGANIZATIONAL RELATIONSHIPS. The organizational relationships of personnel who have responsibility for ship safety are shown in Figure 6.1.



- Note 1: Matters other than reactor safety.
- Note 2: Reports directly to the Operations Officer/Manager on matters of ship safety.
- Note 3: When assigned in writing.

Figure 6.1. Ship Safety Interfaces (Decommissioned Ship)

6.3 PREVENTION AND CONTROL OF FIRE AND FLOODING

6.3.1 CASUALTY REPORTING AND RESPONSE

1. CASUALTY CONTROL (CASCON) STATION. A CASCON Station shall be located near and in sight of the ship, whenever the ship is open and shipboard work is being performed. The station may serve more than one ship provided individual ship information is clearly identified. This station shall be equipped with all facilities necessary to report a fire or flooding and shall include, but not be limited to the following:

- a. Voice communications between the CASCON station and remote CASCON stations.
- b. Means of identifying which alarm box is reporting a casualty.
- c. Means of initiating alarms to the Shipyard fire department.
- d. Simplified ship drawings showing compartments and access.
- e. Direct control of, or communications with, those persons who have control of the ship fire alarm, hot work alarm and evacuate ship alarm systems.
- f. Copy of the current SPOD.
- g. A current file of shipyard safety directives and casualty control procedures.
- h. A public address system microphone with the capability of transmitting announcements to all topside and interior parts of the ship. The communication system shall be tested daily whenever the ship is open and shipboard work is being performed.

2. ALARMS. Alarm systems shall be provided for reporting fires and flooding, for warning personnel to cease hot work, and for evacuating the ship. Alarm boxes shall be properly marked and designated with indicator lights. Each box on the circuit shall produce a clear and distinctive audible signal that can be heard above ship work noise throughout the ship, and in the CASCON station. Each alarm box shall also produce a visible signal. Alarm boxes shall be located in each compartment so that the maximum travel distance to an alarm box from any point on the ship is not more than fifty (50) feet. After sounding the alarm, the public address system located in the CASCON station shall be used to indicate the nature of the emergency and to provide follow-up instructions.

3. EGRESS. Brows, gangways or ramps from ship-to-shore or ship-to-dry dockside, shall be provided in sufficient number to permit the rapid egress, under emergency conditions, of all persons aboard. At least two separate means of egress from the ship, and at two different locations on the ship, shall be maintained. Routes of escape leading to exits shall be clearly marked and illuminated.

4. LIGHTING. Temporary lighting shall be provided throughout the ship to provide illumination for safe personnel egress and inspection of bilge areas. Emergency lighting will also be installed to provide safe egress in the event of a power failure.

6.3.2 FIRE PREVENTION AND CONTROL. Carbon dioxide (CO₂) fire extinguishers of 15-pound capacity or water or Aqueous Film Forming Foam (AFFF) fire extinguishers of 2-1/2 gallon capacity, shall be installed so that the maximum travel distance to a fire extinguisher from any interior point on the ship is not more than fifty (50) feet. The Shipyard shall have a procedure for inspecting and maintaining CO₂ fire extinguishers in accordance with current NAVSEA directives. Hot work fire protection requirements shall be in accordance with reference (n).

6.3.3 FLOODING PREVENTION AND CONTROL. The requirements of Chapter III of this instruction shall be invoked for decommissioned submarines undergoing waterborne work or testing, as modified below. Any exceptions to the requirements of Chapter III not listed below shall have prior approval of the SSC and be listed on the SPOD with an explanation.

1. FLOODING ALARMS. For decommissioned ships being prepared for at-sea tow, flooding alarms in accordance with reference (o) series shall be installed and operational whenever the ship is waterborne or in a simulated waterborne condition. For decommissioned ships that will not be towed, flooding alarms in accordance with reference (p), shall be installed and operational whenever the ship is waterborne or in a simulated waterborne condition.

2. HULL PENETRATIONS/OPENINGS BELOW THE WATERLINE. Whenever waterborne or in a simulated waterborne condition, hull penetrations/openings below the waterline shall be in one of the following conditions:

- a. Hull penetrations/openings below the waterline on submarines being prepared for at-sea tow shall be blanked in accordance with the requirements of reference (o). This is also satisfactory for waterborne storage following tow completion.
- b. Hull penetrations/openings below the waterline on submarines being prepared for long-term storage shall be blanked in accordance with the requirements of reference (p).
- c. Hull penetrations/openings below the waterline on submarines not covered by subparagraphs a or b that will have waterborne work performed prior to final dry-docking for recycling shall have double closure established by a single blank and a locked shut and tagged hull valve, or by double blanks.

Hull penetrations/openings below the waterline shall be considered satisfactorily blanked upon successful completion of testing in accordance with NAVSEA Drawing 126-5792666 series. Positive control shall be exercised by the Shipyard to maintain the above closure requirements until the ship is in dry dock for ultimate recycling with the dry dock dry.

3. MAIN BALLAST TANKS. Whenever waterborne or in a simulated waterborne condition, the condition of the Main Ballast Tanks (MBTs) shall be listed on the SPOD and be in one of the following conditions:

a. All tank flood louvers and vents weld blanked as required in NAVSEAINST 4740.9 series, or

b. All tank flood louvers weld blanked and all vent valves or vent valve openings securely blanked.

4. INTERIOR TANKS. Adding or removing weight to an interior tank greater than 10 tons in capacity (30 tons for TRIDENT Class) shall be approved by the SSC and listed on the SPOD.

5. INTERIOR WATERTIGHT BULKHEADS AND DOORS. Ships that are undergoing a recycling availability within the boundaries of one shipyard (i.e., not being prepared for tow or long term waterborne storage) do not need to maintain internal flooding boundaries. If internal flooding boundaries are not maintained and compartment air testing is not accomplished prior to undocking, a two-hour waiting period over the ship's docking cradle is required to verify lift-off list, trim and draft are as predicted and holding as required. Ships being prepared for tow should maintain compartment integrity in accordance with reference (o). Long-term waterborne storage requirements are specified in reference (p).

6. CHANGE OF TRIM, LIST OR DRAFT. The requirements of Section 3.3.7 shall apply to waterborne work on decommissioned submarines. The Engineering Division shall supply trim, list, stability and buoyancy data prior to undocking and whenever requested by the SSO. Condition "N" is not a factor in determining the Maximum Calculated Draft (waterline).

7. DRILLS. Flooding drills shall be conducted within 30 days prior to Undocking/Simulating Waterborne. Requirements for drills on submarines in long-term storage are specified in reference (p).

8. PUMPING. The dewatering system installed in each ship being prepared for tow in accordance with reference (o), shall be installed and operational whenever the ship is in a waterborne or simulated waterborne condition. For ships not being prepared for tow, whenever waterborne or in a simulated waterborne condition, each compartment, except the Reactor Compartment, shall be capable of being dewatered at a rate in excess of 200 GPM within three minutes or at a rate of 1000 GPM within 15 minutes of the initiation of an alarm.

9. HULL PENETRATIONS/OPENINGS ABOVE THE WATERLINE. All hull openings less than four feet above the waterline shall be listed on the SPOD, and be provided with at least single closure by blanking or a locked shut and danger tagged valve, or be protected to at least four feet above the waterline by a cofferdam. Prior to accomplishing a hull cut waterborne near ballast tanks, the Engineering Division and the SSO shall inspect the site to ensure the cut lines are properly laid out.

10. SAFETY DRAFT MARK WARNING SYSTEM. A Safety Draft Mark warning system shall be in effect whenever the ship is in a waterborne or simulated waterborne condition.

11. UNDOCKING REPORTS. The requirements of Section 0872 of U.S. Navy Regulations and NSTM S9086-7G-STM-010, Chapter 997, shall be applied for the undocking of a decommissioned submarine. The Ship's Commanding Officer and Ship's Force duties and responsibilities listed in Section 0872 of U.S. Navy Regulations and NSTM S9086-7G-STM-010, Chapter 997, will be fulfilled by the SSO and shipyard personnel, respectively.

12. UNATTENDED WATERBORNE SUBMARINES. When no work is scheduled and a waterborne submarine is not attended by an SSW, all access points (hatches/hull cuts) shall be shut and locked, all unessential power to the interior of the submarine shall be secured and the fire and flooding alarms shall be operational to a central location within the Shipyard which provides continuous monitoring.

6.4 DOCUMENTS AND PROCEDURES FOR SHIP SAFETY ASSURANCE

6.4.1 SHIP PLAN OF THE DAY (SPOD). A SPOD, in accordance with Section 4.2.2, shall be in effect on any decommissioned submarine whenever work or testing will be conducted while waterborne or simulated waterborne during the availability, until all waterborne work is complete.

6.4.2 WORK AUTHORIZATION. The work authorization requirements of Chapter IV apply to decommissioned submarines except that for submarines that will not be towed, violations to watertight bulkhead integrity do not require a Safety of Ship WAF.

6.4.3 TAG-OUT PROCEDURES. Tag-outs are used to isolate systems and equipment to ensure ship safety is properly maintained and work and testing may be safely performed. All activities shall comply with the requirements of this manual and reference (d). Appendix C of reference (d) covers "Repair Activity Tag-outs" for use on decommissioned ships. Tag-outs for watertight integrity shall be concurred in by the SSO.

6.4.4 HIGH RISK EVOLUTIONS. High Risk Evolutions listed in paragraph 4.5 will be controlled in accordance with the requirements of paragraph 4.5.

6.4.5 SHIP SAFETY LOG. Ship Safety Logs will be used and maintained by the SSWs in accordance with Section 4.6. The periodicity for SSW patrols is specified for decommissioned ships in paragraph 6.2.3. The SSO, CTE or a SSS qualified Shipyard Duty Officer shall initial at least daily when ship is open for maintenance to indicate review of the patrol in accordance with the Shipyard periodicity requirement.

6.4.6 TROUBLE REPORTS. Trouble Reports for decommissioned submarine problems shall be prepared and handled using the same process required by Section 4.7.

6.4.7 AUDITS. Controls for work, testing and ship conditions on decommissioned ships shall be included in the local, SUPSHIP and NAVSEA audits required by Section 4.8.

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APPENDIX A**REQUIREMENTS FOR SUBMARINE NR-1**

1.1 PURPOSE. This appendix establishes requirements for the control of testing and ship conditions/ship safety during availabilities on Submarine NR-1. This appendix is an adaptation of the requirements of Chapter V to provide appropriate measures to control ship conditions on Submarine NR-1.

1.2 REQUIREMENTS. Control of testing and ship conditions on Submarine NR-1 maintenance availabilities shall be in accordance with the requirements of Chapter V as modified and clarified below:

1.2.1 General.

1. Submarine NR-1 shall be considered another "Class" submarine for the purposes of training and qualifications requirements (paragraph 2.6) for personnel assigned.
2. The SSC shall determine which evolutions unique to Submarine NR-1 are High Risk and invoke appropriate controls in accordance with paragraph 4.5.
3. Sonar Dome status is not applicable to Submarine NR-1.

1.2.2 Ship Waterborne.

1. All requirements applicable to weight changes of ten tons (paragraph 3.3.7) shall be replaced by one ton. The method of control of personnel entry and exit with respect to weight changes shall be documented and agreed to on the availability Memorandum of Agreement (MOA).
2. The bottom edge of the Safety Draft Marks (paragraph 3.3.9) shall be a maximum of six inches above the Maximum Calculated Draft specified on the SPOD, but no greater than twelve inches above the "Condition N" waterline.

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Ref: NAVSEAINST 4160.3A NAVSEA S0005-AA-GYD-030/TMMP

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

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