

JOINT FLEET MAINTENANCE MANUAL
VOLUME I
NEW CONSTRUCTION
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VOLUME I

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A&I	Alteration and Improvement
ACN	Advanced Change Notice
AEL	Allowance Equipage List
AOE	Fast Combat Support Ship
APL	Allowance Parts List
AT	Acceptance Trial
ATG	Afloat Training Group
AWP	Availability Work Package
BAWP	Baseline Availability Work Package
BDT	Builder's Dock Trial
BST	Builder's Sea Trial
BT	Builder's Trial
BUPERS	Bureau of Personnel
CAGE	Commercial and Government Entity
CASREP	Casualty Report
CD-ROM	Compact Disc Read Only Memory
CFE	Contractor Furnished Equipment
CHT	Collection, Holding and Transfer
CNO	Chief of Naval Operations
CO	Commanding Officer
COMFLTFORCOM	Commander, Fleet Forces Command
COMLANFLT	Commander, Atlantic Fleet
COMNAVSEASYSKOM	Commander, Naval Sea Systems Command
COMNAVSURFLANT	Commander Naval Surface Force Atlantic
COMPACFLT	Commander, Pacific Fleet
COMSUBDEVRON	Commander Submarine Development Squadron
COMSUBRON	Commander, Submarine Squadron
COMUSFLTFORCOM	Commander, United States Fleet Forces Command
COSAL	Coordinated Shipboard Allowance List
CPA	Carrier Planning Activity
CS/CCS	Command and Control Systems
CSCT	Combat Systems Certification Trial
CSMP	Current Ship's Maintenance Project
CT	Combined Trial
CVN	Nuclear-Powered Aircraft Carrier
CW	Continuous Wave
DDG	Guided Missile Destroyer
DIRSSP	Director, Strategic Systems Programs
DRA	Dead Reckoning Analyzer
DRAI	Dead Reckoning Analyzer Indicator
DRT	Dead Reckoning Tracer
EAB	Emergency Air Breathing
EDORM	Engineering Department Organization and Regulations Manual
EEBD	Emergency Escape Breathing Device

EGL	Equipment Guide List
EMBT	Emergency Main Ballast Tank
EOSS	Engineering Operational Sequencing System
EPM	Emergency Propulsion Motor
ESM	Electronic Warfare Support Measures
FBW SCS	Fly-By-Wire Ship Control System
FCT	Final Contract Trial
FDRMC	Forward Deployed Regional Maintenance Center
FIT	Fleet Introduction Team
FMA	Fleet Maintenance Activity
FMR	Field Modification Request
FOSAT	Fitting Out Supply Assistance Team
FRP	Fleet Readiness Plan
GFE	Government Furnished Equipment
GFI	Government Furnished Information
GMI	Guarantee Material Inspection
GPETE	General Purpose Electronic Test Equipment
HF	High Frequency
HMR	Headquarters Modification Request
IEM	Inactive Equipment Maintenance
IFF	Identification Friend or Foe
IMP	Incremental Maintenance Plan
INSURV	Inspection and Survey
ISE	Independent Ship Exercise
ISEA	In-Service Engineering Activity
ISIC	Immediate Superior in Command
JFMM	Joint Fleet Maintenance Manual
JFMMBOD	Joint Fleet Maintenance Manual Board of Directors
JSN	Job Sequence Number
LCPC	Life Cycle Planning Conference
LHD	Amphibious Assault Ship
LOA	Light-Off Assessment
LOEP	List of Effective Pages
LSD	Dock Landing Ship
MACHALT	Machinery Alteration
MARMC	Mid-Atlantic Regional Maintenance Center (same command as NSSA)
MBT	Main Ballast Tank
METCAL	Metrology and Calibration
MHC	Coastal Minehunter
MIP	Maintenance Index Page
MRC	Maintenance Requirement Card
MRMS	Maintenance Resources Management System
MSW	Main Seawater
MT	Magnetic Particle Testing
MT	Maintenance Team
MTR	Metrology and Calibration Technical Representative
NAVAIR	Naval Air Systems Command

NAVSEA	Naval Sea Systems Command
NAVSEA 08	Naval Sea Systems Command Nuclear Propulsion Directorate
NAVSEALOGCEN	Naval Sea Logistics Center
NAVSUP	Naval Supply Systems Command
NAWC	Naval Air Warfare Center
NJP	Non-judicial Punishment
NRMC	Navy Regional Maintenance Center
NSSA	Norfolk Ship Support Activity (same command as MARMC)
NSTM	Naval Ships' Technical Manual
NSWC	Naval Surface Warfare Center
NSWCCD	Naval Surface Warfare Center Carderock Division
NTP	Naval Telecommunication Procedures
O&MN	Operations and Maintenance, Navy
OCT	Operational Control Transfer
OIC	Officer In Charge
OPNAV	Office of Chief of Naval Operations
OPPE	Operational Propulsion Plant Examination
ORDALT	Ordnance Alteration
ORSE	Operational Reactor Safeguard Examination
OSI	Operating Space Item
OSS	Operational Sequencing System
PCO	Prospective Commanding Officer
PCU	Pre-Commissioning Unit
PDDI	Post Delivery Deficiency Item
PLAD	Plain Language Address Directory
PMS	Planned Maintenance System
POAM	Plan of Action and Milestones
PQS	Personnel Qualification Standard
PSA	Post Shakedown Availability
PSO	Prospective Supply Officer
QA	Quality Assurance
RDORM	Reactor Department Organization and Regulations Manual
RMC	Regional Maintenance Center
RSE	Reactor Safeguard Examination
RT	Radiographic Testing
SCN	Shipbuilding and Conversion, Navy
SDI	Ship Drawing Index
SDOSS	Sewage Disposal Operational Sequencing System
SHIPALT	Ship Alteration
SIB	Ship Information Book
SITREP	Situation Report
SME	Subject Matter Expert
SMMSO	Submarine Systems Monitoring Maintenance and Support Office
SNAP	Shipboard Nontactical Automated Data Processing Program
SOE	Submerged Operating Envelope
SORM	Ship Organization and Regulation Manual
SOSMRC	Senior Officer Ship Maintenance and Repair Course
SPALT	Strategic System Programs Alteration
SRD	Selected Record Drawing
SSBN	Nuclear-Powered Ballistic Missile Submarine
SSC	Space and Naval Warfare Systems Center

SSGN	Nuclear-Powered Guided Missile Submarine
SSM	Ship Systems Manual
SSN	Nuclear-Powered Attack Submarine
SRDRS	Submarine Rescue Diving Recompression System
SUBMEPP	Submarine Maintenance Engineering, Planning and Procurement Activity
SUBSAFE	Submarine Safety
SUPSHIP NN	Supervisor of Shipbuilding Newport News
SURFMEPP	Surface Maintenance Engineering Planning Program
SYSCOM	Systems Command
SWOS	Surface Warfare Officer School
TD	Test Depth
TDU	Trash Disposal Unit
TEMPEST	National Policy on the Control of Compromising Emanations (unclassified code name)
TFBR	Technical Feedback Report
TSC	Training Support Center
TSRA	Total Ship's Readiness Assessment
TVD	Technical Variance Documentation
TYCOM	Type Commander
UHF	Ultrahigh Frequency
UNSEARESCOM	Undersea Rescue Command
URO	Unrestricted Operations
USFF	United States Fleet Forces
USFFC	United States Fleet Forces Command
VLS	Vertical Launch System
VTI	Visual TEMPEST Inspection

APPENDIX D
GLOSSARY OF TERMS

<u>TERM</u>	<u>DEFINITION</u>
Alpha Trial	Builder's Propulsion Trial; Acceptance Trial for SSN Propulsion Plant; Initial Tightness Dive (SSN); Dive to Maximum Authorized Depth (Selected SSN platforms).
Acceptance Trials (AT)	Trials and material inspections conducted underway by the INSURV Board for ships constructed in a private industrial activity to determine suitability for acceptance of a ship by the Navy.
Accepting Authority	The officer designated by the Chief of Naval Operations (CNO) to accept a vessel for the Navy, normally NAVSEA.
Bravo Trial	Normally the initial Dive to Test Depth; Noise Trial (SSN); Weapons testing (Surface Combatants).
Builder's Trials (BT)	Evaluation trials and inspections conducted underway by the builder to assure the builder and the Navy that the ship is, or will be, ready for Acceptance Trials. These trials should be a comprehensive test of all ship's equipment and be similar in scope to Acceptance Trials. For Aircraft Carriers, this is the Acceptance Trial for the Nuclear Propulsion plant.
Charlie Trial	Combat Systems and retesting (SSN); Acceptance Trials (Surface Forces as applicable).
Combined Trials (CT)	Combined Trials are a combination of an Acceptance Trial with a Final Contract Trial. The INSURV Board normally conducts Combined Trials for nuclear powered submarines.
Common Assessment Procedures	Common assessment procedures are assessments that, to the maximum extent possible, are common across platforms and serve all users for assessments, inspections and certifications. Common assessment procedures are RCM applicable and effective maintenance procedures that can be properly and consistently executed. They deliver accurate assessment and measurement of, determine and document discrepancies to, and specify repairs required to restore satisfactory material condition. Common assessment procedures satisfy the needs of work definition, inspections and certifications in a common document used both across ship classes and by all activities. The two types of commonality invoked are common across functional use and common across platforms with similar systems and equipment.
Deep Dive	The first dive to maximum operating depth. This depth will not necessarily coincide with the design test depth of the hull. See definition of Maximum Operating Depth.
Delivery	The date the Navy accepts the ship from the shipbuilder. This requires a recommendation from the INSURV Board to accept/deliver the ship. Delivery of the ship is based on Acceptance Trials and satisfactory correction or resolution of deficiencies.
Dock Trial	Dock Trials are those ship trials conducted at the Industrial Activity to determine the ability of the ship, from a material standpoint, to conduct Sea Trials safely.

Executive Agent	A term used in Department of Defense and Service regulations to indicate a delegation of authority by a superior to a subordinate to act on behalf of the superior. An agreement between equals does not create an executive agent.
Fast Cruise	A period immediately prior to underway trials during which Ship's Force operates the ship for dockside training. Fast Cruise shall, as far as is practical, simulate at-sea operating conditions.
Final Contract Trials (FCT)	Trials that are conducted prior to the end of the guarantee period to determine if there are any defects, failures, or deterioration other than that due to normal wear and tear.
Fleet Introduction Team (FIT)	A team of personnel assembled to support a pre-commissioning crew by monitoring progress of construction and coordinating training and facilities. They provide administrative support in all facets of new construction.
Fleet Week	Top Management Attention (TMA) O-6 level panel meeting to discuss the Technical Ticklers, review action items, close issues where action is complete and refer issues to Top Management Issues that require Flag level action. Fleet Week is held twice a year, generally in October and April.
Guarantee Material Inspection (GMI)	A material inspection, conducted inport prior to Post Shakedown Availability (PSA) by a Trial Board prior to the end of the guarantee period when CNO has authorized a Combined Trial to determine if contractor responsible equipment has operated satisfactorily during the guarantee period. It shall include the opening and inspection of equipment designated by the Board together with the operation and visual inspection of equipment and the review of material maintenance records.
Guarantee Period (New Construction)	The period of time immediately following preliminary acceptance (delivery), normally eight or nine months (six months for nuclear powered ships), for which the industrial activity is responsible for the correction of deficiencies.
Guarantee Period (PSA)	The guarantee period following PSA varies with the type of contract. Historically, a "cost plus" type contract has had a guarantee period of six months and a "fixed price" type contract a period of 90 days. The Supervising Authority will advise at the time of PSA the guarantee that applies.
In-Service	Nuclear powered ships are assigned an active status of In-Service approximately two to four weeks (two to four months for aircraft carriers) prior to the commencement of Sea Trials and maintain this status until commissioning.
Industrial Activity	The activity responsible for accomplishing construction or repair of ships whether private or public. This includes Naval shipyards, private shipyards, shipbuilders, vendors, Naval Aviation Depots, Naval Ship Repair Facilities, and other Naval Repair/Technical Activities (i.e., Naval Underwater Weapons Center, Naval Ships Weapons Center, etc.).
Initial Dive	For purposes of seawater valve and system testing, as defined in NAVSEAINST C9094.2, the first dive to a depth not previously reached during the trials.
Initial Tightness Dive	First submergence (a submarine's Alpha Trial).

INSURV	Prior to the acceptance and delivery of a new ship, whether built by a private or a naval industrial activity, all machinery, electronics and weapons systems installed shall be subjected to acceptance trials to determine that the installations are capable of meeting performance specifications. Depending upon your platform these trials are referred to as either Acceptance Trials, Combined Trials or INSURV. This independent verification of the ship's readiness for acceptance and recommendation for fleet introduction is the responsibility of the President, Board of Inspection and Survey.
Lead Maintenance Activity	The single activity responsible for integrating all maintenance and modernization on U.S. Naval ships during any type of availability.
Maximum Operating Depth (Also Maximum Authorized Operating Depth)	The depth to the keel for a particular submarine which is authorized by Commander Submarine Forces Atlantic/Commander Submarine Forces Pacific upon the recommendation of NAVSEA, as the depth not to be exceeded in operations. This depth is normally the Test Depth but may be reduced in specific cases. The depth authorized may be less than, but in no case exceed, the depth recommended by NAVSEA.
Mid-Cycle	Intermediate meeting held between Fleet Weeks to discuss a limited number of Technical Ticklers and pending action items.
Moderate Speed	The range of speed that allows the submarine optimum recovery (as shown on applicable submerged operating envelope curves) if loss of stern plane control and/or flooding occurs. Normally 8-15 knots.
Naval Supervisory Authority/Supervisory Authority	The officer designated to represent the Navy Department at an industrial activity; normally a Supervisor of Shipbuilding (new construction), Regional Maintenance Center (Conversion and Repair), or the Commander of a Naval Shipyard.
Post Shakedown Availability (PSA)	An industrial activity availability following Final Contract Trials/Guarantee Material Inspection assigned to correct deficiencies found during the shakedown period or to accomplish other authorized improvements.
Reliability Centered Maintenance	A methodology to develop or revise a maintenance approach with the objective of maintaining the inherent reliability of the system or equipment, recognizing that changes in inherent reliability may be achieved only through design changes.
Technical Tickler	A "living document" submitted by the Commander, United States Fleet Forces Command Maintenance Officer to present the Fleet's top material readiness issues to COMNAVSEASYSCOM and Office of the Chief of Naval Operations Resource Sponsors and used subsequently to record and track their planned corrective action.
Test Depth (TD)	For the purpose of the proper method of measuring and specifying Test Depth, the following applies: Test Depth shall be measured to the bottom of the keel for all types of submarine operations. Builders trials and trials following major industrial activity availabilities greater than six months, shall be at a tolerance of plus zero (0), minus twenty (20) feet of Test Depth when specified. All other trials can be conducted at 95% to 100% of Test Depth to satisfy all the requirements specified for 100% Test Depth.
Top Management Issues (TMI)	Top Management Issues, flag level panel meeting to discuss those issues requiring identification or realignment of resources (funding or manpower), or flag level participation to resolve.

Valve Repair/Restoration/
Overhaul

- a. Repair. Any work done to improve the material condition or operation of the valve correcting deficient conditions such that the component may be returned to service, but which, in total does not meet the full intent of the applicable restoration/overhaul technical standard, is considered a repair.
- b. Restoration/Overhaul. All valve parts replaced or restored to the requirements of the applicable technical standard (e.g., the full intent of the restoration/overhaul technical standard is invoked).

Work

- a. Any action that actually or potentially changes (including disassembly for the purposes of inspection or repair) the approved configuration of any part, component or ship's system.
- b. Any action that removes or affects the ship's ability to operate ship's systems or components in accordance with ship's systems/operating manuals or reactor plant manuals.
- c. Any testing or inspections required to establish, maintain or reestablish certification.
- d. Any design, engineering, planning or configuration management functions that involve the final review and/or approval of technical information.

Examples of work include the following:

- 1. Action which disassembles or removes any part, component or ship's system.
- 2. Action specified in a Technical Work Document.
- 3. Any action that removes or affects the ship's ability to operate ship's systems or components in accordance with ship's systems manuals, operating manuals or reactor plant manuals, excluding tagout in accordance with the Tagout Users Manual, including but not limited to:
 - (a) Component or system tests.
 - (b) Intrusive inspections (such as breaking the plane of electrical panels requiring electrical safety).
 - (c) Valve line ups that alter the normal system line up not governed by operating procedures.
 - (d) Removing valve hand wheels, disconnecting of reach rods.

VOLUME I**CHAPTER 2****POLICIES AND RESPONSIBILITIES**REFERENCES.

- (a) OPNAVINST 4700.8 - Trials, Acceptance, Commissioning, Fitting Out, Shakedown, and Post Shakedown Availability of U.S. Naval Ships Undergoing Construction or Conversion
- (b) OPNAVINST 9080.3 - Procedures for Tests and Trials of Navy Nuclear Powered Ships Under Construction, Modernization, Conversion, Refueling and Overhaul
- (c) NAVSEA T9044-AD-MAN-010 - Requirements Manual for Submarine Fly-By-Wire Ship Control Systems
- (d) INSURVINST 4730.1 - Material Inspections (MI) of Surface Ships
- (e) INSURVINST 4730.2 - Trials and Material Inspections of Submarines
- (f) NAVSEA S0300-B2-MAN-010 - Supervisor of Shipbuilding, Conversion and Repair Operations Manual
- (g) NAVSEAINST 4790.8/OPNAVINST 4790.4 - Ships' Maintenance and Material Management (3-M) Manual
- (h) NAVSEAINST 4734.1 - NAVSEA Test, Measurement, and Diagnostic Equipment (TMDE) and Calibration Programs
- (i) NAVAIRINST 13640.1 - **NAVAL Aviation Metrology and Calibration (METCAL) Program**
- (j) COMNAVAIRLANT/COMNAVAIRPACINST 3500.20 - Aircraft Carrier Training and Readiness Manual
- (k) NAVSEAINST C9210.30 - Procedures for Administration of Nuclear Reactor Plant Preventive Maintenance and Tender Nuclear Support Facilities Preventive Maintenance on Ships
- (l) OPNAVINST C3000.5 - Operation of Naval Nuclear Powered Ships
- (m) COMNAVSUBFOR OPOD 2000
- (n) SSPINST 5600.11 - Preventive Maintenance Management Program for Strategic Weapon Systems Equipments and Associated Material
- (o) COMNAVSUBFORINST 5400.25 - Standard Submarine Supply Department Organization and Regulations Manual
- (p) COMNAVSUBFORINST 5400.29 - Standard Submarine Navigation/Operations Department Organization and Regulations Manual
- (q) COMNAVSUBFORINST 5400.40 - Standard Submarine Combat Systems Department Organization and Regulations Manual (SSN)
- (r) COMNAVSUBFORINST 5400.41 - Standard Submarine SSBN 726 Class Weapons Department Organization and Regulations Manual
- (s) COMNAVSUBFORINST 5400.47 - Standard Submarine Combat Systems Department Organization and Regulations Manual (SSGN)
- (t) COMNAVSURFLANT/COMNAVSURFPACINST 3502.2 - Surface Force Training Manual
- (u) OPNAVINST C9210.2 - Engineering Department Manual for Naval Nuclear Propulsion Plants
- (v) OPNAVINST 4790.15 - Aircraft Launch and Recovery Equipment Maintenance Program (ALREMP)
- (w) COMNAVSURFLANTINST 3540.18/COMNAVSURFPACINST 3540.13 - Engineering Department Organization and Regulations Manual (EDORM)
- (x) COMSUBFOR/COMSUBPACINST C5400.30 - Engineering Department Organization Manual
- (y) NAVSEAINST 5450.142 - Mission and Functions of the Surface Maintenance Engineering Planning Program Activity
- (z) COMNAVSURFLANTINST 4700.4 - Fleet Introduction Handbook

LISTING OF APPENDICES.

- A Message Scenario and Sample Messages/Letters for Habitability Inspections and In-Service
- B Message Scenario and Sample Messages for Fast Cruise and Alpha Sea Trial (Nuclear Powered Ships)
- C Message Scenario and Sample Messages for Bravo, Charlie and Combined Trials (Submarines)

- D Message Scenario and Sample Messages for URO Certification (Submarines)
- E Pre-RSE/RSE/Criticality/Power Range Testing Logic Table (All Nuclear Powered Ships)
- F Sample TYCOM Message Concerning Sea Trial Agenda (Submarines)
- G Sample TYCOM SRDRS Support Services Message (Submarines)
- H Sample TYCOM Message to PCU Concerning Use of the FBW SCS In Support of Alpha Sea Trials (Submarines)
- I Sample TYCOM Message to PCU Concerning FBW SCS Material Condition Initial Certification (Submarines)
- J Sample TYCOM Message to the Ship Concerning FBW SCS Certification (Submarines)
- K Sample Supervising Authority Message to NAVSEA Concerning PCU FBW SCS Material Condition Readiness for Fast Cruise and Alpha Sea Trials (Submarines)
- L Sample Supervising Authority Message to TYCOM and NAVSEA Concerning PCU Fast Cruise Completion and Readiness of FBW SCS Material Condition for Alpha Sea Trials (Submarines)
- M Sample Supervising Authority Message to NAVSEA Concerning PCU FBW SCS Material Condition Readiness Upon Completion of Alpha Sea Trials and Readiness of the FBW SCS for Use During Bravo and Subsequent Sea Trials (Submarines)
- N Sample Supervising Authority Message to NAVSEA Concerning PCU FBW SCS Material Condition Initial Certification (Submarines)
- O Pre Man-Up Checklist for TYCOM/ISIC
- P Basic Requirements for Initial Man-up Personnel of the PCU (Detachment Concept) (Aircraft Carriers and Surface Force Ships)
- Q Basic Requirements for Initial Man-up Personnel of the PCU
- R Generic Base Line of Fleet Introduction Team (FIT) Functions and Responsibilities
- S Sample NAVSEA Message to TYCOM Concerning PCU FBW SCS Material Condition Readiness for Alpha Sea Trials (Submarines)
- T Sample NAVSEA Message to TYCOM Concerning PCU FBW SCS Material Condition Initial Certification (Submarines)
- U Sample NAVSEA Message to TYCOM Concerning PCU Recommendation for Fly-By-Wire Ship Control System Certification

2.1 NAVY SHIPBUILDING PROGRAM MANAGERS. The various Naval Sea Systems Command (NAVSEA)/Program Executive Office for Carriers, Littoral Warfare and Auxiliary codes designated as Navy Shipbuilding Program Managers provide the specifications for the building and testing of all ships. These codes are initially established to get the shipbuilding program and development of logistic support programs up and running.

2.1.1 Pre-Commissioning. Navy Shipbuilding Program Manager responsibilities during the Pre-Commissioning phase of New Construction are delineated in references (a) and (b). The following is a summation of those responsibilities and is intended to be used as a guide, not to be considered all inclusive. Questions concerning a Navy Shipbuilding Program Manager's specific functions should be directed to the applicable NAVSEA code.

- a. Provide supervision and direction concerning all non-nuclear aspects of ship construction.
- b. Provide written instructions to the Supervising Authority regarding the conduct and scheduling of all non-nuclear ship testing.
- c. Generate the correspondence (message or letter traffic) as indicated in Appendix A of this chapter recommending the Habitability Inspection and In-Service dates.
- d. The assignment of deficiency responsibility and ensuring the correction of those deficiencies identified during Combined Trials (CT), Acceptance Trials (AT), Final Contract Trials (FCT) and Guarantee Material Inspections (GMI).
- e. Report to the Type Commander (TYCOM), with information copies to Chief of Naval Operations (CNO) and Fleet Commander, that the material condition of the ship is certified satisfactory for Alpha Sea Trials and recommend authorization to dive the ship be granted under deliberate and controlled conditions to a specified depth for accomplishment of the approved Sea Trials agenda. Appendix B of this chapter provides a sample message flowchart for surface force ships and aircraft carriers. Appendix B-SUBS of this chapter provides a sample message flowchart for submarines.

- f. (Submarines only) Report to the TYCOM that the material condition of the ship is certified satisfactory for Bravo, Charlie, and CTs. Appendix C of this chapter provides a sample message.
- g. (Submarines only) After completion of all Sea Trials, report to the TYCOM that the material condition of the ship is certified for Unrestricted Operations (URO). Appendix D of this chapter provides a sample message.

2.1.2 Post Shakedown Availability (Submarines only). Navy Shipbuilding Program Manager responsibilities during Post Shakedown Availability (PSA) are defined in Volume II, Part I, Chapter 3 of this manual.

2.2 NAVAL SEA SYSTEMS COMMAND NUCLEAR PROPULSION DIRECTORATE (NUCLEAR POWERED SHIPS ONLY).

2.2.1 Pre-Commissioning. NAVSEA Nuclear Propulsion Directorate (08) responsibilities for the Pre-Commissioning period are as follows:

- a. Provide specifications for the building and testing of the nuclear propulsion plant.
- b. Provide supervision and direction of nuclear propulsion plant testing and trials.
- c. Approve the sequencing and scheduling of nuclear propulsion plant tests and trials.
- d. Arrange for technical assistance from the U.S. Department of Energy, including the Pre-Critical Examination by the Director, Division of Naval Reactors.
- e. Provide written instructions to the Supervising Authority regarding the conduct and scheduling of all dockside tests and underway trials involving operation of the nuclear propulsion plant.
- f. Authorize critical operation of the reactor.
- g. Authorize commencement of Fast Cruise after receiving notification from the Supervising Authority that the ship has demonstrated a satisfactory state of training.

2.2.2 Reactor Safeguard Examination. A Pre-critical Reactor Safeguard Examination (RSE) will be conducted by NAVSEA 08 prior to initial reactor criticality. NAVSEA 08 will approve operation of the Nuclear Propulsion Plant during dockside testing and underway trials. Volume I, Chapter 3, Appendix C of this manual provides information on Pre-RSE preparations.

2.2.3 Criticality/Power Range Testing. Upon receiving the request for initial criticality from the Supervising Authority, NAVSEA 08 will authorize critical operation of the reactor, with subsequent power range testing. Appendix E of this chapter provides a listing of the events leading up to the authorization for critical operation of Naval Nuclear Propulsion plants, with sample request messages and/or letters.

2.2.4 Post Shakedown Availability. NAVSEA 08 responsibilities for the PSA period are as follows:

- a. Provide approved test procedures for the verification of reactor plant repairs and alterations accomplished in the availability.
- b. Arrange for technical assistance by the U.S. Department of Energy as required.

2.3 TYPE COMMANDER. Reference (a) states the TYCOM is responsible for monitoring the construction and acceptance process to ensure “customer” input is provided. Reference (c) describes the TYCOM’s responsibilities during new construction for Submarine Fly-By-Wire Ship Control Systems (FBW SCS). The following summarizes major TYCOM responsibilities during the Pre-Commissioning, FCT/GMI and PSA periods.

2.3.1 Pre-Commissioning. During the construction phase, major TYCOM responsibilities include but are not limited to:

- a. Designating an Immediate Superior in Command (ISIC) for all units being built within the TYCOM’s geographical area of responsibility.
- b. Ensuring that the Pre-Commissioning Unit (PCU) is placed on distribution for all message traffic applicable to the platform and platform’s operational environment.
- c. Reviewing all incoming correspondence for PCU applicability and forwarding platform related documentation as required.

- d. Conducting the Habitability Inspection when requested by the Accepting Authority (may be delegated to the ISIC). Sample messages relating to Habitability and In-Service are contained in Appendix A of this chapter.
- e. Recommending to the CNO that the ship be placed “In-Service Active” upon receiving satisfactory results of the Habitability Inspection. Appendix A of this chapter provides sample messages.
- f. (Nuclear Powered Ships only) Conducting or assisting the ISIC with the Pre-RSE.
- g. (Surface Force Ships only) Establishing Light-Off Assessment (LOA) dates via liaison with the ISIC, the Ship and the Afloat Training Group (ATG).
- h. Conducting or directing the conduct of the arrival assist and periodic monitoring inspections as defined in Volume I, Chapter 3, paragraph 3.3.1 and 3.3.2 of this manual.
- i. (Nuclear Powered Ships only) Conducting an inspection to certify crew training per the requirements of reference (b).
- j. (Nuclear Powered Ships only) Exercising operational control during underway trials either directly or through the designated ISIC.
- k. (Submarines only) Reviewing the schedule and sequence of Sea Trial Agendas and concurring by message to the Supervising Authority concerning the operational aspects of the specific trial. Appendix F of this chapter provides a sample message.
- l. (Submarines only) Providing escorts as may be required. Send Sea Trial support services message to specify Submarine Rescue Diving Recompression System “modified alert” requirements. Appendix G of this chapter provides a sample message.
- m. (Submarines only) Assigning an unrestricted Line Officer (a former Commanding Officer (CO) senior to the Officer In Charge (OIC)) as the TYCOM Embarked Representative who has authority to act for the TYCOM, making on-the-spot changes to approved Sea Trial Agendas.
- n. (Submarines only) If desired, assigning an officer to act as the TYCOM material representative on selected trials. The material representative’s duties include:
 - (1) Serving as a technical advisor to the TYCOM Embarked Representative on matters pertaining to Sea Trial Agenda modifications, compliance with this instruction and disposition of emergent material problems.
 - (2) Acting for the TYCOM in making on-the-spot changes to approved Sea Trial Agendas in the absence of the TYCOM Embarked Representative.
- o. (Submarines only) Reporting to the CNO and the Navy Shipbuilding Program Manager that the crew is ready for underway trials, prior to Fast Cruise and upon receipt of the ISIC message certifying the operational readiness of the submarine crew. Appendix B of this chapter reflects the message scenario and contains sample messages for Fast Cruise/Alpha Trials.
- p. (Submarines only) Promulgating of the Alpha Sea Trial Depth Authorization upon receipt of the Supervising Authority message reporting completion of Fast Cruise and the Navy Shipbuilding Program Manager message promulgating the authorized depth for the Alpha Trial. Appendix B of this chapter provides sample messages.

NOTE: SUBSEQUENT TO THE NAVY SHIPBUILDING PROGRAM MANAGER AND SUPERVISING AUTHORITY MESSAGES PROMULGATING DEPTH AUTHORIZATION AND REPORTING THE SHIP’S MATERIAL READINESS TO COMMENCE FAST CRUISE AND SEA TRIALS, ANY DEFICIENCY DISCOVERED AND CORRECTIVE ACTION TAKEN WHICH AFFECTS THE WATERTIGHT INTEGRITY, THE RECOVERABILITY OF THE SHIP, THE OPERATIONS OF THE SHIP’S CONTROL SURFACES OR THE SHIP’S SALVAGE CAPABILITY SHALL BE REPORTED TO THE NAVY SHIPBUILDING PROGRAM MANAGER, THE TYCOM AND FLEET COMMANDER BY THE SUPERVISING AUTHORITY/ISIC/TYCOM REPRESENTATIVE AND PCU BY MESSAGE. PREVIOUS CERTIFICATION MESSAGES SHALL BE SUSPENDED. WHEN THE NAVY

SHIPBUILDING PROGRAM MANAGER'S REVIEW OF THE MESSAGE IS COMPLETED, THE NAVY SHIPBUILDING PROGRAM MANAGER WILL CERTIFY TO THE TYCOM THAT THE MATERIAL CONDITION OF THE SHIP IS SATISFACTORY FOR SEA TRIALS TO A SPECIFIED DEPTH.

- q. (Submarines only) Promulgating by message the Bravo, Charlie and Combined Trials Depth Authorization after receipt of the Supervising Authority message confirming readiness for the test depth dive and the Navy Shipbuilding Program Manager message promulgating Sea Trial Depth Authorization. Appendix C of this chapter provides sample messages.
- r. (Submarines only) Promulgating by message to the PCU the final URO Material Certification upon receipt of the Supervising Authority message concerning material condition for URO and the Navy Shipbuilding Program Manager message recommending URO. Appendix D of this chapter provides sample messages.
- s. (Applicable Submarines only) Prior to Alpha Sea Trials and following NAVSEA certification that the submarine FBW SCS is satisfactory for sea trials and Supervising Authority report that the FBW SCS is satisfactory for commencement of Alpha Sea Trials, report by message to ship authorizing conduct of sea trials in accordance with the approved Sea Trial Agenda and specifically identify any operating restrictions of the ship and/or system. Repeat the routine for each subsequent sea trial. Appendix H of this chapter provides a sample message.
- t. (Applicable Submarines only) After all builder's sea trials, and following NAVSEA certification that the submarine FBW SCS is satisfactory for unrestricted use, report by message to ship authorizing FBW SCS unrestricted use in support of submarine unrestricted operations or specifically identify any operating restrictions of the ship and/or system. Appendix I of this chapter provides a sample message.

2.3.2 Combined Trials/Acceptance Trials/Final Contract Trials/Guarantee Material Inspection. The TYCOM's responsibilities for these trials are documented in references (a), (d), and (e). The most significant action from the ship's perspective is the TYCOM's presenting of the ship for GMI or FCT.

2.3.3 Post Shakedown Availability. The TYCOM's responsibilities as related to PSA are as follows:

- a. (Surface Force Ships only) Assist with LOA as shown in Volume I, Chapter 6, Appendix C.
- b. (Nuclear Powered Ships only) Conduct or assist the ISIC in conducting the Pre-Critical Inspection (only required when reactor has been shut down greater than 16 weeks). Schedule the Fleet Commander Post-Overhaul RSE as recommended by the Industrial Activity in the Key Events Schedule and confirmed by the parent ISIC/TYCOM representative (required if the availability is scheduled for more than six months) upon completion of the ISIC's Pre-Critical Inspection.
- c. (Submarines only) TYCOM responsibilities are defined in Volume II, Part I, Chapter 3 of this manual.
- d. (Applicable Submarines only) For the first ship of a class or when directed by NAVSEA, ship control trials are planned and conducted under the direction of NAVSEA 05 to support verification that the FBW SCS automatic control algorithms performance is in accordance with Section 4 of reference (c). Upon successful completion of these trials, the Navy Shipbuilding Program Manager issues to TYCOM, the ship's final FBW SCS certification message with NAVSEA 07 concurrence and in support of the submarine class FBW SCS design. TYCOM issues to the ship a final FBW SCS certification message. When required, by message or letter, the NAVSEA Navy Shipbuilding Program Manager via separate correspondence shall identify impact to the FBW SCS Certification of other ships in the submarine class. Appendix J of this chapter provides a sample message

2.4 SUPERVISING AUTHORITY. References (a), (b), (c) and (f) describe the Supervising Authority's responsibilities during new construction. The following is a synopsis of those functions with additional amplification. Platform unique functions are identified by indicating the applicable class (if any) or group covered (i.e., Nuclear Powered Ships).

2.4.1 Pre-Commissioning. The Supervising Authority's responsibilities as related to Pre-Commissioning are as follows:

- a. Provide crew support as directed by the Navy Shipbuilding Program Manager. This support may include facility support requirements such as berthing, administration, officer and crew training spaces, vehicles for transportation, computers for development of training programs and ship's directives.
- b. Ensure PCU office spaces have been certified to the appropriate classification for storage of classified documentation.
- c. Provide the required safety training and gear to the crew for working in an industrial area.
- d. Provide initial briefing to Prospective Commanding Officer (PCO)/crew to provide an overview of the Supervisor's role during construction.
- e. Provide to the PCO/crew the planning documents necessary for establishing goals during New Construction, such as a Master Construction Schedule, an Operational Control Transfer (OCT) schedule, Testing schedules, and all other schedules that would require crew support and coordination.
- f. Act as liaison for the ship in resolving conflicts in construction schedules.
- g. Ensure that at least ten copies of reference (g) are available to support Phase 1 and Phase 2 of the Planned Maintenance System (PMS) installation.
- h. Provide the PCU with at least one set of all the technical manuals required to support the equipment installed on the particular platform.
- i. Provide the PCU with, or access to a complete set of ship's drawings and contract specifications.
- j. Monitor the ship's familiarization training conducted by the Industrial Activity or Fleet Introduction Team (FIT) for fulfillment of the contract. For familiarization training conducted using computer-aided instruction, the Supervising Authority is responsible only for ensuring sufficient resources are available to the PCU to utilize the training. Provide feedback to the Navy Shipbuilding Program Manager and the Industrial Activity concerning content and value of this training.
- k. Recommend to the Navy Shipbuilding Program Manager the commencement date for the Habitability Inspection. Appendix A of this chapter provides sample documentation.
- l. Recommend to the Navy Shipbuilding Program Manager the date for placing the ship "In-Service". In-Service for submarines should occur approximately two to four weeks prior to underway trials and for aircraft carriers two to four months prior to underway trials. Appendix A of this chapter provides sample documentation.
- m. Recommend to the Accepting Authority the date for placing the ship "In Commission". The In Commission date is normally on or about the date of delivery.
- n. Request necessary services for each trial from the Fleet Commander in accordance with reference (a), with an information copy to the TYCOM.
- o. (Nuclear Powered Ships only) Accept custody of special nuclear material upon delivery from the U.S. Department of Energy.
- p. (Nuclear Powered Ships only) Transfer custody of, and responsibility for, special nuclear material to the OIC when the ship is placed "In-Service".
- q. (Nuclear Powered Ships only) Coordinate the schedule for dockside and underway tests and trials in accordance with the requirements of the Navy Shipbuilding Program Manager and the Builder.
- r. (Nuclear Powered Ships only) Provide sufficient time for crew training and Fast Cruise during the building period to permit Ship's Force to attain a state of training adequate to ensure proper operation and safety of the ship and its personnel during Sea Trials. Provide sufficient time for the correction of deficiencies after the completion of the final Dock Trials and before the start of the operational training period.
- s. (Nuclear Powered Ships only) Submit for approval the schedule and sequence of any dockside tests or Sea Trials involving operation of the nuclear propulsion plant to NAVSEA 08, except where such tests and trials have been approved in the written instructions provided by NAVSEA 08.

- t. (Submarines only) Coordinate with ISIC for support personnel to perform salvage inspection.
- u. (Nuclear Powered Ships only) Submit the schedule and sequence of all Sea Trials to the ISIC for approval and to the TYCOM for concurrence with the operational aspects of the trial.
- v. (Nuclear Powered Ships only) Report to the Navy Shipbuilding Program Manager when the ship is ready for Fast Cruise and Alpha Sea Trial (Builder's Trials for aircraft carriers). Appendix B of this chapter provides a sample message.
- w. (Nuclear Powered Ships only) Report the successful completion of Fast Cruise and readiness for Alpha Sea Trial (Builder's Trials for aircraft carriers), with the concurrence of the OIC, to the TYCOM, with an information copy to the Navy Shipbuilding Program Manager, the Fleet Commander and the ISIC. Appendix B of this chapter provides a sample message for submarines.
- x. (Nuclear Powered Ships only) Report to the Navy Shipbuilding Program Manager the satisfactory completion of Alpha Sea Trials (Builder's Trials for aircraft carriers). For submarines, the material status of the ship is certified to support operations to test depth. Appendix C of this chapter provides a sample message.
- y. (Submarines only) Certify to the Navy Shipbuilding Program Manager the completion of all Sea Trials, reporting the status of all Sea Trial deficiencies and all CAT 1A Audit Items. Certify the material condition of the ship is satisfactory for URO to test depth. Appendix D of this chapter provides a sample message.
- z. Retain responsibility for the material condition of the ship until it reports for duty in the fleet.
- aa. Maintain "Lessons Learned Logs" from the CO of previously built ship for delivery to the next PCO/OIC.
- ab. (Applicable Submarines only) Report by message to NAVSEA Navy Shipbuilding Program Manager, in advance of the scheduled start of Fast Cruise, that all FBW SCS work necessary for Alpha Sea Trials, including resolution of NAVSEA FBW SCS Certification Audit Category I recommendations, has been completed, provide the status of all incomplete NAVSEA FBW SCS Certification Audit Category IA recommendations, and that the FBW SCS is ready for commencement of Fast Cruise. The message shall also state that there are no conditional FBW SCS Deviations or Waivers which have not been satisfied or cite those that exist, identify any operating restrictions of the ship and/or system, and that, subject to satisfactory completion of Fast Cruise and resolution of mandatory FBW SCS deficiencies, the submarine FBW SCS is satisfactory for commencement of sea trials. Make a similar report prior to each subsequent sea trial. Appendix K of this chapter provides a sample message.
- ac. (Applicable Submarines only) Report by message to the NAVSEA Navy Shipbuilding Program Manager and TYCOM, with the concurrence of the ship's Commanding Officer, successful completion of Fast Cruise as a prerequisite for the start of sea trials. Appendix L of this chapter provides a sample message.
- ad. (Applicable Submarines only) Report by message to the NAVSEA Navy Shipbuilding Program Manager the satisfactory completion of Alpha Sea Trials and report the status of all incomplete NAVSEA FBW SCS Certification Audit Category IA recommendations. Appendix M of this chapter provides a sample message.
- ae. (Applicable Submarines only) Report by message to the NAVSEA Navy Shipbuilding Program Manager the satisfactory completion of all shipbuilder's sea trials, correction of all mandatory sea trial deficiencies, and resolution of all NAVSEA FBW SCS Certification Audit Category IA recommendations. Report that the submarine FBW SCS is satisfactory for unrestricted use in support of submarine unrestricted operations. Identify all deferred FBW SCS work and/or conditionally approved deviations and waivers to date which have not had the condition satisfied and specifically identify any operating restrictions of the ship and/or system. Appendix N of this chapter provides a sample message.
- af. Prior to Ship's Force assuming operational control, ensure that assigned New Construction units operate and maintain installed diesel engines in accordance with established procedures. Specifically, the Supervisor shall:

- (1) Schedule a routine diesel inspection prior to initial start-up by Ship's Force.
 - (2) Observe diesel engine operations during shipboard visits in accordance with Volume IV, Chapter 4 of this manual.
 - (3) Ensure that the Automated Diesel Engine Trend Analysis Program addressed by reference (g) and TYCOM directive is in place.
- ag. Prior to Ship's Force assuming operational control, ensure that assigned New Construction units operate and maintain an installed gas turbine in accordance with established procedures. The Supervisor shall schedule a gas turbine inspection prior to start up by Ship's Force.

2.4.2 Acceptance Trials/Combined Trials. The Supervising Authority is responsible for presenting the ship for AT/CTs. References (d), (e), and (f) delineate the Supervising Authority's responsibilities concerning these trials. Several of the more significant issues are:

- a. Submit for approval the schedule and sequence of AT/CT to the President, Board of Inspection and Survey (INSURV).
- b. Request necessary services for each trial from the Fleet Commander in accordance with reference (a), with an information copy to the TYCOM.
- c. Provide riders to assist and provide system/historical expertise.

2.4.3 Post Shakedown Availability. During PSA the Supervising Authority is responsible for the following:

- a. Determining, in conjunction with the CO, the type and extent of post-repair dockside and at-sea tests/trials, in addition to those described in Volume I, Chapter 6, section 6.4 of this manual. Submit the following for approval:
 - (1) The schedule and sequence of post-repair nuclear propulsion plant trials to NAVSEA for concurrence and the ISIC/TYCOM Representative for approval.
 - (2) The schedule and sequence of post-repair trials subsequent to the nuclear propulsion plant trials to the ISIC for approval. Include the TYCOM as a Copy To addressee.
- b. Providing sufficient time for crew training to support Fast Cruise and to ensure the proper operation and safety of the ship.
- c. Coordinating the schedule for Fast Cruise and post repair trials with the ISIC/TYCOM representative. Submit the Sea Trials Agenda to the Navy Shipbuilding Program Manager for approval.
- d. (Submarines only) Additional Supervising Authority responsibilities are defined in Volume II, Part I, Chapter 3 of this manual.
- e. Reporting to the TYCOM the completion of Fast Cruise and the correction of all mandatory deficiencies. Recommend commencement of Sea Trials with the CO's concurrence in accordance with Volume II, Part I Chapter 3 of this manual.
- f. Reporting to the Navy Shipbuilding Program Manager or the TYCOM (PSA less than six months) that Sea Trials have been completed, and for submarines, that the material condition of those parts of the ship installed, prepared and/or tested by the Industrial Activity is satisfactory for URO to design test depth, concurrence in accordance with Volume II, Part I Chapter 3 of this manual.

2.4.4 Deficiencies. The Supervising Authority's primary functions involve the building of ships and the correction/resolution of deficiencies discovered during the building and trials portion of construction. Reference (f) and locally generated Supervising Authority Instructions provide specific and detailed information pertaining to deficiencies, their identification, tracking and resolution. Contact the Supervising Authority for more information. Volume I, Chapter 5 of this manual also provides additional guidance.

2.5 IMMEDIATE SUPERIOR IN COMMAND. The ISIC is the TYCOM's delegate.

2.5.1 Pre-Commissioning. During the Pre-Commissioning period, the ISIC is responsible for the following:

- a. Providing crew support prior to initial man-up. Personnel arriving prior to initial manning will be tasked with coordinating with the Supervising Authority to start the necessary preparations for initial man-up. Appendix O of this chapter provides a checklist of areas that need to be addressed several months before personnel start arriving.
- b. Conducting an inspection approximately two months following the arrival of the first increment of the crew at the building yard, using Volume I, Chapter 3, paragraph 3.3.1 of this manual as a guide.
- c. Conducting periodic monitoring of ships per Volume I, Chapter 3, paragraph 3.3.2 of this manual to include:
 - (1) Technical and/or administrative/training assistance visits (Tech Assists) directed toward improvements in the management and conduct of maintenance and training tasks.
 - (2) Evaluation visits (Work-ups) to determine the state of administration and training.
 - (3) Spot checks (Monitor Visits) to monitor the progress and effectiveness in specific material, training and administrative areas.
- d. Coordinating with the Bureau of Personnel (BUPERS) to ensure personnel arrive in support of initial crew man-up.
- e. Conducting a Habitability Inspection when directed by the TYCOM. Volume I, Chapter 3, Appendix D of this manual provides information concerning the Habitability Inspection and a sample Compartment Surveillance Guide. Volume I, Chapter 3, Appendix E of this manual provides a sample check list.
- f. Making recommendations to the TYCOM for placing the ship "In-Service". Appendix A of this chapter provides a sample message.
- g. **Contact TYCOM Metrology and Calibration Point of Contact to verify if Establishment of Field Calibration Activity Request has been submitted in accordance with references (h) and (i).**
- h. When Ship's Force has assumed operational control, ensuring that assigned New Construction units operate and maintain installed diesel engines in accordance with established procedures. Specifically, the ISICs shall conduct follow-up action to ensure that any unsatisfactory conditions found are corrected at an early date.
- i. (Nuclear Powered Ships only) Conducting a Pre-RSE of the Engineering/Reactor Department to determine the ship's readiness for the Naval Reactors Pre-Critical RSE. The TYCOM will assist in this examination. Volume I, Chapter 3, Appendix C of this manual provides administrative guidelines for the conduct of the Pre-RSE.
- j. (Nuclear Powered Ships only) Reviewing Pre-RSE findings, the CO's training plan, and progress evaluations, and direct follow-up reviews and/or inspections necessary to verify the ship's readiness for the RSE.
- k. (Submarines only) Prior to Fast Cruise, reporting ship's preparations to assume responsibility for Re-entry Control in the Crew/Material Certification message. Appendix B of this chapter provides a sample message.
- l. (Submarines only) Scheduling salvage inspections per Volume IV, Chapter 18 of this manual.
- m. (Submarines only) Designating the salvage inspection team using the guidance provided in Volume IV, Chapter 18 of this manual.
- n. For CVNs, conduct crew certification in accordance with reference (j).
- o. For all other hulls, conduct formal Phase I crew certification inspection(s) of the Ship's Force in accordance with the TYCOM Training Manual (when required). The purpose of this inspection shall be to audit the readiness and training of the Ship's Force, particularly in the areas of watchstander qualifications, damage control readiness, status of operational and emergency bills, presence on board of essential technical manuals and general operational knowledge. This inspection shall be scheduled about one month prior to Fast Cruise and should include written examinations and personal interviews

with officers and key enlisted personnel to determine their readiness and status of training as outlined for Phase I. A comparison of personnel allowance (including Navy Enlisted Classification requirements) versus onboard count shall be made to ensure that the ship is adequately manned.

- p. Conduct Phase II crew certification. Witness and certify to the TYCOM that the state of crew training is satisfactory for at-sea operations in accordance with the TYCOM Training Manual. This will be done during a two day period subsequent to Dock Trials and Phase II crew certification, and prior to Fast Cruise. This two day period shall be scheduled so that there is normally a 48 hour period between the end of this event and the beginning of Fast Cruise. This two day Phase II crew certification period is divided into a 40 hour crew work-up and rest period and an eight hour modified dockside Operational Readiness Inspection. The entire period should be scheduled to minimize interference with industrial activity work. However, since the certification must be conducted carefully to be meaningful, the officer scheduling the certification should coordinate industrial activity interference during the eight hour modified Operational Readiness Inspection. This certification should be thorough and meticulous. Pressure from the industrial activity or any other source to compromise ship safety must not be permitted to influence the judgment of the certifying officers. The desired overall sequence of these events is shown in Appendix B of this chapter.
- q. Conduct a material inspection of the ship.
- r. Satisfactory completion of the inspections of paragraphs 2.5.1.n. through 2.5.1.p. of this chapter should be reported to the TYCOM in one "PRIORITY" crew certification message in accordance with sample message format of Appendix B of this chapter paralleled by a telephone call to the TYCOM Watch Officer reporting the date-time group of the message. If significant deficiencies exist or it appears that an extension of time is required to correct training/material deficiencies, the TYCOM shall be immediately advised by telephone and by message. The Supervising Authority will be included as an information addressee.
- s. A summary of typical New Construction major milestones and message reporting requirements as they apply to the ISIC is listed in Volume I, Chapter 1, Appendix A of this manual.

2.5.2 Post Shakedown Availability. During PSA, the ISIC is responsible for the following:

- a. Conducting periodic monitoring similar to that described in paragraph 2.5.1.c of this chapter, placing the emphasis on the management and conduct of PSA.
- b. (Nuclear Powered Ships only) Conducting a Pre-Critical Inspection of the Engineering/Reactor Department per Volume I, Chapter 6, paragraph 6.3 of this manual. Review inspection findings, the CO's training plan and progress evaluations, and direct follow-up reviews and/or inspections as necessary to verify ship's readiness for criticality.
- c. Witnessing and certifying to the TYCOM that the state of crew training is satisfactory for at-sea operations per the Force Training Manual.
- d. (Aircraft Carriers only) Receiving from the CO/Supervising Authority the scope, schedule and agenda of the tests for Sea Trials for review and approval. When approved, forward copies of the agenda to the TYCOM.
- e. Arranging for the embarkation of technical personnel who may be assigned by the Navy Shipbuilding Program Manager to observe tests or trials.
- f. Arranging for the assignment of operating areas and communications frequencies.
- g. (Submarines only) Scheduling a salvage inspection in time to have discrepancies corrected prior to Fast Cruise.
- h. (Submarines only) Prior to Fast Cruise, auditing Ship's Force Re-entry Control and Departure from Specification Records. Using the Submarine Maintenance Engineering, Planning and Procurement (SUBMEPP) Activity URO Maintenance Requirement Card (MRC) scheduling reports and current Industrial Activity/Ship's Force updates to the latest report, ensure URO MRC accomplishment is current.

- i. (Submarines only) Conducting a material inspection consisting of a vertical audit of Ship's Force and Fleet Maintenance Activity Submarine Safety (SUBSAFE) work and URO completion status per Volume V, Part I, Chapter 9 of this manual.
- j. (Submarines only) Additional ISIC responsibilities are defined in Volume II, Part I, Chapter 3 of this manual.
- k. If deficiencies exist and/or it appears that extension of time is required to correct training/material deficiencies, the TYCOM shall be immediately advised by telephone and message. The Supervising Authority will be included as an information addressee. The TYCOM retains the prerogative to authorize corrective action by the Industrial Activity in the case of material deficiencies.
- l. When authorized by the TYCOM, direct the ship to get underway for Sea Trials.

2.6 **BUILDING YARD.** The Building yard is an industrial activity responsible for construction of the ship, correction of shipbuilder responsible deficiencies and additional logistic support products as delineated in the contract. The following is a sample listing of the shipbuilder's products and responsibilities.

- a. Technical Manuals for Contractor Furnished Equipment (CFE).
- b. Ship Information Book (SIB)/Ship Systems Manual (SSM).
- c. PMS for new systems when tasked by Navy Shipbuilding Program Managers or cognizant NAVSEA code.
- d. Selected Familiarization Training.
- e. Ship Drawings.
- f. Advising the Accepting Authority and the TYCOM of the date of initial criticality.
- g. Builder's Trials (non-nuclear) to include:
 - (1) Taking the ship to sea.
 - (2) The testing of all equipment and systems with the exception of weapons.

2.7 **DESIGN YARD/PLANNING YARD.** The Design Yard/Planning Yard, which may also be the Building Yard, is an industrial activity responsible for maintaining the Ship's Drawing Index current with configuration. The Planning Yard is responsible for updating ship's drawings to reflect PSA changes.

2.8 **COMMANDING OFFICER, PROSPECTIVE COMMANDING OFFICER, OFFICER IN CHARGE.**

2.8.1 **General.**

- a. The responsibilities of a PCO for a new construction ship are set forth in U.S. Navy Regulations. In the case of a nuclear powered ship under construction, the PCO has additional responsibilities associated with the operation of the nuclear propulsion plant as specified in references (a) and (b). In order to provide him with authority commensurate with this responsibility the PCO will be designated in his orders as CO of the PCU, a separate and detached command, with responsibilities as specified in references (a) and (b) and U.S. Navy Regulations.
- b. Following completion of the required training and material readiness certification, the CO/PCO/OIC must keep the ISIC fully informed of any changes in personnel, training and/or material status which could affect the validity of certification. Prompt notification is required to permit revision of Operational Orders and services required.

2.8.2 **Pre-Commissioning.** Specific responsibilities of the PCO during the primary construction phase are as follows:

- a. The preparation and execution of training plans, operational and emergency bills, procedures and organization manuals in support of his responsibilities.
- b. The demonstration of his crew's operational and administrative readiness in accordance with the inspections required by Volume I, Chapter 3, paragraph 3.3.4 of this manual.

- c. Verifying that all required Navy Enlisted Classification Codes or other skill requirements are met by BUPERS or by the ship's training programs.
- d. The presentation of the crew for the platform applicable inspections described within this volume.
- e. The designation of a Miniature/Microminiature (2M) Repair or Module Test and Repair Manager.
- f. The designation in writing of a Calibration Coordinator.
- g. Ensuring that at least two NAVSEA/Naval Air Systems Command certified Field Calibration Activity/Aircraft Intermediate Maintenance Department technicians are available to support certification.
- h. Verifying that all pertinent alongside tests, inspections and trials are completed.
- i. The establishment of "Lessons Learned Files". These files are to be turned over to the incoming PCO of the next ship of the class to be built. DDG 51 Class Destroyers should pass their files to the PMS 400 tasked contractor. MHC Class ships can provide this data to the FIT while all others should pass Lessons Learned to the Supervising Authority if the next PCO has not yet arrived.
- j. The establishment of PMS in accordance with reference (g) and Volume I, Chapter 3, paragraph 3.4.1 of this manual.
- k. Concurring with the Navy Shipbuilding Program Manager's request to the TYCOM for the conduct of a Habitability Inspection.
- l. The designation of system/space experts to assist the ISIC with the Habitability Inspection.
- m. The establishment of early liaison with the ATG team OIC to define training needs and the agenda for assist visits in preparation for LOA and Initial Light-Off.
- n. (Nuclear Powered Ships only) The development and execution of training plans and documents in support of his responsibilities for inspection and operation of the nuclear propulsion plant. These plans and documents shall be in conformance with the instructions and procedures approved by NAVSEA.
- o. (Nuclear Powered Ships only) The preparation of ship's engineering/reactor personnel for examination by the Nuclear Propulsion Directorate (NAVSEA 08).
- p. (Nuclear Powered Ships only) Review the findings of the ISIC's Pre-RSE Inspection Team and make necessary adjustments to the ship's training program to ensure the crew's readiness for the RSE. Keep the ISIC advised of the ship's training plan and provide an assessment of the crew's progress.
- q. (Nuclear Powered Ships only) Maintain the Reactor Plant in accordance with reference (k). Ensure records are ready for the ISIC's audit prior to Fast Cruise.
- r. (Nuclear Powered Ships only) Review test and trial schedules and agendas and signify concurrence to the TYCOM and the designated ISIC. Copies of detailed schedules and agendas for underway trials will be forwarded to the designated ISIC, the escort ship (Submarines) and the TYCOM Embarked Representative.
- s. (Nuclear Powered Ships only) Assume duty as the OIC and accept custody and responsibility for special nuclear material, after the ship is placed "In-Service". Report to the Fleet Commander In-Service status. Appendix A of this chapter provides a sample message.
- t. (Nuclear Powered Ships only) The preparation of Ship's Force Dock Trial Agenda.
- u. (Nuclear Powered Ships only) In accordance with the specifications and information in this volume, the conduct of dockside and underway trials. Critical operation of the reactor will be conducted in accordance with reference (l).
- v. (Aircraft Carriers only) Prior to Fast Cruise, report to the TYCOM the successful completion of Crew Certification and recommend commencement of Fast Cruise and Builder's Trials via message. Appendix B of this chapter provides a sample message.

- w. (Nuclear Powered Ships only) When authorized by the Navy Shipbuilding Program Manager, conduct Fast Cruise in accordance with Volume I, Chapter 4, section 4.3 of this manual.
- x. (Nuclear Powered Ships only) During Sea Trials, assume the duties of Officer In Tactical Command unless otherwise designated by the ISIC. For submarines, ISICs must comply with direction found in Annex C of reference (m).
- y. (Nuclear Powered Ships only) Provision for adequate crew rest time during Sea Trials. Six uninterrupted hours in each twenty-four hour period is a minimum for each crew member.
- z. (Nuclear Powered Ships only) In the absence of a TYCOM and ISIC representative, act for the TYCOM in approving on-the-spot changes to approved Sea Trial Agendas.
- aa. (Nuclear Powered Ships only) When all platform applicable requirements of this instruction are completed to the OIC's satisfaction and when permission has been received from the ISIC, proceed to sea in accordance with the operations order and carry out the approved Sea Trial Agenda.
- ab. (Submarines only) If possible, participate in two at sea periods prior to initial Sea Trials as follows:
 - (1) Accompany the preceding ship of the class on the first Sea Trial to learn how the propulsion trial is run (except first ship of class).
 - (2) Participate in an underway period of at least five days duration approximately six months prior to the final phase of Crew Certification. The purpose of this ride is to refamiliarize the PCO with those functions unique to being underway so as to ensure the safe conduct of his own initial Sea Trials and shakedown. This underway period also allows him to validate his crew's training program. This underway period should be on a ship, preferably of the same class, which is concentrating on basic ship/submarine operations, such as Selected Refresher Training or Independent Ship Exercise (ISE), so he can witness such evolutions as: coming to periscope depth, snorkeling, ventilating, casualty training, etc. If the new construction schedule has 10-12 weeks between Power Range testing and the final phase of Crew Certification, the PCO should go to sea approximately two months before initial criticality. The intent is for the PCO to go to sea after having been in the Industrial Activity for a fair amount of time (normally one year or more), but with sufficient time remaining to improve his own training program if necessary. During these underway periods, the PCO should spend time on the bridge and also observe piloting and navigation.

NOTE: IF NOT POSSIBLE TO PARTICIPATE IN TWO AT-SEA PERIODS AS DESCRIBED ABOVE, THE ISIC AND TYCOM WILL COORDINATE REQUIRED TRAINING.

- ac. (Submarines only) Request that the ISIC conduct a salvage inspection in accordance with the policies set forth in Volume IV, Chapter 18 of this manual.
 - (1) Coordinate salvage inspection support requirements as may be needed by the inspecting team to fulfill the requirements of Volume IV, Chapter 18, Appendix D of this manual.
 - (2) Ensure Volume IV, Chapter 18, Appendix D of this manual is completed and furnished to the Senior Inspecting Officer prior to the commencement of the Salvage Inspection.
 - (3) Ensure all ship's data called out in Volume IV, Chapter 18, Appendix D of this manual is assembled and staged prior to the inspection for ease of reference by the inspecting team.
 - (4) Take corrective action on all discrepancies found during the Salvage Inspection. Inform the ISIC of corrective action prior to commencement of Fast Cruise.
- ad. (Submarines only) Ensure a copy of the salvage plan has been provided to the escort ship designated for Sea Trials. Coordinate communications and operational procedures with the escort ship to ensure the escort is fully informed of the submarine's condition and intentions.
- ae. (Submarines only) Concur with the Supervising Authority message that the material condition of the ship is satisfactory to commence Fast Cruise.

- af. (Submarines only) Upon successfully completing Fast Cruise and after having exercised his crew thoroughly and operated all machinery, equipment and systems to his satisfaction, concur in the Supervising Authority's message recommending commencement of Alpha Trials. Appendix B of this chapter provides an example of this message.
- ag. (Submarines only) Maintain Planned Maintenance Management Plan in accordance with reference (n). Ensure records are ready for the ISIC's audit conducted prior to Fast Cruise.

2.8.3 Trials and Inspections. PCO responsibilities are delineated in references (d) and (e).

2.8.4 Post Shakedown Availability. Specific responsibilities of the PCO during PSA are as follows:

- a. Determine, in conjunction with the Supervising Authority, the nature and extent of PSA Sea Trials. Prepare, in conjunction with the Supervising Authority, the Sea Trial Agenda, including the sequence and duration of each test. The Supervising Authority will submit it to the Navy Shipbuilding Program Manager and the ISIC/TYCOM representative for approval as described herein. Provide copies of the approved detailed schedule and agenda for underway trials to the local ISIC and, if appropriate, the escort ship and the TYCOM Embarked Representative. This schedule and agenda shall include:
 - (1) The minimum requirements shown in Volume I, Chapter 6, section 6.4 (Volume II, Part I, Chapter 3 for submarines) of this manual.
 - (2) A firm time scheduled for conducting all tests and trials showing their sequence and duration.
 - (3) General prerequisites for conducting each test. Detailed prerequisites should be itemized as part of individual test requirements.
 - (4) Responsibility for conducting each test (Industrial Activity or Ship's Force).
 - (5) Ship's Force support required for conducting each test.
 - (6) Provision for adequate crew rest time during Sea Trials. Six uninterrupted hours in each twenty-four hour period is a minimum for each crew member.
 - (7) (Submarines only) Provision for a minimum of six hours of uninterrupted ISE for crew training following the initial tightness dive and prior to the deep dive.
 - (8) Underway tests may be run during ISE and rest periods on a not-to-interfere basis. Specifically, tests which can be conducted underway under normal operating conditions without manning special watch stations that require extra military personnel may be scheduled during rest periods. Tests which will not interfere with Ship's Force drills and training exercises may be conducted during ISE periods.
- b. Prepare Dock Trial Agenda.
- c. Conduct one day Ship's Force Dock Trials in accordance with Volume II, Part I, Chapter 3 of this manual.
- d. Demonstrate the crew's state of training.
- e. Ensure that all pertinent alongside tests, inspections, and trials are conducted.
- f. (Nuclear Powered Ships only) Supervise operation of the nuclear propulsion plant. Conduct critical operations as set forth in reference (l).
- g. (Nuclear Powered Ships only) When authorized by the TYCOM, conduct Fast Cruise in accordance with Volume II, Part I, Chapter 3 of this manual.
- h. (Nuclear Powered Ships only) Review the findings of the Pre-Critical Inspection (if performed) and adjust the training plan to ensure the crew's readiness for criticality. Advise the ISIC of training plan adjustments and provide an assessment of the crew's progress.
- i. (Nuclear Powered Ships only) Maintain Reactor Plant Maintenance in accordance with reference (k). Ensure records are ready for an ISIC audit conducted prior to Fast Cruise.

- j. (Submarines only) Undergo a salvage inspection in accordance with Volume IV, Chapter 18 of this manual.
- k. (Submarines only) Maintain Planned Maintenance Management Plan in accordance with reference (n) and SUBSAFE Re-entry Control in accordance with Volume V, Part I, Chapter 5 of this manual. Ensure records are ready for an ISIC audit prior to Fast Cruise.
- l. (Submarines only) Additional PCO/CO responsibilities are defined in Volume II, Part I, Chapter 3 of this manual.

2.9 PRE-COMMISSIONING UNIT. The PCO and crew will monitor the ship's construction, prepare ship's directives, regulations and administrative programs, and observe and/or demonstrate the operation of installed systems to ensure the ship is safe and habitable prior to commissioning. The shipyard period is an opportunity for the crew to familiarize themselves with the ship. The ship will be required to complete various certifications leading up to introduction into the fleet. This section provides some insight into the administrative requirements and personnel related issues associated with the initial man-up.

2.9.1 Initial Man-up. New construction ships are manned based on a Crew Scheduling and Phasing Plan. Dependent upon the platform type, crew manning is accomplished in two, three, four or as many as eight increments. The quantitative and qualitative requirements of these increments are based on the platform type, test and construction schedule. The objectives of the Crew Scheduling and Phasing Plan are to:

- a. Ensure adequacy of schooling for personnel assigned.
- b. Ensure appropriate course convening dates.
- c. Ensure there are no conflicts/redundancies between Navy and contractor courses.
- d. Ensure sufficient training for anticipated maintenance and operating skill requirements.
- e. Ensure the optimization of training opportunities for personnel in the pipeline en route to the ship. A senior crew member from the first increment shall be assigned with the responsibility of tracking and reviewing manning issues. For some ships, the Navy Shipbuilding Program Manager has provided support contractors to assist either partially or entirely in the management of the Crew Scheduling and Phasing Plan. Regardless of the class or type of ship, the initial increment of personnel must quickly organize. If a detachment concept is used, Appendix P of this chapter provides a basic listing of requirements that the first increment of personnel should be pursuing. Appendix Q of this chapter provides similar information for the non-detachment approach.

2.9.2 Training.

2.9.2.1 Shipboard Training. The Industrial Activity presents a unique environment with special circumstances not routinely encountered by operating forces. The incremental assignment of personnel to PCUs and the pace of new construction demands a comprehensive training strategy. A well established training program is the key to the ship being ready for introduction into the Fleet. Consistent with the objectives of a shipboard training program, the TYCOM training manuals and references (j) and (o) through (t), a new construction training program will ensure that:

- a. (Nuclear Powered Ships only) The qualification of all Engineering/Reactor Department personnel in strict accordance with reference (u). Included is the CO's responsibility to personally conduct an RSE of each key propulsion plant watchstander.
- b. Personnel are trained in any special Quality Assurance (QA) procedures that may be used during the construction period.
- c. Personnel assigned are knowledgeable of the platform, system and equipment installations and operation of installed equipment.
- d. Watchstander qualifications support a watch section of fully or provisionally qualified personnel for all scheduled events.
- e. Training designated for assigned personnel supports the platform/equipment configuration.
- f. Intensified special training is provided to support:

- (1) Cold Operations.
 - (2) Hot Operations.
 - (3) RSE.
 - (4) LOA.
 - (5) Criticality/Power Range Testing.
 - (6) Combat Systems Installation Certification.
 - (7) Crew Certification.
 - (8) Fast Cruise and Sea Trials.
 - (9) Piloting Party/Navigation Detail.
 - (10) Damage Control Team.
 - (11) Fire Fighting Team.
 - (12) Tactical Team.
 - (13) Special details.
- g. All billets requiring specific Navy Enlisted Classifications are filled.
- h. Established Naval Schools and Trainers are used to the maximum extent possible.
- i. Factory training on systems/equipment for which Naval Schools are not established is provided.
- j. Special training in accordance with TYCOM directives is provided for provisional certification to load, handle, stow and maintain a weapons load-out specific to the class of ship.
- k. Weapons/Combat Systems training is sufficient to enable the Weapons/Combat Systems Department to operate its systems while complying with existing safety rules, technical directives and governing operating procedures promulgated by the CNO, the Defense Nuclear Agency, NAVSEA, Space and Naval Warfare Systems Command, the TYCOM or other commands as applicable.
- l. Industrial Activity/contractor familiarization training courses are monitored for content and value. Provide supplemental instruction where necessary and inform the Supervising Authority and Navy Shipbuilding Program Manager of significant problems or shortfalls.
- m. The enlisted training program is started as soon as the Leading Petty Officers for the major divisions arrive. The Officers and senior enlisted personnel will develop the content and scope of the training programs for implementation with the arrival of the first large increment of enlisted personnel.
- n. Aircraft Launch and Recovery Equipment Maintenance Program training shall be conducted in accordance with reference (v).

2.9.2.2 Industrial Activity Training. The Industrial Activity/FIT will provide familiarization training in accordance with the shipbuilding contract on ship's characteristics and systems. This training generally is not sufficient for "System Expert" qualification, but will provide an excellent opportunity for School of the Boat/Ship, and at the same time provide an opportunity for Divisional Training Petty Officers to develop a more detailed and in depth training program. In most cases the Industrial Activity will allow the ship to control the scheduling of topics.

2.9.2.3 Training Support Center. Surface ships utilizing the Pre-Commissioning Detachment Concept at a Training Support Center (TSC), either in Norfolk, VA or San Diego, CA, are provided with an outstanding opportunity to ensure pipeline training is obtained. This concept also provides for the easy access to many of the basic courses such as firefighting, damage control, Repair Parts Petty Officer training, Drug and Alcohol Program Advisors, Component Change Control, etc., which are needed to ensure assigned personnel can effectively function as a ship's crew upon delivery. For ships not utilizing the TSC Detachment Concept, such as submarines, an individual should be assigned to monitor and track training and manning issues as they develop.

2.9.3 Ship's Qualification Program. The implementation and operation of the Ship's Qualification/Personnel Qualification Standard (PQS) should ensure a logical process for training Ship's Force for watchstanding and ship's qualification. TYCOM instructions that cover Ship's Qualification/PQS requirements are found in references (j) and (o) through (t). The department organization manual should establish prerequisites for watchstander qualification. Qualification goals should be established and the program should support completion of goals within each division. Fleet wide training and qualification goals are:

- a. Underway Watchbills; 3 Section Enlisted, 4 Section Officer/Chief Petty Officer.
- b. Inport Watchbills; 4 Section Enlisted, 5 Section Officer/Chief Petty Officer (6 Section for all personnel on Aircraft Carriers).

2.9.4 Deficiency Identification and Correction. The establishment of procedures by which Ship's Force reports and tracks the correction of deficiencies cannot be overstressed. The Supervising Authority relies heavily upon PCU involvement to augment their efforts. Inspections of systems, equipment and spaces by PCU personnel are extremely important in the identification of unsatisfactory work and/or material deficiencies. Each shipbuilder and associated Supervising Authority have their own established system for tracking shipbuilder responsible deficiencies. Those deficiencies which are not corrected during the construction cycle will be submitted to the INSURV Board just prior to FCT, AT or CT (the type of trial dependent on platform). These deficiencies, depending on their seriousness, may impact a ship's delivery to the Navy. Deficiencies cited must either be resolved/corrected or waived by the Navy Shipbuilding Program Manager.

2.9.5 Establishment of Engineering/Reactor Department. This paragraph addresses the Engineering/Reactor Department establishment and tasks which are to be accomplished during the pre-commissioning phase of new construction. The tasks defined in this section incorporate experience gained and lessons learned from previously completed ships. The objective is to provide guidance which will assist in the ship's readiness, from an Engineering/Reactor Department standpoint, to successfully complete contract milestones and to prepare for fleet introduction.

2.9.5.1 Requirements. The PCU should monitor and report on the ship's construction progress to the PCO, and dependent upon platform, conduct and/or witness and participate in the ship's dockside and at-sea testing, attend periodic documentation reviews, assessments, and validations, and provide recommendations regarding manpower, training, watchstanding and related shipboard engineering requirements. Tasks and responsibilities include items discussed in the following paragraphs.

2.9.5.2 Shipboard Inspections. Shipboard inspections by the ship's Engineering/Reactor Department and cognizant Supervising Authority personnel are necessary during the ship construction phase. There is no precise pattern or timetable for these inspections, but they should be thorough and conducted frequently. Ship's Force personnel need to become familiar with the contract specifications and system drawings. This will ensure the prompt identification, and documenting, of discrepancies discovered when comparing "as built" conditions to the actual specification.

2.9.5.3 Personnel Qualification Standards. Theoretical portions of PQS should be implemented during the training pipeline at the specific Training Centers and at the TSCs using available technical manuals and training material. Ship-wide PQS should be implemented prior to the arrival of the final crew increment at the shipbuilder's yard. The ship's Engineer Officer should establish interim watch qualifications to set the training goals for Engineering/Reactor Department personnel as they arrive at the Industrial Activity. Additionally, PQS sign-off authority should be specified in writing by the ship's Engineer Officer, in order to ensure that the provisional qualifications and sign-off procedures function smoothly.

2.9.5.4 Outfitting Support (as applicable). The PCU must ensure that engineering spaces are completely outfitted. Routine progress inspections must be made in this area, and the PCU will participate in completing Compartment Completion Inspection Reports. It is important that personnel involved with Compartment Completion Inspection Reports are fully aware of all implemented Engineering Change Proposals and Engineering Change Notices to ascertain that outfitting materials and Operating Space Items (OSI) support the ship as revised by Engineering Change Proposals and Engineering Change Notices. Configuration Change Requests must be drafted with full recognition of the guidance contained in both the General Specifications for Building Naval Vessels and the specific Class Building Specifications.

2.9.5.5 Operational Sequencing System (Surface Force Ships/Aircraft Carriers only). The Operational Sequencing Systems (OSS) (Engineering Operational Sequencing System (EOSS), Sewage Disposal Operational Sequencing System, etc.) establish the operational procedures for various shipboard equipment, including applicable Casualty Control procedures. Validation of Engineering Department OSS manuals is the responsibility of the ship's Engineering Department personnel, with assistance provided by the Navy Shipbuilding Program Manager and contractor support personnel (if available). This validation will ensure that procedural requirements are current, well-defined and correct. OSS validation is a Key Event that must be accomplished by the PCU prior to arrival of the final crew increment. EOSS installation (under the cognizance of Naval Surface Warfare Center Carderock Division (NSWCCD)) involves the following sequence of events, which may be modified for other OSS installations:

- a. Develop the preliminary EOSS package.
- b. Submit the preliminary EOSS to the PCU, the Supervising Authority and the Navy Shipbuilding Program Manager.
- c. The PCU, the Supervising Authority and the Navy Shipbuilding Program Manager review the preliminary EOSS.
- d. Conduct cold plant check to validate equipment for correct system operation.
- e. Revise EOSS to pre-hot check package and submit EOSS to the PCU, the Supervising Authority and the Navy Shipbuilding Program Manager.
- f. Conduct pre-hot check.
- g. Conduct hot system ship check.
- h. Submit final EOSS to the PCU, the Supervising Authority and the Navy Shipbuilding Program Manager for review/comment.
- i. Deliver electronic copy of EOSS to Navy Shipbuilding Program Manager.
- j. Print, laminate, assemble EOSS.
- k. Install final EOSS.

2.9.5.6 Engineering/Reactor Department Organization and Regulations Manual. The Engineering/Reactor Department Organization and Regulations Manual (EDORM/RDORM) is the responsibility of the ship's Engineer/Reactor Officer, however, basic EDORM/RDORMs have been established as guidelines. Reference (w) provides EDORM development guidance for Surface Forces, reference (x) provides guidance for submarines, and reference (u) provides EDORM/RDORM development guidance for aircraft carriers.

2.10 SUPPORT ACTIVITIES.

2.10.1 Technical Support. The Regional Maintenance Centers (RMC) have numerous functions and responsibilities, some of which will further be discussed in Volume I, Chapter 3 of this manual, but for the purpose of this section only those functions and responsibilities related to new construction will be discussed.

2.10.1.1 Naval Sea Logistics Center (Detachment Norfolk/San Diego).

- a. TYCOMs are responsible for ensuring the proper installation and operation of PMS within the ships under their command. The importance of the PMS installation cannot be overemphasized.
- b. Prior to the PMS installation, equipment configuration information will be verified by the Configuration Data Manager. The PMS Maintenance Index Page/MRC documentation will be certified by the Naval Sea Logistics Center Detachment Norfolk/San Diego (NAVSEALOGCEN Detachment Norfolk/San Diego), as appropriate. Following the validation, the applicable NAVSEALOGCEN Detachment Norfolk/San Diego will assemble the PMS documentation, equipment listings, schedules and forms required for the installation package. Each PMS installation package is ship tailored.
- c. NAVSEALOGCEN Detachment Norfolk/San Diego has the responsibility for installing PMS aboard ship. The installation of PMS is done in two phases; preliminary and final.
- d. Supporting information can be found in reference (g).

2.10.2 Submarine Maintenance Engineering, Planning and Procurement Activity. The SUBMEPP Activity is located in Portsmouth, NH. SUBMEPP functions are related to submarines and selected submarine support activities. As was the case with the RMCs, SUBMEPP's functions are numerous and deal with a submarine's maintenance at all levels of accomplishment (Organizational, Intermediate, Depot) from construction to inactivation. For the purpose of this section SUBMEPP's responsibilities and functions include:

- a. Tracking the configuration of ships under construction.
- b. Assisting local RMC with the PMS installation on all new construction submarines.
- c. Assisting the Supervisor of Shipbuilding, Groton with the resolution of INSURV deficiencies concerning PMS related issues.
- d. Providing Ship's Force with a Master Equipment Guide List (EGL) for all non-nuclear/non-missile related equipment (component to MRC).
- e. Providing Ship's Force with their URO and Maintenance Standard documentation at PMS installation.
- f. Providing Maintenance and Material Management Coordinator Training at SUBMEPP concerning VIRGINIA and SEAWOLF Maintenance philosophy.
- g. Processing all shipbuilder developed Submarine PMS to the In-Service Engineering Activity for review and approval.

2.10.3 Carrier Planning Activity, PMS312C (Aircraft Carriers only). The Carrier Planning Activity (CPA) provides centralized Aircraft Carrier life-cycle management, maintenance and modernization planning, closely aligned to Fleet and Program Executive Officer Aircraft Carriers needs and priorities. Operationally, CPA reports to the Navy Shipbuilding Program Manager, In-Service Aircraft Carriers (PMS 312). In accordance with NAVSEAINST 5400.130, CPA responsibilities are as follows:

- a. Development, maintenance and monitoring of the Carrier Incremental Maintenance Plan (IMP), including tracking the backlog of IMP and modernization work.
- b. Developing Carrier Baseline Availability Work Packages (BAWP) including integration of the IMP sequencing plan and the Modernization Plan for presentation to the TYCOMs.
- c. Capturing and analyzing maintenance data history for use in updating the IMP Sequencing Plan and supporting the TYCOMs in assessing the value of ongoing material assessments.
- d. Supporting the TYCOMs and Executing Activities in the development of continuous maintenance requirements including life cycle input from the IMP to the continuous maintenance process.

2.10.4 Surface Maintenance Engineering Planning Program (Surface Force Ships only). Surface Maintenance Engineering Planning Program (SURFMEPP) shall provide centralized surface ship lifecycle maintenance engineering, class maintenance planning and management closely aligned to the Surface TYCOM and NAVSEA needs and priorities in accordance with reference (y). For the purpose of this section, SURFMEPP's responsibilities and functions include:

- a. Serve as the authorized engineering agent for Surface Ship Lifecycle maintenance engineering, planning and management.
- b. Act as the surface ship Class Maintenance Program development and management activity.
- c. Capture and analyze maintenance data history, to include cost, for use in updating the Class Maintenance Plan.
- d. Review the material assessments in order to modify the technical content of the Class Maintenance Plan.
- c. Develop and issue BAWPs for CNO availabilities after PSA.

2.10.5 Space and Naval Warfare Systems Centers.

- a. Space and Naval Warfare Systems Center Atlantic (SSC Atlantic) designs, develops, implements and provides life cycle support for standard fleet non-tactical automated information systems, afloat and ashore. SSC Atlantic is the software development and support activity for applications automated under the Naval Tactical Command Support System and remaining legacy systems. The Naval Tactical Command Support System automates supply, inventory, ship/submarine/aviation maintenance and configuration management; food services, retail operations, personnel administration and watch, quarter, and station bills, for fleet and fleet-like activities. In all, SSC Atlantic's customers number over 1200 separate activities, many of which operate with multiple functional systems.
- b. SSC Atlantic Tidewater facilities, located on Naval Station Norfolk, VA, manage all software development. Naval Station Norfolk is also home to SSC Atlantic's In-Service Engineering Activity for hardware and software support, along with Atlantic Fleet implementations. Space and Naval Warfare Systems Center Pacific (SSC Pacific), San Diego, CA is responsible for Pacific Fleet implementations and support. SSC Pacific maintains a detachment in Yokosuka, Japan to provide on-site assistance for commands and units deployed to their Area of Responsibility.

2.10.6 Fleet Introduction Team (Surface Forces only). Reference (z) states that for newly commissioned Commander Naval Surface Force Atlantic (COMNAVSURFLANT) ships, COMNAVSURFLANT assumes the responsibility of instituting and managing a fleet introduction program. FITs provide support to pre-commissioning crews by monitoring the progress of construction, coordinating training, providing continuity in the management and administration of facilities at the building site and providing administrative support. The Navy Shipbuilding Program Manager provides this support in the form of support contractors. The specific responsibilities of individual FITs will vary dependent upon the platform and the requirements peculiar to that platform. Appendix R of this chapter provides a generic base line of services available if a FIT is established.

2.10.7 Afloat Training Group (Surface Force Ships only). The ATG is chartered by reference (w) to assist ships in tailoring a training program for the conduct of pre-light-off cold checks and evaluations, program management and fire fighting. This assistance is rendered through formal visits, scheduled at the request of the ship's ISIC via the quarterly scheduling process. ATG teams will conduct tailored training, defined in consonance with the CO, the ISIC and the team OIC which best meets the needs of the ship.

2.10.8 Surface Nuclear Propulsion Mobile Training Team (Aircraft Carriers only). The Surface Nuclear Propulsion Mobile Training Team will conduct training and assessment of Reactor Departments (to include Engineering department on CVN 65) for ships undergoing extended availabilities and for PCUs. These assessments shall include Reactor Department administration, qualifications, operations, cleanliness, preservation, material condition, radiological controls, chemistry controls and damage control. The Maintenance Training Group will conduct preavailability training with Reactor Department personnel, conduct in process quality assurance assessments and training visits, and train the crew in life cycle management.

2.10.9 Fitting Out Supply Assistance Team (Surface Ships only).

- a. Fitting Out Supply Assistance Team (FOSAT), a function under Naval Supply Weapons Systems Support-Mechanicsburg, will assist Prospective Supply Officers (PSO) in attaining maximum administrative and material readiness of the Supply Department prior to delivery of a ship to the Navy. The team is involved in monitoring the provisioning process, material availability, inventory validity, Supply Department administrative readiness and establishment of Supply Department spaces. Additionally, the team provides pre-commissioning training and assistance in all areas of Supply Department organization. The primary focus of the FOSAT team is to provide assistance and evaluation. Assistance is rendered to the PSO through training and as a result of each of the PSO's divisions communicating their areas requiring assistance. Evaluation is accomplished by reviewing each division's operating procedures. Evaluation is also accomplished through regular communication to ascertain each division's progress based upon the most current Supply Management Certification checklist. In addition, assistance and evaluation are accomplished by performing visits to the PCUs.
- b. Services provided by FOSAT includes:
 - (1) Storeroom Bin Validation.

- (2) Review of General Use Consumable List.
- (3) RSUPPLY Implementation and Validation.
- (4) Culinary Specialist Assistance.
- (5) Ship's Serviceman Assistance.
- (6) Disbursing Assistance.
- (7) Postal Assistance.
- (8) Critical Path Visits.

2.11 NAVAL SEA SYSTEMS COMMAND (SUBMARINES ONLY). Reference (c) describes NAVSEA's responsibilities during new construction for Submarine FBW SCS. The following is a synopsis of those functions with additional amplification:

2.11.1 Pre-Commissioning. NAVSEA's responsibilities for the Pre-Commissioning period are as follows:

- a. (Applicable Submarines only) Supervising Authority sends message to NAVSEA in advance of the scheduled start of Fast Cruise stating the status of all incomplete NAVSEA FBW SCS Certification Audit Category IA recommendations, that all FBW SCS work necessary for sea trials, including resolution of all NAVSEA FBW SCS Certification Audit Category I recommendations, has been completed and that the FBW SCS is ready for commencement of Fast Cruise. The message shall also state that there are no conditional FBW SCS Deviations or Waivers which have not been satisfied or cite those that exist, identify any operating restrictions of the ship and/or system, and that, subject to satisfactory completion of Fast Cruise and resolution of mandatory deficiencies, the FBW SCS is satisfactory for commencement of Alpha Sea Trials. Appendix S of this chapter provides a sample message.
- b. (Applicable Submarines only) NAVSEA Navy Shipbuilding Program Manager message to TYCOM certifying that the submarine FBW SCS is satisfactory for sea trials in accordance with the approved Sea Trial Agenda. The message shall also state that there are no conditional FBW SCS Deviations or Waivers which have not been satisfied or cite those that exist, identify any operating restrictions of the ship and/or system, and that, subject to satisfactory completion of Fast Cruise and resolution of mandatory deficiencies, the FBW SCS is satisfactory for commencement of Alpha Sea Trials. Appendix T of this chapter provides a sample message.
- c. (Applicable Submarines only) NAVSEA Navy Shipbuilding Program Manager shall provide a report documenting the resolution of sea trial deficiencies to NAVSEA 07TC for review in support of NAVSEA 07 concurrence on final system certification. Appendix U of this chapter provides a sample message.

2.12 INTEGRATION OF CLASS MAINTENANCE PLAN AND BASELINE AVAILABILITY WORK PACKAGE (SURFACE FORCE SHIPS ONLY).

- a. SURFMEPP has lead responsibility for BAWP development for new construction ships entering the Fleet Readiness Plan (FRP) cycle.
- b. **Initial BAWP generation for new construction ships is dependent on PSA completion and Class Maintenance Plan development. Once the BAWP is issued, see Volume II, Part II, Chapter 2, Appendix D of this manual for the remaining BAWP to Availability Work Package (AWP) process.**

2.12.1 Life Cycle Planning Conference. SURFMEPP will **coordinate** the date, location and agenda for the **Life Cycle Planning Conference (LCPC)**. SURFMEPP will be responsible for planning and conducting the conference, attendees should include: **TYCOM, RMC Assessment Directors, Program Manager Representatives, representatives from NAVSEA 05, NAVSEA 21 Modernization, Planning Activity and the ship's MT.**

2.12.2 BAWP Pre-Pushed to Maintenance Team. SURFMEPP will send a list of the FRP Maintenance Cycle Class Maintenance Plan requirements to the ship's Port Engineer for review and correction. This list is a preview of the initial BAWP and will be discussed in detail at the LCPC. Upon request, SURFMEPP will provide a list of Class Maintenance Plan-required assessments to TYCOM, Navy Regional Maintenance Center (NRMC) and RMC.

2.12.3 BAWP Upload.

- a. SURFMEPP will upload a data file (MM0001 file) with all mandatory requirements and expected CNO Availability services into the appropriate IT system in support of ship-specific MT screening and brokering requirements.
- b. SURFMEPP will issue formal correspondence detailing the planning schedule and outstanding action items from the LCPC.

2.12.4 Other BAWP to AWP Process Milestones. All other BAWP to AWP process milestones are germane (refer to Volume II of this manual) for in-service non-Forward Deployed Naval Forces ships.

APPENDIX A₁₀

SAMPLE CO PRE-COMMISSIONING UNIT MESSAGE REPORTING "IN-SERVICE ACTIVE"

FM PRECOMUNIT (SHIP NAME)//
TO (FLEET COMMANDER)//
INFO COMNAVSEASYSCOM WASHINGTON DC//(NAVY SHIPBUILDING PROGRAM MANAGER)/ (NUCLEAR
POWERED SHIPS ONLY)//
(TYCOM)//
(ISIC)//
(PARENT GROUP)//
(PARENT SQUADRON)//
(SUPERVISING AUTHORITY)//(APPROPRIATE CODE)//
NVR NORFOLK VA (NAVAL VESSEL REGISTER)//
BT
UNCLAS //N05441//
MSGID/GENADMIN/(SHIP NAME)//
SUBJ/ (SHIP NAME AND HULL NO.) IN-SERVICE//
REF/A/MSG/(ORIGINATING ACTIVITY)/(DTG)//
AMPN/REF A IS NAVY SHIPBUILDING PROGRAM MANAGER DIRECTION TO PLACE SHIP IN-
SERVICE//
REF/B/DOC/COMNAVSUBFOR OPORD 2000/(DATE)//(SUBMARINES ONLY)
AMPN/APPROPRIATE SECTION OF REF B IS APP 7 TO ANNEX C//
RMKS/1. IAW REF A (SHIP NAME) IN-SERVICE ACTIVE (DTG).
2. IAW REF B (SHIP NAME) REPORTING TO FLEET COMMANDER FOR OPCON.//(SUBMARINES ONLY)
BT

**NOTE: ENSURE MESSAGES ARE IN ACCORDANCE WITH CURRENT MESSAGE FORMAT AND
CURRENT PLAD IS UTILIZED.**

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VOLUME I
CHAPTER 3
PRE DELIVERY

REFERENCES.

- (a) NAVSEA 0900-LP-095-4010 - Ship Test and Evaluation Planning Guide
- (b) NAVSEA S9040-AA-GTP-010 - Shipboard Systems Certification Requirements For Surface Ship Industrial Periods (Non-Nuclear)
- (c) OPNAVINST 9080.3 - Procedures for Tests and Trials of Navy Nuclear Powered Ships Under Construction, Modernization, Conversion, Refueling and Overhaul
- (d) OPNAVINST 4700.8 - Trials, Acceptance, Commissioning, Fitting Out, Shakedown and Post Shakedown Availability of U.S. Naval Ships Undergoing Construction or Conversion
- (e) COMSUBLANT/COMSUBPACINST 3540.10 - Periodic Monitoring of Submarines and Support Facilities
- (f) COMNAVAIRLANT/COMNAVAIRPACINST 3500.20 - Aircraft Carrier Training and Readiness Manual
- (g) COMNAVSURFLANT/COMNAVSURFPACINST 3502.2 - Surface Force Training Manual
- (h) COMNAVSUBFORINST 5400.25 - Standard Submarine Supply Department Organization and Regulations Manual
- (i) COMNAVSUBFORINST 5400.29 - Standard Submarine Navigation/Operations Department Organization and Regulations Manual
- (j) COMNAVSUBFORINST 5400.40 - Standard Submarine Combat Systems Department Organization and Regulations Manual (SSN)
- (k) COMNAVSUBFORINST 5400.41 - Standard Submarine SSBN 726 Class Weapons Department Organization and Regulations Manual
- (l) COMNAVSUBFORINST 5400.47 - Standard Submarine Combat Systems Department Organization and Regulations Manual (SSGN)
- (m) COMNAVAIRLANTINST 9080.2 - Conduct of Trials and Inspections Incident to Construction, Overhauls or Availabilities of Nuclear Powered Aircraft Carriers (CVN)
- (n) OPNAVINST 3120.28 - Certification of the Aviation Capability of Naval Ships Operating Aircraft
- (o) COMPACFLTINST 9830.1 - Certification of Aviation Facilities in Naval Ships Operating Aircraft
- (p) COMLANFLTINST 3500.18 - Certification and Readiness of Aviation Facilities in Naval Ships Operating Aircraft
- (q) NAVAIRINST 3120.1 - Lead Systems Command Procedures and Responsibilities for Certification of Aviation Facilities and Equipment in Naval Ships Operating Aircraft
- (r) COMNAVSURFPACINST 3501.4 - Aviation Readiness Evaluation (ARE) and Certification of Aviation Facilities Onboard COMNAVSURFPAC Ships
- (s) NAVAIRINST 13800.11 - Procedures and Responsibilities for Certification and Verification of the Precision Approach and Landing System
- (t) NAVSEAINST 4734.1 - NAVSEA Test, Measurement, and Diagnostic Equipment (TMDE) and Calibration Programs
- (u) NAVAIRINST 13640.1 - **NAVAL Aviation Metrology and Calibration (METCAL) Program**
- (v) NAVSEA ST700-AM-GYD-010 - Metrology and Calibration (METCAL) Laboratory Requirements and Certification Guide
- (w) NAVAIR 17-35QAL-15 - **NAVAL Aircraft Carrier and Amphibious Assault Ships Metrology and Calibration (METCAL) Program Manual**
- (x) OPNAVINST C5510.93 - Navy Implementation of National Policy on Control of Compromising Emanations
- (y) MIL-STD-1680 - Installation Criteria for Shipboard Secure Electrical Information Processing Systems
- (z) OPNAVINST 9640.1 - Shipboard Habitability Program
- (aa) OPNAVINST 3120.32 - Standard Organization and Regulations of the U.S. Navy
- (ab) OPNAVINST C8950.2 - Magnetic Silencing
- (ac) NAVSEA S9086-QN-STM-010 - NSTM Chapter 475 (Magnetic Silencing)

- (ad) COMNAVSURFORINST 3540.1 - Engineering Operations Assessment, Training and Certification for Conventionally Powered Surface Ships
- (ae) COMNAVSURFORINST 3540.2 - Surface Force Engineering Readiness Process
- (af) NAVSEA S9086-T4-STM-010 - NSTM Chapter 589 (Cranes)
- (ag) NAVSEAINST 4790.8/OPNAVINST 4790.4 - Ship's Maintenance and Material Management (3-M) Manual
- (ah) NAVSEA 0924-062-0010 - Submarine Safety (SUBSAFE) Requirements Manual
- (ai) NAVSEA S9073-AW-SNC-010 - Ship Acoustical Surveys for Submarines
- (aj) NAVSEA 0989-028-5000 - Manual for Control of Testing and Plant Conditions (Nuclear)
- (ak) NAVSEA S9002-AK-CCM-010/6010 - Industrial Ship Safety Manual for Submarines

LISTING OF APPENDICES.

- A Areas to be Evaluated During Arrival Assists
- B Areas to be Evaluated During Monitoring Inspections
- C Sample Pre-Reactor Safeguard Examination Notice
- D In-Service Compartment Surveillance Guide (Aircraft Carriers and Submarines Only)
- E Sample Pre-Commissioning Habitability Inspection Checklist for New Construction Ships

3.1 PURPOSE. This chapter addresses the major evolutions confronting the crew from initial man-up through Dock Trials, Fast Cruise and the commencement of Sea Trials.

3.2 SHIPBUILDER'S TEST PROGRAM. Throughout the building phase, the Shipbuilder is responsible for the testing/certification of installed equipment and systems. Reference (a) establishes the Test and Evaluation policy for all phases of a ship's life cycle. This guide contains information concerning the documentation and procedural requirements for a ship's Acquisition, Test and Evaluation Program. Reference (a), in conjunction with the Navy Shipbuilding Program Manager's prepared System Acquisition, Test and Evaluation Handbooks, provides familiarization and an understanding of the total Ship Test Program.

3.3 INSPECTIONS/CERTIFICATIONS/ASSISTS. There are numerous inspections/certifications associated with new construction. Reference (b), which can be obtained from the Supervising Authority, identifies all the certification requirements which have been approved for accomplishment during surface ship industrial periods. The following paragraphs deal with generic inspections or platform unique certifications.

3.3.1 Arrival Assist.

- a. Purpose. To determine that adequate plans have been developed and implemented to support the requirements of Ship's Force training, administration and testing during new construction and to evaluate the ship's ability to conduct various evolutions.
- b. Conduct. The arrival assist visit may be conducted as a single visit or as a series of visits. Appendix A of this chapter provides sample areas to be reviewed during the arrival assist visit.
- c. Scheduling. The arrival assist should be scheduled for accomplishment within a two month period following the arrival of the first crew increment.
- d. Reports. **Formal reports are not required. However, the Immediate Superior in Command (ISIC) should inform the Type Commander (TYCOM) in the event that progress in preparations is evaluated as unsatisfactory.**

3.3.2 Periodic Monitoring/Inspections/Visits.

- a. Purpose.
 - (1) To provide ships in new construction with training and administrative assistance as required by references (c) and (d). The focus will be to improve Ship's Force involvement with the construction process, maintenance and training tasks. Visits of this nature are defined as Tech Assists.

technical manuals or directives. The message will also specify the ship's current certification status, including deficiencies that preclude full certification for the operational capabilities specified by the CNO.

- (3) Certification. NAVAIR or NAWC grants or rescinds certification via message after review of the recommendation from the NAWC team coordinator and any other information that may be available. The certification message will be addressed to the TYCOM and other appropriate commands. It will specify the ship's present aviation status, including any corrections that must be accomplished to achieve full certification for the operational capabilities specified by the CNO. Certifications granted will remain in effect until such time that major equipment modifications or alterations are accomplished or until the next overhaul (not to exceed two years on Air Capable Ships and Amphibious Assault Ships unless rescinded by NAVAIR or NAWC.
- c. Technical Publications. A listing of technical publications required for Air Certification can be obtained from the TYCOM. References (b) and (q) list specific certifications required for aviation platforms.

3.3.7 Salvage Inspection (Submarines only).

- a. Purpose. To determine the readiness of submarine rescue and salvage equipment.
- b. Conduct. Submarine Salvage Inspections will be conducted in accordance with the direction of Volume IV, Chapter 18 of this manual.

3.3.8 Field Calibration Activity/Aircraft Intermediate Maintenance Department Calibration Laboratory Initial Certification (Submarines, Aircraft Carriers and Surface Forces, as appropriate).

- a. Purpose. To verify the NAVSEA/NAVAIR Designated Command has in place the necessary documentation, facilities, equipment and trained personnel to support calibrations of **Test, Measurement and Diagnostic Equipment (TMDE)** as specified in references (t) and (u).
- b. Conduct. Initial certification is conducted by the NAVSEA/NAVAIR Metrology and Calibration (METCAL) Technical Representatives in accordance with the requirements of references (v) and (w).
- c. Scheduling. Initial certification should be accomplished **after approval of Establishment of Field Calibration Activity Request** and prior to or concurrent with delivery. Coordination between the **TYCOM METCAL Point of Contact, METCAL Technical Representative**, the Navy Shipbuilding's Program Manager and Ship's Calibration Coordinator is required to insure all participants can support the certification date and that all required TMDE is available.
- d. Reports. Reports will be per the requirements of reference (v) and submitted by letter to the applicable TYCOM and Commanding Officer (CO).
- e. Additional information concerning calibration can be found in Volume VI, Chapter 9 of this manual.

3.3.9 National Policy on the Control of Compromising Emanations Inspection.

- a. Reference (x) promulgates the Navy's implementation of the National Policy on the Control of Compromising Emanations (TEMPEST). Reference (y) provides installation criteria for shipboard secure electrical information processing systems.
- b. All ships are considered to be operating under an "acceptable risk" category until such time as they have been certified to meet National Policy. Two types of inspections are conducted to certify ships:
 - (1) Instrumented TEMPEST Survey. The Instrumented TEMPEST Survey is a comprehensive inspection which will only be done on selected ships to certify the ship class.
 - (2) Visual TEMPEST Inspection (VTI). The VTI is a less comprehensive inspection to certify compliance with class and CNO standards. VTIs can be conducted by **Regional Maintenance Centers (RMC)**, industrial activities and Navy Command, Control, and Ocean Surveillance Center Naval In-service Engineering.

- c. A VTI will be accomplished on all new construction ships. This inspection will be scheduled upon the completion of the installation of all Radio Room/secure electrical information processing equipment. In addition, a TEMPEST file needs to be established to include all actions pertaining to installations, modifications or alterations to secure electrical information processing equipment or centers. The specific information to be retained is identified in reference (x).

3.3.10 Diesel Inspection.

- a. Purpose. To validate/certify engine alignment, foundation integrity, engine frame integrity, shimming and stressing requirements, hold down bolts, blower operation and engine performance.
- b. Conduct. Diesel inspections shall be conducted in accordance with Volume IV, Chapter 4 of this manual.

3.3.11 Habitability Inspection. Navy ships are built to meet habitability standards for berthing areas, messing areas, water closets, laundry and barber facilities as set forth in reference (z). Prior to certifying readiness for In-Service the ISIC will conduct a Habitability Inspection to determine that the ship is materially ready for the crew to move aboard. The results of the Habitability Inspection shall be reported to the TYCOM by message (see Volume I, Chapter 2, Appendix A₄ of this manual for sample message).

- a. The Habitability Inspection for submarines is conducted two to four weeks prior to certifying the ship's readiness for In-Service, two to four months prior to this certification for aircraft carriers and just prior to delivery and crew move aboard for all others.
- b. Compartment Surveillance Guide. Appendix D of this chapter has been included to serve as a guide when preparing for the Habitability Inspection and In-Service. Appendix E of this chapter is a sample checklist which can be tailored to any platform.

3.3.12 Requirements for In-Service. Assigned Ship's Force constitutes the only group of personnel authorized to operate naval nuclear powered ships during dockside testing and Sea Trials. Because of this requirement, references (c) and (d) specify that nuclear powered ships in construction are assigned an active status of In-Service prior to commencement of the first Sea Trial (two to four weeks for submarines, two to four months for aircraft carriers) and retains that status until delivery of the ship. To support this event the contractor is required to make the ship available to the Navy for a period of two days for a Habitability Inspection two to four weeks prior to In-Service. At In-Service, the responsibility for, and custody of, fissionable materials is transferred from the Supervising Authority to the Officer In Charge (OIC) of the ship. The PCO becomes the OIC of the ship and continues in this capacity until Commissioning at which time the OIC becomes the CO.

- a. Responsibilities for Safety of the Ship. Placing the ship In-Service has an impact upon the established responsibilities for safety of the ship.
 - (1) Prior to In-Service, or Delivery for Surface Ships, the industrial activity's responsibilities for the safety of the ship are all inclusive. The Supervising Authority is responsible for monitoring the industrial activity's safety and fire protection program.
 - (2) At In-Service the PCO assumes the duties of OIC and the responsibility for the safety of the ship. Reference (aa) states that the OIC of a ship In-Service has the same responsibilities for the safety of the ship as a CO of a commissioned ship.
- b. Division of Responsibility. In order to establish clear lines of responsibility at In-Service and to eliminate unnecessary duplication of effort, the following shall apply:
 - (1) Ship's Force. At In-Service, Ship's Force must have operational control of all ship's systems required to maintain ship safety (i.e., ventilation, firefighting and flood control) in the ship and will stand all shipboard watches, making all security patrols of the ship, the moorings, and the immediate adjacent pier.
 - (2) Industrial Activity. The industrial activity continues to perform all contract requirements until delivery. The industrial activity will support Ship's Force in the performance of those requirements assumed by Ship's Force as required.

- (3) Supervising Authority. During preparations for In-Service, conduct liaison between Ship's Force and the industrial activity to ensure that the above division of responsibility is understood and agreed to. Verify that a schedule of compartment/space and system turnover is prepared, mutually agreed to, and that a means to identify deficiencies in systems and spaces turned over to Ship's Force is executed.

3.3.13 Degaussing/Deperming. Reference (ab) establishes the provision for checking, operating and maintaining degaussing systems. Reference (ac) contains basic principles and background information concerning degaussing.

- a. Deperming, a method of neutralizing the magnetic field of a ship's hull to minimize permanent magnetism, is required for all new construction ships.
- b. A listing of degaussing/deperming facilities currently available is contained in the Degaussing Folder (NAVSEA Form 8950/1) which is issued to individual ships.
- c. Degaussing/deperming requirements shall be accomplished in accordance with Volume VI, Chapter 12 of this manual.

3.3.14 Light-Off Assessment (Surface Force Ships only).

- a. Light-Off Assessments (LOA) for boilers, Main Propulsion diesel and gas turbine ships will be conducted before propulsion plant operations at an appropriate time before completion of the fitting out availability. The ISIC, with the assistance of Afloat Training Group Atlantic/Pacific, will determine if ship's training procedures and status support safe plant operations, if management programs are effective, if the propulsion plant is ready for light-off and Ship's Force ability to combat a main space fire.
- b. References (ad) and (ae) address propulsion plant LOAs administered by the ISIC, with the assistance of Afloat Training Group Atlantic/Pacific, and recommend that Ship's Force is to have a minimum of two weeks after completion of industrial activity work in the engineering spaces prior to the LOA. Experience has shown this two week period is crucial, not only to successful completion of the LOA but to the operation of the ship subsequent to construction. If it appears the two week interval is in jeopardy, the ship's OIC should discuss ways to speed up the industrial activity work with the Ship Superintendent or this subject should be addressed at Supervising Authority progress conferences.
- c. Completion of industrial activity work should be interpreted as meaning that all known work and testing authorized for accomplishment by other than Ship's Force, and which is necessary to support LOA, is complete, including the removal of associated staging and equipment, reinstallation of access doors and hatches, cleanup and painting. Fuel and lube oil, and feedwater should be on board. Partial or temporary installations do not meet completion criteria except as necessary to support the LOA itself or, in the case of lagging pads, as necessary to allow readjustment upon light-off to hot settings of regulators, reducers, and relief valves. The systems and spaces involved in LOA vary from ship to ship, but normally include all systems and spaces needed to support the plant(s) being inspected. This would include main and auxiliary machinery spaces, switchboards, diesels, shaft alleys, uptakes, repair lockers, oil laboratories and calibration laboratories for Automatic Boiler Control systems, etc. Confirm spaces subject to inspection with the Afloat Training Group.
- d. Emergent work items or additional discrepancies requiring industrial activity work that become apparent during the pre-LOA period need to be accommodated. Normally these requirements can be worked during night shifts or inclusive weekends. However, any industrial activity work during this period will be permitted only with the consent of the Supervising Authority and the OIC.
- e. This Key Event is largely an exercise in attention to detail and coordination at and between all three levels of maintenance activity (Ship's Force, the Shipbuilder and the Supervising Authority). LOA preparations should begin months before the availability.
- f. First-hand inspections of main and auxiliary machinery spaces are most effective when industrial activity personnel are not on board (weekends and holidays). During these periods, joint inspections by the Engineer Officer with Leading Petty Officers are recommended for every main space. Similar inspections of the auxiliary spaces should be conducted by either the CO or the Executive Officer, along

with the Leading Petty Officers of those spaces. Discrepancy lists convert readily to work lists. Night repair teams (primarily composed of duty section personnel) can work discrepancies when industrial activity workers are not in the way.

- g. The Plan of Action and Milestones for a successful LOA must be written in detail, at the minor equipment/minor task level, and the more detailed, the better. It is a dynamic document and requires updating and revision daily as the LOA date approaches.

3.3.15 Shipboard Crane Certification Program (Surface Force Ships and Aircraft Carriers as appropriate). The Shipboard Crane Certification Program established by reference (af) is intended to improve the reliability and safety of all shipboard cranes and is applicable to all cranes mounted on board and cranes assigned to forces afloat (exceptions are listed in reference (af)). Initial crane certification should be accomplished per reference (af).

3.3.16 Marine Gas Turbine Inspection.

- a. Purpose. To validate/certify engine alignment, foundation integrity, engine frame integrity, engine resilient mounts, fluid system cleanliness, intake and uptake cleanliness, compressor and turbine blade integrity, fluids leakage, controls and instrumentation functionality and engine starting and performance.
- b. Conduct. Marine Gas Turbine inspections shall be conducted in accordance with Volume IV, Chapter 23 of this manual.

3.4 MAINTENANCE AND MATERIAL MANAGEMENT PROGRAM.

3.4.1 Planned Maintenance System.

- a. The installation of the Planned Maintenance System (PMS) on new construction ships should be scheduled to provide maintenance documentation to support the Operational Control Transfer (OCT) of systems/equipment from the shipbuilder to Ship's Force. This early load out of PMS allows Ship's Force personnel to become familiar with the maintenance procedures and facilitates the identification of problems with the Maintenance Requirement Cards (MRC) prior to the ship being placed in operation. Local RMC coordinates the scheduling of PMS installations with the ship's Maintenance and Material Management (3-M) Coordinator. In addition, Naval Sea Logistics Center (NAVSEALOGCEN) is responsible for:
 - (1) Generating a preliminary List of Effective Pages (LOEP) for Phase I validation.
 - (2) Conducting Phase I of the PMS installation.
 - (3) Generating a final LOEP based on Phase I and 3-M Coordinator Feedback.
 - (4) Notifying local RMC of the required PMS documentation (LOEP requirements) and the date the documentation is required to support Phase II PMS installation.
 - (5) Compile Phase II PMS package and forward to ship.
 - (6) Conduct Phase II PMS installation.
 - (7) Effect additional LOEP corrections as a result of Phase II.
 - (8) Outbrief with ship's PCO/OIC concerning status of ship's 3-M program.
- b. PMS installation for nuclear powered ships will be conducted approximately six months prior to initial reactor plant criticality. The installation for Surface Force Ships will be conducted at least three months prior to delivery. Installation of PMS is accomplished in two phases.
 - (1) Phase I. Phase I results in the establishment of a ship's LOEP. Local RMC, utilizing either the LOEP from the previous ship of the class or configuration information provided by Submarine Maintenance Engineering, Planning and Procurement (SUBMEPP) Activity (Submarines only), Supervisor of Shipbuilding Newport News PMS 312C, (Aircraft Carriers) or applicable TYCOM (Surface Force Ships), generates a preliminary LOEP for Ship's Force review. This preliminary LOEP and copies of the listed Maintenance Index Pages (MIP) are delivered to the new construction unit for a review by the ship's 3-M Coordinator, Work

Center Supervisors and maintenance personnel. Ship's Force personnel review the documentation, verify MIP to Work Center assignments and approve the preliminary LOEP. Phase I occurs approximately two months prior to Phase II.

- (2) Phase II. Phase II is the actual load out of PMS documentation, final verification of the LOEP, generation of preliminary schedules for local RMC review and a Ship's Force validation of provided documentation. Depending upon the ship class, quantity of documentation, and/or Ship's Force preparation, Phase II can last from two to four days. Additionally, maintenance support organizations such as Naval Surface Warfare Center, Carderock Division (NSWCCD), SUBMEPP or Submarine Monitoring, Maintenance and Support Program Office may be participants.
- c. The preparation of preliminary Cycle, Quarterly, or Weekly schedules to support PMS load out prior to the preparation of First Quarter after Overhaul schedules is recommended. As a minimum, the development of a cycle schedule for each work center should be accomplished prior to Phase II PMS installation. As systems/equipment is turned over, Ship's Force maintenance should be scheduled to support. This preliminary quarterly schedule (schedule "A") is utilized to track maintenance prior to the official First Quarter after Overhaul start date. Additional preliminary quarterly schedules identified as "B", "C", etc. may be developed as required.
 - d. The "official" PMS start date depends upon several factors: OCT of equipment, available man power, availability of supporting documentation and the availability of tools, parts, test equipment, and material. The start date is also an arbitrary date arrived at by the ship's 3-M Manager and 3-M Coordinator. A start date should be selected that causes as little disruption and preparation of schedules as possible. Utilization of preliminary schedules as discussed in paragraph 3.4.1.c of this chapter will allow for the flexibility to start PMS "officially" at the beginning of a quarter. However, should this approach not support your situation, the starting of PMS should be indicated on your quarterly schedule with a yellow vertical line, top to bottom, indicating your start date.
 - e. Inactive Equipment Maintenance (IEM).
 - (1) IEM, per the direction of reference (ag), may be implemented anytime that an equipment will be out of service for thirty days or longer. The implementation of IEM may be appropriate for those systems/equipment which was transferred to ship's custody early in the construction cycle. Ship's Force should follow the guidance of reference (ag) when implementing.
 - (2) In deciding whether to place equipment in lay up, consideration should be given to the training opportunity lost. As long as equipment is in an active status, Ship's Force will be performing PMS. By virtue of accomplishing those maintenance tasks, they will become more familiar with the equipment, its operation and the maintenance procedures. Maintaining equipment in an active status also allows for the identification of procedural problems within the MRCs.

3.4.2 Technical Feedback Reports. Ship's Force should start using Technical Feedback Reports (TFBR) to report problems with PMS as soon as the PMS package is installed. TFBRs should be submitted per the requirements of reference (ag). The TFBR tracking log should be established, even if PMS has not officially started. TFBRs are processed through the ISIC for further processing to RMC. If an ISIC is not available, TFBRs are to be processed through the TYCOM or directly to RMC. New construction ships will provide their TFBRs to the local RMC. The current contact information for the RMCs is listed in Volume VI, Chapter 2, Appendix A of this manual.

3.4.3 Establishment of Current Ship's Maintenance Project. The ship's Current Ship's Maintenance Project (CSMP) will be initialized at delivery. That does not mean however, that significant maintenance related events do not happen during the construction period. In fact, every industrial activity has their own deficiency tracking programs, all of which contain a certain degree of data that should be retained in the ship's CSMP. The problem is that this data resides on industrial activity computers which for the most part do not "talk" to Navy computers. When the ship leaves the industrial activity, it generally leaves without this data. Ship's Force will load into the CSMP any deficiencies not adjudicated at delivery and any historical construction related maintenance data deemed worthy of future retrieval.

3.4.4 Naval Tactical Command Support System. Space & Naval Warfare Systems Center Atlantic (SSC Atlantic) and Space & Naval Warfare Systems Center Pacific (SSC Pacific) are responsible for the software installation, installation training, hardware support and software support. Ship's Force should initiate liaison with the appropriate SSC Atlantic and Pacific team to facilitate installation or installation training. All support requests are initiated via the Navy 311 Help Desk. Additional details describing the SSC Atlantic and Pacific support functions are addressed in Chapter 2, paragraph 2.10.5 of this volume.

3.5 EQUIPMENT LOAD OUT.

3.5.1 Test Equipment. The General Purpose Electronic Test Equipment (GPETE) load out involves personnel from the ship, the Supervising Authority, NAWC, China Lake, CA. The actual load out will vary dependent upon the platform. Generally, the equipment arrives during the construction phase and is stored by the shipbuilder until load out. Ship's Force, if not requested to do so by the Supervising Authority, should inventory and identify shortages while the GPETE is in storage. **Coordinate with TYCOM METCAL Point of Contact to assist in resolving TMDE deficiencies.**

3.5.2 Hand Tools and Weight Handling Equipment. Hand tools and weight handling equipment will also be arriving. Inventory of this equipment against Allowance Equipage Lists (AEL)/Allowance Parts Lists (APL) or class specific load lists at the earliest opportunity ensures the required support material is available when maintenance of equipment begins. Weight handling equipment requires certification prior to use and while it may be months before this equipment is required, a recall schedule should be developed to get the equipment certified.

3.6 LOGISTIC SUPPORT.

3.6.1 Technical Manuals and Drawings. Technical manuals and drawings are provided by the Supervising Authority and the Navy. The shipbuilder develops and provides manuals and drawings for all Contractor Furnished Equipment (CFE), including equipment furnished by subcontractors. In the case of Government Furnished Equipment (GFE), the shipbuilder will identify the required manuals to the Navy Publication and Printing Service Manuals Office, Washington, D.C., via the Supervising Authority and the Navy Shipbuilding Program Manager. Navy Publication and Printing Service Manuals Office will deliver the manuals to the shipbuilder. For the first ship of a class, equipment manuals for new design GFE may not be immediately available from the Navy Publication and Printing Service Manuals Office. These manuals will be shipped with the equipment by the vendor. The shipbuilder shall provide stowage and custody of this documentation until actual shipboard load out. To ensure all required technical manuals and drawings are received, initial documentation validation should be accomplished on a random sampling basis with emphasis placed on low visibility items such as power supplies and electronic subsystem manuals. Final validation will occur during load out. Each Navy Shipbuilding Program Manager has assigned an activity with the responsibility for loading out of Technical Manuals and Drawings. Contact the Supervising Authority or the Navy Distance Support Anchor Desk to determine the Navy Shipbuilding Program Manager. The Anchor Desk can be reached at 1-877-418-6824 or by e-mail (help@anchordesk.navy.mil).

- a. Ship Systems Manual (SSM)/Ship Information Book (SIB). The SSM/SIB (SSM for submarines and SIB for surface force ships and aircraft carriers) are the primary descriptive and operating manuals for non-propulsion plant ship systems. They are designed as a class manual and are the basic source of information for locating, describing and operating the following non-propulsion plant systems:
 - (1) Mechanical.
 - (2) Piping.
 - (3) Electrical.
 - (4) Electronic.

These manuals do not provide detailed maintenance information but do reference sources of information on maintaining, testing, troubleshooting, installing and removing these systems and equipment. SSMs and SIBs must be turned over to the ship prior to or at OCT or custody transfer of the system or equipment.

- b. Engineering Drawings. All engineering drawings belong to one of two groups: ship construction drawings or equipment drawings. Each group is made up of several types of drawings.

- (1) Ship Construction Drawings. These drawings are developed for building the ship and to reflect installed systems. These drawings are each assigned a seven-digit NAVSEA number and depending upon the platform a three-digit Component Identification Number/Ship Work Breakdown Structure/Expanded Ship Work Breakdown Structure may appear on the drawing. The NAVSEA number identifies the drawing and the Component Identification Number/Ship Work Breakdown Structure/Expanded Ship Work Breakdown Structure assigns the drawing to a group of related drawings. Ship construction drawings are usually “class drawings” however, ships of a class, built at different times, may vary from the original design as improvements are made. This necessitates the development of hull unique construction drawings which have been verified by the shipbuilder and Supervising Authority to reflect an individual ship’s configuration. Systems requiring these Selected Record Drawings (SRD) are identified in the ship’s building specifications.
 - (2) Equipment Drawings. Equipment drawings describe equipment shown on ship construction drawings. They are prepared by industrial activities and/or equipment manufacturers and may be called vendor drawings. Equipment drawings are rarely assigned NAVSEA or any other government controlled number. These drawings are identified by a Commercial and Government Entity code with a manufacturer’s drawing number.
- c. Drawing Types. Engineering practices have developed common titles that are used on most drawings. By understanding the kind of technical information associated with each title, the drawing needed for a given job can be determined. The following is a list of common drawing types (they may be either equipment or ship construction drawing group types).
- (1) System diagrams - A system diagram shows how a system is designed and describes the relationship among system components. System diagrams do not include physical or dimensional data, but normally refer to other drawings and documents that contain detailed information.
 - (2) Arrangement drawings - Arrangement drawings show locations, dimensions, and other system component information necessary to make correct installation on the ship.
 - (3) Assembly and subassembly drawings - Assembly and subassembly drawings show how individual parts fit together to form a larger component or equipment.
 - (4) Installation drawings - Installation drawings show piping, foundations, ventilation ducting, and other installation details. Installation drawings are used to install systems and equipment in the ship.
 - (5) Outline drawings - Outline drawings show the outward appearance of major system components and contain dimensions and service requirements necessary to install the component.
 - (6) Detail drawings - Detail drawings show dimensions and other manufacturing data for individual parts of components.
 - (7) Electrical drawings - Electrical drawings have a family of titles similar to those of other engineering drawings. Proceeding from the general to the detailed the following are the common electrical drawing types:
 - (a) Electrical system wiring diagrams - Electrical system wiring diagrams show how the overall system is intended to function.
 - (b) Cabling drawings - Cabling drawings describe cable runs in greater detail (similar to piping system diagrams).
 - (c) Wireway drawings - Wireway drawings show how cables are routed from one point to another in the ship (similar to system arrangement drawings).
 - (d) Schematic wiring diagrams - Schematic wiring diagrams describe individual wires inside the cables and how they connect to components.

- (e) Wiring tables - Wiring tables provide detailed point-to-point data for connecting ship's wiring between components.
- d. Technical Variance Documentation (TVD). Drawings may be amended with supplementary information called TVD. A set of TVD is a collection of documents describing how the as-built configuration of a ship differs from the class drawing design. TVD is not intended to be a revision to a drawing. Liaison Problem and Solution Sheets, Engineering Notices, Waivers and Deviations are some of the documents that make up TVD.
- e. Format of Onboard Drawings. Very few drawings are provided to ships and shore facilities in hard copy form. Most are on microfilm aperture cards or microfiche, collectively known as microform. For selected platforms, Compact Disc Read Only Memory (CD-ROM) is being utilized. However, some of the more important SRDs are provided in hard copy as well as in other mediums.
- f. Ship Drawing Index (SDI). The SDI lists all drawings for a class of ship. Using the SDI is the only way to determine a drawing's applicability. In addition to drawing applicability, it provides drawing revision applicability and TVD applicability. The SDI will also identify whether a drawing contains Submarine Safety (SUBSAFE) information, Noise Control information or is an SRD.

3.6.2 Unrestricted Operations Maintenance Requirement Cards (Submarines only).

- a. Reference (ah) establishes the maintenance requirements and identifies the responsibilities and actions required to support continued unrestricted submarine operations to design test depth. This program is invoked on all SUBSAFE certified submarines. To support this program the Navy Shipbuilding Program Manager issues individual manuals containing required, periodic SUBSAFE maintenance actions for each class and in some instances particular ships.
- b. Load out of Unrestricted Operations (URO) MRCs will be accomplished at delivery. The ISIC Quality Assurance Officer will provide to the ship's Quality Assurance Officer the ship's copy of the "URO CD-ROM". SUBMEPP manages the URO program for Navy Shipbuilding Program Managers.
- c. Additional information concerning the URO program can be found in Volume VI, Chapter 25 of this manual.

3.7 OPERATIONAL CONTROL TRANSFER. OCT, depending on the platform, will happen in one of several ways. The entire ship is turned over at one specific time (ship custody transfer), compartments/spaces are turned over as completed, or systems are turned over as completed without regard to space completion.

- a. The shipbuilder will:
 - (1) Ensure all testing is complete to the most practical extent possible.
 - (2) Provide Ship's Force and the Supervising Authority with a turnover schedule.
 - (3) Conduct a review of all existing work/deficiencies with Ship's Force and the Supervising Authority and determine those items that must be cleared or resolved to support a safe and operational system turnover.
 - (4) Verify system, space or ship ready for turnover.
 - (5) Conduct walk-through with Ship's Force.
 - (6) Execute turn-over.
- b. Ship's Force should be prepared to:
 - (1) Provide system experts for walk-throughs.
 - (2) Address concerns regarding turn-over to the Supervising Authority's Ship Manager.
 - (3) Ensure all work/deficiencies are cleared or resolved to ship's satisfaction prior to acceptance.
 - (4) Assume maintenance responsibility upon receipt. (PMS installation should be scheduled to support OCT).

NOTE: IN SOME INSTANCES SYSTEMS MAY BE TURNED OVER THAT REQUIRE TEMPORARY SUPPORT SYSTEMS. THE INDUSTRIAL ACTIVITY WILL PROVIDE OPERATING INSTRUCTIONS, DRAWINGS (AS NECESSARY) AND OPERATING INDOCTRINATION TO SHIP'S FORCE. FOLLOWING THE REMOVAL OF TEMPORARY SUPPORT SYSTEMS, SHIP'S FORCE AND THE SHIPBUILDER SHOULD BE PREPARED TO CONDUCT ADDITIONAL WALK-THROUGHS.

3.7.1 Sound Silencing Programs Unique to New Construction (MHC/SSN only).

- a. Isolation System Survey. During the construction process, the shipbuilder, through Noise Reduction Program requirements, periodically inspects the ship to identify incorrect installation and poor construction techniques relating to the silencing nature of the ship. It is imperative that no sound shorts exist between sound isolated systems/components and the hull structure. Ship's Force can play a major role in the inspection process by identifying deficiencies. This survey is the basis for acoustic measurements to be completed in subsequent surveys. Additional information concerning submarine noise reduction surveys is addressed in Volume VI, Chapter 23 of this manual.
- b. (Submarines only) Topside and Housekeeping Survey. During the construction process, this survey is completed to accomplish two aspects of silencing. First, the topside inspection checks the outside of the pressure hull, especially flow exposed areas, to ensure that tones or rattles are not caused by loose gear, fairing plates, and other discontinuities. Secondly, the housekeeping inspection checks the inside of the pressure hull to ensure sound shorts do not occur as a result of installation of lockers and locker doors, stowage, clogged ventilation ducts or filters, etc. This survey usually identifies problems associated with items not covered by ship design, but those items typically handled by the ship.
- c. Structureborne and Oversight Surveys. Upon installation of Noise Critical components and their associated operating systems, structureborne noise surveys are accomplished to check the acoustic nature of the installation. Proper installation of isolation features and proper maintenance of the component during any lay up is crucial to the success of this survey. Ship's Force must continually be aware of the installation practices of the shipbuilder and thoroughly inspect the installation for sound shorts and proper alignment prior to system/component turnover. The Oversight Survey is accomplished outside the hull (pressure hull for submarines) as an indication of radiated noise. Proper operation of systems and components during this process is crucial to satisfactory acoustic levels. Reference (ai) provides additional information concerning acoustic surveys for submarines.

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APPENDIX A
AREAS TO BE EVALUATED DURING
ARRIVAL ASSISTS

1. As a minimum, the following areas should be evaluated. Duplicate inspection of areas covered by other inspections need not be made.

1.1 Training program which should include instructions in the following:

- a. Industrial activity organization, including management and working levels.
- b. Industrial activity procedures and practices, including:
 - (1) OCT.
 - (2) Tag-Out.
 - (3) Ripout.
 - (4) Industrial Activity Deficiency Correction.
 - (5) General Testing Requirements. Personnel should be familiar with references (aj) and (ak).
 - (6) The industrial activity system for accomplishing planned maintenance on equipment under their cognizance.
- c. General schedule of Key Events and phases of work and testing.
- d. Safety requirements including Ship's Force and industrial activity responsibilities for:
 - (1) Dry Dock Safety.
 - (2) Fire Watches.
 - (3) Watertight Integrity.
 - (4) Reactor Plant Safety.

1.2 Status of administrative preparations, including:

- a. Ship and department organization manuals and directives to ensure administration is in accordance with current requirements.
- b. Ship and departmental training plans for implementation during construction.
- c. Procedures for qualifying underway/steaming watchstanders and maintaining proficiency for inport watchstanders, including:
 - (1) Formal provisional qualification procedures.
 - (2) Qualification goals for Key Events, such as undocking/launching, operational testing of ship and propulsion plant systems, steam testing, initial criticality, etc. The goals for Fast Cruise should include a three section watch capability for the entire crew.
- d. Procedures for maintenance and security of Ship's Force barge or office spaces.
- e. General plan for Ship's Force responsible actions including provisions for:
 - (1) Barge, berthing and messing facilities.
 - (2) Routine ship and barge watch bill.
 - (3) Scheduling of required shore based schools and leave for personnel.
 - (4) Ship's Force planned maintenance routines.
 - (5) Provisions for shift work during known periods of intensive testing (e.g., Hot Ops, Power Range Testing).

(6) Target dates for completion of key ship and department directives and procedures.

1.3 Evaluate the capability of the crew to perform industrial activity type evolutions including:

- a. Ability to review industrial activity Work Authorization Forms, major system tag-outs, and test procedures.
- b. Inport and dry dock watchstanding procedures including special inspection requirements for systems in abnormal lineups or partially removed.
- c. Ability to inspect and monitor ship conditions in relation to the special requirements for watertight integrity. This evaluation should include observation of a trim/draft change calculation by the Ship's Safety Council representative.

1.4 Ensure that Ship's Force has a satisfactory understanding of the following:

- a. Relationship with the industrial activity and Supervising Authority including ship's responsibility regarding weekly management meetings.
- b. Relationships with the ISIC and the TYCOM Type Desk, including the ship's responsibility for reporting problem areas.
- c. Relationship with the local Naval Reactors Representative.
- d. Functions and responsibilities of the Joint Test Groups (Nuclear/Hull, Propulsion and Auxiliaries/Weapons) and the Ship's Safety Council.
- e. Control mechanisms for work/tests affecting ship's condition.
- f. Relationship with the TYCOM industrial activity representative (if assigned).

VOLUME I
CHAPTER 4
TRIALS

REFERENCES.

- (a) OPNAVINST 9080.3 - Procedures for Tests and Trials of Navy Nuclear Powered Ships Under Construction, Modernization, Conversion, Refueling and Overhaul
- (b) COMNAVAIRLANTINST 9080.2 - Conduct of Trials and Inspections Incident to Construction, Overhauls or Availabilities of Nuclear Powered Aircraft Carriers (CVN)
- (c) COMNAVAIRLANT/COMNAVAIRPACINST 3500.20 - Aircraft Carrier Training and Readiness Manual
- (d) OPNAVINST 4700.8 - Trials, Acceptance, Commissioning, Fitting Out, Shakedown and Post Shakedown Availability of U.S. Naval Ships Undergoing Construction or Conversion
- (e) COMNAVSURFLANT/COMNAVSURFPACINST 3502.2 - Surface Force Training Manual
- (f) INSURVINST 4730.2 - Trials and Material Inspections of Submarines
- (g) NAVSEA S9086-C4-STM-000 - NSTM Chapter 094 (Trials)
- (h) INSURVINST 4730.1 - Material Inspections (MI) of Surface Ships
- (i) NAVSEAINST C9094.2 - Submarine Valve Operation Requirements for Builders and Post-Overhaul Sea Trial Test Dives
- (j) OPNAVINST C3000.5 - Operation of Naval Nuclear Powered Ships
- (k) OPNAVINST 4730.5 - **Trials and Material Inspections of Ships Conducted by the Board of Inspection and Survey**
- (l) INSURVINST 4730.11 - Preparation of Deficiency Forms
- (m) NAVSEAINST 4790.8/OPNAVINST 4790.4 - Ships' Maintenance and Material Management (3-M) Manual
- (n) NAVSEA S0300-B2-MAN-010 - Supervisor of Shipbuilding, Conversion and Repair Operations Manual
- (o) OPNAVINST C9210.2 - Engineering Department Manual for Naval Nuclear Propulsion Plants
- (p) COMNAVSUBFOR OPORD 2000
- (q) COMSUBLANTINST 5400.4/COMSUBPACINST 5400.7 - Submarine Force, U.S. Atlantic/Pacific Fleet Regulations

LISTING OF APPENDICES.

- A Specific Dock Trial Test Areas
- B Minimum Fast Cruise Requirements
- C Listing of Tests to Be Performed During Aircraft Carrier Builder's Trials
- D Listing of Tests to Be Performed During Initial Tightness Dive
- E Escort Ship Capabilities for Submarine Sea Trials
- F Listing of Tests to be Performed Prior to, During and Following First Dive to Test Depth
- G Submarine Sea Trial Situation Report (SITREP)

4.1 **PURPOSE.** To identify the Trials incident to new construction, provide a brief description of each, identify unique support requirements and list specific test areas.

4.2 **DOCK TRIALS.**

4.2.1 **Purpose.** To demonstrate that major systems and equipment **is** ready to support Fast Cruise and Sea Trials.

4.2.2 **Conduct.** Dock Trials are conducted by Ship's Force in accordance with reference (a) for nuclear powered ships and in accordance with the Builder's Contract for Surface Force Ships. Normally a period of one day is assigned for integrated Dock Trials, tests and evolutions.

4.2.3 Scheduling. Dock Trials must take place prior to crew certification for submarines, prior to Fast Cruise for aircraft carriers and prior to the first Ship's Force underway period for Surface Force Ships. Dock Trials should be scheduled by mutual agreement between the ship, shipbuilder and the Supervising Authority. Dock Trials should be completed with adequate time allowed to correct deficiencies.

NOTE: THE SHIPBUILDER/SUPERVISING AUTHORITY MAY DESIRE TO CONDUCT "MACHINERY CHECKOUT" OR SYSTEM CHECKS PRIOR TO DOCK TRIALS IN ORDER TO TEST SHIP SYSTEMS. COMPLETION OF REPAIRS AND MODIFICATIONS ARE NOT REQUIRED EXCEPT FOR SYSTEMS THAT DIRECTLY SUPPORT THE TESTS. IN ORDER TO SUPPORT THESE EVOLUTIONS, CLOSE LIAISON BETWEEN THE PROSPECTIVE COMMANDING OFFICER (PCO)/OFFICER IN CHARGE (OIC) AND THE SHIPBUILDER/SUPERVISING AUTHORITY WILL BE REQUIRED.

NOTE: SHIP'S FORCE MUST HAVE OPERATIONAL CONTROL OF ALL SHIP'S SYSTEMS REQUIRED FOR SEA TRIALS PRIOR TO THE CONDUCT OF DOCK TRIALS.

4.2.4 Specific Test Areas. There are specific tests which relate to both system and ship safety which must be conducted in preparation for Fast Cruise and Sea Trials. Appendix A of this chapter lists the minimum alongside tests to be conducted by Ship's Force during Dock Trials. References (b) and (c) provide additional information for aircraft carriers.

4.3 FAST CRUISE.

4.3.1 Purpose. To train the crew and determine the crew's ability to safely take the ship to sea.

4.3.2 Conduct.

- a. Fast Cruise is conducted in accordance with references (a), (d), and (e).
- b. In addition to the normal underway routine, the Commanding Officer (CO) or OIC shall have all equipment operated to check for proper operation and to determine the state of training of the crew. Fast Cruise shall, as far as is practical, simulate at-sea operating conditions. It is to be conducted by Ship's Force and is to be unhampered by construction or repair work or by movement of industrial activity personnel through the ship. Neither the shipbuilder nor the Supervising Authority shall schedule any trials, tests or other work on the ship during this period.
- c. The ship will be operated as if underway, simulating the various evolutions required for safe operation. Each underway watch section shall be exercised in the evolutions which are normally performed on a section basis. Check out all communication systems during each evolution. Ensure that each is in proper working order and that, where duplicate systems exist, a priority system is designated.
- d. (Submarines only) The Fast Cruise should be a minimum of four days in duration. It should be completed within a five-day period. It should end not more than three days prior to underway trials. Normally, the ship will go to sea for underway trials within a day after completion of Fast Cruise. Should the 72 hour period be exceeded, the Type Commander (TYCOM) may direct an additional Fast Cruise.

4.3.3 Scheduling. Fast Cruise is scheduled immediately prior to underway trials. Approximately 7 days prior to the first underway trial, the Supervising Authority with the concurrence of the CO/OIC notifies the Navy Shipbuilding Program Manager that the ship is ready to commence Fast Cruise (Volume I, Chapter 2, paragraph 2.4.1.v of this manual refers).

4.3.4 Specific Test Areas. Appendix B of this chapter lists the minimum evolutions and drills to be conducted during Fast Cruise. Additional drills and evolutions are at the discretion of the PCO or OIC. References (b) and (c) provide additional information for aircraft carriers, reference (e) for Surface Force Ships.

4.3.5 Reports (Nuclear Powered Ships only). The Supervising Authority with concurrence from the PCO/OIC reports the successful completion of Fast Cruise using the format of Volume I, Chapter 2, Appendix B₇ of this manual (submarines only). Volume I, Chapter 2, paragraph 2.4.1 of this manual refers.

4.4 SEA TRIALS.

4.4.1 General.

- a. The policies, procedures and responsibilities pertaining to Sea Trials for ships undergoing construction are set forth with reference (d). References (a), (f), (g) and (h) augment the basic instruction.
- b. Sea Trials for the various platforms undergoing construction differ in complexity, conduct and scope of Ship's Force involvement. Surface Force Ship platforms such as the DDGs or LHDs go through Builder's Trials (BT) which for the most part are conducted with little to no involvement by Ship's Force. Industrial activity employees take the ship to sea and perform the majority of system/equipment testing. Paragraph 4.4.2 of this chapter provides additional information concerning BTs.
- c. Nuclear powered ships' Sea Trials, however, are much more orientated to Ship's Force involvement. Ship's Force is responsible for taking the ship to sea and operating all shipboard equipment. The terms Alpha Trial, Bravo Trial, Charlie Trial, Combined Trial (CT) and Guarantee Material Inspection (GMI) are most often associated with submarine Sea Trials whereas aircraft carriers undergo BTs prior to Acceptance Trials (AT). Subsequent paragraphs provide amplifying information concerning these trials.
- d. Underway trials following construction, particularly initial submerged and test depth trials for submarines, must be undertaken with the knowledge that the crew lacks recent experience operating as a unit and that the ship's structure and fittings have not been tested in an at-sea environment. All tests and procedures must be conducted carefully and methodically. In the case of submarines, systems and components designed to operate at test depth should not be exercised at test depth for the sole purpose of proving the design. They should be operated at the deepest depth at which they might be used. Trials and tests which are inherently hazardous should not be conducted. For example, a submarine's hovering system should not be demonstrated at test depth. Reference (i) provides additional information concerning the testing of submarine seawater systems during underway Sea Trials. Sea Trials following new construction are normally conducted with a significant number of "riders". These riders represent Naval Sea Systems Command (NAVSEA), TYCOM, Shipbuilder and Board of Inspection and Survey (INSURV) personnel onboard to observe various tests and trial evolutions. The ship's normal load out of Lithium Hydroxide canisters, Lithium Hydroxide curtains, Emergency Air Breathing (EAB) masks, Submarine Escape Immersion Ensemble suits and Oxygen candles is not sufficient to support this increase in personnel. Therefore, an additional four Lithium Hydroxide canisters, four Lithium Hydroxide curtains, one EAB mask, one Submarine Escape Immersion Ensemble suit (as applicable), and two oxygen candles shall be carried for each rider exceeding normal crew manning. Lithium Hydroxide canisters, EABs, Submarine Escape Immersion Ensemble suits (as applicable) and Lithium Hydroxide curtains are to be obtained from the industrial activity.
- e. The following general conditions apply:
 - (1) A shipbuilder generated, Supervising Authority/Navy Shipbuilding Program Manager/TYCOM approved agenda is required for each Sea Trial.
 - (2) All trial periods must be organized such that each member of the crew has an opportunity to get six uninterrupted hours of sleep during each 24 hour period. Sea Trial elements which can be accomplished by a normal watch section may be conducted concurrently with crew rest periods.
 - (3) Sea Trials should normally be scheduled to allow at least three weeks between CT/AT and the scheduled delivery date.
 - (4) The prerequisites for aircraft carrier and submarine Sea Trials are a Pre-Critical Reactor Safeguard Examination (RSE), Crew Certification, Dock Trials and Fast Cruise.
 - (5) Each submarine watch section shall be provided with approximately two hours experience submerged at moderate speeds prior to the deep dive or full power run.

- (6) Critical operation of reactors while naval nuclear powered ships are in a Naval or private industrial activity will be governed by reference (j). Prior to delivery, permission to conduct critical reactor plant operations must be obtained by the Supervising Authority from NAVSEA Nuclear Propulsion Directorate (08).
- (7) During inspections, deficiencies should be limited to those items for which a correction is mandatory to ensure safe operation during Sea Trials.
- (8) At the start of Fast Cruise the ship should be ready in all respects for the commencement of Sea Trials with the exception of the additional training the crew will receive during Fast Cruise.
- (9) Inspectors must determine that all work/testing necessary to support Sea Trials has been completed or identified for completion prior to commencement of Fast Cruise including the following:
 - (a) All ship systems which affect safe operation during Sea Trials must be operable.
 - (b) All work necessary for safe operation of the ship during Sea Trials has been satisfactorily completed and tested. Included must be a check for any special configuration or installations ensuring that they have been authorized by the proper authority (NAVSEA and TYCOM), that their impact has been fully assessed and that the Sea Trial agenda addresses these impacts or limitations.
- (10) NAVSEA and the Supervising Authority are expected to properly discharge their responsibilities for quality assurance and control of authorized industrial work (e.g., it is not necessary for the Immediate Superior in Command (ISIC) inspections to inspect the quality of the pressure hull radiographs or other nondestructive test records of the industrial activity).
- (11) Following completion of the required training and material readiness certification, the CO/OIC must keep the ISIC fully informed of any changes in personnel, training and/or material status which could affect the validity of certification. Prompt notification is required to permit revision of Operational Orders and services required.
- (12) (Submarines only) Prior to getting underway for Sea Trials, Shipyard, Ship's Force and Type Commander shall jointly agree that the required seven day supply of Oxygen (O₂) and seven day supply of Carbon Dioxide (CO₂) removal capacity will be available in each compartment, based upon the number of expected occupants of that compartment, independent of the supply and removal capacity in the other compartment(s).
- (13) Sea Trial Situation Reports (SITREP) (Submarines only). Ships executing Sea Trials associated with a new construction program shall submit daily SITREPs using the message format in Appendix G in accordance with the SITREP guidelines contained in Volume II, Part I, Chapter 3, paragraph 3.6.8.3.9 of this manual.

4.4.2 Builder's Trials. BTs conducted by a private shipbuilder are normally comprised of a Builder's Dock Trial (BDT) and one or more Builder's Sea Trials (BST). Some DDGs are currently undergoing three BSTs. The first BST, referred to as an Alpha Trial by the DDG community, is primarily a propulsion plant trial. The second BST, referred to as a Bravo Trial, primarily covers Combat System evolutions and the third BST is the AT. While the actual content of BSTs will be dependent upon the platform, the primary purpose is still the same; the validation of ship's equipment and systems in preparation for Charlie Trials/AT. Appendix C of this chapter provides a sample listing of tests to be performed during an aircraft carrier's BT.

4.4.3 Alpha Sea Trial (Submarines only). A submarine's first underway period primarily conducted for propulsion plant testing and the initial tightness dive. (First ship of each class normally conducts a dive to Test Depth during this trial).

- a. Testing. The tests and evolutions to be carried out while on the surface en route to the test dive area, just prior to the initial dive and during the initial dive are identified in Appendix D of this chapter.

APPENDIX A
SPECIFIC DOCK TRIAL TEST AREAS

Test Area	Class of Ship			
	MSC Ships	CVN	Surface Force Ships	SSN
1. Check all sound powered/interior communications circuits between all stations.	X	X	X	X
2. Test all alarms, i.e., General Quarters, Collision, etc.	X	X	X	X
3. Test each indication on Ballast Control Panel.				X
4. Test whistle.	X	X	X	X
5. Check emergency lights.	X	X	X	X
6. Operate all hydraulic plants using each installed pump.	X	X	X	X
7. Conduct a complete air charge using only ship's compressors.				X
8. Conduct a normal battery charge using only ship's power and equipment.				X
9. Conduct low pressure blow of all MBTs. Thereafter conduct dockside operation portion of URO MRC 022.				X
10. Flood sanitary tanks and then blow/pump them.				X
11. Operate each main vent valve in hand and power. Following operation, with vent valves shut, conduct a controlled removal of MBT vent covers, one at a time, to check MBT vents for leaks.				X
12. Operate the outboard induction valve in hand and power.				X
13. Operate the diesel engine exhaust valve in hand and power.				X
14. Operate inboard induction valves.				X

Test Area	Class of Ship			
	MSC Ships	CVN	Surface Force Ships	SSN
15. Raise, train and lower periscopes, snorkel, radar and antenna masts and fairings.				X
16. Test operation of all radio transmitters and receivers using all antennas.	X	X	X	X
17. Operate all radar equipment at rated conditions.	X	X	X	X
18. Operate all sonar equipment at rated conditions.			X	X
19. Take and plot fixes using all navigation equipment and each antenna.	X	X	X	X
20. Test operation of drain pump(s) from all operating locations using each bilge suction.				X
21. Test operation of trim/ballast control/list control system and pump by pumping to and from each tank and by pumping to and from sea (from all operating locations).	X	X	X	X
22. Calculate and enter the diving trim compensation.				X
23. Test operation of portable submersible pump from each installed outlet.	X	X	X	X
24. Fire waterslugs from torpedo room.				X
25. Fire waterslugs from weapons launch console.				X
26. Test magazine/pyro flooding system.	X	X	X	X
27. Operate each lube oil system, including pumps, controllers, purifiers and indicators.	X	X	X	X
28. Energize the Navigation System and gyrocompass; determine that they settle out; take azimuth; check all repeaters.	X	X	X	X
29. Check fresh water system, have water samples analyzed.	X	X	X	X

Test Area	Class of Ship			
	MSC Ships	CVN	Surface Force Ships	SSN
30. Test capstans.	X	X	X	X
31. Test bow and stern planes in all modes in accordance with applicable class operating procedures.				X
32. Operate steering system. Test normal and emergency rudder angle indicators, if applicable.	X	X	X	X
33. Check alignment of periscopes, TBTs and all bearing and range repeaters.				X
34. Test engine order telegraphs.	X	X	X	X
35. Test ABTs.	X	X	X	X
36. Operate each watertight door and hatch.	X	X	X	X
37. Check operation of escape hatch/scuttle fittings.	X	X	X	X
38. Operate each bulkhead flapper and each inter-compartment air salvage valve.				X
39. Operate Signal Ejector by impulse and by hand. Demonstrate satisfactory operation of the Signal Ejector both locally and remotely by firing waterslugs and operating the hand rammer through one complete cycle.				X
40. Turn on and check navigation/running lights for brightness and proper lenses (to be done at night). Includes Flight Deck lighting.	X	X	X	X
41. Check air conditioning, chill water, ventilation, and heating systems.	X	X	X	X
42. Check underwater log.	X	X	X	X
43. Check operation of all 400 cycle generating equipment.	X	X	X	X

Test Area	Class of Ship			
	MSC Ships	CVN	Surface Force Ships	SSN
44. Check out all galley, messing, and ship's service equipment.	X	X	X	X
45. Check fathometer.	X	X	X	X
46. Check bilge flooding alarms.	X	X	X	X
47. Check dummy log.	X	X	X	X
48. Check all HP and LP air system.	X	X	X	X
49. Operate distilling units.	X	X	X	X
50. Check out anchor windlass and brake operation.	X	X	X	X
51. Check battery water system.				X
52. Check out atmosphere monitoring equipment, both installed and portable.		X		X
53. Operate oxygen generator, CO ₂ scrubbers, CO burners, and emergency air breathing system.				X
54. If possible, lower, train (if applicable), operate and raise secondary propulsion motor(s).				X
55. Ensure that all required planned maintenance to ship depth detectors is complete.				X
56. Operate the diesel.	X	X	X	X
57. Engage and disengage the clutch.			X	X
58. Test Main Engines; Submarines jack main engines.	X	X	X	X
59. Ensure 7 day supply of oxygen onboard.				X
60. Check out all TV monitoring systems.	X	X	X	X
61. Check out SASS upper and lower trolley cars.		X		

Test Area	Class of Ship			
	MSC Ships	CVN	Surface Force Ships	SSN
62. Check out small arms lockers and security devices.	X	X	X	X
63. Check out all IFF equipment.	X	X	X	X
64. Check out degaussing equipment (where applicable).	X	X	X	X
65. Check out Hangar Bay doors.	X	X	X	
66. Check out damage control equipment.	X	X	X	X
67. Inspect and operate oxygen and nitrogen systems.	X	X	X	X
68. Check out all tank level indicating systems.	X	X	X	X
69. Check out Flight Deck communications.	X	X	X	
70. Check out meteorological equipment.	X	X	X	
71. Check out graphics preparation/display equipment.	X	X	X	
72. Check out Weapon Systems. Check to include loading of dummy missile at each launch station, transmission of fire control signals and operation of launchers in all modes.	X	X	X	X
73. Operate all electrical/mechanical medical equipment.	X	X	X	X
74. Inspect all compartments for proper stowage and cleanliness.	X	X	X	X
75. Inspect boiler and diesel fuel oil systems.	X	X	X	X
76. Test and inspect jet blast deflectors.		X		
77. Test and inspect JP-5 fuel systems.	X	X	X	
78. Test and inspect all aircraft starting and handling equipment.	X	X	X	

Test Area	Class of Ship			
	MSC Ships	CVN	Surface Force Ships	SSN
79. Test and inspect aircraft landing equipment including landing signal officer equipment, arresting gear, crash barriers, as applicable.	X	X	X	
80. Operate all RAS equipment.	X	X	X	
81. Inspect paint lockers and sprinkling systems.	X	X	X	
82. Operate all accommodation ladders.	X	X	X	
83. Operate all conveyors.	X	X	X	
84. Launch and raise motor whaleboat.	X	X	X	
85. Operate all boats.	X	X	X	
86. Test and inspect lifeboat/life raft stowage and launch equipment.	X	X	X	
87. Test and inspect all elevators in all modes of operation.	X	X	X	
88. Test and inspect all fire fighting systems.	X	X	X	X
89. Test and inspect refrigeration systems.	X	X	X	X
90. Test and inspect all seawater cooling systems.	X	X	X	X
91. Operate stern gate doors.			X	
92. Operate boat handling cranes.			X	
93. Conduct URO MRC 029.				X
94. Test and inspect Torpedo Handling System.				X
95. Test and inspect aircraft elevators.		X	X	
96. Test and inspect aircraft launching equipment including catapults.		X		

Test Area	Class of Ship			
	MSC Ships	CVN	Surface Force Ships	SSN
97. Record megger readings of all antennas where meggering is permissible. (Note: This evolution is not required for PSA unless antennas/hull fittings are specifically worked during PSA.)				X

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APPENDIX B
MINIMUM FAST CRUISE REQUIREMENTS

Test Area	Class of Ship			
	MSC Ships	CVN	Surface Force Ships	SSN
1. Make all preparations for getting underway.	X	X	X	X
2. Station the maneuvering watch/sea and anchor detail.	X	X	X	X
3. Station the normal underway watch (section watches).	X	X	X	X
4. Simulate getting underway and return to port. (Day and Night)	X	X	X	X
5. Walk through all major Sea Trial evolutions.	X	X	X	X
6. Walk through the cycling of hull and back-up valves to be tested during the deep dive.				X
7. Exercise the reduced visibility detail.	X	X	X	X
8. Spot check storage and availability of spare parts and tools. Verify adequacy of stores and provisions.	X	X	X	X
9. Rig for dive and rig for surface.				X
10. Simulate diving and surfacing.				X
11. Rig for deep submergence.				X
12. Conduct the following emergency drills:				
a. Fire	X	X	X	X
b. Collision	X	X	X	X
c. Flooding	X	X	X	X
d. Toxic Gas				X
e. Abandon Ship	X	X	X	X
f. Man Overboard	X	X	X	X

Test Area	Class of Ship			
	MSC Ships	CVN	Surface Force Ships	SSN
g. Submarine Escape				X
h. Loss of AC Power	X	X	X	X
i. Emergency Ventilation				X
j. Loss of Air Conditioning/ACW		X		X
k. Loss of Lighting	X	X	X	X
l. Loss of Interior Communications	X	X	X	X
m. Loss of Steering	X	X	X	X
n. Engine Casualty Control	X	X	X	X
o. Flight deck and hangar deck crash/fire drills, barricade drills, and MOVLAS drills		X		
13. Set General Quarters. Exercise the crew at battle stations.	X	X	X	X
14. Conduct communication and ECM drills.	X	X	X	X
15. Conduct an air charge to all air banks.				X
16. Bleed oxygen and ventilate ship. Ensure 7 day supply of oxygen onboard.				X
17. Anchor (walk-through).	X	X	X	X
18. Exercise damage control party with emergency and damage control equipment.	X	X	X	X
19. Operate atmosphere control equipment and take air samples.				X
20. Perform the minimum Fast Cruise requirements for nuclear propulsion plants contained in reference (o).		X		X
21. Operate air conditioning plants to demonstrate ability to carry the maximum existing ship's air conditioning load or 100% capacity.	X	X	X	X

Test Area	Class of Ship			
	MSC Ships	CVN	Surface Force Ships	SSN
22. Operate fresh water/seawater heat exchangers at sufficient load to demonstrate proper operation.				X
23. Simulate underway conditions, performing all evolutions and operating all equipment.	X	X	X	X
24. Simulate boat transfer at sea.	X		X	
25. Conduct competitive and non-competitive drills and exercises such as aircraft tracking and aircraft control.	X	X	X	
26. Light-off main propulsion plant, shift to ship's power and run all engines with steam for a short period of time.	X	X	X	X
27. Man Towing/Salvage/Fueling Stations.	X	X	X	
28. Set Flight Quarters as applicable.	X	X	X	

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APPENDIX D
LISTING OF TESTS TO BE
PERFORMED DURING INITIAL TIGHTNESS DIVE
(SUBMARINES ONLY)

1. The following tests and evolutions will be carried out on the surface en route to the test dive area and prior to the initial tightness dive:

- a. Underway. Rig for dive (for Alpha Trial, rig for deep submergence is required for the initial dive). Compensate. Start-up **reverse osmosis units**.
- b. Ship's Force instruct Sea Trial riders on the proper use of EAB masks.
- c. Conduct operational test of rudder in normal and emergency modes.
- d. Navigation system check. Take fixes by all electronic, celestial, and visual means and compare.
- e. Test underwater log(s) using the base course/reciprocal course method (i.e., inertial reference method) or other approved functional procedures to determine accuracy.
- f. Check accuracy of all bearing transmitters and indicators. Compare sonar, visual and radar bearings.
- g. Check operation of all radar.
- h. Check all radio transmitters, receivers and electronic equipment.
- i. Inspect stern tube packing gland/seals and circulating water flow for excessive heating, leakage and audible noise.
- j. Check Dead Reckoning Analyzer Indicator (DRAI), Dead Reckoning Analyzer (DRA), Dead Reckoning Tracers (DRT) and RPM indication. If certified for electronic navigation, verify satisfactory operation of the Voyage Management System including the ability to receive inputs from the Navigation System, Electromagnetic Logs, Radar bearings, Sonar bearings, fathometer and Gyrocompass, as applicable.
- k. Test fathometer(s) and compare with charted soundings.
- l. Run ahead at full power long enough for temperatures to reach a stable value. After readings have stabilized, operate rudder through full throw in each direction in normal and emergency power. Time evolution and compare with design values. Check out hand modes.
- m. Ahead flank to back emergency.
- n. Fire Control System operation.
- o. Check operation and accuracy of ship's gyrocompass.
- p. Check operation of magazine/pyro locker flooding if not tested in industrial activity.
- q. Rendezvous with escort. Conduct radio and sonar communications checks. (See Note 1).
- r. Test all bottomside sonar.
- s. Test bow/sail and stern plane operations in all modes.
- t. Flood variable tanks to computed compensation.
- u. Record megger readings of all antennas where meggering is permissible. (See Note 8).
- v. Operate trim and drain pumps.
- w. Test variable ballast system for proper operation.

NOTE: CONDUCT PARAGRAPHS 1 AND 3 OF URO MRC 022 (DOCKSIDE OPERATION OF EMBT BLOW SYSTEM VALVES) OR EQUIVALENT SHIPYARD TEST PROCEDURE DURING DOCK TRIALS PER APPENDIX A OF THIS CHAPTER FOR THE TEST OF THE EMBT BLOW SYSTEM. ENSURE THE REMAINING PORTIONS OF URO MRC 022, THE TEST OF THE EMBT BLOW SYSTEM, ARE COMPLETED PRIOR TO INITIAL DIVE TO TEST DEPTH ON ALPHA SEA TRIAL (INITIAL BUILDER'S SEA TRIAL).

- x. Perform a low pressure, normal and EMBT blow for as long as necessary to verify system operability. A static blow shall not be used to test the EMBT blow system.
- y. Operate on the Emergency Propulsion Motor (EPM) for 10 minutes.
- z. Motor generator set operation.
- aa. Ventilate ship.
- ab. Start atmosphere control equipment.
- ac. Additional requirements may be imposed at the discretion of the CO.

NOTE: REQUIRED SYSTEMS ARE LISTED IN PARAGRAPH 4b OF REFERENCE (i). OBSERVE RESTRICTIONS ON OPERATION OF SYSTEMS LISTED IN PARAGRAPH 4d OF REFERENCE (i). BALL VALVE TRASH DISPOSAL UNITS (TDU) (WITHOUT REMOTE CLOSURES) WILL NOT BE OPERATED BELOW 200 FEET.

2. The following tests and evolutions will be carried out immediately prior to or during the initial tightness dive:
 - a. Obtain navigational fix and take sounding. Maximum depth of water is 400 feet as specified in reference (p).
 - b. Conduct a dive to periscope depth. Obtain stop trim, if practical, at periscope depth. If sea state requires deeper submergence, proceed slowly to 150 feet for SSN 688 Class submarines (155 feet for SSN 774 Class submarines), (160 feet for SSN 21 and SSBN/SSGN 726 Class submarines) to obtain stop trim. Maximum keel depth shall be per Table 1 of Appendix F.
 - c. Inspect the discharge of all automatic drains in each EMBT Blow quadrant for sea water leakage prior to the first dive when the ballast tanks are flooded (e.g., at periscope depth).
 - d. Check operation of ship control systems, including depth indication. (See Note 2).
 - e. Shoot pyrotechnics from each ejector by hand and impulse methods, as applicable (see Notes 3 and 4).
 - f. Communicate with escort on WQC at each depth increment or at ten minute intervals, whichever is sooner. If communications are lost, return to depth at which communications can be established before continuing (see Note 1).
 - g. All hands inspect for leaks and report them to the Sea Trial coordinator.
 - h. Operate all periscopes, checking optics and for leakage. Operate all masts.
 - i. Test full throw of rudder and planes at slow speeds.
 - j. Test operation of trim and drain systems.
 - k. Check all sonar equipment on each hydrophone.
 - l. Comply with the Command Control Systems (CS/CCS) Test Program regarding the shooting of waterslugs. This event is not required by the TYCOM if not required by the CS/CCS Test Program (see Notes 3 and 4).
 - m. Snorkel, test operation of stills and air compressors (see Notes 4 and 5).
 - n. Operate all hull and back-up valves and equalize sea pressure on all systems designed for test depth (see Notes 4, 6 and 7).
 - o. Check hovering system (where applicable) (see Note 4).

APPENDIX F
LISTING OF TESTS TO BE
PERFORMED PRIOR TO, DURING AND
FOLLOWING FIRST DIVE TO TEST DEPTH

1. The following tests and evolutions, as summarized in Table 1 of this appendix, will be carried out following the initial tightness dive and prior to the deep dive:

- a. Six hours of Independent Ship Exercise for crew training. (see Note 1).
- b. Charge air banks and battery if necessary. The ship may be submerged while charging air banks provided the depth of the ship does not exceed other guidelines in this instruction, or those of the flooding bill or ship's operating procedures.
- c. Operate IFF and ESM equipment. If possible use aircraft. (see Note 2).

2. The following tests and evolutions, as summarized in Table 1 of this appendix, will be carried out immediately prior to or during the first deep dive. Per Volume V of this manual, a second deep dive must be performed to complete valve cycling and operation of systems not required for normal safe operation of the ship, i.e., torpedo tubes, Trash Disposal Unit (TDU), hovering, plumbing. (see Note 3).

- a. Ensure that air banks are charged to within 200 psi of full pressure.
- b. Ensure all MBT blow systems are fully operational and in a normal line up configuration.
- c. Take sounding. Maximum water depth is given in reference (p). Accurately fix the ship's position within the specified dive area (reference (p)).
- d. Conduct a dive to periscope depth. Obtain speed trim, if practical, at periscope depth. If sea state requires deeper submergence, proceed slowly to (150 feet for SSN 688 Class submarines), (155 feet for SSN 774 Class submarines), (160 feet for SSN 21 and SSBN/SSGN 726 Class submarines) to obtain speed trim. (see Note 4).
- e. Obtain stop trim. Take readings and water samples required to make a check of ballasting. Stop trim should be conducted at the most desirable time during the trials.
- f. Trim ship to maintain neutral buoyancy. (see Note 5).
- g. Line up propulsion plant for maximum reliability in accordance with ship's instructions.
- h. Rig ship for deep submergence, **except reverse osmosis units**. All systems should be in the maximum secure condition with unnecessary sea systems isolated. (see Note 6).
- i. Station personnel throughout the ship to inspect for leaks.
- j. At depths specified in reference (i):
 - (1) Inspect for leaks.
 - (2) Adjust trim. (see Note 5).
 - (3) Communicate with escort at each 100 feet depth increment or at 10 minute intervals, whichever is sooner. If communications are lost, return to depth at which communications can be reestablished before continuing. (see Note 7).

NOTE REQUIRED SYSTEMS ARE LISTED IN PARAGRAPH 4b OF REFERENCE (i). OBSERVE RESTRICTIONS ON OPERATION OF SYSTEMS LISTED IN PARAGRAPH 4d OF REFERENCE (i). BALL VALVE TRASH DISPOSAL UNITS (TDU) (WITHOUT REMOTE CLOSURES) WILL NOT BE OPERATED BELOW 200 FEET.

- k. At depths listed for hull valve cycling in reference (i) (as applicable) per NAVSEA approved Deep Dive Test Form:
 - (1) Check accuracy of gages and repeaters.

- (2) Conduct operational test of signal ejectors. (see Note 8).
 - (3) Check shaft bearings and stern tubes for excessive heating, leakage and noise. Shaft seals must be tested at each depth and for the required time, as specified in the approved class test form.
 - (4) Cycle rudder and planes through full throw to check for binding. (see Note 9).
 - (5) Operate all hull and back-up valves (using remote closures, as applicable, from flooding control stations) of seawater systems required to maintain propulsion and other functions vital to the ship's operation at increments of depth specified in reference (i). Required systems are listed in paragraph 4.b. of reference (i). Observe restrictions on operation of systems listed in paragraph 4.d. of reference (i).
 - (6) Check operation of bulkhead flappers and watertight doors for binding.
 - (7) Operate trim and drain pumps, discharging to sea.
 - (8) Cycle components of each torpedo tube. Check for leakage. Establish integrity of torpedo tubes by admitting sea pressure through equalizing lines or flooding connection before cycling components (see Notes 3, 8 and 16).
 - (9) Vent negative tank inboard (if installed). (see Notes 3 and 10).
 - (10) Cycle main vents to check for binding.
- l. At maximum authorized operating depth:
 - (1) Repeat item 2.k.(1) of this appendix - Depth gages and repeaters.
 - (2) Operate each signal ejector by impulse and hand, as applicable. (see Notes 3 and 8).
 - (3) Repeat item 2.k.(3) of this appendix - Shafting and bearings.
 - (4) Repeat item 2.k.(5) of this appendix - Hull and back-up valves.
 - (5) Repeat item 2.k.(6) of this appendix - Bulkhead flappers and watertight doors.
 - (6) Repeat item 2.k.(7) of this appendix - Trim and drain pumps.
 - (7) Repeat item 2.k.(8) of this appendix - Torpedo tubes. (see Notes 3 and 16).
 - (8) Repeat item 2.k.(9) of this appendix - Negative tank (if applicable).
 - (9) Equalize TDU with sea pressure through trim line. During conduct of the Deep Dive Test Form on new construction submarines, the TDU Hull Valve will be cycled at depths specified by reference (i) in order to meet material certification requirements. (see Note 3).
 - (10) Equalize sea systems and cycle hull and back-up valves as specified in reference (i).
 - (11) Repeat item 2.k.(10) of this appendix - Cycle main vents and check for binding.
 - m. After the deep dive, surface fully with EMBT blow from the depth required per the NAVSEA approved EMBT Test Procedure and the approved Sea Trial Agenda. Check air bank pressures before and after blow.
 - n. Additional requirements may be imposed at the discretion of the CO.
3. The following tests and evolutions will be carried out submerged following the deep dive:
- a. Steering and diving operation at full speed. (see Notes 4 and 11).
 - b. Full power run. (see Notes 11, 12 and 13).
 - c. Steep angles - operate the ship through several depth changes using large up and down angles to check operation of ship machinery. (see Notes 11 and 14).
 - d. Time raising each periscope and mast at maximum depth and speed for which they were designed. Check training feature where applicable.

- b. Report Format. Appendix A of this chapter is an example of a completed page of the Consolidated Report, containing sample entries from various parts. The symbols used in defining the action taken by each activity are described in Appendix B of this chapter along with a discussion of the use of each column. The Consolidated Report typically consists of the following parts:
- (1) Part A Key Definitions for Symbols used in the PSA Work Package.
 - (2) Part B INSURV Deficiencies.
 - (3) Part C-I Non-Nuclear HMRs.
 - (4) Part C-II Other Non-Nuclear Items.
 - (5) Part C-III Non-Nuclear CSCT Items.
 - (6) Part D Antenna Inspection Deficiency Items.
 - (7) Part E PDDIs.
 - (8) Part F Silencing Deficiencies.
- c. Preparation.
- (1) Part B:
 - (a) List of INSURV deficiency items: Prepared by the Navy Shipbuilding Program Manager and distributed following CT/AT.
 - (b) List of INSURV GMI/FCT items: Prepared by the ship in accordance with Appendix C of this chapter immediately following the GMI/FCT for use by NAVSEA at the GMI/FCT Card Conference. The Navy Shipbuilding Program Manager will distribute a finalized GMI/FCT list following the GMI/FCT Card Conference.
 - (2) Part C-I, C-II, C-III, D and F: Prepared and distributed by the Navy Shipbuilding Program Manager.
 - (3) Part E: Prepared by the ship as discussed in section 5.6 of this chapter.
- d. Reporting.
- (1) Thirty days after delivery, the ship will submit marked up copies of Part B indicating the priority assignment of each uncorrected CT/AT deficiency (Navy Shipbuilding Program Manager, TYCOM, Immediate Superior in Command (ISIC), Supervising Authority).
 - (2) The Navy Shipbuilding Program Manager will prepare and distribute marked up copies of Parts C-I, C-II, C-III, D and F as the information becomes available.
 - (3) Priority assignment for Part B deficiencies (including review of all uncorrected CT/AT deficiencies) is determined at the GMI/FCT Card Conference. Marked up copies are retained by all participants. (Navy Shipbuilding Program Manager, TYCOM, ISIC, Ship, Supervising Authority).
 - (4) The ship will report deficiencies discovered after GMI/FCT and before the end of the SCN period in accordance with section 5.6 of this chapter.
 - (5) Deficiencies listed in the Consolidated Report which are corrected by Forces Afloat are to be reported in writing to the Navy Shipbuilding Program Manager with copies to the TYCOM, the Supervising Authority as appropriate, and the scheduled PSA activity. This report will normally be submitted by the ship at the end of a refit or maintenance period. Negative reports are not required.
 - (6) The ship will submit a marked up copy of the Consolidated Report to the TYCOM; copy to the ISIC, Navy Shipbuilding Program Manager, Supervising Authority, Submarine Maintenance Engineering, Planning and Procurement (SUBMEPP) Activity (for submarines), Surface Maintenance Engineering, Planning Program (SURFMEPP) (for surface force ships)

and the President of the INSURV Board thirty days after PSA or at the end of the guarantee period, whichever is later. This report will indicate the final status of all deficiencies identified during the guarantee period.

5.4 COMBINED TRIALS/ACCEPTANCE TRIALS. The CT/AT is scheduled by the Supervising Authority and conducted by the INSURV Board. The Supervising Authority in conjunction with the ship's CO will present to the INSURV Board known deficiencies which require correction.

5.5 GUARANTEE MATERIAL INSPECTION/FINAL CONTRACT TRIALS. GMIs/FCTs are scheduled by the TYCOM and conducted by the INSURV Board after shakedown, prior to the end of the guarantee period. These inspections/trials provide a formal evaluation of the material condition of each newly constructed ship after limited service. GMIs/FCTs are conducted sufficiently in advance of PSA to allow "lead time" for the procurement of material and the advanced planning required for the correction of deficiencies during the availability. The CO will present the ship's material status to the INSURV Board following the guidance in Appendix C of this chapter. GMIs are conducted for submarines; all other ships will undergo an FCT.

5.6 POST DELIVERY DEFICIENCY ITEMS. The CO is responsible for reporting deficiencies not otherwise identified by INSURV, until the end of the SCN period in accordance with the following procedures. By using the same format for PDDI reporting as for INSURV items and by extending the use of the Consolidated Report to include these items, the same management attention is afforded to all construction deficiencies.

- a. The following types of problems should be reported as PDDIs:
 - (1) Recurring failures in a piece of equipment or machinery such that the reliability is considered unsatisfactory.
 - (2) Major equipment or component malfunction which requires outside assistance to correct (vendor or industrial activity).
 - (3) Symptoms of major machinery problems which require investigation to determine the extent of the problem. (Improper temperatures, pressures, leakage, vibration, noise, etc.).
 - (4) Insufficient supply support for specific equipment or machinery based on operational experience. Allowance deficiencies reported as PDDIs should be supplemented by submission of Allowance Change Requests/Configuration Change Reports as appropriate.
 - (5) Excessive or accelerated wear, erosion, or corrosion determined through inspection.
 - (6) Improper bonding of preservation on surfaces that must be protected.
 - (7) Any casualty which results in a Casualty Report (CASREP). Insert an amplification data set immediately after the Parts Identification data set consisting of "AMPN/PDDI:___-___/"/", ensuring that the CASREP includes all appropriate PDDI addressees. A separate PDDI must also be submitted.
 - (8) Identification of any condition or defect which requires a Departure from Specification request.
 - (9) Improper alignment, clearance, or resistance to ground which indicates an unaccounted for change from baseline data.
 - (10) Significant internal and external valve leakage. (Primary, seawater, steam, air, hydraulics, etc.).
 - (11) Any significant AT/CT deficiency item reported corrected which has recurred. Refer to the AT/INSURV number in the text of the deficiency description.
 - (12) Any AT/CT deficiency item reported corrected by the shipbuilder which is not considered by the ship to be complete. Refer to the AT/INSURV number in the text of the deficiency description.

NOTE: DEFICIENCIES AND MATERIAL PROBLEMS WHICH ARE CORRECTED BY SHIP'S FORCE WITHOUT ASSISTANCE SHOULD NOT BE REPORTED AS PDDIs.

- b. Reporting.