

**JOINT FLEET MAINTENANCE MANUAL****VOLUME V****QUALITY MAINTENANCE****LIST OF EFFECTIVE PAGES**

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**VOLUME V**

**QUALITY MAINTENANCE**

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**APPENDIX A****LIST OF ACRONYMS**

ACCMP	Aircraft Carrier Class Maintenance Plan
AEL	Allowance Equipment List
AIT	Alteration Installation Team
APL	Allowance Parts List
AQAO	Assistant Quality Assurance Officer
ASW	Auxiliary Sea Water
AWP	Availability Work Package
CA	Coordinating Activity
CAD	Certifying Activity Designator
CD ROM	Compact Disc Read Only Memory
CET	Carrier Engineering Team
CI	Critical Cleanliness Inspection
CMH	Controlled Material Handler
CMPO	Controlled Material Petty Officer
COSAL	Coordinated Shipboard Allowance List
CRA	Chemistry and Radiological Controls Assistant
CSB	Certification Signature Block
CSMP	Current Ship's Maintenance Project
CWP	Controlled Work Package
DDGOS	Deep Diving General Overhaul Specifications
DFS	Departure from Specification
DL	Deficiency Log
DMP	Depot Modernization Period
DSS	Deep Submergence System
DSW	Diesel Sea Water
ECD	Estimated Completion Date
E-DFS	Electronic Departure from Specification
EHF	Electrical Hull Fitting
EOH	Engineered Overhaul
ERO	Engineered Refueling Overhaul
ET	Eddy Current Testing
E-W/D	Electronic Waiver and Deviation
FBR	Feedback Report
FBW SCS	Fly-By-Wire Ship Control System
FMA	Fleet Maintenance Activity
FRC	Federal Records Center
FWP	Formal Work Package
GSO	General Specifications for Overhaul of Surface Ships
HFP	Horizontal Fixed Pipe
ID	Identification
ISEA	In-Service Engineering Activity
ISIC	Immediate Superior in Command

JCN	Job Control Number
JID	Joint Identification Number
JSN	Job Sequence Number
LAR	Liaison Action Request
LI/SS	Level I/SUBSAFE
LOEP	List of Effective Pages
LPO	Leading Petty Officer
LWC	Lead Work Center
MB	Megabyte
MCD	Material Control Division
MCR	Maintenance Certification Record
METCAL	Metrology and Calibration
MIC	Material Identification and Control
MIL-SPEC	Military Specification
MIL-STD	Military Standard
MOA	Memorandum of Agreement
MP	Maintenance Procedure
MRC	Maintenance Requirement Card
MS	Maintenance Standard
MSW	Main Sea Water
MT	Magnetic Particle Testing
NACE	National Association of Corrosion Engineers
NAVAIR	Naval Air Systems Command
NAVICP	Naval Inventory Control Point
NAVIMFAC	Naval Intermediate Maintenance Facility
NAVSEA	Naval Sea Systems Command
NAVSEA 08	NAVSEA Nuclear Propulsion Directorate
NAVSEALOGCEN	Naval Sea Logistics Center
NAVSUP	Naval Supply Systems Command
NDT	Nondestructive Test
NEC	Navy Enlisted Classification
NIIN	National Item Identification Number
NNPI	Naval Nuclear Propulsion Information
NPS	Nominal Pipe Size
NRO	Nuclear Repair Officer
NRP	Nuclear Repair Part
NSDSA	Naval Systems Data Support Activity
NSF	Nuclear Support Facility
NSN	National Stock Number
NSTM	Naval Ships' Technical Manual
OOP	Out Of Position
OPNAV	Naval Operations
OQE	Objective Quality Evidence
OSIC	On Site Installation Coordinator
P&E	Planning and Estimating
PLAD	Plain Language Address Directory
PMS	Planned Maintenance System
POC	Point Of Contact
PPEA	Propulsion Plant Engineering Activity
PQS	Personnel Qualification Standard
PSA	Post Shakedown Availability

**APPENDIX B****GLOSSARY OF TERMS**

<u>TERM</u>	<u>DEFINITION</u>
Acceptance Trials	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.
Acid Spot Test	See Generic Material Verification/Identification.
Alpha Trial	Builders Propulsion Trial; Acceptance Trial for SSN/SSBN/SSGN Propulsion Plant; Initial Tightness Dive (SSN/SSBN/SSGN); Dive to Maximum Authorized Depth (Selected SSN platforms).
Assist Work Center	The Work Center or group on board ship or at a repair activity with responsibility for accomplishment of a work/maintenance procedure as assist to or under direction of a Lead Work Center.
Audit	A detailed analysis and evaluation of records to determine compliance with existing requirements.
Backup Valve	A valve which, when closed, provides, in part or in whole, the secondary isolation boundary to sea pressure.
Boundary	The specific limits of the physical area involved in work and testing accomplished. That line, point or location identified as the border between controlled and uncontrolled areas. Depending on the type of system involved, it means the system component nearest to the work area which is operated to regulate or shut off the flow of fluid or deenergize electricity to the portion of the system which is being worked.
Bravo Trial	Normally the initial Dive to Test Depth; Noise Trial (SSN/SSBN/SSGN); Strategic Weapons System Missile Testing (SSBN); Weapons testing (Surface Combatants).
Builder's Trials	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 nuclear powered surface ships this is the Acceptance Trial for the Nuclear Propulsion plant.
Calibration	The comparison of a measurement system or device of unverified accuracy to a measurement system or device of known and greater accuracy to detect and correct any variation from required performance specifications of the unverified measurement system or device.
Casting	A part formed by pouring molten metal into a mold.
Certification	To provide assurance, in writing, that the component or system conforms to the technical requirements.

Certification (Material)	The process of receipt inspection of material received from the Naval Supply System which establishes the correct level of essentiality and acceptability of the material in accordance with the appropriate specifications and material control standard.
Certified Oxygen Clean	Certified Oxygen Clean applies to material which is intended for or installed in shipboard oxygen generating, storage and distribution systems. The Naval Sea Systems Command (NAVSEA) source document which governs certification of oxygen cleanliness is MIL-STD-1330, Standard Practice for Precision Cleaning and Testing of Shipboard Oxygen, Helium, Helium-Oxygen, Nitrogen and Hydrogen Systems.
Certifying Activity	The activity, approved by Systems Command, that is qualified to complete all of the necessary certifying requirements of the particular specification or standard.
Change In Configuration	Ship's configuration is defined by drawings and drawing revisions specified in the Ship's Drawing Index and by equipment technical manuals applicable to equipment installed in the ship in accordance with these drawings. Changes which do not conform to these documents are a change in configuration. For example: <ul style="list-style-type: none"><li>a. Material substitutions.</li><li>b. Pipe joint additions or deletions.</li><li>c. Significant rerouting or relocation of piping, cabling and equipment.</li><li>d. Seal welding of normally mechanically sealed assemblies.</li><li>e. Changes in piece dimensions.</li></ul>
Charlie Trial	Combat Systems and retesting (SSN/SSBN/SSGN); Acceptance Trials (DDG).
Cleanliness	<ul style="list-style-type: none"><li>a. Reactor Plant - Minimum reactor plant cleanliness requirements according to NAVSEA 0989-064-3000; Cleanliness Requirements For Nuclear Propulsion Plant Maintenance and Construction.</li><li>b. Steam Plant - Minimum steam plant cleanliness requirements according to NAVSEA 0989-064-3000.</li><li>c. Commercial Cleanliness - A term that is used to describe the minimum level of cleanliness which should be maintained during work on propulsion plant systems and equipment not covered by NAVSEA 0989-064-3000. Commercial cleanliness is the absence of foreign material which could, if present, interfere with the function of these systems and components.</li><li>d. Oxygen System - Minimum oxygen system cleanliness requirements according to MIL-STD-1330, Standard Practice for Precision Cleaning and Testing of Shipboard Oxygen, Helium, Helium-Oxygen, Nitrogen and Hydrogen Systems.</li></ul>
Cleanliness Inspector/Certifier	Individuals trained and qualified to perform cleanliness inspections required by work procedures for systems/components requiring cleanliness controls.

- (9) Maintain files of outstanding DFSs.
- (10) Aggressively pursue clearing of DFSs.
- h. Monitor the QA program and procedures of assigned FMA periodically and monitor corrective actions on discrepancies noted during the last TYCOM audit. (Submarines only) Naval Submarine Support Command New London will monitor Naval Submarine Support Facility New London.
- i. Schedule and conduct a QA Program assessment in conjunction with the Inter-Deployment Training Cycle (or as determined by each TYCOM) of all assigned ships to ensure the repair actions undertaken by Ship's Force conform to the provisions of the QA Program as well as pertinent technical requirements.
- j. Review and endorse TYCOM audit report of assigned FMA(s).
- k. Conduct periodic monitoring of Ship's Force work and QA program on all assigned ships during maintenance periods.
  - (1) Perform at least one surveillance during each refit/upkeep/FMA availability.
  - (2) Conduct monitoring during industrial availabilities (e.g., Selected Restricted Availability, Drydocking Selected Restricted Availability, Extended Refit Period, Post Shakedown Availability, Phased Maintenance Availability, Docking Phased Maintenance Availability, Depot Modernization Period, Engineered Refueling Overhaul and Regular or Refueling Overhaul).
- l. (Submarines only) Perform annual SUBSAFE/SOC/FBW SCS awareness training for staff members (Submarine Squadrons and associated Naval Submarine Support Centers and Performance Monitoring Teams to include Weapons, Combat Systems and Material Departments with the associated Chain of Command) that routinely review SUBSAFE/SOC/FBW SCS objective quality evidence, make determinations on SUBSAFE/SOC/FBW SCS DFSs, perform other SUBSAFE/SOC/FBW SCS work oversight functions.
- m. (Submarines only) Conduct an oral interview of relieving Ship's Force QAO which covers the following topics as a minimum:
  - (1) URO Program Management including a review of the ship's current URO Schedules and Inventories and completion procedures.
  - (2) DFS Program Management including a review of all outstanding departures.
  - (3) QA Training and Qualification Program.
  - (4) QA Surveillance and Assessment Program including a review of the ship's last ISIC QA Assessment and corrective actions.
  - (5) CWP opening and closing review processes.
- n. Ensure fact-finding critiques are held to establish underlying causes and pursue corrective actions when major errors, mistakes or problems occur during maintenance that affect Nuclear, Level I, Submarine Flight Critical Components (SFCC), Deep Submergence System (DSS)/SOC or SUBSAFE work, or result in serious damage to equipment or injury to personnel. Contact the TYCOM immediately for issues which will result in a SUBSAFE/FBW SCS/DSS/SOC critique, SUBSAFE/FBW SCS/DSS/SOC trouble report, and/or SUBSAFE/FBW SCS/DSS/SOC fact-finding and send a copy of the report to the TYCOM electronically.

- o. (Submarines only) ISIC responsibilities. Maintain FBW SCS certification in accordance with reference (a). In relation to the planning and performance of post Upgrade/Alteration or Major Repair Work Sea Trials, for maintaining FBW SCS certification of previously certified submarine FBW SCS, the ISIC shall:
  - (1) Provide sufficient time for crew training during the Upgrade/Alteration or Major Repair Work period to permit Ship's Force to attain a level of knowledge and proficiency of the FBW SCS adequate to ensure proper operation and safety of the ship and its personnel during Sea Trials. ISIC shall also ensure crew has proper number of trained operators.
  - (2) Conduct FBW SCS Certification Audits of Upgrade/Alterations or Major Repair Work and issue report to the activity. Audits shall be conducted using the TYCOM provided FBW Certification Audit Checklist at a minimum. Provide a copy of the FBW SCS Certification Audit Report to the Supervising Authority, ship's Commanding Officer, TYCOMs, Fleet Commanders and NAVSEA.
  - (3) Following Upgrade/Alteration or Major Repair Work report, by message, crew readiness and prior to each underway until certified, verification from the ISEA/activity performing the work that all work performed by the ISEA/activity performing the work necessary for at-sea testing or Sea Trials has been completed, including resolution of ISIC FBW SCS Certification Audit Deficiencies recommendations and status of incomplete ISIC FBW SCS Certification Audit Category Deficiencies, and that the material condition of those parts of the ship installed, repaired, and/or tested by the ISEA/activity performing the work is satisfactory, certify to the TYCOM, with information copies to the Chief of Naval Operations, the appropriate Fleet Commander and NAVSEA, that the FBW SCS material condition of those parts of the ship installed, repaired and/or tested by the ISEA/activity performing the work is satisfactory for Sea Trials in accordance with approved at-sea tests or Sea Trial agenda.
  - (4) Following verification from the ISEA/activity performing the work of satisfactory completion of all at-sea testing or trials, completion of controlled dives, correction of all mandatory Sea Trial deficiencies, and resolution of all ISIC FBW SCS Certification Audit Category IA recommendations, certify to the TYCOM, with information copies to Chief of Naval Operations, the appropriate Fleet Commander and NAVSEA, the FBW SCS material condition of those parts of the ship installed, repaired, and/or tested by the ISEA/activity performing the work is satisfactory, and recommend authorization for FBW SCS unrestricted use in support of submarine unrestricted operations, subject to ISIC verification that FBW SCS certification of areas outside ISEA/activity performing the work tasking has been sustained, or specifically identify any operating restrictions of the ship and/or system.
  
- p. (Submarines only) The ISIC will transmit a Submarine Material Transfer Message to the gaining ISIC for deploying/deployed submarines when the unit out chops to include the following:
  - (1) Status of outstanding Casualty Reports.
  - (2) Status of outstanding Z0ZZ.
  - (3) Status of outstanding (SUBS).
  - (4) Status of active DFS actions.
  - (5) Status of Periodic Maintenance Requirements (Integrated Maintenance and Modernization Plans and UROs) for accomplishment.
  - (6) Status of Alterations for accomplishment.

- (7) Status of Pre-Overhaul Tests/Pre-Availability Testing for ships within 12 months of a scheduled Chief of Naval Operations availability.

## 1.5 SHIP RESPONSIBILITIES.

### 1.5.1 Ship's Commanding Officer. Commanding Officer is responsible to:

- a. Designate a QAO in writing.
- b. Approve Technical Work Document (TWD) as required in Part I, Chapter 2, Appendix D, TWD Review and Approval matrix, of this volume.
- c. (Submarines only) Provide the ISIC a written report of ship's certification continuity prior to underway, as specified in Part I, Chapter 5, paragraph 5.10.7 of this volume.
- d. (Submarines only) Organize and implement a program to ensure performance of required maintenance to sustain the material condition necessary to support URO to authorized operating depth in accordance with the applicable class URO MRC manual and Volume VI of this manual.
- e. (Submarines only) Approve and sign all recertification Reactor Plant Work Accomplishment Reports (RPWAR) and ensure these documents are forwarded to the Reactor Plant Planning Yard with copy to NAVSEA Nuclear Propulsion Directorate (08), TYCOM and ISIC.
- f. Certify all QA personnel qualifications (respective Department Head on Aircraft Carriers).
- g. Review and sign with the shipyard or other industrial activity, RMC/FMA and ISIC, an MOA on responsibilities and action of each party with respect to work accomplishment prior to start of SUBSAFE, nuclear, FBW SCS or Level I work in accordance with this manual.
- h. Approve DFSs in accordance with Part I, Chapter 8 of this volume.

### 1.5.2 Ship's Executive Officer. Executive Officer is responsible for the following:

- a. Monitoring the QAO's administration of the ship's QA Audit, surveillance, training and qualification programs.
- b. Providing senior command level authority to backup the QAO in the performance of the QAO's duties.
- c. Spot checking performance of QA training by attending/monitoring training periodically.
- d. Assigning an Assistant Quality Assurance Officer (AQAO) who is an E-6 or above to be an administrative assistant to the QAO.

### 1.5.3 Ship's Department Head. Department Heads are responsible to:

- a. Ensure area(s) in or adjacent to their work centers/divisions/spaces are designated for the stowage of controlled material in accordance with Part I, Chapter 6 of this volume.
- b. Review or approve Formal Work Package (FWP) and TWD as required in Part I, Chapter 2, Appendix D, TWD Review and Approval matrix, of this volume.
- c. Ensure personnel in their departments involved in performing, planning, approving or supervising shipboard maintenance on SUBSAFE, nuclear, FBW SCS and Level I systems participate in QA training.

- d. Verify the department maintains sufficient numbers of qualified Quality Assurance Inspectors (QAI) and Controlled Material Petty Officers (CMPO).
- e. Participate in oral examination of shipboard QAI and Quality Assurance Supervisor (QAS) assigned to their departments.
- f. Ensure personnel within their departments perform QA surveillance, qualification, training, etc. as defined in this volume.
- g. Review and approve information submitted to the FMA for identification of controlled work. This information must include a TWD serial number when required by Part I, Chapter 2 of this volume. This review will also ensure that the work request identifies specific categories applicable in each of the following situations as required by this volume:
  - (1) SUBSAFE.
  - (2) Level I.
  - (3) Submarine Antenna Engineering Directorate (SAED).
  - (4) Nuclear.
  - (5) Special cleanliness requirements.
  - (6) Special testing requirements.
  - (7) Special fabrication requirements.
  - (8) DFS.
  - (9) SOC.
  - (10) SFCC.
- h. Ensure fact-finding critiques are held to establish underlying causes and pursue corrective actions when major errors, mistakes, or problems occur during maintenance that affect Nuclear, Level I, SFCC, DSS/SOC or SUBSAFE work, or result in serious damage to equipment or injury to personnel. Contact the ISIC immediately for issues which will result in a SUBSAFE/FBW SCS/DSS/SOC critique, SUBSAFE/FBW SCS/DSS/SOC trouble report, and/or SUBSAFE/FBW SCS/DSS/SOC fact-finding and send a copy of the report to the TYCOM.
- i. Review DFS for technical accuracy and sign.
- j. Spot check performance of QA training by attending/monitoring training at least quarterly.
- k. (Aircraft Carriers only) Certify QA qualifications for personnel assigned to their department by signing the applicable Personnel Qualification Standard cover sheet of reference (b).

1.5.4 Ship's Supply Officer. The Supply Officer is responsible to:

- a. Ensure procurement, receipt and stowage of Nuclear, SUBSAFE, SOC, SFCC, SAED - Submarine Antenna Quality Assured Material and Level I materials are in compliance with this volume, applicable material control standards and instructions.

- b. Designate and maintain areas for stowage of Level I/SUBSAFE (LI/SS) and SOC stock program material, SFCC and Nuclear Repair Parts (NRP) in the custody of the supply department.
- c. File the Supervisor of Shipbuilding letter of certification for Level I, SUBSAFE, SFCC and NRP which are in the custody of the supply department.
- d. Turn over the material certification documentation (or copy of, when only partial issue of lot) for LI/SS/SOC/SEAWOLF Class Component (SW)/VIRGINIA Class Component (VU) stock program material and NRP to the customer.
- e. Send LI/SS/SOC stock program material, NRP, SW, VU and copies of material certification documents to FMA work centers when the ship is providing the material.
- f. Ensure copies of the material certification documents are forwarded to the requesting activity, when LI/SS/SOC stock program material, SFCC and NRP items are removed from own ship's systems or from onboard repair parts.
- g. Return defective LI/SS/SOC stock program material, SW, VU and NRP to the Navy supply system and submit defective material reports in accordance with supply department procedures.
- h. Ensure appropriate supply department personnel receive training on nuclear and non-nuclear controlled material certification, procurement, receipt inspection and LI/SS/SOC stock program material, SW, VU and NRP stowage requirements.

1.5.5 Ship's Engineer Officer (Submarines only). The Engineer Officer is responsible to:

- a. Submit blank RPWAR forms to the FMA with each work request and CWP serial number, when FMA assistance is necessary for reactor plant SUBSAFE work. Ensure all work requests requiring special reactor plant SUBSAFE work controls are properly identified.
- b. Verify continuity of reactor plant SUBSAFE certification by controlling and documenting work and tests performed for each Re-Entry.
- c. Review and sign the necessary recertification information on the applicable RPWAR pages for repairs requiring RPWAR submission and forward the original to the Reactor Plant Planning Yard with a copy to NAVSEA 08, TYCOM and ISIC.
- d. Maintain current the reactor plant hull integrity records using the completed RPWAR, filed in an auditable manner with the latest revision of the NAVSEA drawing "Status of Reactor Plant Work Accomplishment Reports for (individual ship)". Reproducible blank RPWAR will also be maintained in this same file to support future maintenance. Documentation of the actual maintenance performed and testing accomplished by Ship's Force is to be maintained in the ship's completed CWP file required by this volume.
- e. Review or approve Oxygen, Nuclear and SUBSAFE CWPs as required by Part 1, Chapter 2, Appendix D of this volume.
- f. Coordinate with the Ship's QAO and Engineering Department Master Chief to incorporate QA training as required by Part I, Chapter 3 and Part III, Chapter 3 (as applicable) of this volume and reference (a) (as applicable) into the Engineering Department Training Plan.

1.5.6 Availability Coordinator (Submarines only). A submarine served, nuclear trained Limited Duty Officer will be assigned to augment the normal ship's complement during Depot Modernization Periods, Engineered Refueling Overhauls, or Engineered Overhauls and will act as the Availability Coordinator for the ship. The Availability Coordinator's responsibilities include:

- a. Become a knowledgeable member of the availability project team.
- b. To support these requirements, the Availability Coordinator will be assigned as early as possible during the pre-availability test and inspection period, nominally 15 months before the availability starts. Prior to reporting to the submarine, the Availability Coordinator will be trained in shipyard processes and Availability Work Package requirements in accordance with reference (c), Appendix H. After reporting to the submarine, the Availability Coordinator should spend a significant portion of his time working with the shipyard project team prior to the start of the availability. This may require that he remain ashore during key pre-availability planning phases while the submarine is at sea. Finally, to prevent interference with his responsibilities for availability planning and execution, the Availability Coordinator should not be assigned routine watch standing duties. He should maintain proficiency requirements (about two watches per month), but his watch standing duties should not interfere with daily project management routine or the increased pace of coordination associated with major key events (e.g., undocking).
- c. Educate/train Ship's Force on shipyard tools and processes to be used during the availability. This responsibility does not circumvent the requirements placed on the industrial activity to train Ship's Force, but the Availability Coordinator will coordinate and complement the training provided by the industrial activity.
- d. Coordinate the integration and execution of Ship's Force responsibilities during the availability planning and execution.
- e. Act as the primary liaison between Ship's Force and the shipyard project team.

1.5.7 Ship's Maintenance Manager (Aircraft Carriers only). Maintenance Manager is responsible to establish and maintain a Quality Deficiency Reporting Program for resolving quality issues for work performed by outside activities and to ensure that each work request/job order is screened for Quality Control/QA requirements and marked up or stamped as to specific category applicable in each of the following situations as required by this volume:

- a. Nuclear.
- b. Level I.
- c. Special cleanliness requirements.
- d. Special testing requirements.
- e. Special fabrication requirements.

1.5.8 Ship's Principal Assistant. Principal Assistants will be responsible for duties as assigned by the Engineer/Reactor Officer.

1.5.9 Ship's Division Officer. Division Officers are responsible to:

- a. Review TWD as required in Part I, Chapter 2 Appendix D, TWD Review and Approval matrix, of this volume.
- b. Review the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- c. Verify controlled work is accomplished in accordance with an approved CWP.
- d. Ensure personnel assigned to their divisions perform QA surveillance, qualification, training, etc. as defined in this instruction.

- e. Supervise QA training of division personnel.
- f. Provide timely response to QA 14, indicating root cause analysis and actions taken.

1.5.10 Ship's Work Center Supervisor. Work Center Supervisor is responsible to:

- a. Review the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- b. Have TWD prepared, when designated the Lead Work Center (LWC), and as required by Part I, Chapter 2, paragraph 2.2 of this volume:
  - (1) Verify the FWP provides the correct written instructions both in sequence and requirements to satisfactorily accomplish the controlled work.
  - (2) Verify the FWP contains/lists the correct technical specifications or requirements (e.g., torque values, dimensions, Nondestructive Testing (NDT) inspection, special cleanliness, recertification test) for certification attributes to be documented on the appropriate QA form.
  - (3) Ensure signatures for repair work attributes are annotated as requiring Certification Signature Block (CSB) or signature, as applicable, on the QA form and in the FWP as discussed in Part I, Chapter 2 of this volume by use of (R), (S), (C), (I), (Q) and (V) in the margin by the appropriate step.
- c. Ensure all controlled work is accomplished in accordance with approved CWP.
- d. Ensure proper work authorizations have been obtained prior to starting work.
- e. Ensure tools, measuring and test equipment used during maintenance and testing are of proper range, scale and in calibration.
- f. Conduct QA training of work center personnel.
- g. Ensure work center personnel are properly trained and qualified, if required, prior to assignment to tasks requiring QA and/or special cleanliness (e.g., oxygen, hydrogen, reactor plant, steam plant) certifications.
- h. Ensure only material specified by the applicable drawings, standards, or specifications is ordered and installed.
- i. Submit request for use of rejected material using a Reject Tag (QA form 3).
- j. Obtain written permission from the QAO to downgrade LI/SS stock program material, NRP, or controlled material for non-level use.
- k. Supervise QA programs within assigned work centers.
- l. Review work for satisfactory completion.
- m. Ensure CWPs for completed controlled work are complete, properly reviewed and forwarded with all certifying documents.
- n. Initiate a DFS for non-nuclear or Liaison Action Request (LAR) for nuclear tests, inspections, material or other requirements of any maintenance action in which the requirements were not met.

1.5.11 Ship's Craftsman. Craftsman is responsible to:

- a. Perform all maintenance actions in accordance with the approved procedure. If that guidance is either incorrect, incomplete or unclear, stop and seek clarification from the work center or shift supervisor.
- b. Ensure QA forms associated with the maintenance are correctly completed in accordance with the applicable sections of this volume.
- c. Enter signature, printed name and date on all QA data forms completed.
- d. Initiate a DFS for non-nuclear or LAR for nuclear tests, inspections, material or other requirements of any maintenance action in which the requirements were not met.
- e. Ensure only Test, Measuring and Diagnostic Equipment (TMDE) (i.e., measuring devices, instruments, inspection tools, gauges, jigs or fixtures), which have current calibration stickers/records attached or available, are used for production, acceptance and testing. Uncalibrated/untested TMDE will be tagged and removed from service immediately.

1.5.12 Ship's Quality Assurance Officer. QAO is responsible to:

- a. Administer the ship's QA program.
- b. Review TWD as required in Part I, Chapter 2, Appendix D, TWD Review and Approval matrix, of this volume.
- c. Review the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- d. Verify the FWP, in the CWP, specifies the correct OQE that is to be generated to prove recertification of the system or component.
- e. Verify the testing requirements for controlled work, called out in the FWP, are correct and in accordance with the latest applicable specifications as required by Part I, Chapter 2, paragraph 2.3 of this volume.
- f. Verify completed test results for controlled work fully satisfy test requirements, or corrective action is taken.
- g. Review and close out all TWDs for work on systems or components required for reactor plant startup, propulsion plant startup or ship's underway operations (e.g., if the work is on a spare component it may not be necessary to close the TWD) prior to startup or getting underway.
- h. Maintain the following record files in accordance with Part I, Chapter 10, paragraph 10.5 of this volume:
  - (1) Completed CWPs.
  - (2) QA Assessments, audits, surveillance and deficiency correction.
  - (3) Controlled material.
- i. Determine suitability for use of Level I, SUBSAFE, SOC, SFCC or Nuclear Level I material from another ship in own ship's system, when the transfer is directly from the donating ship.
- j. Provide disposition instructions for material rejected at receipt inspection.

- k. Obtain chemical analysis, NDT, destructive testing and generic materials identity testing results as required by Part I Chapter 6 of this volume to certify material for use in a certified (e.g., Level I, SUBSAFE, Nuclear, Scope of Certification) system.
- l. Provide technical services to the Supply Officer for determining material requirements.
- m. Authorize downgrading of LI/SS stock program material, NRP or controlled material for non-level use.
- n. Review requests for DFS for accuracy and technical merit, and forward to Department Head.
- o. Maintain an auditable file of outstanding DFS and the record of DFS numbers assigned. Prior to each underway following any scheduled Fleet/Chief of Naval Operations Maintenance Availability, the ship's QAO will audit active DFSs against associated Job Control Numbers to verify a current up to date entry in the Current Ship's Maintenance Project exists.
- p. Maintain a file of DFS which have been approved as permanent repairs and result in change in configuration until they are reflected in ship's drawings.
- q. Verify ship's mapping plans and selected records and drawings are updated (marked up) when approved DFS authorize a change in configuration as a permanent repair.
- r. Submit DFS clearance reports, using Departure Clearance Report (QA form 12A) to the approving authority when the work was done which corrects specific DFS. If unable to use a QA form 12A, use the message format of Part I, Chapter 8, Appendix B, of this volume.
- s. Manage the ship's internal QA Audit and Surveillance program as required by Part I Chapter 9 of this volume. Coordinate with the ship's Executive Officer to resolve surveillance scheduling and accomplishment problems.
- t. Ensure that QA training is conducted as required by Part I, Chapter 3 and Part III, Chapter 3 (as applicable) of this volume and reference (a) (as applicable). The QAO will coordinate with the Ship's Engineer and Engineering Department Master Chief to incorporate these requirements into the Engineering Departmental Training Plan. The QAO will attend QA training when practical.
- u. Assess QA training and provide input to Engineering Department Master Chief and Ship's Engineer for incorporation into the periodic Engineering Department Training assessment as required by reference (d).
- v. Implement a formal qualification program for QAIs, CMPOs, Cleanliness Inspector/Certifiers, QASs, Work Center Supervisors and Maintenance Planners (if assigned).
- w. Conduct oral qualification interviews for QAIs/QASs/CMPOs/Cleanliness Inspector/Certifiers, Work Center Supervisors and Maintenance Planners.
- x. Maintain a current master list of qualified CMPOs/Controlled Material Handlers (CMH), Cleanliness Inspectors, QAIs, QASs (if assigned), Oxygen Clean Workers, Oxygen Clean Instructors, Work Center Supervisors and Maintenance Planners as specified in Part I, Chapter 10 of this volume.
- y. (Submarines only) Verify all reactor plant hull integrity area maintenance is accomplished in accordance with appropriate directives.
- z. (Submarines only) Verify REC is initiated for work within the SUBSAFE boundary (unless REC exception as specified in reference (e)).
- aa. (Submarines only) Maintain SUBSAFE REC records including the CWP log.

- ab. (Submarines only) Coordinate with the ISIC and the FMA to ensure the administration, scheduling and reporting of the URO MRC program is in accordance with the applicable class URO MRC manual, and this volume.
- ac. (Submarines only) Retain any QA form 34 generated in connection with controlled assembly performed as a REC exception in accordance with Part I, Chapter 5, paragraph 5.10.6, Note 3 of this volume.
- ad. Review in detail as many non-nuclear NDT weld records as possible (minimum of 10 percent per year) to ensure that all of the requirements of the applicable fabrication documents have been and are continuously being met.
- ae. Verify an active Job Control Number exists for all active temporary DFSs at the completion of all scheduled Fleet Maintenance Activity Availabilities, major or minor, Chief of Naval Operations availabilities or at least quarterly and maintain an auditable record of the verification until superseded.

1.5.13 Ship's Assistant Quality Assurance Officer. A QAO is responsible to perform duties as assigned by the QAO.

1.5.14 Ship's Quality Assurance Supervisor. QAS, if assigned, will perform the duties as specified in paragraph 1.6.12 of this chapter.

1.5.15 Ship's Quality Assurance Inspectors. QAIs are responsible for coordinating and administering the QA Program within their respective work centers. The QAI will:

- a. Develop a thorough understanding of the QA program.
- b. After verifying work completed, enter initials or signature (as required by the form, tag or procedure), and the date on all applicable QA forms/tags and CWP steps.
- c. Verify QA form 2 is filled out correctly and attached to items removed from a controlled system for transfer to another Fleet activity and ensure items received from another ship have QA form 2 tags attached.
- d. As LWC QAI, review each CWP prepared which requires QAI CSBs to verify inspection requirements are adequately addressed before submission to QAO and/or Department Head as required by Part I, Chapter 2, Appendix D, of this volume.
- e. Verify all work inspected meets the minimum requirements set forth in latest applicable plans, specifications and directives of higher authority as stated in the FWP.
- f. Perform QA inspections of certification attributes as required by Part I, Chapter 5, of this volume.
- g. Ensure all inspections beyond the capability of the QAI are performed by FMA inspectors prior to final acceptance/installation of the product by the ship.
- h. Ensure only TMDE (i.e., measuring devices, instruments, inspection tools, gauges, jigs or fixtures), which have current calibration stickers/records attached or available, are used for production, acceptance and testing. Uncalibrated/untested TMDE will be tagged and removed from service immediately.
- i. Ensure items removed from controlled systems are tagged with QA form 2 when required by Part I, Chapter 6 of this volume. Tags are not required if material is nuclear non-Level (Level N/A) or non-nuclear non-level.
- j. Ensure controlled material (SUBSAFE, Level I, Nuclear Level I, Scope of Certification) delivered to a RMC/FMA work center for work is tagged with a QA form 2.

- k. Report all work and testing discrepancies/deficiencies to the department head and the QAO via chain of command. Ensure the deficiency is resolved before work continues.
- l. Sign QA form 2 when controlled material is installed for SUBSAFE and nuclear systems.
- m. As LWC QAI, review all completed QA forms and data sheets for accuracy, completeness and technical correctness.
- n. Reject untraceable, damaged, or unclean controlled material using a material reject tag (QA form 3).
- o. Witness controlled assemblies, as a second party not involved in the actual work.
- p. (Submarines only) Complete the necessary recertification information for maintenance performed by Ship's Force; for material changes/replacement, material generic identification (if not previously documented) or fastener torque on the applicable blank RPWAR pages and submit to the Engineer Officer for review prior to approval by the Commanding Officer. The general notes for report preparation and use, supplied with each RPWAR, will be used in completing the recertification form.
- q. Review certification testing as part of CWP preparation.
- r. Witness and document results of tests (hydrostatic, drop, joint tightness). Work center tests of components conducted by the FMA need not be witnessed, unless directed by the Department Head or FMA CWP. Promptly inform supervisors of unsatisfactory test results. Ensure test documentation is complete and accurate.
- s. Review DFS/LAR prepared by the work center for accuracy and technical merit, and forward to the Division Officer and QAO.

1.5.16 Ship's Controlled Material Petty Officer. CMPOs are responsible to:

- a. Ensure all material under their cognizance is stored and controlled to the requirements of references (a) or (e).
- b. Receipt inspect all LI/SS stock program material, SFCC and NRP received by work center/division.
- c. Request disposition instructions for rejected material.
- d. Remove QA form 3 from previously rejected and now accepted controlled material, annotate the material acceptance on the QA form 2 and file the QA form 3 with the CWP.
- e. Maintain custody of controlled material in segregated stowage in accordance with reference (f).
- f. Inspect controlled material storage areas of their work center semi-annually, as a minimum in accordance with Part I, Chapter 6 of this volume.
- g. Ensure controlled material is properly stowed and handled so the identification of the subject material and its certification are always maintained.
- h. Ensure nuclear material received without Ready for Issue tags is certified to the required "Level of Essentiality".
- i. Reject unsatisfactory material. Fill out and attach QA form 3 and request disposition instructions.
- j. Send any material certification documents for material which has been provided by the ship to the RMC/FMA QA office. Ship should retain original.

- k. Perform receipt inspection of package alteration kits that contain controlled material when ready for use.
- l. Ensure controlled material markings are on all pieces when cutting a smaller piece from a larger one.
- m. Ensure controlled material markings are moved to an unaffected area, if the controlled material item will lose the markings due to a fabrication process (e.g., welding, machining) prior to the fabrication process.
- n. Ensure all controlled material is identified, color coded, marked and tagged as required by this volume and the applicable material control standard.

1.5.17 Ship's Cleanliness Inspector/Certifier. Cleanliness Inspectors/Certifiers are responsible to perform initial, in process and final cleanliness inspections during maintenance/repairs for those systems requiring cleanliness controls per Part I, Chapter 5, paragraph 5.8, of this volume.

1.5.18 Ship's Nondestructive Test Examiner. The ship's NDT Examiner shall be appointed in writing by the Commanding Officer and shall be responsible for all aspects of the command's Nondestructive testing program. NDT Examiner qualification and certification requirements are specified in reference (g). The following shall comprise the core responsibilities of the ship's NDT Examiner:

- a. Coordinate the efforts of other assigned NDT examiners at the activity.
- b. Act as the command's point of contact for NDT technical issues. In addition, act as the command's point of contact with NAVSEA for NDT issues.
- c. Develop the command's NDT examiner guidelines, to include the command's written practice for NDT certification when required by reference (h) utilizing the input of all participating NDT examiners.
- d. Ensure submittal of required reports of certification or re-certification to higher authority as required by reference (i).
- e. Review all requests for NDT training courses and examiner certification services. Provide recommendations to the chain of command regarding eligibility of the requestor, and the need for such training or certification based on current and projected NDT personnel resources.
- f. Approve examination material for all NDT methods utilized at the activity for which they are certified. Ensure examination material reflects changes made to applicable fabrication documents.
- g. Approve, and qualify NDT procedures for each method utilized at the activity. Revise and approve procedures as necessary when changes are made to applicable fabrication documents.
- h. Schedule and perform NDT Inspector surveillance. Maintain records of surveillance in order to perform trend analysis of inspector abilities and program effectiveness.
- i. Schedule and administer NDT examinations. Maintain records of examinations sufficient to trace inspector qualifications to original examination material. Maintain a matrix of high miss questions in order to assess inspector knowledge and program effectiveness.
- j. Train, certify and monitor NDT Inspectors as required by applicable specifications and Part I, Chapter 3 paragraph 3.2.2 of this volume.
- k. Schedule eye examinations for NDT Inspectors.
- l. Ensure each NDT Inspector's service record is kept updated with qualification status.

- m. Maintain individual records of qualification for NDT inspectors.
- n. Monitor the welder/brazer qualification and training per reference (j).
- o. Review all welder/brazer qualification records for completeness, semi-annually.
- p. Review completed NDT inspection reports for technical completeness and accuracy and sign, where indicated on the report, on completion of work.
- q. Review, approve and monitor the command's welder/brazer training and qualification program as required by reference (j).
- r. Prepare and execute the training and qualification program for each NDT method that leads to inspector certification in each method and maintains inspector competency in each method.

1.5.19 Ship's Nondestructive Test Inspector. NDT Inspectors are responsible to:

- a. Verify CWP's which include NDT inspections properly identify the inspection requirements and acceptance criteria.
- b. Ensure NDT inspections are completed correctly and in accordance with the applicable requirement and inspection reports are technically complete and accurate.
- c. Ensure use of only TMDE (i.e., measuring devices, instruments, inspection tools, gauges, jigs or fixtures), which have current calibration stickers/records attached or available, for production, acceptance and testing. Uncalibrated/untested TMDE will be tagged and removed from service immediately.
- d. When no NDT Examiner is assigned, monitor the welder/brazer qualification and training per reference (j).

1.5.20 Engineering Department Master Chief. The Engineering Department Master Chief is responsible to coordinate with the Ship's Engineer and QAO to incorporate the QAO provided training as required by Part I, Chapter 3 and Part III, Chapter 3 (as applicable) of this volume and reference (a) (as applicable) into the Engineering Department Training Plan.

1.5.21 Ship's Maintenance Planner (Submarines and Aircraft Carriers only). Maintenance Planners are responsible to:

- a. Prepare the FWP/CWP as required in Part I, Chapter 2, paragraph 2.3.1.b of this volume.
- b. Perform ship check/job check to verify equipment configuration supports work package development.
- c. Develop FWPs/CWPs with the correct written instructions both in sequence and requirements to satisfactorily accomplish the work.
- d. Develop FWPs/CWPs with the correct technical specifications or requirements (e.g., torque values, dimensions, NDT inspection, special cleanliness, recertification test) for certification attributes to be documented on the appropriate QA form. Fill in all preplaced data required by QA form instructions prior to routing CWP.
- e. Ensure signatures for repair work attributes are annotated as requiring CSB or signature, as applicable, on the QA form and in the FWP as discussed in Part I, Chapter 2 of this volume by use of (R), (S), (C), (I), (Q) and (V) in the margin by the appropriate step.

- f. Ensure correct materials, spare parts and special test equipment to be used during maintenance and testing are called out in the materials section of the FWP.
- g. Initiate revisions to FWPs/CWPs when requirements of Part I, Chapter 2, paragraph 2.3.7.3.b(2)(b) and (d) of this volume are met.
- h. Maintain file of Standardized FWPs in accordance with Part I, Chapter 2, paragraph 2.3.7.10.e. of this volume, for their respective divisions. Submit Standardized FWPs to LWC Supervisor for approval prior to use.
- i. Initiate procurement of material specified by the applicable drawings, standards or specifications to complete the designated repairs.
- j. Prepare and route a DFS for non-nuclear or LAR for nuclear tests, inspections, material or other requirements of any maintenance action in which the requirements were not met.

1.6 REGIONAL MAINTENANCE CENTER/FLEET MAINTENANCE ACTIVITY RESPONSIBILITIES.

1.6.1 RMC Commander/FMA Commanding Officer. Responsible for QA in the maintenance, repair and alteration of fleet ships as follows:

- a. Designate the RMC/FMA QAO in writing.
- b. (Submarines only) Provide a written report of certification to the tended ship, at the conclusion of a maintenance period and prior to a tended ship's next underway.
- c. Certify the qualifications of QA personnel.
- d. Ensure the RMC/FMA has an effective audit and surveillance program capable of assessing work performance and identifying areas of poor performance.
- e. Initiate a semi-annual evaluation of the RMC/FMA QA Program by the QAO.

1.6.2 RMC Deputy Commander/FMA Executive Officer. Responsible for the following:

- a. Monitoring the QAO's administration of the RMC/FMA's QA surveillance, training and qualification programs.
- b. Providing senior command level authority to backup the QAO in the performance of the QAO's duties.
- c. Spot checking performance of QA training by attending/monitoring training periodically.
- d. Assigning an AQAO who is an E-7 or above or a senior civilian to be an administrative assistant to the QAO.
- e. Assigning sufficient QASs and QAIs to the QA Division.

1.6.3 RMC Production Officer/FMA Repair Officer. Production Officer/Repair Officer is responsible to:

- NOTES:
- 1. AT TRIDENT REFIT FACILITIES SOME OF THESE RESPONSIBILITIES MAY BE UNDER THE COGNIZANCE OF THE PLANNING OFFICER. HOWEVER, THEY WILL NOT BE DELEGATED TO A LEVEL LESS THAN A DEPARTMENT HEAD.
  - 2. WHERE NOTED, SOME OF THESE RESPONSIBILITIES MAY BE UNDER THE COGNIZANCE OF THE ENGINEERING DEPARTMENT HEAD AT AN RMC.

- a. Implement a work request screening process such that jobs requiring special controls are recognized.
- b. Implement a QA Program that ensures all work accomplished by the Production/Repair Department meets the material and workmanship requirements of approved plans and specifications.
- c. Provide liaison with other department heads when their functions are directly or indirectly related to the QA requirements of the Production/Repair Department.
- d. Review and approve TWD as required in Part I, Chapter 2, Appendix D, TWD Review and Approval matrix, of this volume.
- e. Review and approve the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- f. (Submarines only) Approve and sign all recertification RPWAR and ensure these documents are forwarded to the Reactor Plant Planning Yard with copy to NAVSEA 08, TYCOM and tended ship's parent ISIC.
- g. Review all DFS initiated by the RMC/FMA.
- h. (Submarines only) Review and approve all LARs initiated by the FMA.
- i. Maintain a sufficient number of qualified personnel to adequately staff the QA Division. At RMCs this may be performed by the Engineering Department Head.
- j. Implement a formal training and qualification program for all personnel assigned to the Production/Repair Department who perform, plan, and/or supervise controlled work, covering QA requirements and practices.
- k. Designate nuclear Metallographic Test Method Examiner and Generic Material Alloy Identification Examiners (as applicable). At RMCs this may be performed by the Engineering Department Head.
- l. Verify the RMC/FMA has an effective audit and surveillance program capable of assessing work performance and identifying areas of poor performance. At RMCs this may be performed by the Engineering Department Head.
- m. Ensure fact-finding critiques are held to establish underlying causes and pursue corrective actions when major errors, mistakes, or problems occur during maintenance that affect Nuclear, Level I, SFCC, DSS/SOC or SUBSAFE work, or result in serious damage to equipment or injury to personnel. Contact the ISIC immediately for issues which will result in a SUBSAFE/FBW SCS/DSS/SOC critique, SUBSAFE/FBW SCS/DSS/SOC trouble report, and/or SUBSAFE/FBW SCS/DSS/SOC fact-finding and send a copy of the report to the TYCOM. At RMCs this may be performed by the Engineering Department Head.
- n. Ensure that each work request/job order is screened for Quality Control/QA requirements and marked up or stamped as to specific category applicable in each of the following situations as required by this manual:
  - (1) SUBSAFE.
  - (2) Level I.
  - (3) SAED.
  - (4) Nuclear.
  - (5) Special cleanliness requirements.

- (6) Special testing requirements.
- (7) Special fabrication requirements.
- (8) SOC.
- (9) SFCC.

1.6.4 FMA Supply Officer. Supply Officer is responsible to:

- a. Designate area(s) for stowage of LI/SS/SOC/SW/VU stock program material and NRP in the custody of the supply department.
- b. Ensure procurement, stowage, and issue of SAED – Submarine Antenna Quality Assured Material, Nuclear, SUBSAFE, SOC, SFCC and Level I materials are in compliance with the applicable material control standards, instructions and this volume.
- c. Ensure accompanying certification documents remain with the LI/SS/SOC stock program material, SW, VU and NRP for which the supply department has custody.
- d. Turn over material certification documentation (or copy, if issuing other than the entire lot) for LI/SS/SOC stock program material, SFCC and NRP to the customer.
- e. Return defective LI/SS/SOC stock program material, SW, VU and NRP to the Navy supply system in accordance with supply department procedures. Submit defective material reports.
- f. Ensure appropriate supply personnel receive training on nuclear and non-nuclear material covering material certification, material procurement, receipt inspection, and LI/SS/SOC stock program material, SW, VU and NRP stowage requirements.
- g. Ensure semiannual inventories of supply's LI/SS/SOC stock program material, SW, VU and NRP are conducted.

1.6.5 FMA Nuclear Repair Officer. When assigned, the Nuclear Repair Officer is responsible to:

- a. Determine and specify the material requirements and the certification requirements for the NRP to be used in nuclear controlled work.
- b. Initiate procurement action for NRP required for accomplishment of nuclear tasks.
- c. Review and approve the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- d. Prepare and promulgate the CWP, when OQE is required at the conclusion of the nuclear work and as required by Part I, Chapter 2 of this volume.
  - (1) Verify the FWP is the correct procedure both in sequence and requirements to satisfactorily accomplish the controlled work.
  - (2) Verify the CWP contains/lists the correct technical specifications or requirements (e.g., torque values, dimensions, NDT inspections, special cleanliness, test) for certification attributes to be documented on the appropriate QA form.
  - (3) Ensure test requirements for controlled work comply with the latest applicable specifications.

- (4) Ensure signatures for repair work attributes are annotated as requiring CSB or signature, as applicable, on the QA form and in the FWP as discussed in Part I, Chapter 2 of this volume by use of (R), (S), (CI), (G), (C), (I), (Q) and (V) in the margin by the appropriate step.
- e. (Submarines only) Review and sign the necessary recertification RPWAR pages, as required by Part I, Chapter 5, paragraph 5.11, of this volume for repair/maintenance actions performed in Reactor Plant SUBSAFE/Hull Integrity areas by the FMA and forward to the QAO for review.
- f. (Submarines only) Maintain copies of approved RPWAR forwarded to the Reactor Plant Planning Yard in an auditable fashion.
- g. Provide the tended ship the test requirements and joints/components to be tested for recertification of FMA work prior to commencing work on the tended ship.
- h. Conduct oral examinations for qualification of personnel as reactor plant Cleanliness Inspector/Certifier.
- i. Ensure only appropriately trained and/or qualified personnel perform nuclear work.

1.6.6 RMC/FMA Planning and Estimating Officer. Planning and Estimating Officer is responsible to:

- a. Determine and specify the material requirements and the certification requirements for the LI/SS/SFCC and other materials to be used in non-nuclear controlled work.
- b. Initiate procurement action for LI/SS/SFCC stock program material and other materials required for accomplishment of non-nuclear tasks assigned.
- c. Review the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- d. Prepare and promulgate the CWP when OQE is required at the conclusion of the non-nuclear controlled work and as required by Part I, Chapter 2 of this volume.
  - (1) Verify the FWP is the correct procedure both in sequence and requirements to satisfactorily accomplish the controlled work.
  - (2) Verify the CWP contains/lists the correct technical specifications or requirements (e.g., torque values, dimensions, NDT inspections, special cleanliness, tests) for certification attributes to be documented on the appropriate QA form.
  - (3) Ensure test requirements comply with the latest applicable specifications.
  - (4) Ensure signatures for repair work attributes are annotated as requiring CSB or signature, as applicable, on the QA form and in the FWP as discussed in Part I, Chapter 2, paragraph 2.3 of this volume by use of (R), (S), (CI), (G), (C), (I), (Q) and (V) in the margin by the appropriate step.
- e. Provide the tended ship the test requirements and joints/components to be tested for recertification of FMA work prior to commencing work on the tended ship.

1.6.7 RMC/FMA Division Officer. Division Officers are responsible to:

- a. Supervise and direct QA program within work centers under their cognizance.
- b. Ensure divisional personnel understand the requirements for/of a CWP.

- c. Ensure all repair actions performed by their division conform to applicable specifications and any deviation from specifications is reported as a DFS for non-nuclear work or LAR for nuclear work.
- d. Ensure CMPOs are assigned, qualified and executing their duties for each work center handling or stowing controlled material.
- e. Ensure areas are designated and are appropriate for proper stowage of controlled material.
- f. Review the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- g. Review each TWD as required in Part I, Chapter 2, Appendix D, of this volume.
- h. Conduct/monitor divisional and work center QA training.
- i. Obtain written permission from the QAO to downgrade LI/SS Stock Program Material or NRP for non-level use.

1.6.8 RMC/FMA Work Center Supervisor. Work Center Supervisors are responsible to:

- a. Ensure controlled and non-controlled material to be installed is correct per plan, drawing or other specification.
- b. Review each TWD for the work center as required in Part I, Chapter 2, Appendix D, of this volume.
- c. Review the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- d. Supervise QA programs within assigned work centers.
- e. Review work for satisfactory completion.
- f. Ensure CWPs for completed controlled work are complete, properly reviewed and forwarded with all certifying documents, when work is completed.
- g. Ensure work center personnel are properly trained and qualified, if required, prior to assignment to tasks requiring QA and/or special cleanliness (e.g., oxygen, hydrogen, reactor plant, steam plant) certifications.
- h. Ensure all personnel use only TMDE (i.e., measuring devices, instruments, inspection tools, gauges, jigs or fixtures), which have current calibration stickers/records attached or available, for production, acceptance and testing. Uncalibrated/untested TMDE will be tagged and removed from service immediately.
- i. Prepare DFS or LAR for non-conforming conditions found or caused by the work center, sign, and forward to QAO.

1.6.9 RMC/FMA Craftsman. Craftsman is responsible to:

- a. Perform all maintenance actions in accordance with the FWP. If that guidance is either incorrect, incomplete or unclear, **stop** and seek clarification from the work center or shift supervisor.
- b. Ensure QA forms associated with the maintenance are correctly completed as required by the applicable sections of this volume.
- c. Enter signature, printed name and date on all QA data forms completed.

- d. Ensure only TMDE (i.e., measuring devices, instruments, inspection tools, gauges, jigs or fixtures), which has current calibration stickers/records attached or available, is used for production, acceptance and testing. Uncalibrated/untested TMDE will be tagged and removed from service immediately.

1.6.10 RMC/FMA Quality Assurance Officer. QAO is responsible to:

- a. Organize and implement a QA program within the RMC/FMA to carry out provisions of this volume.
- b. Provide guidance and evaluate efforts to produce work of acceptable standards.
- c. Prepare QA procedures, where necessary, to implement the provisions of this volume.
- d. Assist the TYCOM/ISIC as requested in performing QA audits on tended ships.
- e. Assist the TYCOM/ISIC as requested in providing indoctrination training on the QA program to the Engineer Officers and QAOs of assigned ships. Provide QA training for tended ship's personnel qualifying as CMPO/CMH, QAS and QAI.
- f. Approve downgrading of controlled material.
- g. Determine suitability for use of controlled material received from one ship, for use on another ship, when the transfer is via an RMC/FMA work center.
- h. Provide disposition instructions for rejected material.
- i. Institute a formal qualification program for QA personnel.
- j. Train and qualify work center CMPOs/CMHs. Inform the appropriate Division Officer and the Production/Repair Officer in writing of those qualified and any changes.
- k. Review RMC/FMA generated DFS for accuracy and technical merit, sign and forward to the Repair Officer. At an RMC, this function will be the responsibility of the NAVSEA Technical Authority Warrant Holder in Engineering Department.
- l. Obtain chemical analysis, NDT and destructive testing required to upgrade or certify material for nuclear and non-nuclear applications for both the FMA and tended ships.
- m. Establish and coordinate RMC/FMA procedures for material control as delineated in this volume.
- n. Review, open and close out TWDs as required in Part I, Chapter 2, Appendix D, TWD Review and Approval matrix of this volume. Establish positive controls to ensure that repairs which are not in conformance with specification are not accepted without an approved DFS for non-nuclear systems or LAR for nuclear systems.
- o. Review the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- p. (Submarines only) Review and sign RPWAR.
- q. Develop a QA training program, in conjunction with the Training Officer, which includes training for personnel who perform, plan and/or supervise controlled work.
  - (1) Supervise training and qualification of:
    - (a) QAS.

- (b) QAIs.
  - (c) CMPOs/CMHs.
  - (d) Cleanliness Inspectors/Certifiers.
- (2) Review and evaluate training of all personnel performing controlled work. Ensure that the continuing training is in sufficient detail and depth to provide effective training in all topics and areas specified in Part I, Chapter 3 of this volume.
- r. Maintain a current master list of qualified QASs (if assigned), QAIs, CMPOs/CMHs, Cleanliness Inspectors, Oxygen Clean Workers and Oxygen Clean Instructors as specified in Part I, Chapter 10 of this volume.
  - s. Establish and administer a comprehensive RMC/FMA QA audit and surveillance program capable of assessing the work performance, training and qualifications and identifying areas of poor performance. Enlist the assistance of other repair department officers and senior enlisted personnel for audits and surveillance in the repair and supply departments.
    - (1) Prepare and update a written surveillance and annual audit schedule.
    - (2) Provide the Commander/Commanding Officer with a semi-annual evaluation of the overall adequacy and effectiveness of the RMC's/FMA's QA program.
  - t. Ensure record files are maintained for CWP, controlled material, audits, surveillance, audit deficiency corrections, qualifications and training.
  - u. Ensure all testing required for completion of TWD is complete and reviewed prior to the tended ship reactor plant startup, propulsion plant startup, or getting underway or a DFS for non-nuclear systems or LAR for nuclear systems has been submitted and approved.
  - v. Perform opening reviews of CWP as assigned to assure OQE generated will support work recertification. Perform closing reviews of CWP as assigned to assure technical accuracy and satisfactory OQE exists for record history.
  - w. Supervise QASs, QAIs, Cleanliness Inspectors/Certifiers, CMPOs/CMHs and other personnel, involved in controlled work, in the performance of their QA duties.
  - x. Conduct QA audits, surveillance and coordinate corrective actions to ensure compliance with specifications.
  - y. Maintain QA records and files, which includes completed CWPs including radiography film (if radiography used for acceptance of work), controlled material records (e.g., QA form 1, certification papers received with the material), training and qualification, etc.

1.6.11 RMC/FMA Assistant Quality Assurance Officer. AQAO is responsible to perform duties as assigned by the QAO.

1.6.12 RMC/FMA Quality Assurance Supervisor. QAS is responsible to:

- a. Ensure all testing required for completion of CWP is complete and reviewed prior to the tended ship reactor plant startup, propulsion plant startup, or getting underway or a DFS for non-nuclear systems or LAR for nuclear systems has been submitted and approved.

- b. Perform opening reviews of CWP as assigned to assure OQE generated will support work recertification. Perform closing reviews of CWP as assigned to assure technical accuracy and satisfactory OQE exists for record history.
- c. Train and supervise QAIs, Cleanliness Inspectors/Certifiers, CMPOs/CMHs and other personnel, involved in controlled work, in the performance of their QA duties.
- d. Conduct QA audits, surveillance and coordinate corrective actions to ensure compliance with specifications.
- e. Maintain QA records and files including completed CWPs (including radiography film if radiography used for acceptance of work), controlled material records (e.g., QA form 1, certification papers received with the material), training and qualification, etc.
- f. Review DFS for accuracy and technical merit and forward to QAO.

1.6.13 RMC/FMA Quality Assurance Inspector. QAIs are responsible to:

- a. Review steps in CWP which require QAI signatures to verify all requirements are adequately addressed.
- b. Ensure all work inspected meets the requirements set forth in the latest applicable plans, specifications and directives of higher authority as stated in the CWP.
- c. Perform QA inspections of certification attributes.
- d. Verify permanent markings on controlled material are properly transferred and new material control tags are affixed.
- e. Ensure all personnel use only TMDE (i.e., measuring devices, instruments, inspection tools, gauges, jigs or fixtures), which have current calibration stickers/records attached or available, for production, acceptance and testing. Uncalibrated/untested TMDE will be tagged and removed from service immediately.
- f. Sign QA form 2 as controlled material is correctly installed for SUBSAFE and nuclear systems.
- g. Witness and verify testing and inspections. Promptly inform supervisors of unsatisfactory test results.
- h. Ensure all test results are completed, properly documented and the QA forms are returned to the CWP except for those specifically designated as work center records.
- i. Review DFS for accuracy and technical merit and forward to QAO.

1.6.14 RMC/FMA Controlled Material Petty Officer/Controlled Material Handler. CMPO/CMHs are responsible to:

- a. Receipt inspect all controlled material received by their work center/division.
- b. Ensure all material under their cognizance is stored and controlled to the governing material control requirements.
- c. Inspect controlled material storage areas of their work center semi-annually, as a minimum, in accordance with Part I, Chapter 6 of this volume.
- d. Ensure controlled material is properly stowed and handled so the identification of the subject material and its certification are always maintained.

- e. Reject unsatisfactory material. Fill out and attach QA form 3 and request disposition instructions.
- f. Send any material certification documents for material which has been provided by a ship along with the QA form 1 to the QA office. Ship shall retain originals when the material has been issued for installation.
- g. Receipt inspect package alteration kits that contain controlled material when ready for use.
- h. Remove QA form 3 from previously rejected and now accepted controlled material, annotate the material acceptance on the QA form 2 and file the QA form 3 with the CWP.
- i. Retain custody of controlled material when it is not in the custody of a craftsman or in a controlled material storage area.
- j. Ensure controlled material markings are on all pieces when cutting a smaller piece from a large one.
- k. Ensure controlled material markings are moved to an unaffected area, if the controlled material item will lose the markings due to a fabrication process (e.g., welding, machining) prior to the fabrication process.

1.6.15 RMC/FMA Cleanliness Inspector/Certifier. Cleanliness Inspectors/Certifiers are responsible to perform initial, in process and final cleanliness inspections during maintenance/repairs for those systems requiring cleanliness controls per Part I, Chapter 5, paragraph 5.8 of this volume.

1.6.16 RMC/FMA Command Nondestructive Test Examiner. The Command Nondestructive Test (NDT) Examiner shall be appointed in writing by the Commander/Commanding Officer and shall be responsible for all aspects of the Command's Nondestructive testing program. The Command NDT Examiner will perform the responsibilities of the NDT Examiner per paragraph 1.6.17 of this chapter when a single Examiner is assigned to the RMC/FMA. The following shall comprise the core responsibilities of the FMA Command NDT Examiner:

- a. Coordinate the efforts of other assigned NDT Examiners at the activity.
- b. Act as the Command's point of contact for NDT technical issues. In addition, act as the Command's point of contact with NAVSEA for NDT issues.
- c. Develop the Command's NDT Examiner guidelines, to include the Command's Written Practice for NDT certification when required by reference (h) utilizing the input of all participating NDT examiners.
- d. Ensure submittal of required reports of certification or re-certification to higher authority as required by reference (k).
- e. Review all requests for NDT training courses and examiner certification services. Provide recommendations to the chain of command regarding eligibility of the requestor and the need for such training or certification based on current and projected NDT personnel resources.

1.6.17 RMC/FMA Nondestructive Test Examiner. RMC/FMA NDT Examiner is responsible to:

- a. Approve examination material for all NDT methods utilized at the activity for which they are certified. Ensure examination material reflects changes made to applicable fabrication documents.
- b. Approve and qualify NDT procedures for each method utilized at the activity. Revise and approve procedures as necessary when changes are made to applicable fabrication documents.
- c. Schedule and perform NDT Inspector surveillance. Maintain records of surveillance in order to perform trend analysis of inspector abilities and program effectiveness.

- d. Schedule and administer NDT examinations. Maintain records of examinations sufficient to trace inspector qualifications to original examination material. Maintain a matrix of high miss questions in order to assess inspector knowledge and program effectiveness.
- e. Train, certify and monitor NDT Inspectors as required by applicable specifications and Part I, Chapter 3 paragraph 3.2.2 of this volume.
- f. Schedule eye examinations for NDT Inspectors.
- g. Ensure each NDT Inspector's service record is kept updated with qualification status.
- h. Maintain individual records of qualification for NDT inspectors.
- i. Monitor the welder/brazer qualification and training per reference (j).
- j. Review all welder/brazer records for completeness semi-annually. This review may be performed by the welding engineers at Trident Refit Facilities (TRF).
- k. Review completed NDT inspection reports for technical completeness and accuracy and sign, where indicated on the report on completion of work.
- l. Review, approve and monitor the commands' welder/brazer training and qualification program as required by reference (j).
- m. Prepare and execute the training and qualification program for each NDT method that leads to inspector certification in each method and maintains inspector competency in each method.

1.6.18 RMC/FMA Nondestructive Test Inspector. NDT Inspectors are responsible to:

- a. Verify CWP's which include NDT inspections properly identify the inspection requirements and acceptance criteria.
- b. Ensure NDT inspections are completed correctly and in accordance with the applicable requirement and inspection reports are technically complete and accurate.
- c. Ensure use of only TMDE (i.e., measuring devices, instruments, inspection tools, gauges, jigs or fixtures), which have current calibration stickers/records attached or available, for production, acceptance and testing. Uncalibrated/untested TMDE will be tagged and removed from service immediately.
- d. Sign QA form 2 as controlled material is correctly installed.

1.7 OTHER ACTIVITY RESPONSIBILITIES. Activities other than RMC/FMAs will conform to the requirements of this volume through a formal MOA, as defined in Volume II, Part I of this manual, with the ISIC while conducting maintenance on fleet activities. This includes work performed by naval shipyards, government agents, civilian contractors and other activities not specifically mentioned in other sections of this instruction.

- a. Ship's Force is ultimately responsible for all work accomplished on board their ship.
- b. Ship's Force is responsible for the development of TWDs for use in technical assist visits.
- c. In some cases, technical assists may provide troubleshooting services or complete equipment changes. Technical representatives are expected to utilize approved QA procedures or observe the requirements of this manual. The contractor or representative shall be able to explain what controls he/she will place on a given job, including testing and documentation to be provided for OQE.

- d. Technical support agencies and contracted organizations may not perform work inside the SUBSAFE boundary. Only activities that are listed in NAVSEA NOTE 5000 are authorized to perform SUBSAFE work. In cases where RMCs or other activities are assisting on maintenance inside the SUBSAFE boundary, paragraph 1.7.a and 1.7.b of this chapter will be strictly adhered to.
- e. Product Quality Deficiency Reporting shall be in accordance with reference (i), with the exception of Aircraft Launch and Recovery Equipment. Quality Deficiency Reporting associated with Aircraft Launch and Recovery Equipment is addressed in reference (k).

- y. Maintenance performed which invokes MIL-STD 1330 or MIL-STD 1622 cleanliness standards.
- z. Maintenance on Fly-By-Wire Ship Control Systems, per reference (e).
- aa. (Submarines only) Special Valves.

NOTE: THE HEX PLUGS (MS PLUGS) DISCUSSED IN THESE PARAGRAPHS ARE NOT EQUIVALENT TO THE MS PLUGS DESCRIBED IN TABLE 5-14, RE-ENTRY CONTROL EXCEPTIONS OF CHAPTER I-5 OF THIS VOLUME. THE FOLLOWING PARAGRAPHS REFER TO TABLE 2-1 BELOW.

Style	Description	Ship/Class	Drawing/Specification
Style 1	Rectangular block assembly	SSN 688 Class	NGNN 2300-818
Style 2	Integral assembly or TRIDENT style fitting	SSBN 726 Class SSN 774 Class	NAVSEA 845-4687601
Style 3	Threaded boss assembly or Shroeder test fitting	SSN 21 Class SSN 774 Class	MIL-V-24695

Pressure Test Stations (PTS) and Test Pressure Stations (TPS) in the SUBSAFE boundary refer to components of different design that perform a similar function.

- (1) Style 1 and 2 PTSs and TPSs hex plugs form part of the secondary pressure boundary and serve as contaminant protection. Removal and reinstallation of the hex plug requires a TWD but does not require Re-Entry Controls or controlled assembly. The TWD shall verify that seat leakage criteria and seating surface and hex plug inspections are performed in accordance with applicable technical specifications.
- (2) Re-Entry Controls are not required when operating Style 1 or 2 PTSs or TPSs associated needle valves in accordance with normal operating procedures identified in Ship Safety Manuals, Steam and Electric Plant Manuals or other NAVSEA-approved procedures. If a ship's operating procedure is unavailable, a locally prepared FWP will be generated to operate the valve.
- (3) Style 3 PTSs and TPSs have a Delrin cap. Removal and reinstallation of the Delrin cap requires a TWD but does not require Re-Entry Controls or controlled assembly. The TWD shall verify that seat leakage criteria and seating surface and Delrin cap inspections are performed in accordance with applicable technical specifications.
- (4) Any disassembly for major or minor repair of Style 1, 2 or 3 PTSs or TPSs requires a SUBSAFE Re-Entry Control CWP.

2.2.2 Maintenance Procedure. MPs may be fully usable in their existing form. The minimum requirements to perform any work are a valid MP and permission to perform maintenance.

- a. (Submarines only) If an approved NAVSEA Maintenance Standard (MS) is invoked to perform an emergent repair and there is no intention to reset the maintenance interval, then the MS can be used as a guide to the extent necessary to perform repair. Parts removed can be inspected in accordance with the MS. Inspection criteria for parts not addressed by the MS (e.g., those parts identified as mandatory replacement parts) shall be inspected in accordance with general acceptance criteria or the system drawing or the component technical manual. Additionally, the torque, lubrication, and test criteria cited in the MS may provide revised values which differ from NAVSEA drawings and/or component technical manuals.

- b. The following are examples of existing MPs:
- (1) Planned Maintenance System (PMS) Maintenance Requirement Cards.
  - (2) MSs.
  - (3) Ship Systems Manuals.
  - (4) Component Technical Manuals.
  - (5) Shipyard Process Instructions.
  - (6) Ship Alteration Instructions.
  - (7) Reactor Plant Manual Operating Procedures, Operating Instructions, Maintenance and Replacement Instructions, and Reactor Maintenance Requirement Page.
  - (8) Alteration and Improvement Instructions.
  - (9) Naval Sea Systems Command (NAVSEA) Drawings which include disassembly/reassembly instructions.
  - (10) Shipyard Task Group Instructions (TGI).
  - (11) Steam and Electric Plant Manual.
  - (12) (Surface Force ships only) Reference (f) Appendix 4E specifications.

2.2.3 Formal Work Package. An FWP coordinates in a single document materials required, initial conditions, MP, test and inspections, and system restoration for the selected maintenance task. In some instances, the maintenance task will not have an existing MP. This will require the activity to develop an FWP in order to ensure first time quality accomplishment of the maintenance task. FWPs should be only as detailed as required by the complexity of the work, craftsman knowledge, technical requirements, extent of tests, and level of worker supervision required (see Appendix B).

2.2.4 Controlled Work Package. A CWP is required when higher authority requires a record (Objective Quality Evidence (OQE)) of repairs/maintenance for fabrication, repair, installation, inspection and testing process for specific systems/components, such as Level I, SUBSAFE, Submarine Flight Critical Components (SFCC) or nuclear. CWPs may be necessary when required by the level of work control of the system (nuclear, SUBSAFE, SFCC and Level I) or when other extensive and formal Quality Assurance (QA) or test requirements exist (weight test, crane repairs, etc.). In its simplest form a CWP will consist of, as a minimum, a MP and the required QA forms. Examples of required CWPs:

- a. Level I.
- (1) Manufacture, installation, and repair of Level I components/systems except for the following actions, which may be controlled with TWDs other than CWPs.
    - (a) Software replacement (e.g., O-rings, packing glands, body to bonnet gaskets, silver seal replacements).
    - (b) Inspections to support routine maintenance programs or troubleshooting.
    - (c) Replacement of any non-pressure boundary parts which are non-Material Identification and Control (MIC) level pieces.

- (2) Repair by welding, brazing, machining, lapping or manufacture of Level I fittings or components.
- b. Reactor Plant/Nuclear Support Facility/Controlled Industrial Facility.
- (1) Manufacture, installation, and repair of nuclear Level I systems and components. The following actions may be controlled with TWDs other than CWP's except for work involving Nuclear Level I piping system mechanical joints:
    - (a) Software replacement (e.g., O-rings, packing, body to bonnet gaskets, silver seal replacements).
    - (b) Inspections to support routine maintenance programs or troubleshooting.
    - (c) Replacement of any non-pressure boundary parts which are non-Material Identification and Control (MIC) level pieces.
  - (2) Hydrostatic testing as required by reference (g) to certify reactor plant work conducted.
  - (3) Welding and Nondestructive Testing (NDT) which provides OQE of the integrity of reactor plant piping, and structural welding.
  - (4) Work affecting the integrity of permanent shielding installations.
  - (5) Work affecting reactor plant brazed joints that are inaccessible during reactor operations.
  - (6) Manufacture and corrective maintenance of mechanical nuclear support and test equipment whose configuration is specified by NAVSEA technical manuals or drawings (e.g., brittle fracture pressure limit rigs, nitrogen sparging rigs).
  - (7) Ship's Force retests of FMA or Ship's Force performed nuclear work that require hydrostatic testing or an external pressure source for the retest or test (e.g., Pre-Overhaul Tests).
- c. Work within SUBSAFE/hull integrity boundary.
- (1) Work within SUBSAFE/hull integrity boundary, identified in reference (h), including submarine pressure hull grinding, cutting and welding.
  - (2) Any disassembly for major or minor repair of PTSs or TPSs in the SUBSAFE boundary.
- d. Welding/Brazing.
- (1) P-1, P-LT, P-3a Special Category/Critical Piping Systems repair, alteration and/or fabrication, by welding and brazing in accordance with reference (i) and reference (j). (Small self-contained freon units, such as ice cream machines, ice machines, etc., are excluded.)
  - (2) Pressure Vessel Class A-F, A-1, A-2, A-3, A-LT, M-1, T-1 repair, alteration and/or fabrication by welding and brazing in accordance with reference (i).
  - (3) Permanent repairs and alterations of the primary structure of surface ships, including ballistic plating and superstructure designed for blast loading. Records shall be made and retained for category "C" repairs as required by references (k) and (l).
  - (4) Welding on submarine hull and structures in accordance with reference (m) as listed below:

- (a) Pressure hull envelope.
  - (b) Pressure hull structure.
  - (c) Support structure.
  - (d) Containment structure.
  - (e) Extended pressure hull structure.
  - (f) Interface structure.
- e. Weight Handling Equipment Manufacture and Repair except for cranes.
  - f. Corrective maintenance within the certified boundaries (envelope) of cranes as defined in reference (n).
  - g. (Submarines only) Performance of Category "A" (Safety of Ship) Alterations and Improvements.
  - h. Maintenance within SUBSAFE boundaries of submarine antennas and masts.
  - i. Maintenance on Recovery Assist, Securing and Traversing systems per reference (d).
  - j. Maintenance on systems requiring cleanliness controls as defined by MIL-STD 1330 or MIL-STD 1622 (e.g., diver's air, oxygen, nitrogen, hydrogen, helium-oxygen). For MIL-STD 1622 applications, only systems defined as "critical" require a CWP for cleanliness controls. A CWP is not required for inspections specified in MIL-STD 1330 during maintenance of cleanliness when performed by Type Commander or Ship's Force personnel on systems and equipment not certified by reference (h), reference (o) or reference (p).
  - k. Maintenance within the SFCC Boundary, per reference (e).

2.2.5 Maintenance Certification Record/Controlled Work Package (Non-SUBSAFE). Various sea water system components require frequent entry into the system boundary for routine operations or maintenance actions in order to enable the ship to carry out its mission. Table 2-2 of this paragraph includes certain systems and equipment which require Level I work controls that are frequently entered but shall be exempt from Maintenance Certification Record (MCR)/CWP Controls. The operational requirements for these systems and equipment have been reviewed. Inherent operational controls in the present system are considered adequate and the below listed items are considered safe exceptions to the formalized MCR/CWP system. The operational control which is considered as meeting the intent of the MCR/CWP requirements is listed beside each item and must be in effect in order to use the exception.

NOTE: MCR EXCEPTIONS ARE FOR SHIP'S FORCE USE ONLY AND ARE NOT AUTHORIZED FOR USE BY REPAIR ACTIVITIES. REPAIR ACTIVITIES SHALL NOT REQUEST THE SHIP TO INVOKE A MCR/CWP EXCEPTION IN CONJUNCTION WITH REPAIR ACTIVITY WORK.

NOTE: MCR EXCEPTIONS ARE NOT AUTHORIZED TO BE USED FOR THE INSTALLATION OF NEW LEVEL I HARDWARE WITHIN THE LEVEL I BOUNDARY.

**Table 2-2 Submarine Seawater MCR EXCEPTION ITEM (Non-SUBSAFE)**

Submarine Seawater MCR EXCEPTION ITEM	OPERATIONAL CONTROL REQUIREMENT	RECERTIFICATION TESTING
Cleaning Shaft Seal Cooling Water strainers or filters	Controlled assembly (Notes 1 and 2)	None
Cleaning of Auxiliary Sea Water system strainers	Controlled assembly (Notes 1 and 2)	None
Cleaning evaporator, distilling plant and Reverse Osmosis supply water strainers	Controlled assembly (Notes 1 and 2)	None
Shaft Seal Cooling Water Cyclone Separators	Controlled assembly (Notes 1 and 2)	None

## Notes:

- (1) An FWP in accordance with Part I, Chapter 2 of this volume, (e.g., PMS MRC, technical manual pages, detailed maintenance outline), will be used to control and document all work performed as a MCR exception.
- (2) Controlled assembly requirements are:
  - (a) Verification that surface finishes of gasket/o-ring sealing surfaces are in accordance with applicable specifications.
  - (b) Verification that fastener material and installation is in accordance with applicable specifications.
  - (c) Verification that gaskets/o-rings are properly installed and in accordance with applicable specifications.
  - (d) Assembly is documented on a QA form 34.
  - (e) Inspected by a Quality Assurance Inspector (QAI) or Quality Assurance Supervisor (QAS).

NOTE: EXCEPTIONS FROM MCRs OTHER THAN THOSE LISTED ABOVE ARE NOT AUTHORIZED.

2.2.6 Sequencing Document. A sequencing document is used to tie two or more TWDs together when a single TWD is insufficient to complete a maintenance task. In these cases, a sequencing document shall be developed, which provides the craftsman with directions for going from one TWD to another. Normally, this sequencing document will be in outline format. The sequencing document will be approved as directed by the Department Head (Principal Assistant for Aircraft Carriers).

### 2.3 FORMAL WORK PACKAGE DEVELOPMENT.

#### 2.3.1 Responsibility for Preparation of Formal Work Packages/Controlled Work Packages.

- a. For Ship's Force work processes, the FWP/CWP is prepared by the work center responsible for accomplishing the work.

- b. For submarines and aircraft carriers, the FWP/CWP is to be prepared by a qualified Maintenance Planner. The FWP/CWP may also be prepared by any member of the work center as long as it is reviewed by a qualified Maintenance Planner in that work center.
- c. For FMA work processes, the FWP/CWP is prepared by the appropriate planning division.

2.3.2 Security Classification. Attention must be paid to proper classification, handling, and marking of an FWP. As initially prepared, the FWP itself or as used in a CWP, is frequently unclassified and becomes classified as data is recorded. FWPs for nuclear propulsion plant systems are frequently CONFIDENTIAL, and almost always contain Naval Nuclear Propulsion Information and should be marked and controlled as required by the appropriate NAVSEA, Naval Operations (OPNAV), and Department of Energy Security instructions (e.g., NAVSEAINST 5510.45 Series, NAVSEAINST C5511.32, OPNAVINST 5510.11 Series, CG-RN-1).

2.3.3 Formal Work Package Format. The FWP format below identifies elements that may be beneficial when writing an FWP. Asterisk (\*) elements are required for all FWPs. This format is a general guide and each element may not be required depending on the task being performed.

- a. List of References.
- b. List of Enclosures.
- c. List of Effective Pages (LOEP).
- d. General Information.
- e. Material. \*
- f. Responsibilities.
- g. Precautions.
- h. Budgeted Man-Rem (if required by the Radiation Health Manual).
- i. Initial Conditions (plant/system conditions, prerequisites including tagouts). \*
- j. Procedure. \*
- k. Test and Inspection. \*
- l. System Restoration. \*

2.3.3.1 Formal Work Package Elements Defined.

- a. List of References. All references used shall be listed in a manner which will allow positive identification of the references and will state the current revision and advance change notice when the FWP was prepared.
- b. List of Enclosures. Enclosures are any technical documents which are not readily available to the craftsman and are used to provide information, direct or document work, or direct contingency work. Each enclosure page will contain, as a minimum, the FWP (file) number, enclosure number, and enclosure sheet number for traceability purposes. Enclosures are not required to be listed as references. Examples of enclosures are:
  - (1) Diagrams, prints or applicable portions of technical manuals.

- (2) Necessary QA forms (CWP only).
- (3) Contingency repair (predictable event).
- c. LOEP. The LOEP is an accounting of every page, including enclosures that make up the FWP. Each time a change/revision adds, modifies, or deletes a page of the FWP, the LOEP sheet must also be revised. Original pages will be marked "-". Subsequent changes/revisions will reflect latest change/revision number.
- d. General Information. This section is used to provide useful information, clarifying remarks, and sequencing allowances.

**NOTE: NATIONAL ITEM IDENTIFICATION NUMBER (NIIN) MAY BE USED WHENEVER NATIONAL STOCK NUMBER (NSN) IS CALLED FOR, INCLUDING ALL QA FORMS. THE NATIONAL ITEM IDENTIFICATION NUMBER UNIQUELY IDENTIFIES MATERIAL IN SUPPLY SYSTEM AND IS ADEQUATE FOR OQE PURPOSES.**

- e. Materials Required (required element). This section is used to list all material, spare parts, and special tools required to accomplish the job. Material listed in this section should be verified on hand prior to starting work. A Job Material List may be attached as a supplement to the Material List. Lead Work Center (LWC) Supervisor/Division Officer may add materials after the FWP is open that does not constitute a revision per paragraph 2.3.7.3 of this chapter using a technical pen and ink change. Example of a line in the materials required list or table:

<u>Item Name</u>	<u>Size/Class/Type</u>	<u>Qty</u>	<u>Matl</u>	<u>MIL-SPEC</u>	<u>Level</u>	<u>PC#/ REF</u>	<u>Step/End Use</u>	<u>NSN/ NIIN</u>
Bolt	½ -13UNCx2½	6ea.	Cr-Mo	MIL-S-1222	Level I	12/E	H.3/ASW-504	

**NOTE: THE RESPONSIBILITIES SECTION OF THE FWP IS MANDATORY IF MORE THAN ONE REPAIR ACTIVITY IS INVOLVED IN THE WORK.**

- f. Responsibilities. List the general responsibilities of all involved ship's divisions or FMA Work Centers and tended ship personnel. Examples are:
  - (1) "38N will establish and maintain freeze seals as specified in the Freeze Seal Agreement."
  - (2) "51A will provide motor rewind and balancing services."
- g. Precautions. List precautions for personnel and equipment protection that are specific to the job. Three examples of precautions are:
  - (1) Personnel: Hazards (e.g., toxic or explosive mixtures), stressors (e.g., high noise levels, high heat operations), and protective requirements needed to ensure personnel safety.
  - (2) Equipment: Safeguards, protective equipment, operating restrictions necessary to prevent equipment damage.
  - (3) Prevention of the loss of cleanliness: Specific precautions to prevent the loss of cleanliness for the task being performed.
- h. Budgeted Man-Rem. In this section, establish the Man-Rem estimate for accomplishment of the task, if required by the Radiation Health Protection Manual, NAVMED P-5055.

- i. Initial Conditions (required element). This section contains those prerequisites and plant conditions that must be completed prior to commencing the MP. Examples are: material certification, job briefings and actions required for safety precautions listed in the Precautions Section.
  - (1) Prerequisites must be completed prior to starting the MP and include actions necessary to certify the material, conduct briefings and state safeguards taken against hazards identified in the Precautions Section. Production work, other than shop work will not be performed as a prerequisite. Examples of prerequisites:
    - (a) "EM01 or 38A: Record name plate data from component to be worked. Verify the FWP is consistent with the name plate data."
    - (b) "Division Officer/Leading Petty Officer (LPO)/Nuclear Repair Officer (NRO)/Radiological Control (RADCON) Officer: Conduct a pre-work briefing. Complete attendance sheet provided as Enclosure ( )."
  - (2) List the initial plant/system conditions required to properly and safely accomplish the work to be done. This should include work boundaries which will be specified by the Ship/FMA depending on the job. The isolation boundaries will be determined and established by the duty officer/tagout authorizing officer prior to authorizing commencement of the maintenance (this includes the isolation valve lineup, power isolation, etc.). The extent of this section will vary depending upon the type of job.
    - (a) For a Ship's Force job, this section should identify work boundaries and plant/system conditions (e.g., Pressure/Temperature Band, cold iron). The duty officer/tagout authorizing officer will determine and set the isolation boundaries.
    - (b) For an FMA ship to shop job, this element is not applicable.
    - (c) For an FMA job on a tended ship, the FMA must determine the work boundaries and identify to the ship any plant conditions that must be maintained during the work. The ship will determine and set the isolation boundaries.
- j. Procedure (required element). This section contains the instructions on how to accomplish the work. Concentrate on putting the steps of the job in proper sequence. Don't describe technically how to do a step (unless past experience has shown some of this type of information is required). The following steps describe how to write this section of the FWP:
  - (1) Outline the various steps necessary to accomplish the work to be done. Whenever there is a need to provide information, or caution the reader, write the word (NOTE or CAUTION) in capital letters followed by a colon and the text of the note or caution in ALL CAPITAL LETTERS. The NOTE or CAUTION is to appear immediately before the step or section it is applicable to. NOTES and CAUTIONS do not perform work, but are used as the first sentence(s) in a work step. Where NOTES and CAUTIONS are used in the same work step, the CAUTION will be specified first.
    - (a) CAUTIONS should only be used whenever a specific danger to personnel, equipment, or the potential for loss of cleanliness exists.
      - 1 **CAUTION: THE ANTI-SEIZE COMPOUND USED IN THIS STEP IS A HAZARDOUS MATERIAL AND REQUIRES SPLASH PROOF GOGGLES AND RUBBER GLOVES TO BE WORN WHILE HANDLING OPEN CONTAINER OR USING THE MATERIAL.**

**2 CAUTION: ENSURE CLEANLINESS PLUGS ARE STAGED FOR USE PRIOR TO BONNET REMOVAL.**

(b) NOTES should inform the reader about key information, sequence allowance or direct him/her to additional information.

1 NOTE: STEPS 8, 9, AND 10 MAY BE PERFORMED IN ANY SEQUENCE.

2 NOTE: STEPS 1 THROUGH 4 MAY BE PERFORMED SIMULTANEOUSLY.

(2) Work Center Designations. This is not mandatory for Ship's Force work. Each work step of the procedure shall have a Work Center (i.e., 31A, EM01, etc.) designated responsible for performing that step. A specific designation (e.g., NRO, Engineering Officer of the Watch,

Engineering Duty Officer, LPO/LWC Supervisor, LPO) may be substituted for Work Center designations where appropriate. More than one Work Center Designation may be used where dual responsibilities are needed. Examples of Work Center Designations:

(a) "38A/93B: Perform a final disc-to-seat blue check. Verify that a satisfactory final seat-to-disc blue check has been performed."

(b) "38N: NOTE: SEE FIGURE [1] OF ENCLOSURE (3) FOR CANOPY JOINT INFORMATION AND LOCATION. Fit-up the upper and lower body-to-bonnet canopy joints."

(3) Symbols. The symbols below are located in the margin of the FWP and indicate the following:

(a) (R) = Steps requiring verification/inspection as defined in references (b) and (c).

(b) (S) = Steps in an FMA procedure requiring verification by a member of Ship's Force.

(c) (C) = Steps requiring Cleanliness Inspection by craftsman.

(d) (I) = Steps requiring inspection by a QAI or NDT Inspector.

(e) (CI) = Steps requiring independent Cleanliness Inspectors (SCI, RCI).

(f) (Q) = Critical Quality Control Points (Q-Point).

(g) (V) = Steps requiring verification by a craftsman.

(h) (G) = Government notification required.

(4) Signature Requirements in FWPs and CWPs. Certain steps require positive assurance that the step was actually performed and/or completed in a prescribed manner. Signatures are also required for assurance of critical requirements, critical measurements, or requirements for OQE. If the step requires completion of a data form (e.g., inspection, NDT record, hydrostatic test data sheet), the signature block shall be on the data form, not the procedure step. The following is a list of typical steps/examples requiring signatures:

- (a) Steps which require performance of QA checks or NDT that are documented on a QA form in order to provide traceability of signatures. Personnel who sign QA forms or other OQE documents will print their name along with their signature and date. These types of steps must include a statement of satisfactory compliance adjacent to the signature block in the associated QA form.
  - (b) Completion of a strength test.
  - (c) Hull and backup valve blue checks of seat and disc and stack height measurements.
  - (d) Completion of Controlled Assembly steps.
  - (e) Certification Signature Block requirements of Part II, Chapter 1, Addendum B-1, Section 2.d. of this volume.
- (5) In order to provide traceability of signatures, personnel who sign QA forms, or other OQE documents will print their name along with their normal signature. This will positively identify the individual and allow traceability of the signature to appropriate authorization and qualification records.
- (6) For nuclear work, Certification Signature Blocks are required where specifically called out in NAVSEA technical documents (see Part II, Chapter 1 of this volume).

NOTE: WHEN INVOKING A MS WHEN OTHER THAN A COMPLETE COMPONENT OVERHAUL IS PLANNED, THE MS MAY BE USED AS A GUIDE. THERE IS NO NEED TO INVOKE THE ENTIRE MS FOR SPECIFIC REPAIRS: E.G., PUMP MECHANICAL SEAL REPLACEMENT NEED NOT INVOLVE COMPLETE BREAKDOWN AND INSPECTION OF THE PUMP.

- (7) Procedure Detail. The procedure should be used to list the various tasks to be performed and the sequence in which they should be accomplished. Notes on proven craftsmanship skill techniques that significantly aid in first-time quality and are not addressed in other reference documents should be included. A well-written procedure is designed for use by trained personnel who have a requisite level of knowledge about their specialty and the work to be performed. A procedure must have sufficient detail to allow a determination of exactly what was done, material used, inspections required, and allow re-certification of the system or component.
- (8) Sequencing of Work. As the work package is being prepared, the steps of the job should be placed in a logical and proper sequence. In instances where work can be performed in parallel, identify those steps by use of a sequencing note.
- (9) Q-Points. Work processes, regardless of type (maintenance, training, administrative, etc.), have critical execution points whose proper accomplishment overwhelmingly affects the ultimate first-time quality success of the process. Quality Maintenance Program work processes identify these crucial work process points as Q-Points. The below concepts apply to Q-Points:
- (a) Q-Points in a work process are typically characterized by requiring high level skills, proficiency, strong knowledge, working within narrow tolerances, and/or difficult environmental conditions which mandate close supervision.
  - (b) Q-Points are determined by the organizational unit (Work Center, division, command, etc.) having cognizance over the specific work process.

- (c) Maintenance managers shall give strong focus to Q-Points in work scheduling, personnel assignments, and appropriate supervision.
  - (d) Scheduling a Q-Point to occur late at night, with tired, fatigued personnel or with less than adequate supervision places the successful execution of that Q-Point at a great risk and compromises first-time quality completion of the work process.
  - (e) Q-Points are annotated in FWP's whether the FWP is used as a stand alone or as the core of CWP. Not all FWP's will require the use of Q-Points. Q-Points are process control aids and do not require signatures.
- k. Tests and Inspections (required element). Only tests that are required to recertify the system or component after the repair work is complete will be listed in the test and inspection section of the FWP. Repair process tests, such as seat leakage tests or joint tightness tests performed in the shop, will be considered part of in process work and will be contained within the procedure section. If the testing results are required for OQE, then the necessary QA forms will be enclosures to the FWP.
- (1) Ship to shop work. For FMA work on tended units where components are removed from the ship and repaired in the shop:
    - (a) All testing that can be performed in the shop will be performed in the shop by the FMA. The FMA will write and conduct all shop tests and inspections.
    - (b) The FMA will provide the tended unit with all required testing and inspection requirements and QA forms for the shipboard testing needed to certify the work performed by the FMA. The FMA work package will specify the joints/components that require testing and the type of test(s) required that the tended unit must perform. The tended unit will review the test requirements and is responsible for writing the test FWP and conducting the test(s). The original completed test documents will be provided to the FMA for inclusion in their work package (FWP/CWP) for re-certification.
  - (2) Careful planning and review prior to beginning work is needed to ensure all tests and inspections are identified before starting work. Various TWDs include tests and inspections required. Further guidance is also provided in Volume IV, Chapter 9 (System Test Check List) and Volume IV, Chapter 18 (Submarine Salvage Inspection) of this manual, and should be consulted when preparing and performing this section for the FWP.
  - (3) The range, serial numbers and calibration due date of any calibrated measuring and test equipment used for conducting the test must be documented on the QA form.
- l. System Restoration (required element). This section contains those steps necessary to restore the system to normal operating status.
- m. (Submarines only) Ship's Force test FWP's for non-shipyard associated FMAs nuclear work will be provided to the Immediate Superior In Command (ISIC) for review.

2.3.3.2 Use and Transcribing of Source Documents. Retyping/scanning extensive step-by-step procedures from source documents into FWP's is discouraged. Ideally, the procedure should reference the source document. A reproduced copy of the appropriate section may be included in the work package as an Enclosure. If the source document steps are not lengthy, they may be written directly into the procedure. When work is per a referenced procedure or enclosure, specify the precise steps of the reference or enclosure that are to be performed. The applicable portion of an enclosure to be used by the craftsman shall be marked or highlighted and portions not used will be marked out.

2.3.4 Formal Work Package Approval.

- a. FWP's developed for a job are routed and approved prior to the performance of the work. The appropriate work authorization and reference material, (including QA documents for CWP's), to conduct the FWP shall accompany this routing.
- b. Review of the FWP by the Chemical RADCON Assistant or Quality Assurance Officer (QAO) may be appropriate.
- c. For FMAs, the FWP is reviewed by the Planning Officer, LWC and Assist Work Centers. The FWP can be approved by the Repair Officer as the standard FWP for that work process.
- d. Approval signatures are made on the FWP approval sheet (see Appendix C ). Signature blocks not required will be marked NA. Signature blocks that are signed will be accompanied by a legible printed name and date.
- e. For Ship's Force standardized FWP's the LPO/LWC supervisor shall verify that all references are current. For FMA Standardized FWP's the Planning Officer shall perform the verification. If changes are required, the FWP must be revised and routed for approval.
- f. For FWP's that are part of a CWP, see CWP approval matrix, Appendix D.

2.3.5 Controlled Work Package Approval. When the FWP has been prepared, the following actions are required to prepare and approve the CWP:

- a. For controlled (i.e., Level I, Nuclear, Scope of Certification, SFCC) or SUBSAFE work to be performed by Ship's Force only, the ship's QAO will issue the CWP/Re-Entry Control (REC) numbers sequentially for entry in Block 4 of the ship's QA form 9. For controlled or SUBSAFE work performed by the repair activity on, or for a tended ship, the ship's QAO will issue CWP/REC numbers sequentially to the repair activity for entry in Block 4 of the repair activity's QA form 9. For controlled or SUBSAFE work to be performed by the repair activity only (in repair activity shops and the repair activity does no work onboard the ship, examples include ship to shop work; rotatable pool assets), the repair activity's QAO will issue the CWP/REC numbers sequentially for entry in Block 4 of the repair activity's QA form 9. The format of the CWP/REC serial numbers will be the serial number followed by the year (e.g., 1-90, 123-01).
- b. An MCR/REC (QA form 9), will be prepared by the planner or CWP preparer. A QA form 10 may be required as a supplement to the QA form 9.
- c. CWP approval is in accordance with Appendix D.

2.3.6 Formal Work Package In Process Use. The FWP/TWD will be at the job site during the performance of work. For multiple work sites, the FWP may be copied but all signatures and data will be recorded on the original/master FWP.

2.3.7 Formal Work Package Changes.

2.3.7.1 Pen and Ink Changes. Pen and ink changes to an FWP may be made for minor administrative changes that do not change the scope and/or intent of the FWP. Changes of this nature include additions or deletions of a Work Center assigned to a step, typographical/editorial errors, amplifying additional information to clarify a step, or a change in the sequence of steps.

- a. Pen and ink changes to an FWP will be made with the approval of the LPO/LWC Supervisor or Division Officer responsible for the affected step in the FWP.

- b. Pen and ink changes to the QA forms in a CWP shall be made with the approval of QAO, QAS or QAI. Examples are: Additions or deletions of Work Centers assigned on a QA form, correction of typographical or editorial errors on a QA form, addition of information to clarify a QA form.
- c. Pen and ink changes shall be accomplished by drawing a single line through the portion to be changed, and entering the necessary change adjacent to that portion. The person making the change will initial, date, and print the name of the approving authority for the change. If the change is per verbal direction, the name or title of the person authorizing the change will be annotated (per telcon with Division Officer, Repair Officer, etc.).
- d. Technical pen and ink changes are used to correct a technical error and must be approved by the department head. The same process will be used as in a non-technical pen and ink change except that it is documented in the "instructions for entering revision" area of the FWP revision sheet.

2.3.7.2 Rework Addendum. Rework is the unplanned repetition of a step, or a series of steps in a CWP/FWP. A rework addendum specifies which steps must be repeated in a CWP/FWP and may be used in lieu of a revision when rework is required and the scope of the original work will not be changed. Any additional actions that were not included in the originally approved CWP/FWP constitute a change in scope or work boundaries and must be issued as a revision to the CWP/FWP. All rework must be documented.

- a. The craftsman doing the work must stop the work and notify the LPO/Work Center Supervisor (WCS) that rework is required.
- b. Clear directions on which steps are to be repeated must be provided. Reproducing QA forms may be required. All original and rework QA forms will be retained with the CWP.
- c. An updated LOEP is required when rework requires additional QA forms.
- d. A rework addendum is approved by the Division Officer (for CWPs, concurrence is obtained from the Production Officer/QA Officer).

2.3.7.3 Revisions. Revisions are any change to a CWP/FWP/TWD that meets the criteria listed below. Revisions require formal review and approval.

- a. Reasons requiring a revision to a FWP/TWD:
  - (1) Scope of the work changes (e.g., replace software changed to machine the valve).
  - (2) Boundary of the work changes (e.g., change location of or additional disconnected joints).
  - (3) Change in test requirements unless authorized by a Departure from Specification.
  - (4) Any change in material requirements, which result in a change in testing requirements.
    - (a) The LWC Division Officer or LWC Planner may add materials after the FWP is open that do not change testing requirements.
    - (b) For FWPs executed as a part of the CWP, the QAO/QAS will concur with the addition of material. Concurrence will be by initialing the new line item.
    - (c) At job completion the material list must accurately reflect new materials installed in the system or component.

- (5) If RADCON is insufficient for the work, based on actual conditions at the worksite, and to change the type of contamination enclosure specified for the work (e.g., to use a drape in lieu of glove bag as specified in the FWP).
  - (6) MCR/REC must be revised.
- b. Steps for making a revision to a CWP/FWP/TWD:
- (1) Work must stop immediately and the LPO/WCS must be notified when the need for a revision is identified.
  - (2) The revision is then initiated.
    - (a) For **Surface Force Ships**, an FWP revision is initiated by the originating Work Center and reviewed by the Division Officer responsible for the work associated with the revision.
    - (b) **For submarines and aircraft carriers, an FWP revision is initiated by the originating Work Center Maintenance Planner and reviewed by the Division Officer responsible for the work associated with the revision.**
    - (c) For **Surface Force Ships**, a CWP revision is initiated by the LWC and approved per the requirements of Appendix D of this chapter.
    - (d) **For submarines and aircraft carriers, a CWP revision is initiated by the LWC Maintenance Planner and approved per the requirements of Appendix D of this chapter.**
  - (3) A revision is normally made by page substitution. Revisions shall be lettered consecutively starting with "A" with the revision letter entered on all affected sheets of the FWP. Revised portions of the FWP shall be marked with a vertical line and the revision letter in the margin. New or replacement sheets may be added by labeling the added sheet with the number of the preceding page and a sub-letter (e.g., Page 5A of 15). Superseded pages (without signatures or recorded data) shall be retained until the FWP is closed out.
  - (4) A cover sheet for the revision is attached. The FWP revision sheets will be placed on top of the previous cover sheet with the most current cover sheet on top.
  - (5) Routing and authorization of the FWP/TWD is performed.
    - (a) The revised FWP/TWD must be routed only to and reviewed by the divisions affected by the revision process.
    - (b) For an FWP concurrence with the revision is obtained from the Department Head prior to executing the revision. A revision, as a minimum, must be approved by the same level of personnel who approved the original FWP.
    - (c) CWP revisions must be approved by the QAO and officer(s) who approved the original (e.g., Repair Officer, Department Head and Commanding Officer).
- c. Other guidance on making revisions to an FWP/TWD.
- (1) Revisions to issued FWPs may include non-technical modifications (e.g., line outs) discussed above. In addition, the following instructions are those permitted to be made in the Instructions for Entering Revisions area of Appendix C.

- (a) Remove: Physically take out the page(s) as specified in the change instruction.
  - (b) Replace: Physically take out the page(s) specified in the change instruction. Put the replacement page(s) provided by the revision in place of the removed page(s) as specified.
  - (c) Insert: Physically insert the page(s) specified in the change instruction into the FWP as specified.
- (2) A revision will not remove pages with or QA forms from the CWP/FWP/TWD with signatures or recorded data. The portion not yet complete on pages with signatures or data, including QA forms, will be lined out.
- (3) Each activity affected will ensure that revisions are made and accounted for in an exact manner. The following intent will be adhered to regarding the revision process:
- (a) All revisions will be entered into the body of the original FWP or will be added as an enclosure or attachment to the original FWP.
  - (b) Revisions shall be numbered such that accountability is maintained.
  - (c) The LOEP will be modified each time a change is made.

2.3.7.4 Attachment. If additional work must be added to the FWP and it is relatively extensive but does not require a change in plant conditions or work boundary, it can be accomplished by using an attachment to the FWP. In this case, the attachment would be written and added to the FWP after the enclosures using the revision process (at a minimum, as a technical pen and ink change). This page would have an additional step that directs performance of the attachment. It would also indicate work sequence, for example whether the attachment would be worked in series or parallel with original FWP work. The composition of an attachment is identical to an addendum except it is prepared after the FWP is issued based on an unexpected problem.

Example: Upon disassembly of a valve it is determined the back seat of the bonnet must be repaired. This repair could be accomplished by attachment.

2.3.7.5 Supplement. Where additional work is required that is similar to or greater in scope to that on the original FWP or involves changes in plant conditions, testing, or major support equipment changes, a supplement could be used. A supplement is another stand-alone FWP containing detailed instructions to perform the additional work. A supplement will comply with the requirements of paragraph 2.2.3 of this chapter. The original FWP should indicate the additional work accomplished in the supplement, if required, to make the original FWP continue to stand alone.

Example: Recovery from loss of cleanliness where work boundaries are increased, additional components opened to obtain flush paths, etc. The original FWP would direct work to the supplemental FWP for recovery and then direct resumption of work per the original FWP. Once cleanliness is reestablished, the original work would continue. In this case, it is necessary to indicate satisfactory completion of the supplement, so that it is clear the condition is corrected.

2.3.7.6 Voiding. There are times during the performance of an FWP where events occur that render the rest of the FWP unnecessary. In this case, a revision would be issued to the FWP providing instructions such as directing work to a new FWP and would void the remainder of the original FWP. For a CWP traceability will be provided to the replacement REC. The document being voided must maintain traceability to the new activity's repair procedure when RECs are being transferred to another activity. Voided CWPs must retain traceability/continuity to the follow-on procedure.

Example: During the repair of a valve, defects are discovered that cannot be repaired, requiring the valve to be replaced instead of repaired as originally intended. Once it is determined the repair is no longer necessary, the repair instructions would be voided.

2.3.7.7 Formal Work Package Closeout. FWPs are reviewed and approved for closing by the LPO/LWC supervisor and designated assist LPO/WCSs for satisfactory completion. Signatures will be accompanied by a legibly printed name and date. The closeout review verifies the below attributes:

- a. Maintenance was completed as specified in the FWP.
- b. Required signatures were made and names printed.
- c. Cleanliness requirements were satisfactorily met.
- d. Correct materials were used.
- e. Post-maintenance testing was properly completed.
- f. Equipment and systems were restored to normal conditions and configurations.
- g. Data was recorded properly and within specifications.

2.3.7.7.1 Completed Formal Work Packages. FWPs executed as stand-alone documents are not required to be retained following:

- a. Completion of the availability in which the work was performed.
- b. Completion of closeout reviews as required by paragraph 2.3.7.7 of this chapter.
- c. Recording of all required data (e.g., Material History).

2.3.7.8 Controlled Work Package Closeout. Upon completion of the maintenance task, each of the cognizant work centers and the QAO will perform a comprehensive review of CWP documentation for correctness and completeness. Once a satisfactory review is completed, CWPs will be closed out subject to the following guidance:

- a. CWPs required to support reactor plant or propulsion plant startup, equipment startup or ship's underway must be closed prior to the event.
- b. CWPs for spare equipment, equipment requiring reactor plant or propulsion plant operations to test, equipment requiring retest at sea or for equipment not required for reactor plant, propulsion plant or at sea operations may be left open with the Department Head and Commanding Officer's concurrence.
- c. All nuclear CWPs shall be reviewed for compliance with requirements and closed out prior to reactor plant or propulsion plant startup or ship's underway, as applicable. Prior to reactor plant or propulsion plant startup or ship's underway, any activities performing controlled maintenance on the ship will provide the status of the maintenance to the ship (and the ISIC for submarines). When critical operations or at sea testing is required to complete the task the following procedures will be used:
  - (1) The testing must be required by an approved NAVSEA procedure (e.g., Maintenance and Replacement Instruction).
  - (2) All open CWPs will be logged and tracked in the CWP/REC Log as follows:
    - (a) All deferred (follow-on) actions will be annotated in the CWP/REC Log of the tended ship.

- (b) The CWP must include documented transfer of responsibility for accomplishment of deferred actions from the FMA to the tended ship and must be signed by the Commanding Officer, Reactor Officer or Engineer Officer of the tended ship.
  - (c) The closeout review of the CWP will verify that the required documentation from above is contained in the CWP for all deferred actions.
- (3) A copy of the test results will be provided to the FMA (as applicable) for final review and CWP closeout as soon as practical.
- d. In the event a CWP is prepared, the job is planned to be accomplished, but for some reason the job is cancelled or deferred the following actions should be taken:
  - (1) If work was authorized to start, the CWP must be revised to reflect that no work was accomplished and then administratively closed. The QA form 11 log will be annotated to show that the job was "Cancelled".
  - (2) If work was not authorized to start, and the job was cancelled, annotate the remaining blocks of the QA form 9 with "N/A" and note that the CWP was cancelled and no work was accomplished. Blocks 20 (and 21 if the CWP has an REC) will be signed to formally cancel the CWP. If the CWP was prepared by a Repair Facility, a copy of the QA form 9 will be provided to the Tended unit. If a Certification Continuity Letter is required, the cancelled CWP shall be provided with the Certification Continuity Letter. The QA form 11 log will be annotated to show that the job was "Cancelled".
  - (3) If work was not authorized to start and the job is deferred to a future maintenance period, the CWP is not required to be cancelled. The QA form 11 log will be annotated as "Deferred". This is not considered to be an open CWP/REC.
- e. There are no retention requirements for a CWP if work was not authorized to start and the job was cancelled.
- f. The closed CWP will be retained by the QAO in accordance with Part I, Chapter 10 of this volume.

2.3.7.9 Emergent Controlled Work. On those occasions when a component fails and the normal practice of processing a CWP would preclude meeting the ship's operational commitment, work may begin without formal approval of the CWP, provided the concurrence of the FMA Repair Officer (if an FMA is involved), and the ship's Commanding Officer and ISIC (if an FMA is involved) is obtained. The following is required:

- a. The MCR/REC must be properly approved and, to the maximum extent possible, a CWP will be prepared prior to commencement of work.
- b. The task must be continuously monitored and all actions taken recorded by:
  - (1) QAS, if an FMA is involved or
  - (2) Ship's Work Center LPO and a QAI, if the LPO is not a qualified QAI.
- c. All OQE must be completed and inspected as required by Part I, Chapter 5 of this volume.
- d. All records must be reviewed and verified complete and correct.
- e. Departure from Specification will be processed in accordance with Part I, Chapter 8 of this volume for any specifications not met during the repair.

2.3.7.10 Standardized Formal Work Package.

- a. FWPs, which have been performed and proven, may be retained on file to lessen the effort in preparing for a future task of a similar nature.
- b. Standardized FWPs can be used to accomplish the same maintenance task without routing for approval provided the LPO/LWC supervisor and Planning Officer (if assigned) verify that no changes to the reference documents have been issued since initial approval. When initially routed for approval as a standardized FWP, the RADCON OFFICER/Chemistry and Radiological Controls Assistant (CRA) will determine the need for evaluating RADCON for future maintenance actions. If the RADCON OFFICER/CRA determined it is necessary to evaluate RADCON for each future maintenance action the RADCON OFFICER/CRA will check "YES" in CHOP FOR FURTHER USE?. When "YES" is checked RADCON personnel are required to review the standardized FWP prior to each instance of use to verify RADCON controls in the standardized FWP are appropriate for the work. If the RADCON OFFICER/CRA determined it is not necessary to evaluate RADCON for each future maintenance action the RADCON OFFICER/CRA will check "NO" in CHOP FOR FURTHER USE? When "NO" is checked no additional RADCON review is required prior to use of the standardized procedure. If the LPO/LWC supervisor or RADCON personnel (when required) determine the FWP requires a change, it must be routed for approval as a revision to the FWP.
- c. Standardized FWPs developed by FMAs may be used by Ship's Force. Implementation requires Division Officer recommendation and Department Head approval.
- d. Standardized FWPs developed by an FMA may be used at any FMA. Implementation requires Planning Officer recommendation and Department Head approval.
- e. Use of standardized FWPs requires a system to ensure the FWP is current.
  - (1) Maintain a master listing of standardized FWPs by name and revision number.
  - (2) Once approved as a standard FWP the cover sheet will be removed, annotated as master copy, and retained on file.
  - (3) A copy of the approved master cover sheet will be attached to the standard FWP when work is in progress.
  - (4) All revision cover sheets will be retained with the previous master cover sheet.

2.3.7.11 Lost Controlled Work Packages Following Controlled Work Package Approval.

- a. Formally inform the ISIC and Type Commander.
- b. Conduct a formal critique for CWPs approved/opened and not closed, and provide a copy to the ISIC and Type Commander.
- c. Initiate corrective action using a QA form 14.

2.4 TROUBLESHOOTING.

- a. Troubleshooting a system which is being operated in accordance with the normal ship's operating procedures in normal operation in response to a request for on-site Fleet Technical Assistance does not require an FWP provided the troubleshooting is non-obtrusive (i.e., visual inspection/observations only) and intended to evaluate the nature of the reported problem. Any manipulation of the system outside normal operating conditions requires an FWP.

- b. Troubleshooting equipment normally controlled by using an FWP/TWD, whether done by Ship's Force or by an outside activity, can seldom be precisely defined at the start of corrective maintenance. An FWP for troubleshooting shall include well-defined initial conditions, boundaries and stop points within which troubleshooting can be accomplished. Detailed procedural steps are not required. Troubleshooting procedure may require some form of trial and error process of elimination. In order to determine the proper tests following troubleshooting, a record of actions performed shall be kept. Once the problem is identified, the FWP shall be revised to properly repair and test the affected equipment.

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**APPENDIX A**

**OUTLINES OF TYPICALLY EFFECTIVE TRAINING TOPICS**

1. Work Authorization.

a. Topic.

- (1) Work authorization forms.
- (2) Tag-outs.
- (3) Safety requirements.
- (4) Ship responsibility for outside activity maintenance.

b. Reference: COMUSFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual, Volume V.

2. Formal Work Package/Controlled Work Package documentation.

a. Topic.

- (1) Record retention requirements.
- (2) Mandatory documents.
- (3) Routing of documents and signature documents.
- (4) Test requirements for FMA work.

b. Reference: COMUSFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual, Volume V.

3. In Process Control.

a. Topic.

- (1) Torquing.
- (2) Controlled assembly.
- (3) Cleanliness requirements for:
  - (a) Air systems.
  - (b) Hydraulic systems.
  - (c) Reactor plant (nuclear powered ships only).
  - (d) Steam plant (non-nuclear and nuclear powered ships).
  - (e) Oxygen/Nitrogen systems.
  - (f) Seawater systems.

- (g) Lubricating systems.
  - (h) Gas Turbine systems.
  - (i) Fuel systems.
  - (j) Diesel systems.
  - (4) Use of formal work packages.
  - (5) Control of fasteners. (Include avoidance of carbon steel in seawater systems).
  - (6) Material control.
  - (7) Re-work.
    - (a) Administration.
    - (b) Root cause and corrective action.
  - (8) Revisions: Administration.
  - (9) Critical QM points.
  - (10) Procedural compliance.
  - (11) Submarine antenna work including mast clamps.
  - (12) Departure from specifications.
  - (13) Submarine Flight Critical Components
- b. References.
- (1) COMUSFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual, Volume V.
  - (2) NAVSEA 0902-018-2010; General Overhaul Specifications for Deep Diving SSBN/SSN Submarines (DDGOS).
  - (3) NAVSEA S9505-AM-GYD-010; Submarine Fastening Criteria (Non-Nuclear), Description, Design and Maintenance.
  - (4) NAVSEA S9520-AA-MMA-010; Repair of Submarine Seawater Ball Valves (Non-Nuclear).
  - (5) Naval Ship's Technical Manuals (NSTM).
  - (6) MIL-STD 1330; Standard Practice for Precision Cleaning and Testing of Shipboard Oxygen, Helium, Helium-Oxygen, Nitrogen and Hydrogen Systems.
  - (7) NAVSEA 0900-LP-016-6080; QA Standard for Submarine Antenna and Mast Assemblies.
  - (8) NAVSEA S9AA0-AB-GOS-010/020/030; General Specifications for Overhaul of Surface Ships (GSO); AEGIS Supplement.

- (9) NAVSEA T9044-AD-MAN-010 - Requirements Manual for Submarine Fly-By-Wire Ship Control Systems.

#### 4. Testing.

##### a. Topic.

- (1) Hydrostatic test rig requirements including calibration.
- (2) Test pressure drawings.
- (3) Air blast/vacuum and other tests.
- (4) Use of FMA and shipyard test plans/procedures.
- (5) Conducting hydrostatic tests and completing hydrostatic test forms (including common mistakes).
- (6) NDT alternative in testing.

##### b. References.

- (1) COMUSFLTFORCOMINST 4790.3 Joint Fleet Maintenance Manual, Volume V.
- (2) Test Pressure Drawings.
- (3) NAVSEA S9505-AF-MMA-010; Submarine Non-Nuclear Piping System Test Manual.
- (4) NAVSEA 0902-018-2010; General Overhaul Specifications for Deep Diving SSBN/SSN Submarines (DDGOS).
- (5) NAVSEA S9086-RK-STM-010; NSTM Chapter 505 (Piping Systems).
- (6) NAVSEA S9AA0-AB-GOS-010/020/030); General Specifications for Overhaul of Surface Ships (GSO); AEGIS Supplement.

#### 5. Material Certification.

##### a. Topic.

- (1) SUBSAFE material requirements.
- (2) Level I material requirements.
- (3) Level I material exceptions.
- (4) Use of drawings for Quality Assurance Lists.
- (5) Submarine antenna material.
- (6) Upgraded systems to Level I requirements.
- (7) Upgrading components to meet Level I and SUBSAFE requirements.

(8) Submarine Flight Critical Components requirements.

b. References.

(1) SUBSAFE Certification Boundary Book.

(2) Joint Identification Plans/Mapping Plans.

(3) COMUSFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual, Volume V.

(4) Ship's Coordinated Shipboard Allowance List (COSAL).

(5) NAVSEA 0948-LP-045-7010; Material Control Standard (Non-Nuclear).

(6) NAVSEA/NAVSUPINST 4855.1; Quality Assured Submarine Antenna Material: Policy and Procedures for Control and Implementation.

(7) Applicable Class Material Identification and Control of Piping Systems Boundary Book.

(8) NAVSEA T9044-AD-MAN-010 - Requirements Manual for Submarine Fly-By-Wire Ship Control Systems.

6. Material Procurement/Receipt Inspection.

a. Topic.

(1) SUBSAFE/Level I/Submarine Flight Critical Component material.

(2) Material substitution.

(3) Stowage requirements for controlled material.

(4) Ship's COSAL.

b. References.

(1) COMUSFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual, Volume V.

(2) NAVSEA 0948-LP-045-7010; Material Control Standard (Non-Nuclear).

(3) NAVICPINST 4355.5; Receipt, Inspection, Storage and Issue of Level I/SUBSAFE Material.

(4) NAVSEA 0948-LP-103-6010; Level I/SUBSAFE Stock Program Catalog, (Part I - Submarine Items, Part II - Surface Ship Items).

(5) Applicable Class Material Identification and Control of Piping Systems Boundary Book.

(6) NAVSEA T9044-AD-MAN-010 - Requirements Manual for Submarine Fly-By-Wire Ship Control Systems.

7. SUBSAFE.

a. Topic.

- (1) Determination of SUBSAFE/Hull Integrity boundaries.
- (2) Use of QA forms and tags.
- (3) Torquing of hull integrity fasteners.
- (4) Generation of an MCR/REC.
- (5) Unrestricted Operation/Periodic Maintenance Requirement.
- (6) Departure from Specification requirements.
- (7) REC exceptions.
- (8) Positive material identification requirements for hull integrity fasteners.

b. References.

- (1) SUBSAFE Certification Boundary Book.
- (2) NAVSEA 0924-LP-062-0010; Submarine Safety (SUBSAFE) Requirements Manual.
- (3) COMUSFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual, Volume V.
- (4) Applicable Unrestricted Operation Maintenance Requirement Card program technical manual.

8. Audit and Surveillance (for personnel performing).

a. Topic.

- (1) Audit/surveillance requirements.
- (2) Purpose of audit and/or surveillance program.
- (3) Preparing for and conducting an audit including specific discussion of techniques to be used to make audits effective and useful to the organization.
- (4) Preparing for and conducting a surveillance includes a specific discussion of techniques to be used to make surveillance effective and useful to the organization.
- (5) Documenting an audit or surveillance.
- (6) Root cause identification.
- (7) Trends and trend analysis.

b. Reference: COMUSFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual, Volume V.

9. Additional Training Topics.

- a. Weight handling equipment testing, use and safety.
- b. Oxygen/Nitrogen plant maintenance.

- c. Working aloft and Sail Safety.
- d. Combat systems maintenance requirements.
- e. Electrical safety.
- f. Welding.
- g. Brazing.
- h. REC requirements on diving systems.
- i. Cleanliness requirements for diving systems.
- j. Controlled material requirements for diving systems.

10. Nuclear Training Topics.

NOTE: INFORMATION ON THIS SUBJECT IS SAFEGUARDED IN ACCORDANCE WITH NAVSEAINST C5511.32 AND IS CONTAINED IN PART II, CHAPTER 1 OF THIS VOLUME.

**VOLUME V**  
**PART I**  
**CHAPTER 5**  
**IN-PROCESS CONTROL**

**REFERENCES.**

- (a) [NAVSEA S9510-AB-ATM-010/020](#) - Nuclear Powered Submarine Atmosphere Control Manual
- (b) [NAVSEA S9086-RJ-STM-010](#) - NSTM Chapter 504 (Pressure, Temperature and other Mechanical and Electromechanical Measuring Instruments)
- (c) [NAVSEA 389-0317](#) - Procedures for Maintenance and Repair of Naval Reactor Plants (Nuclear)
- (d) [NAVSEA 0989-LP-043-0000](#) - Commissioned Surface Ship General Reactor Plant Overhaul and Repair Specification
- (e) [NAVSEA 0989-LP-037-2000](#) - Commissioned Submarine General Reactor Plant Overhaul and Repair Specification
- (f) [NAVSEA S9505-AM-GYD-010](#) - Submarine Fastening Criteria (Non-Nuclear), Description, Design and Maintenance
- (g) [NAVSEA S9086-CJ-STM-010](#) - NSTM Chapter 075 (Threaded Fasteners)
- (h) [NAVSEA 0948-LP-045-7010](#) - Material Control Standard (Non-Nuclear)
- (i) [NAVSEA S9086-RK-STM-010](#) - NSTM Chapter 505 (Piping Systems)
- (j) [NAVSEA S9086-CM-STM-010](#) - NSTM Chapter 078 (Gaskets, Packing and Seals)
- (k) [MIL-STD-1330](#) - Standard Practice for Precision Cleaning and Testing of Shipboard Oxygen, Helium, Helium-Oxygen, Nitrogen and Hydrogen Systems
- (l) [NAVSEA S9086-T4-STM-010](#) - NSTM Chapter 589 (Cranes)
- (m) [NAVSEA MS 7650-081-091](#) - Submarine Hull Inspection
- (n) [NAVSEA MS 6310-081-015](#) - Submarine Preservation
- (o) [NAVSEA 0989-064-3000](#) - Cleanliness Requirements for Nuclear **Propulsion** Plant Maintenance and **Construction**
- (p) [NAVSEA 0989-LP-058-1000](#) - Destroyer Tender and Submarine Tender Nuclear Support Facilities Overhaul and Repair Specification
- (q) [MIL-STD-767](#) - Cleaning Requirements for Special Purpose Equipment, Including Piping Systems
- (r) [NAVSEAINST 9210.41](#) - All Naval Nuclear Propulsion Plants - Use of Standard Lubricants and Penetrating Fluid; Requirements for
- (s) [MIL-STD-413](#) - Visual Inspection Guide for Elastomeric O-Rings
- (t) [NAVSEA 0924-LP-062-0010](#) - Submarine Safety (SUBSAFE) Requirements Manual
- (u) [COMSUBLANTNOTE C3120](#) - Submarine Operating Restrictions and Depth Authorizations
- (v) [COMSUBPACNOTE C3120](#) - Submarine Operating Restrictions and Depth Authorizations
- (w) [NAVSEA T9044-AD-MAN-010](#) - Requirements Manual for Submarine Fly-By-Wire Ship Control Systems
- (x) Fly-By-Wire Ship Control System Certification Boundary Book (ship specific)
- (y) [NAVSEA SL720-AA-MAN-020](#) - **Fleet Modernization Program (FMP) Management and Operations Manual**
- (z) [NAVSEAINST 4790.8](#) - Ship's Maintenance and Material Management (3-M) Manual
- (aa) [NAVICPINST 4441.170](#) - COSAL Use and Maintenance Manual

**LISTING OF APPENDICES.**

- A Determining Software Usability
- B Format for Submarine Certification Continuity Report
- C Format for Fleet Maintenance Activity Certification Report to Tended Submarine
- D Format for Non-Fleet Maintenance Activity Certification Report to Tended Submarine
- E Reactor Plant Configuration Change Report

- F RPCCR Cover Letter for Nuclear Liaison Inquiries (Sample)
- G RPCCR Cover Letter for SHIPALTS (Sample)
- H Technical Manual Deficiency Report (TMDER)
- I Fleet COSAL Feedback Report

5.1 PURPOSE. To provide the requirements or direct the user to the appropriate references to ensure that maintenance performed during the ship's life cycle (new construction through decommissioning) supports certification at all times. Sections 5.4 through 5.7 of this chapter provide explicit inspection and acceptance criteria. This guidance is adequate for all non-nuclear, non-Submarine Safety (SUBSAFE), non-Scope of Certification (SOC)/Deep Submergence Systems and Fly-By-Wire Ship Control Systems (FBW SCS) maintenance performed by forces afloat. All material used within any nuclear and non-nuclear submarine pressure hull shall be certified for use in accordance with reference (a).

## 5.2 TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT.

5.2.1 General Requirements. Test, Measuring and Diagnostic Equipment (TMDE) for in-process work must be properly selected and used. TMDE requiring periodic calibration must be within its calibration periodicity when in use. All TMDE should be selected ensuring the equipment is of the proper range to perform the test, inspection or repair. The craftsman and Quality Assurance Inspector (QAI) should inspect all TMDE prior to use and reject questionable equipment. When inspections or measurements using TMDE are performed with the results documented on a Quality Assurance (QA) form, the type of equipment, range, serial numbers and calibration due dates for TMDE used will be recorded on the QA form as part of the Objective Quality Evidence (OQE).

### 5.2.2 Torque Wrenches.

- a. Selection. Torque wrenches should be selected in such a manner that the required final torque falls within 20% to 90% of the torque wrench range. For example:
  - (1) A torque wrench with a scale range of 0-100 ft-lbs can be used for a maximum torque of 90 ft-lbs and a minimum torque of 20 ft-lbs.
  - (2) A torque wrench with a scale range of 50-250 ft-lbs can be used for a maximum torque of 225 ft-lbs and a minimum torque of 50 ft-lbs.
- b. Calibration. Calibration should be verified to be within the required periodicity (based on due date on the calibration label) prior to use. Most Navy torque wrenches are calibrated for use in one direction only. These tools will have a label affixed stating, "Use Clockwise Only" or "Use Counterclockwise Only". The tool can be used only in the direction indicated. Torque tools calibrated for bi-directional use will bear a yellow "SPECIAL CALIBRATION" tag or label indicating that the tool was calibrated for use in both directions. Navy torque wrenches can be calibrated for bi-directional use only if specifically authorized by model number in the latest Naval Sea Systems Command (NAVSEA) OD 45845.
- c. Micrometer adjustable torque wrenches. To ensure acceptable performance of micrometer adjusted torque wrenches, users must adhere to the following requirements:
  - (1) Exercise the wrench (apply pressure until snap mechanism activates) six times at approximately 60 percent of the rated maximum value before each use. This procedure minimizes the erratic readings often experienced with this type of wrench during the first few activations.
  - (2) Micrometer-type wrenches to be used in counterclockwise applications should be calibrated in the counterclockwise direction and marked as such.

- (3) Some micrometer “click” type torque wrenches do not accommodate torque values down to 20 percent of the maximum rated capacity. Requests to use a specific torque wrench/meter, outside of the ranges specified above, require an engineering evaluation and written authorization from a technical warrant.
  
- d. Extensions/Adapters. Torque wrenches are calibrated based on the specific length of the wrench as established by the wrench manufacturer. Use of an extension changes the effective length of the wrench. The actual torque being applied to the fastener will be different than that indicated on the wrench dial. Any time extensions are used, the following mathematical formulas should be used to determine the wrench dial reading required for the required applied torque:

NOTE: EXTENSIONS CAN SIGNIFICANTLY AFFECT THE APPLIED TORQUE TO INDICATED TORQUE RELATIONSHIP. ANY EXTENSION OTHER THAN A DIRECT ATTACHMENT (I.E., CROWSFOOT) MUST BE TAKEN INTO ACCOUNT.

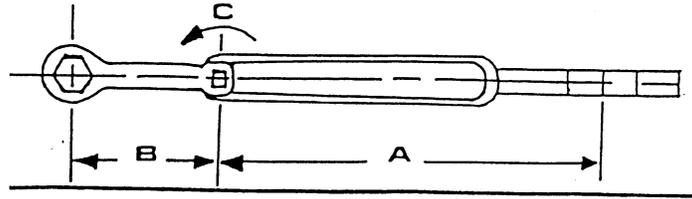
$$T_{ind} = \frac{T_{act} \times L_1}{L_1 + L_2}$$

Where:

T <sub>act</sub>	=	Applied torque required
T <sub>ind</sub>	=	Torque indicated on dial
L <sub>1</sub>	=	Length of torque wrench
L <sub>1</sub> + L <sub>2</sub>	=	Length of torque wrench plus length of extension

When an adapter or extension is used on a torque wrench it increases the torque range of the wrench. The formula for computing torque when using an adapter or extension is explained in Figure 5-1 of this chapter.

Figure 5-1 Use of Torque Wrench Adapters

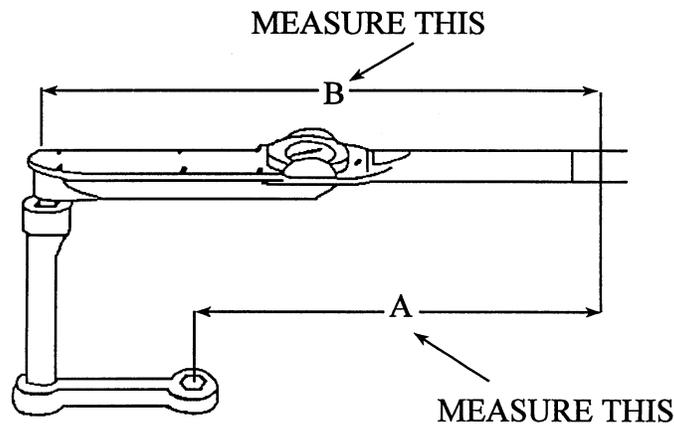


**FORMULA FOR USING ADAPTERS**

C = ACTUAL TORQUE APPLIED TO WRENCH      A = DISTANCE FROM DRIVE TO PULLER'S HANDGRIP  
 B = LENGTH OF ADAPTER      T = TORQUE REQUIRED FOR FASTENER

FORMULA:  $C = \frac{A \times T}{A + B}$       PROBLEM:  $\frac{28 \times 200}{28 + 9} = \frac{5600}{37} \quad C = 150$

**ADAPTER REQUIRING REVERSE CORRECTION**



A = TOTAL LENGTH = 18"

B = TORQUE WRENCH LENGTH = 24"

C = CORRECTION FACTOR =  $A \div B = 18 \div 24 = 0.75$

T = TORQUE REQUIRED FOR FASTENER

**FORMULA FOR USE OF CORRECTION FACTOR**

D = Actual Torque Applied to Wrench      C = Correction Factor =  $A \div B$

Formula:  $D = \frac{T}{C}$       Problem:  $\frac{200}{.75} = 266$

h. Catapult steam and steam drains.

5.8.6.3 Discussion. Significant contamination of boilers with chlorides and/or other detrimental materials has resulted from the introduction of foreign materials into steam plant systems during maintenance onboard conventionally powered ships. The guidance for foreign material exclusion and general cleanliness controls for steam plant system components (e.g., boilers, turbines, condensers) are formally promulgated by NSTMs. However, there is no definitive NAVSEA guidance for many of the steam plant systems piping on conventionally powered ships during maintenance and repair. Therefore, the guidance for cleanliness controls provided in the following paragraphs is for those instances where there is no definitive NAVSEA guidance.

5.8.6.4 Requirements. During general maintenance that breaks the system boundaries, the following cleanliness controls will be implemented:

a. Maintenance of cleanliness.

- (1) Temporary covers or plugs will be installed on all steam system piping, components, and tanks opened for work except during the time that the opening must actually be uncovered to perform the work. Covers and plugs will be designed to preclude loose pieces from entering the steam system. Covers and plugs will be rubber, metal, or rigid plastic and will be securely fastened to the component or piping.
- (2) Following maintenance and prior to removing plugs or covers from inside piping or components, inspect and thoroughly clean the work area to ensure that no tools, rags, lubricants, or other foreign materials are left inside. This includes removal of loose scale and other easily removed corrosion products, as well as removal of residue from grinding, chipping, welding, or other maintenance.

b. Control of foreign material introduction.

- (1) New or repaired components should be cleaned to the maximum extent practical without disassembly prior to installation into the system to ensure preservatives, desiccants, etc. are removed.
- (2) Assembly and maintenance may require the use of lubricants, sealants, and other compounds. Those compounds should be used only as authorized and only applied in the flow path, if authorized by the process instruction.
- (3) During all maintenance, ensure action is taken to ensure all foreign materials are removed following the maintenance and prior to system operations.
- (4) Water used for cleaning or flushing steam plant systems must meet the criteria for steam plant makeup/feedwater.

c. Verification of cleanliness. When verification of cleanliness is required, verification should be accomplished by visual inspection. If configuration of the system or component precludes visual inspection, and cleanliness has not been maintained, then flushing may be used to verify cleanliness.

- (1) Visual inspections will be conducted using normal reading level lighting. Mirrors and borescopes may be used provided resolution is sufficient to verify cleanliness.
- (2) Components should not be disassembled just to conduct visual cleanliness verification. Instead a flush may be used to verify cleanliness. Valves may have the visual inspection performed on the accessible portions of the flow area.
- (3) Flushes will be conducted for period of not less than five minutes.

- (4) Visual inspection acceptance criteria.
  - (a) No grease, oil, or other foreign material.
  - (b) For uncoated surfaces, tightly adherent corrosion products typical for the type of material (e.g., carbon steel) are acceptable. No loose corrosion products may be present.
  - (c) For coated surfaces, the coating must be acceptable to the process instruction used to apply the coating. No loose corrosion products may be present.
  
- (5) Flush acceptance criteria (Visual).
  - (a) For water flushing, the water sample must be free of foreign material.
  - (b) For steam flushing, a sample of condensate downstream of the area being flushed must be free of foreign material.
  - (c) For lines flushed with compressed gas, place a white filter cloth at the outlet to collect debris. After flushing, the cloth must contain only light speckling and/or staining due to rust and dirt and must contain no readily apparent quantities of foreign materials (e.g., metal shavings, abrasive grit, oil).
  - (d) For piping where direct sampling of the flush effluent is not possible, the following requirements apply:
    - 1 For lines that cannot be directly sampled during flushing (e.g., lines that discharge into a tank or condenser without drains or sample taps between the area being flushed and the tank), flush for five minutes. Sample the collected discharge from the tank, the water sample must be free of foreign material.
    - 2 Dead-ended piping in a line being flushed by opening a mechanical connection, will have water, steam, or gas (as applicable) flushed past the dead end connection to the main stream for a minimum of five minutes at the maximum practical flow rate. When cleanliness is verified for the main stream, it is also verified for the dead-ended piping.
    - 3 For piping which cannot be sampled because it discharges overboard, flush for at least five minutes. No acceptance criteria are applicable.

**NOTE: CLASS 3 STUDS KNOWN TO BE SET WITH ANAEROBIC SEALING COMPOUND BASED UPON DRAWINGS REQUIREMENTS OR OTHER OQE MAY USE THE “IN-SERVICE ANAEROBIC STUD ROTATION” CHECKS FROM QA FORM 34 TO DETERMINE THE ACCEPTABILITY FOR USE WITHOUT RESETTING.**

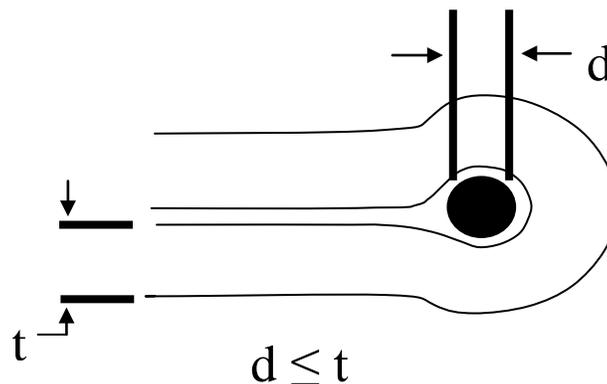
5.8.7 Set Stud Inspection. During disassembly or reassembly, inspect set studs to ensure no rotation is exhibited during nut loosening and tightening. Where direct visual inspection is not possible, marking the top of the stud (e.g., felt tip marker) to a reference point on the assembly may be used. Rotation of any stud during disassembly is cause for rejection (except studs known to be class 3 studs set with anaerobic sealing compound) and the stud must be reset prior to final assembly. If marking is used, use care to not remove material markings such as material color coding during marking removal.

## 5.9 SOFTWARE.

5.9.1 Determination of Acceptability and Use of Piping System Software. To assist in the determination of acceptability of non-metallic packing materials (e.g., O-Rings, wall seals) for installation in non-nuclear and nuclear systems, decision aids have been developed from reference (j) and are provided in Appendix A. In case of question or conflict the requirements of reference (j) apply. Additional guidance regarding non-metallic seals is provided in the following paragraphs.

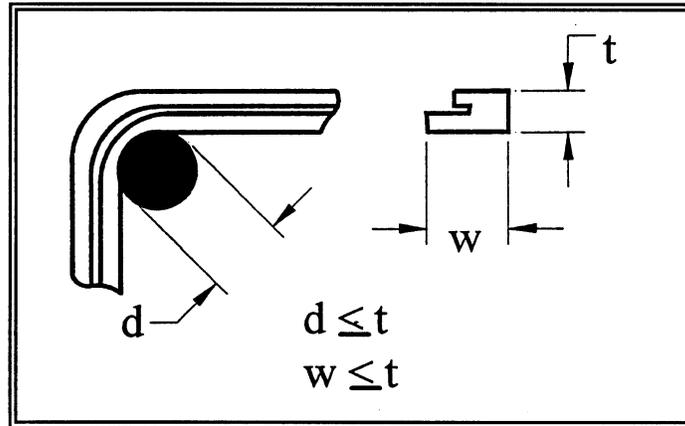
- a. It is Fleet policy that software (e.g., O-Rings, gaskets) will be reused only as a last resort. If new software is not available, software may be used after satisfactory inspection for damage, resiliency, discoloration, or cracking in accordance with reference (j).
- b. In all cases, the guidance provided in applicable NAVSEA technical documents (e.g., drawings, component technical manuals, references (j) and (s) for nuclear and non-nuclear applications) will be followed.
- c. Reuse of software during daily Planned Maintenance System (PMS) or other specified situations. The practice of not reusing software does not apply to items of daily PMS (e.g., drain pump strainer, lubricating oil strainers) or the Logistics Escape Trunk on submarines and, therefore, the O-Ring or gaskets may be reused provided the software has been inspected and is not damaged.
- d. Software which have exceeded their recommended shelf life may be used in naval reactor plant applications provided the following criteria are met:
  - (1) The software has been properly stored in its original package.
  - (2) Software shall be inspected as part of issuing the software for a job or prior to installation. Inspection by a QAI or Controlled Material Petty Officer is not required. No certification signatures are required. The user activity shall define who shall test software with expired shelf lives to ensure they are adequately tested.
  - (3) Except for tubing, each surface of the material shall be examined. For tubing, only the outside surface shall be examined. The software shall be resilient and show no evidence of cracking, discoloration, flaking, tackiness, brittleness, surface contaminants, or other physical damage. Further, each surface shall be inspected and shall exhibit no cracks under 5X magnification when it is deformed as follows:
    - (a) For flat pieces, strips, and O-Rings, bend material onto itself over a rod of diameter (d) no greater than the cross sectional thickness (t) as illustrated in Figure 5-14 below:

**Figure 5-14 Simple Software Deformation Inspection**



- (b) For complex shapes or parts with non-uniform cross section which closely resemble flat pieces, strips, or O-Rings, bend the material at least 90 degrees over a rod of diameter (d) no greater than the maximum cross sectional thickness (t or w) as illustrated in Figure 5-15 below.

**Figure 5-15 Complex Software Deformation Inspection**



- (c) For parts which do not fall into the above categories and parts which are too stiff to be deformed as required, approval shall be obtained on a case basis from the respective Reactor Plant Planning Yard via a Liaison Action Request per Part I, Chapter 8, Section 8.4 of this volume.

**5.10 SUBMARINE SAFETY MAINTENANCE CERTIFICATION/RE-ENTRY CONTROL NUCLEAR AND NON-NUCLEAR.**

5.10.1 **Purpose.** To promulgate the policy and procedures for:

- a. Maintaining continuity of SUBSAFE certification during the operating cycle.
- b. General Maintenance Certification Record administrative requirements.

5.10.1.1 **General.**

- a. Reference (t) establishes the SUBSAFE certification criteria which must be accomplished on submarines in order for NAVSEA to recommend UROs to design test depth. Once the certification criteria are satisfied, NAVSEA will make a recommendation to the appropriate TYCOM that the submarine be authorized for URO to design test depth. Based upon the NAVSEA recommendation, TYCOM will authorize the submarine to operate to design test depth, or some lesser depth depending upon specific conditions. Each TYCOM summarizes the authorized operating depths and restrictions for ships in reference (u) or (v).
- b. Continued URO to design test depth is dependent on:
  - (1) The positive control and re-certification of all re-entries into the SUBSAFE or hull integrity boundaries of the ship and
  - (2) The satisfactory and timely completion of URO MRC requirements.

### 5.10.2 Re-Entry Control Program.

- a. Applicability. This section is applicable whenever work is accomplished within a SUBSAFE boundary as defined by SUBSAFE Requirements Manual, reference (t), and as depicted in the SUBSAFE Certification Boundary Book.

NOTE: SUBSAFE REQUIREMENTS MANUAL IS THE FINAL AUTHORITY FOR DETERMINING IF AN ITEM IS WITHIN THE SUBSAFE BOUNDARY. THE SUBSAFE CERTIFICATION BOUNDARY BOOK IS AN ILLUSTRATED REFERENCE TO AID IN THE DETERMINATION OF WHETHER AN ITEM IS SUBSAFE OR NOT.

- b. General. The Re-Entry Control (REC) Program includes those elements associated with maintenance and/or repair necessary to maintain the certification established by NAVSEA. The program provides auditable OQE of the following:
- (1) What work was accomplished, including material and components used, re-test requirements, tests performed, and test data.
  - (2) Why work was required.
  - (3) Who authorized and accepted the REC.
  - (4) Who did the work.
  - (5) When and where the work was accomplished, including the work and re-test boundaries.
- c. When it becomes necessary to re-enter a SUBSAFE certified system or structure, it will be accomplished in accordance with the requirements and procedures of paragraph 5.10.4 of this chapter. Specific direction on completing the Maintenance Certification Record (MCR) (QA form 9) is contained in the instructions for QA form 9.
- d. Some exceptions to RECs are allowed due to frequent entry into the certified boundary for routine operations or maintenance actions. These exceptions and administrative and/or operational control requirements are contained in paragraph 5.10.7 of this chapter.
- e. NAVSEA SUBSAFE Grams are not authorized for use by submarines or maintenance activities managed by the TYCOM. SUBSAFE Grams will be engineered into the Joint Fleet Maintenance Manual where appropriate.

5.10.3 Nuclear Submarine Safety System Re-Entry. When Re-Entry of a nuclear SUBSAFE system or a portion of a nuclear SUBSAFE system is necessary, the applicable Reactor Plant Manual, reference (e), and the ship's specific Reactor Plant Work Accomplishment Report (RPWAR) will be reviewed and used to provide technical guidance. Nuclear SUBSAFE Re-Entry will be in accordance with the requirements and procedures of Section 5.11 of this chapter. Specific guidance on Reactor and Propulsion Plant Fresh Water Heat Exchanger maintenance is contained in Part II, Chapter 1, Appendix B of this volume.

#### 5.10.3.1 Reactor Plant Planning Yard Liaison Action Requests.

NOTE: INFORMATION ON THIS SUBJECT IS SAFEGUARDED IN ACCORDANCE WITH NAVSEAINST C5511.32 AND IS CONTAINED IN PART II, CHAPTER 1 OF THIS VOLUME.

### 5.10.4 Re-Entry Control Administrative Procedures.

- a. General. REC procedures provide a continuous, auditable record of work done on fully certified systems to provide positive assurance that they remain "certified". Continuity of Certification is mandatory throughout the operational life of the ship to ensure URO to design test depth.
- b. REC. When re-entry of a SUBSAFE system or a portion of a SUBSAFE system (or component) is necessary, the work and re-certification of the work will be documented using the MCR/REC, QA form 9.
  - (1) A MCR/REC will be used for each re-entry of the pressure hull and/or each certified system, certified component or portion thereof as defined by the SUBSAFE certification boundaries.
  - (2) A MCR/REC will be restricted to a single system within a single mapping plan, a single component removed from a system, or a single component removed/worked that requires multiple mapping plans (e.g., trash disposal unit, Main Sea Water hull/backup valves and hydraulic actuators, modified after signal ejectors).
  - (3) When a MCR/REC is opened by a ship to permit removal of a component by Ship's Force for repair by an FMA as a "ship to shop" job, a MCR/REC must be opened by the FMA to cover the work and retesting of the work center work performed by the FMA.
  - (4) Where other certified systems must be re-entered to accomplish a MCR/REC, each system will have its own MCR/REC, except as described in paragraph 5.10.4.b.(2) above.
  - (5) The MCR/REC and records of MCR/REC will contain all of the OQE necessary to comply with paragraph 5.10.2.b above.
  - (6) The work procedures associated with a MCR/REC will contain sufficiently detailed instructions to assure that all requirements for certification are properly accomplished and documented.
  - (7) Work and test boundaries will be defined in terms that are unique and directly identifiable with the specific mapping plan and/or task involved.
  - (8) When work and test boundaries are different, both boundaries will be set forth. The work boundaries, test boundaries and pressure boundaries should be specified and should not be confused. Work boundaries define the limits to which work was performed. Test boundaries define the limits for testing to certify the work; these tests may involve actuators, indicators or components other than those actually repaired. Pressure boundaries define (perhaps by valve lineups) the limits of the system which were pressurized to hydrostatically test the work. The pressure boundaries and test boundaries may be the same.
  - (9) On a "ship to shop" job the work boundaries may be best described by system joint designators even though those joints were not "disturbed" by the FMA (e.g., rebuild a Rubber Insert Sound Isolation Coupling (RISIC), the work/test boundaries will be the end flanges that bolt up to the system, the joint identification numbers may be clearest identification of that boundary point).
  - (10) Previously certified hardware will be reused when certification is not affected by the re-entry, or when it can be recertified. The words "replace", "repair", and "re-install" should be used carefully. "Replace" means the use of a different/new component, while "re-install" indicates the use of the previously installed component, whether repaired or not. "Repair" indicates that some refurbishment, other than mere disassembly and/or cleaning, was performed.
  - (11) Associated supporting documents such as Nondestructive Testing (NDT) records, material certification, test data, etc., will be specifically identified and referenced on the MCR/REC.

- (12) When it becomes necessary for an FMA to re-enter a certified component (periscopes, Auxiliary Sea Water pumps, Electronic Warfare Support Measures masts) which will not be returned to the ship from which it was removed, or when a component is re-entered when the ship on which it will be installed is not present, the FMA will control the work and document the re-entry using a QA form 9, MCR/REC. The MCR/REC will be initiated and closed out by the FMA. A copy of the completed MCR/REC will accompany the component when it is installed in a certified SUBSAFE submarine or shipped to another activity as proof of certification. These controls are required whether the certified component is to be installed in a SUBSAFE certified ship or stored. Each component must retain its certification. These RECs are separate from and in addition to any MCR/REC required for removal of a component from SUBSAFE system and are only necessary whenever the original component will not be returned during the current availability to the ship from which it was removed.
- (13) The CWP/REC Log, QA form 11 will be established and maintained by the QAO in accordance with the detailed instructions for QA form 11 in Part I, Chapter 11 of this volume. The QA form 11 shall be reviewed by the QAO to verify all MCR/RECs are closed prior to submerged operations. The FMA QAO will maintain a log for the FMA only and one for each tended ship RECs. The QA form 11 shall be reviewed by the FMA QAO to verify all FMA MCR/RECs are closed prior to underway operations of each tended ship.
- (14) Revisions to the MCR/REC are required for the following:
- (a) Change in work boundaries (e.g., breaking additional or new mechanical joints not previously identified on the MCR/REC). A REC revision is not required to delete undisturbed joints. Deletion of joints must be authorized by cognizant technical authority and documented in the REC package. Block 13 must be annotated to reflect joint deletions prior to signing REC Block 16.
  - (b) Change in NDT or test requirements (e.g., "J" vice H hydrostatic test, when "H" was originally specified). This does not include a DFS for unaccomplished testing. A REC revision is not required for NDT incidental to minor repairs as defined in paragraph 5.10.4.b.(15) (d) below. NDT results must be documented in the REC package.
  - (c) Scope of work changes (e.g., originally replace software changed to weld repair sealing surfaces, originally replace software changed to metallic pressure boundary part replacement).
  - (d) The REC does not require revision in order to conduct minor repairs in support of the original scope of work. These minor repairs must be authorized by cognizant authority and documented in the REC package, with appropriate OQE generated and added to Block 15 prior to the signing of Block 16 of the QA form 9. Hot work is not classified as a minor repair. Minor repairs authorized to be performed without a revision are:
    - 1 Minor machining such that the machining is within the limits of the technical drawing, MS, or technical manual (e.g., taking a skim cut on an O-Ring groove such that the final machined dimensions are within the tolerances of the technical reference).
    - 2 Epoxy repairs.
    - 3 Electroplate repairs.
    - 4 Preventive coating application.

- (15) A revision cannot be used when a new MCR/REC is required (e.g., different system must be entered to conduct repair).
- (16) REC Cancellation and REC Administrative Closeout. In the event a CWP is prepared and the job is planned to be accomplished but for some reason it was cancelled or deferred the following actions should be taken:
  - (a) If work was authorized to start, the CWP/REC must be revised to reflect that no work was accomplished and the REC was revised to close administratively. The QA form 11 log will be annotated that the job was "Cancelled".
  - (b) If work was not authorized to start, and the job has been cancelled, annotate the remaining blocks of the QA form 9 with NA and note that the REC was cancelled and no work was accomplished. Blocks 19 and 20 will be signed to formally close the REC. If the REC was prepared by a Repair Facility, a copy of the QA form 9 will be provided to the tended unit with the Certification Continuity Letter. QA form 11 log will be annotated that the job was "Cancelled".
  - (c) If work was not authorized to start and the job has been deferred to a future maintenance period, the REC is not required to be cancelled. The QA form 11 log will be annotated as "Deferred". This is not considered an open REC.
- (17) Prior to every underway for submerged operations, all SUBSAFE RECs shall be closed. Commanding Officers of submarines will submit to Immediate Superior In Command (ISIC) a written report in accordance with paragraph 5.10.8 of this chapter. SUBSAFE certification letter is only required after an inport period in which SUBSAFE work was performed.
- (18) Ship's Force is responsible for providing "Buddy" SUBSAFE REC serial numbers to outside repair activities performing SUBSAFE work on shipboard SUBSAFE systems. The Buddy REC number is issued from ship's QA-11 log and will be documented on repair activities SUBSAFE/RE-ENTRY CONTROL FORM. The use of the Ship's Force Buddy REC number is NOT required for Chief of Naval Operations/TYCOM scheduled availabilities. The issue of the Ship's Force Buddy REC is an administrative tool to make REC Log keeping easier and ensure the required certification letters are received prior to underway. The Ship's Force Buddy REC does not result in a Ship's Force REC Form, does not require Ship's Force Record Retention and does not allow Ship's Force to participate in the assigned activities work or certification process, except performance of testing. Ship's Force will only issue Buddy RECs to SUBSAFE certified activities performing SUBSAFE Work.

5.10.5 Using a Controlled Dive Departure from Specification to Close a Maintenance Certification Record/Re-Entry Control. If a MCR/REC is closed by transferring at sea testing to a DFS (e.g., controlled dive to test depth for retest of a periscope hull gland, controlled dive for retest of a sea connected system in lieu of joint tightness test to "J" pressure of Test Pressure Drawing (TPD)), the ship will be restricted, as required by reference (t), as follows:

**NOTE: IF AN UNSATISFACTORY CONDITION OR SEAWATER LEAKAGE IN EXCESS OF THE SPECIFICATION IS FOUND DURING THE CONDUCT OF THE CONTROLLED DIVE TO TEST DEPTH, THE SHIP SHALL CONTINUE TO TEST DEPTH UNLESS THE COMMANDING OFFICER DETERMINES IT APPROPRIATE TO ABORT THE DIVE.**

- a. Except for the controlled dive to test depth to retest the system/component, ship's depth will be limited to one half test depth plus fifty feet until satisfactory completion of inspections during the controlled dive. The ship will stay at test depth for the time required as detailed in the normal retest procedure (i.e., 30 minutes if the normal joint tightness test is for 30 minutes) plus adequate time to permit inspections.

- b. If inspections of the system/component during the controlled dive are satisfactory, the ship is released for UROs with no immediate report required. Clearance of the DFS will be reported as required by Part I, Chapter 8 of this volume.
- c. If inspections of the system/component during the controlled dive are unsatisfactory, the ship is restricted to one-half test depth plus fifty feet as indicated in paragraph 5.10.5a. above, unless specific authorization is received from TYCOM approving URO or changing the depth restriction. An immediate report of unsatisfactory inspections will be made to ISIC and, if required, a request, including Commanding Officer's evaluation of unsatisfactory conditions and justification for request, for approval to conduct operations at depths deeper than one half test depth plus fifty feet will be made to TYCOM with information copy to ISIC and NAVSEA (07T). Deficiencies discovered that are not joints specified for inspection in the MCR/REC and DFS are dispositioned as required by Part I, Chapter 8 of this volume and are not cause for depth restrictions unless the Commanding Officer deems necessary.
- d. Should the presence of an installed Dry Deck Shelter or Advanced Seal Delivery System preclude a component requiring deep dive testing from seeing submergence pressure, the requirements of paragraph 5.10.5a. of this chapter shall apply upon removal of the Dry Deck Shelter/Advanced Seal Delivery System, and shall be so annotated in the approval comments of the deep dive DFS.

5.10.6 Voyage or At Sea Repairs. If emergent repairs or at-sea repairs involve REC work, the ship is limited to 200 feet or less until the ship's Commanding Officer has signed for the closed REC.

- a. If equipment malfunctions (except for casualties affecting recoverability, salvage, watertight integrity, or operation of ship's control surfaces), or seawater leakage in excess of the specification is found during the conduct of the initial tightness dive or the controlled dive to test depth, the ship should continue to the required depth and execute the sea trial agenda unless the Commanding Officer determines it appropriate to abort the dive. The Commanding Officer should be particularly circumspect in the case of leakage locations not isolable by flood control/other closures (e.g., electrical hull penetrators, periscope hoist rods, etc.).
- b. Following completion of the initial tightness dive and the controlled dive to test depth, SUBSAFE deficiencies which result in seawater leakage exceeding the specification for acceptance shall be reported to the TYCOM, NAVSEA and info to all concerned.
- c. If leakage is from an unisolable joint, ship's depth will be limited to 1/2 test depth plus 50 feet until approval from the TYCOM is received to continue trials at depths greater than 1/2 test depth plus 50 feet.

5.10.7 Exceptions to Re-Entry Control. Table 5-14 of this chapter includes certain systems and equipment within the certified SUBSAFE boundary which require frequent entry into the certified boundary for routine operations or maintenance actions in order to enable the ship to carry out its mission. The operational requirements for these systems and equipment have been reviewed. Inherent operational controls in the present system are considered adequate and the below listed items are considered safe exceptions to the formalized REC system. The operational control which is considered as meeting the intent of the REC requirements is listed beside each item and must be in effect in order to use the exception. Some REC exceptions permit removal of material from the installed system to perform maintenance or testing. The original material must be reinstalled or a complete REC (controlled work package) must be used to capture the installation of new Level I material and/or certification testing for new material.

**NOTE: MCR/REC EXCEPTIONS ARE FOR SHIP'S FORCE USE ONLY AND ARE NOT AUTHORIZED FOR USE BY REPAIR ACTIVITIES. REPAIR ACTIVITIES SHALL NOT REQUEST THE SHIP TO INVOKE A REC EXCEPTION IN CONJUNCTION WITH REPAIR ACTIVITY WORK.**

NOTE: REC EXCEPTIONS ARE NOT AUTHORIZED TO BE USED FOR THE INSTALLATION OF NEW LEVEL I HARDWARE WITHIN THE SUBSAFE BOUNDARY.

**Table 5-14 Re-Entry Control Exception List (SUBSAFE)**

REC EXCEPTION ITEM	OPERATIONAL CONTROL REQUIREMENT	RECERTIFICATION TESTING
Operation of access hatches and watertight doors	Ship's operating instructions (Note 1)	None
Operation of trash disposal unit	Ship's operating instructions (Note 1)	None
Streaming and retrieving the floating wire antenna	Ship's operating instructions (Note 1)	None
Normal loading/unloading of signal ejector/launcher and hand ram operations	Ship's operating instructions (Note 1)	None
Operating of shore services trunk and hook-up and disconnect of shore power, including removal and replacement of shore power covers	Ship's operating instructions (Note 1)	None
Normal operation of torpedo tube system	Ship's operating instructions (Note 1)	None
Entry into Auxiliary Tanks modified for storage (Does not include changing tank from wet to dry or vice versa)	Ship's operating instructions (Note 1)	None
Streaming and retrieving of towed array sonar systems	Ship's operating instructions (Note 1)	None
Operation of dry sonar sphere access hatch	Ship's operating instructions (Note 1)	None
Removal of MS plugs (9/16" and smaller) including test fittings for gauge test/hydro	Controlled assembly (Notes 2 and 3)	Note 4
Removal of and re-installation external salvage pipe cap	Controlled assembly (Notes 2 and 3)	None
Operation of Electronic Warfare Support Measure nitrogen purge lines	Operation by qualified FMA Electronic Warfare Support Measure repair personnel	None
Operation of periscope gassing valve	Operation by qualified FMA periscope personnel	None
Cleaning Sea Water Injection Strainers	Controlled assembly (Notes 2 and 3)	None
Main closure regreasing on MOD 25 MSW pumps, SSN 21 and SSN 774 Class Sea Water Pumps	Controlled assembly (Notes 2 and 3)	None
Removal and re-installation of Advanced Seal Delivery System nitrogen system caps	Controlled assembly (Notes 2 and 3)	None
Fresh Water Flushing of Towed Array Handling System Valve/Seal Assembly	Controlled assembly (Notes 2 and 3)	None
Removal and Reinstallation of the special test plug from MSW and ASW hull and backup valve body access covers	Controlled assembly (Notes 2 and 3)	None
Cleaning Sea Water Cyclone Separator	Controlled assembly (Notes 2 and 3)	None

Notes:

- (1) Ship's operating instructions are procedures approved and signed by the Commanding Officer, or for SSN 688 and later classes of submarines, procedures promulgated in the Ship Systems Manual and Steam and Electric Plant Manual.

- (2) An FWP in accordance with Part I, Chapter 2 of this volume, (e.g., PMS MRC, technical manual pages, detailed maintenance outline), will be used to control and document all work performed as a REC exception.
- (3) Controlled assembly requirements are:
  - (a) Verification that surface finishes of gasket/o-ring sealing surfaces are in accordance with applicable specifications.
  - (b) Verification that fastener material and installation is in accordance with applicable specifications.
  - (c) Verification that gaskets/o-rings are properly installed and in accordance with applicable specifications.
  - (d) Assembly is documented on a QA form 34.
  - (e) Inspected by a Quality Assurance Inspector (QAI) or Quality Assurance Supervisor.
- (4) The re-certification test is an operational test to system operating pressure.

NOTE: EXCEPTIONS FROM REC OTHER THAN THOSE LISTED ABOVE ARE NOT AUTHORIZED.

5.10.8 Certification Continuity Report. In order to ensure continued certification of each submarine, periodic reports are required as follows:

- a. Prior to each underway for submerged operations, all SUBSAFE RECs shall be closed. Commanding Officers of submarines will submit to ISIC (deployed ISIC, if deployed), a written certification continuity report, which addresses the status of Ship's Force SUBSAFE/Submarine Flight Critical Component (SFCC) CWP, testing of SUBSAFE/FBW SCS systems, URO maintenance completed and RECs closed by transferring actions to a DFS. Appendix B provides the minimum requirements for the letter. If no SUBSAFE/SFCC controlled work, testing or URO MRCs were accomplished, no report is required.
- b. Prior to the ship's underway after an FMA availability, refit or inport period when SUBSAFE/SFCC work was performed, the FMA Commanding Officer will issue a letter report to each tended submarine, with a copy to parent ISIC, which addresses the status of SUBSAFE/SFCC CWPs, testing of SUBSAFE/FBW SCS systems, URO maintenance requirements completed and SUBSAFE non-conformances (i.e., DFS and LAR). Appendix C provides the minimum requirements for the letter.
- c. Prior to ship's underway, activities other than FMAs which perform SUBSAFE/SFCC maintenance on submarines will issue a letter report to the submarine with a copy to the parent ISIC, certifying that the maintenance performed meets the requirements of applicable specifications invoked by the governing document (e.g., unscheduled availabilities, contract) and the Memorandum of Agreement. Appendix D provides the minimum requirements for the letter.

## 5.11 REACTOR PLANT WORK ACCOMPLISHMENT REPORT (SUBMARINES ONLY).

### 5.11.1 Purpose.

- a. The RPWAR form is a listing of those pipe and components of the reactor plant which are SUBSAFE. It is specific for each ship and is provided by the Reactor Plant Planning Yard via the TYCOM. The RPWAR consists of:
  - (1) Status sheet.

- (2) Cover sheet.
  - (3) RPWAR Master Pages.
  - (4) Addendum Sheet.
  - (5) RPWAR general notes.
- b. The reactor plant hull integrity area is comprised of those items on the RPWAR. Each ship must maintain the RPWAR current. Each completed RPWAR will be filed in an auditable manner along with the latest revision for the ship of the NAVSEA RPWAR status drawing. The reproducible blank RPWAR will be maintained in the same file. The ship will reproduce blanks as necessary to support reactor plant work.
  - c. To properly complete the RPWAR, the preparer must review the general notes of the applicable RPWAR and the instructions in reference (e).
  - d. To certify (or recertify) a nuclear SUBSAFE item, a RPWAR must be completed by the activity performing the maintenance (ship, FMA or shipyard) in accordance with reference (e) and forwarded as soon as possible to the Reactor Plant Planning Yard with copies to NAVSEA 08, TYCOM, ISIC and the ship. The RPWAR is to be signed in ink and the signed in ink copy should be forwarded to the Reactor Plant Planning Yard. Initials or typed signatures are not permitted. When work is complete, submit only those pages of the RPWAR line items that certify the work accomplished.
  - e. The RPWAR does not, in any way, relieve the FMA or ship of its responsibility to comply with all applicable requirements specified in technical manuals, plans, and other NAVSEA documents.
  - f. When the FMA works in an area covered by the RPWAR, the ship's Engineer Officer will provide the FMA with a reproduced RPWAR with the number filled in, notes, applicable certification forms and addenda sheet.
  - g. Instructions contained in this section are in amplification of those included in reference (e) and the RPWAR drawing itself.

5.11.2 Specific Instructions for Completing Reactor Plant Work Accomplishment Report Cover Sheet.

- a. The ship's hull number must be specified in the space provided (if not already pre-printed).
- b. The reporting activity (ship, FMA or shipyard) must be listed.
- c. The report number must be included. The report number is the next consecutive number to that indicated on the latest completed RPWAR held by the ship.
- d. The report must be dated.
- e. The applicable block specifying when the work was accomplished must be checked.
- f. The signatures and titles of the personnel preparing, reviewing, and approving the RPWAR must be included. Each RPWAR submitted by ships is prepared by the Lead Work Center QAI, reviewed by the QAO and Engineer Officer, and approved by the Commanding Officer. Each RPWAR submitted by an FMA is prepared by the nuclear Planning and Estimating Work Center (10D), reviewed by the Nuclear Repair Officer and QAO, and approved by the Repair Officer.

5.11.3 Specific Instructions for Completing Reactor Plant Certification When New or Previously Uncertified Material is Installed in a Submarine Safety Application.

- a. The applicable revision of the drawing or plan must be referenced in the "DWG. NO. AND REV" block for each item worked on.

NOTE: IF A DRAWING OR PLAN OTHER THAN THAT REFERENCED IN THE "DWG. NO. AND REV" BLOCK IS USED BY THE REPORTING ACTIVITY, THE ACTUAL DRAWING OR PLAN USED SHOULD BE SPECIFIED IN EITHER THE "REMARKS" BLOCK OR ON THE ADDENDA SHEET AS A REFERENCED NOTE. THE REASON FOR USING A DIFFERENT DRAWING OR PLAN SHOULD ALSO BE SPECIFIED.

- b. The identification of the reporting activity's detailed record should be entered in the "DETAILED RECORD IDENTIFICATION" block if the inspections required by the applicable inspection category were performed by the reporting activity (ship or FMA).

NOTE: THE RECORD RETAINING ACTIVITY, IF OTHER THAN THE REPORTING ACTIVITY, SHOULD BE IDENTIFIED IN THIS BLOCK.

- c. Where sufficient space does not exist for entry of information, refer to the addenda sheet in the "REMARKS" block and enter the required information on the addenda sheet.
- d. The report number will be entered in "REMARKS" block for each line item worked on by the reporting activity.
- e. The signature block must be completed, indicating that the corresponding line item work has been satisfactorily completed and that records substantiating this are on file.
- f. Where SUBSAFE work is accomplished in accordance with an Alteration, the reporting activity will reference, for each work item, the applicable Alteration with revision number in the "REMARKS" block.
- g. Waiver, if any, previously granted for each item must be identified, including reference to the NAVSEA approval letter.

NOTE: IF THE WORK PERFORMED ON THE SUBSAFE ITEM IS SUCH THAT THE PREVIOUS CERTIFICATION IS VOIDED (SUCH AS REPLACEMENT OF A SUBSAFE VALVE TAILPIECE), THE REPAIRED OR ALTERED ITEM MUST BE CERTIFIED AS NEW MATERIAL.

5.11.4 Specific Instructions for Completing Reactor Plant Certification When Previously Certified Material is Reinstalled.

- a. Reinstallation of previously certified material does not require a RPWAR unless specifically called out as a line item on the RPWAR requiring torque or installation verification.
- b. The fastener torque sheet is filled out as follows:
  - (1) The inspection document is the QA form 34, the FWP or CWP serial number and job sequence number.
  - (2) The signature block is signed by the QAI who verified the torque.
  - (3) If sufficient space is not available in the QA form 34, the addenda sheet should be used with the appropriate line item listed.

5.12 MATERIAL CONDITION MONITORING (SUBMARINES ONLY).

5.12.1 Unrestricted Operations Maintenance Requirement Card Program.

- a. The URO MRC program provides the minimum material condition requirements for URO to design test depth, with an established periodicity to accomplish. It is one of the programs required to maintain SUBSAFE certification. Accomplishment of the URO MRC will identify changes within the SUBSAFE or hull integrity boundaries of the ship, which result from the degradation caused by the service environment.
- b. Administration, scheduling and reporting of the URO MRC program will be in accordance with the requirements of Chapter 25, Volume VI of this manual. A summary of URO MRC status will be reported by the submarine Commanding Officer in accordance with paragraph 5.10.8 of this chapter.
- c. When performing corrective maintenance the following guidance is provided with regard to URO MRC:
  - (1) When performing corrective maintenance, associated URO MRCs should be reviewed to determine if the URO MRCs should be accomplished concurrently ahead of scheduled periodicity to preclude having to disassemble equipment again to accomplish the URO MRCs. Ship's schedule or FMA resources may preclude concurrent, early accomplishment of URO MRCs.
  - (2) If URO MRC criteria are used, in total or in part, during corrective maintenance, and a measured parameter is found out of tolerance and not restored, a major DFS must be submitted, in accordance with Part I, Chapter 8 of this volume, even though the periodicity of the URO MRC has not expired.
  - (3) When performing corrective maintenance that does affect a URO MRC measured parameter, perform that portion of the applicable URO MRC. A URO MRC measured parameter is any parameter that is documented on the Data Report Form during the performance of the URO MRC. The following are examples of corrective maintenance that may affect a URO MRC measured parameter:
    - (a) When the retest of the corrective maintenance is a documented URO MRC measured parameter (i.e., Emergency Flood Control Accumulator Tightness Test - URO MRC 026).
    - (b) When maintenance (such as opening mechanical joints or replacing hardware, adjustments, tests) affects the operation of a system inspected/tested by a URO MRC (i.e., Emergency Flood Control - URO MRC 025).
- d. Following installation of an alteration (Ship Alteration (SHIPALT), Alteration and Improvement, Temporary Alteration) that modifies the structure of the Ship, such that access to vital equipment is or may be impacted, the Ship shall evaluate the need to perform URO MRC 029. If access to vital equipment could be restricted, the Ship shall perform URO MRC 029 and provide a copy to the installing activity and the ISIC. Partial accomplishment of URO MRC 029 is acceptable if appropriate for the alteration. If partial accomplishment of the URO MRC is performed, provide a copy to the installing activity and the ISIC. If the complete URO MRC is accomplished, provide a copy to normal distribution.

### 5.13 SUBMARINE FLY-BY-WIRE MAINTENANCE CERTIFICATION.

#### 5.13.1 Purpose. To promulgate the policy and procedure for:

- a. Maintaining continuity of the FBW SCS certification during the operating cycle.
- b. General Maintenance Certification Record administrative requirements.

- d. Steam Plant Action Request (SPAR).
- e. Steam Plant Liaison Inquiry (SPLI).
- f. Reactor Plant Configuration Change Report (RPCCR).
- g. Planned Maintenance System (PMS) Technical Feedback Reports (TFBR).
- h. Tech Manual Deficiencies & Manual Change Requests.
- i. Fleet Coordinated Shipboard Allowance List (COSAL) Feedback Reports.

5.14.2 Non-Nuclear Deviations, Waivers and Departure from Specifications. The terms “deviation” and “waiver” are often used synonymously. However, the principle difference is a deviation is requested prior to conducting work that will result in a non-conformance, where a waiver is requested after a non-conformance has been discovered. Requests for deviation and waivers shall be retained and tracked within the DFS system by Ship’s Force and the ISIC/TYCOM until permanent documentation is confirmed to reflect the specific non-conforming condition. Use of the Web Based Electronic Departure from Specification or Electronic Waiver and Deviation programs facilitate meeting these requirements. A DFS (non-nuclear system/components only) is used specifically to identify a lack of compliance with plans, procedures, instructions, or authoritative documents during a maintenance action or operations.

5.14.2.1 During a Maintenance Action. A DFS is required for any lack of compliance with cognizant documents or drawings. For an “as found” condition during maintenance, the TYCOM, the ship and the Regional Maintenance Center (if involved) must evaluate the non-compliance using the guidance of paragraphs 8.2.4 and 8.2.5, of Part I, Chapter 8 of this volume to determine if the nonconforming condition meets the criteria as a Major or Minor DFS.

NOTE: IF THE SHIP IS AT SEA THE GUIDANCE OF PARAGRAPH 8.3.8 OF PART I, CHAPTER 8 OF THIS VOLUME APPLIES.

5.14.2.2 During Operations. A DFS is required for any lack of compliance with cognizant documents or drawings. For any “as found” conditions or equipment failures that result in a non-compliance, the ship (and/or TYCOM if in port) must evaluate the condition or failure using the guidance of paragraphs 8.2.4 and 8.2.5 of Part I, Chapter 8 of this volume to determine if the nonconforming condition meets the criteria as a Major or Minor DFS.

- a. If the nonconforming condition does not meet the criteria as a Major or Minor DFS, no DFS is required and the nonconforming condition will be entered in the ship's Current Ship's Maintenance Project (CSMP).
- b. If a DFS is required, the request should be processed as soon as possible to enable an engineering evaluation of the non-conformance and subsequent approval or disapproval issued without disrupting ship’s operations.
- c. Requests for DFS will be submitted, approved and cleared in accordance with paragraph 8.3.7 or 8.3.8 of Part I, Chapter 8 of this volume. Use of the Web Based Electronic Departure from Specification and Electronic Waiver and Deviation programs are acceptable unless directed otherwise by TYCOM.
- d. If a DFS is approved as “temporary” and requires rework to correct the discrepant condition at a later date, a new CSMP entry for correction of the discrepant condition will be initiated by the ship. The ship’s QAO shall ensure this action is accomplished.
- e. The QAO shall verify that an active Job Control Number (JCN) exists for all active temporary DFSs at the completion of all scheduled maintenance availabilities or at least quarterly and shall ensure that an auditable record of such verification is maintained until superseded.
- f. For all DFSs, deviations or waivers that have been adjudicated, the approving activity is required to provide a copy of the DFS, deviation or waiver to the ship's QAO for retention and tracking per Part I, Chapter 8, paragraph 8.3.1.e of this volume.

5.14.3 Liaison Action Requests – Nuclear Cognizant Areas.

5.14.3.1 Technical Responsibilities. A memorandum of agreement exists between NAVSEA Nuclear Propulsion Directorate (08) and NAVSEA PMS 312/335 that details the division of responsibilities within the propulsion plants of nuclear powered ships. If a nuclear powered ship is unable to comply with specifications for reactor plant systems or components and also those systems identified as nuclear by the appropriate nuclear/non-nuclear interface diagram, then a review of NAVSEA 08 requirements shall be requested via a LAR. A formal resolution of all LARs is generally required prior to reactor plant or propulsion plant startup.

5.14.3.2 Technical Resolution. In general, technical resolution to questions or problems for reactor plant systems or components requires the submission of a LAR for nuclear powered surface ships in accordance with the requirements set forth in Appendix 4 (Liaison Services) of reference (d).

- a. Request for DFSs for nuclear systems will neither be requested nor approved. If a ship has a question, problem, or is unable to comply with any nuclear specification, a request for technical resolution will be made using a LAR.
- b. A LAR should not be submitted for cases of out of specification seat leakage of nuclear valves following repairs. The Reactor Plant Planning Yard and Reactor Plant Prime Contractors do not have the authority to waive valve leakage specifications. When valve seat leakage exceeds reactor plant manual specification after attempted Ship's Force/FMA repairs, the guidance of Part I, Chapter 8, paragraph 8.4.2.c. of this volume may be used to defer any rework to a later date and close out the CWP.
- c. A LAR is also never used for removing or reprogramming work, to or from, an Availability Work Package (AWP).
  - (1) AWP for Chief of Naval Operations availabilities are developed and/or changed in accordance with Section 5.1.1 and Appendix D or F of the Aircraft Carrier Class Maintenance Plan (ACCMP).
  - (2) The ACCMP can be found on the Carrier Team One website under "Resources/Library".
- d. An auditable LAR file shall be maintained by the originating activity. A copy of the status of all liaison actions LAR shall be kept as part of this file with a copy maintained in the applicable Controlled /Formal Work Procedure, as required.

5.14.4 Nuclear Liaison Inquiry – Nuclear Cognizant Areas.

NOTE: INFORMATION ON THIS SUBJECT IS SAFEGUARDED IN ACCORDANCE WITH NAVSEAINST C5511.32 AND IS CONTAINED IN PART II, CHAPTER 1 APPENDIX B OF THIS VOLUME.

APPENDIX E AND APPENDIX F APPEAR IN PART II, CHAPTER 1 OF THIS VOLUME AS ENCLOSURE (1) AND ENCLOSURE (2), RESPECTIVELY.

5.14.5 Steam Plant Action Request - Non-Nuclear Cognizant Areas. In 2003, the Propulsion Plant Engineering Activity (PPEA) was formed as an additional resource for assisting operational aircraft carriers with technical or operational issues, not associated with Ship Alteration Installation or configuration control.

- a. **The Steam Plant Action Request (SPAR) is designed to allow the fleet and maintenance activities to submit requests for technical assistance on non-Ship Alteration related issues. The Carrier Engineering Team (CET) will assist in providing solutions which satisfy specification requirements, supply a technical evaluation or the basis for concurrence or non-concurrence with a deviation or proposed change. Where sufficient information is not available to resolve the problem, the CET may request additional information in a reply. Each SPAR will be categorized based on the type of action taken in the proposed reply.**

- b. As with a LAR, if a ship or FMA has a question or technical problem or is unable to comply with a non-nuclear specification, technical assistance is available from the In-Service CET. CET Liaison services are requested using the SPAR discussed in detail in Appendix 4 of reference (d).

5.14.5.1 Usage. SPARs requesting changes or deviations from specification shall not be submitted or approved by the CET. The SPAR is not a substitute for a Request for DFSs described in Part I, Chapter 8 of this volume.

- a. SPAR should be submitted by the ship or FMA to the PPEA to address technical, logistical and/or operational problems with the steam and electric plant systems. It is the intent of these requirements to ensure consistency between fleet units and overhaul and repair activities in the content, format and completeness of SPAR submissions. The SPAR is not intended to replace Ship's Force and Overhaul/Repair Yard communication with the CVN68 class Engineering Configuration Manager for drawing and Ship Change Document/ShipAlt installation and configuration control issues using LARs prepared in accordance with reference (y).
- b. Examples of when generation of a SPAR is appropriate are:
  - (1) Receipt of spurious De-Aerating Feed Tank level alarms during maneuvering transients that the performance of available preventive maintenance and technical manual troubleshooting does not correct.
  - (2) Failure of the Emergency Diesel Generator to parallel across the Emergency Diesel Generator output breaker during a normal Emergency Diesel Generator feedback in accordance with the Steam Plant Manual and troubleshooting do not correct or identify the cause of the failure.
  - (3) Failure of a normal seeking Automatic Bus Transfer to transfer to its normal source upon a return of the normal power supply and Ship's Force is unable to identify the cause through available troubleshooting methods.
- c. The SPAR is not intended to replace:
  - (1) The CSMP for work requests/candidates.
  - (2) TFBRs for discrepancies with the PMS System.
  - (3) Technical Manual Deficiency/Evaluation Reports (TMDER) or Manual Change Requests for identifying discrepancies in technical manuals.
  - (4) Reporting changes to ship's configuration as a result of the Navy Modernization Program.
- d. A SPAR is also never used for removing or reprogramming work to or from an AWP.
- e. AWP for Chief of Naval Operations availabilities are developed in accordance with Section 5.1.1 and Appendix D or F of the ACCMP. The ACCMP can be found on the Carrier Team One website under the "Resources/Library" tab.

5.14.5.2 Validation. Upon receipt of a SPAR, the PPEA makes a determination, with NAVSEA concurrence as needed, as to whether the SPAR is a valid request. Once validated, the PPEA will route the SPAR to the appropriate cognizant engineering activity for resolution. If the appropriate activity is not clear, i.e. in the case of overlapping areas of cognizance, NAVSEA 05V will determine which organization will provide resolution. SPAR responses meeting the criteria below, DO NOT require NAVSEA approval and the PPEA has the authority to provide a final resolution to the requesting activity.

- a. The request concerns a PPEA cognizant system or component as defined in Enclosure (1) to PPEA-1.
- b. The request does not change:
  - (1) Engineering System Diagrams.

- (2) System diagram attributes, such as system design or performance characteristics, material, pipe size, etc.
- (3) Steam Plant Manual.
- (4) Component Procurement Specifications.
- (5) Component Technical Requirement documents.
- (6) Component technical manuals.
- (7) System testing requirements.
- (8) GSO requirements.

c. The request has no impact on Reactor Plant systems or components.

5.14.5.3 Categories. Actionable SPARs fall into one of four categories: Emergency, Urgent, Routine, and Date Needed By. Informational SPARs typically do not require a response. Emergency, Urgent, Routine and Date Needed By SPARs require an approved response delivered to the originator as follows:

- a. Routine – within 20 business days.
- b. Urgent – within 5 business days.
- c. Emergency – within 1 business day (24 hours).
- d. Date Needed by: Date specified by the originating activity to support upcoming evolutions or ship's schedule.

5.14.5.4 Coordination. Once a CVN SPAR response is developed, it is subsequently forwarded to NAVSEA 05V for approval. NAVSEA 05V1 coordinates the review and approval process for the various NAVSEA agencies. Any NAVSEA comments to the SPAR response are communicated directly to the responding activity during the approval process and then adjudicated. The approved SPAR response is returned to PPEA, who distributes the response to the ships and appropriate activities. The PPEA provides record retention services for all SPAR responses.

5.14.5.5 Routing. In addition to preparing SPAR responses, the PPEA is tasked as the Process Manager for both the SPAR and SPLI Programs. This involves dispositioning SPARs received, routing to the appropriate activity for resolution, routing of responses to NAVSEA for approval and distribution of approved responses to the requestor and other activities as appropriate.

5.14.5.6 Status. The EFORMS application maintains the status of all SPARs. This application includes the date the SPAR was received, the date the responding activity approved the response, the date the SPAR response was sent to NAVSEA, the current responsible party and current routing status. Reports listing all outstanding and completed SPARs for a desired time period can be retrieved from the application via the search engine function.

5.14.5.7 Software. Naval Sea Logistics Center is responsible for maintaining the EFORMS application that tracks SPAR status from receipt to completion, maintaining a historical file of completed SPARs, and having the ability to provide CET and PPEA management with meaningful statistics on SPAR processing.

5.14.5.8 Process Map. The PPEA SPAR Process Map is shown in detail in Figure 5-16 of this chapter.

5.14.6 Steam Plant Liaison Inquiry – Non-Nuclear Cognizant Areas. SPLIs are the Steam Plant equivalent of an NLI. SPLIs are used by the CET to request information, disseminate technical information associated with the Steam Plant, or direct work that does not require a drawing change or affect system configuration control, to the Fleet and overhaul activities. This document is intended to be a data collection tool only, and in general will not direct Forces Afloat to accomplish any repair, modification, or alteration to systems or components. Following NAVSEA approval, a SPLI is issued to the

applicable TYCOM(s), who will forward the request to the appropriate ships via official letter. Each activity shall maintain an auditable file, containing all information associated with each incoming and outgoing (answered) inquiry. A SPLI may be necessary to obtain specific data and other information from Forces Afloat during development of SPAR responses and other CET products.

5.14.6.1 Process Manager. In addition to preparing SPLI's, the PPEA is tasked as the Process Manager for both the SPAR and SPLI Programs. Additionally, the PPEA is responsible for maintaining an SPLI log book/database and providing a historical file of completed SPLIs.

- a. The PPEA is responsible for keeping track of SPLIs in routing for concurrence, SPLIs issued to the fleet for accomplishment and ensuring the log book is updated as SPLIs are completed.
- b. The PPEA will route a copy of all SPLI responses received to the SPLI originator and other parties as applicable. If a SPLI request has exceeded the requested due date without the required response, the applicable CET representative shall contact the TYCOM to establish a revised due date. The final status of an SPLI shall be noted in the SPLI log book/database.
- c. The status of outstanding SPLIs will be reported monthly. The activity's report will be maintained by the PPEA SPAR/SPLI Process Manager and will list only those SPLIs which require a response.

5.14.6.2 Amplifying Information. Amplifying information is provided in the NLI/SPLI Process Map (Figure 5-17 of this chapter).

5.14.7 Reactor Plant Configuration Change Report. RPCCRs (Figure 5-16) are used to report any and all changes to the configuration of any NAVSEA 08 cognizant space. This includes SHIPALTs, Ship Class Drawings, NLIs or any other form of authorized change. Addresses can be found in reference (d) or obtained through the TYCOM as needed.

- a. Formal instructions for completion of RPCCRs is found in Appendix 11 of reference (d). Blocks 1 – 30 (31 if needed) must be filled out in accordance with the instructions found in Appendix 11.
- b. Commanding Officers are directed to forward RPCCR(s) to NAVSEA 08 by official letter, similar to the sample in Appendix G of this chapter, using ship's letterhead with copies to the TYCOM, ANSTR Pittsburgh and A4W/A1G RPPY.

5.14.8 Preventive Maintenance System Feedback Reports. The PMS Feedback Reports (PMS FBR) (OPNAV form 4790.7B) of reference (z) is used specifically to notify the Naval Sea Logistics Center (NAVSEALOGCEN) of matters related to PMS. Instructions for preparation and submission of the form are also located in reference (z). The PMS FBR and TFBR Process Map is shown in Figure 5-18 of this chapter.

- a. While the FBR will provide initial PMS coverage and changes, submission of an OPNAV 4790/CK form is required to report configuration changes and changes in logistic support.
- b. Automated forms for FBR submission may be transmitted electronically using:
  - (1) SKED Feedback Report Wizard (preferred).
  - (2) Fleet Technical Support Center website.
  - (3) Anchor Desk website.

5.14.8.1 Feedback Report Types. There are three types of FBRs: Category A, Category B, and Urgent.

- a. Category A - non-technical in nature and intended to meet PMS needs which do not require technical review, including changes in Work Centers. Category A FBRs are submitted to request classified or other PMS documentation, which cannot be obtained locally.

- b. Category B - technical in nature and are used to report technical discrepancies inhibiting PMS performance or shift of maintenance responsibilities.
- c. Urgent – reason for submission involves safety of personnel, ship or potential for damage to equipment and relates to the technical requirements of PMS. Urgent FBRs will be forwarded by naval message, containing a PMS Feedback Serial Number, to **NAVSEALOGCEN** with info to the cognizant System Command, Bureau of Medicine and Surgery, Naval Safety Center and TYCOM. The message shall describe the unsafe procedures or conditions and identify the specific Maintenance Index Page/MRC involved.

Figure 5-16 - PPEA SPAR Process Map

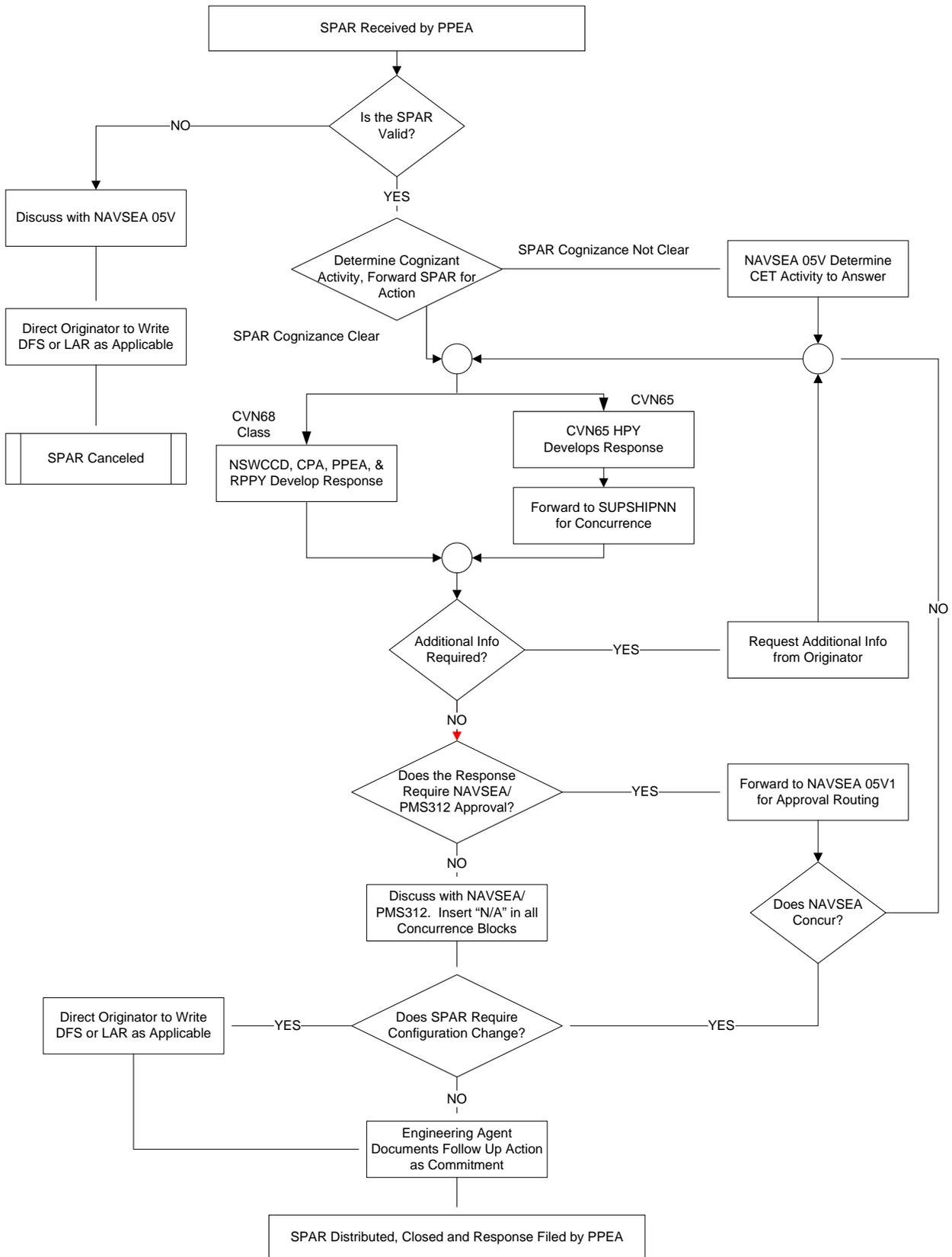


Figure 5-17 Overall NLI/SPLI Process Map

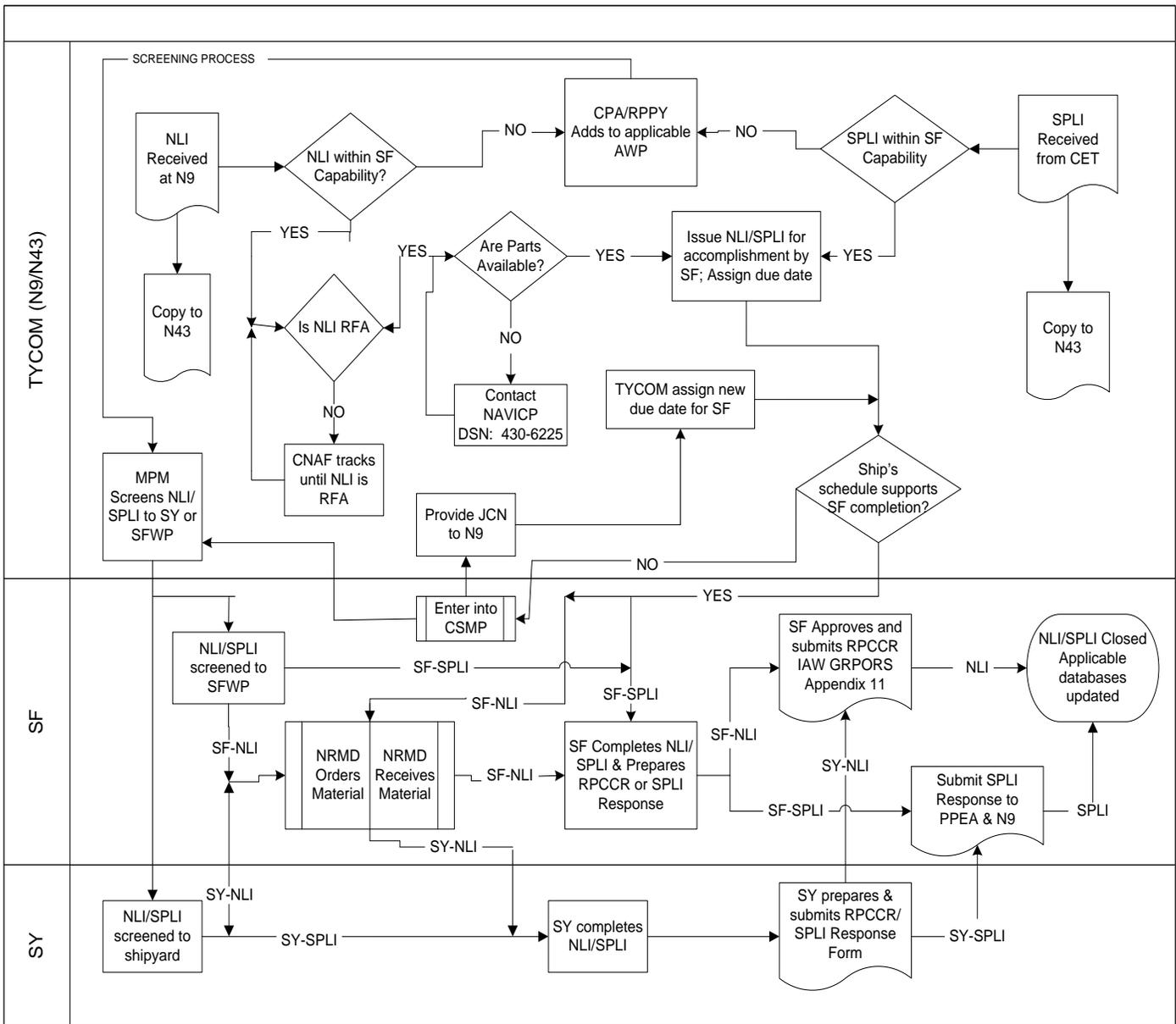
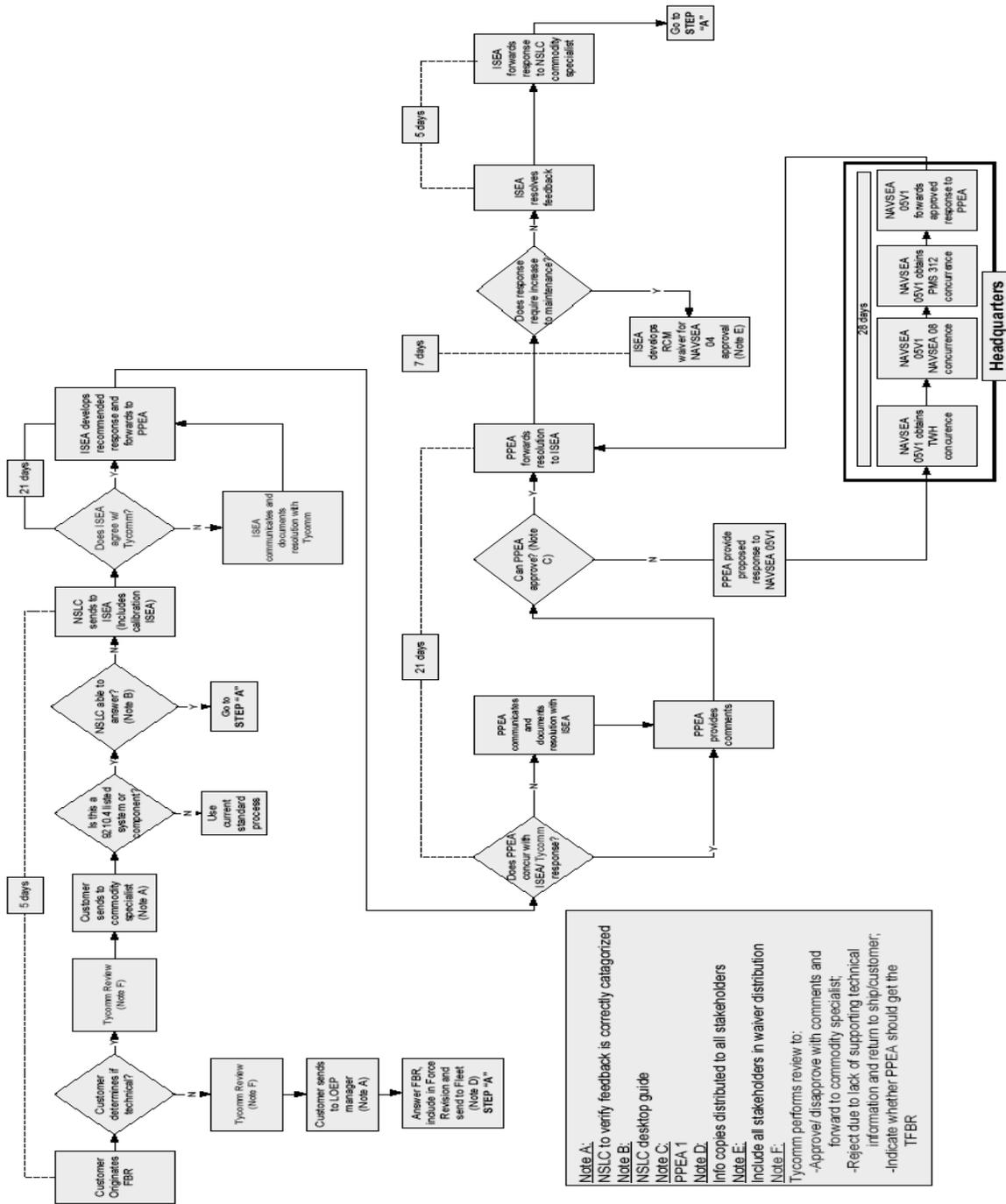


Figure 5-18 Technical Feedback Report (TFBR) Process Map



5.14.8.2 Feedback Report Screening. The ship's 3-M System Coordinator is responsible to screen all FBRs and serialize and forward within four days of receipt.

- a. The 3-M System Coordinator shall maintain accountability for all PMS FBRs submitted and actions taken until corrected PMS documentation is received.
- b. The 3-M System Coordinator shall also ensure that the originator and all applicable Work Centers are kept apprised of action taken and ensure the originating and other applicable Work Center Supervisors implement the changes or corrections when received.
  - (1) **NAVSEALOGCEN** is responsible to provide expeditious resolution to all FBR whenever possible.
  - (2) Where resolution by **NAVSEALOGCEN** is not possible, the FBR will be electronically forwarded to the cognizant Technical Review Activity for resolution.

5.14.9 Preventive Maintenance System Technical Feedback Reports. TFBRs are specifically used for reporting technical deficiencies or errors in PMS documents. Technical PMS discrepancies that could have a detrimental effect on personal safety, safety of ship or could result in significant equipment damage, are classified as "Urgent". All other TFBRs are classified as "Routine".

5.14.9.1 Preventive Maintenance System Coordinating Activities. The central control points for processing TFBRs are the Preventive Maintenance System Coordinating Activities (PMS CAs). Depending on the type and level of technical authority necessary to answer the TFBR, PMS CAs will either respond to the originator with a resolution, or forward the TFBR to the appropriate NAVSEA technical authority for action.

5.14.9.2 In-Service Engineering Activities. In-Service Engineering Activities (ISEA) are those activities designated by NAVSEA as the technical experts for specific systems and/or equipment. Naval Surface Warfare Center, Carderock Division, is the ISEA for the majority of Hull, Mechanical and Electrical equipment installed on most ships, outside of Nuclear cognizant areas.

5.14.9.3 Action Activities. Design Activities, ISEAs or other activities under the direction of the NAVSEA or other System Commands holding technical authority for systems and equipment, take all appropriate action on TFBRs under their cognizance and forward the response to the PMS CAs. The PMS CAs will record the TFBR result in the system and provide the final response to the originator.

5.14.10 Urgent Technical Feedback Reports.

- a. Urgent TFBRs are those feedbacks reporting technical discrepancies that can result in personnel injury, risk to the safety of the ship or significant equipment damage.
- b. PMS CAs shall provide a message response to all Urgent TFBRs within one (1) working day of receipt. If the TFBR is forwarded to a Design Activity or ISEA for resolution, then the Design Activity or ISEA shall provide a message response to all Urgent TFBRs informing the originator of specific actions and/or required changes that will result from the TFBR evaluation within one (1) working day of receipt. This message response shall be addressed to the originator and distributed to TYCOMs. TYCOMs will forward this message to all commands that could be affected by PMS change. The Urgent TFBR response message may recommend pen and ink changes to the affected PMS requirement.
- c. PMS CAs shall distribute revised PMS documentation to all affected users within 30 calendar days from receipt, via special issue or Advance Change Notice.

5.14.11 Routine Technical Feedback Reports.

- a. PMS CAs shall perform technical review, research and provide a response to routine TFBRs where resolution does not require technical authority action.

- b. TFBRs that PMS CAs cannot resolve will be sent to the cognizant Design Activity or ISEA. The cognizant Design Activity or ISEA will provide the response to the appropriate PMS CA, describing the action taken. The PMS CAs will provide the response to the originator by electronic means.
- c. Distribution of the revised MRC to the originator and other affected users will be accomplished via the next Force Revision.
- d. NAVSEA has established a goal of providing answers to TFBRs in one day. While it is realized that some TFBRs will require more extensive research, the majority of TFBRs received can and should be answered in one day.
- e. If no revision to PMS documentation is required, pertinent comments will be provided in the response to the appropriate PMS CA. When not concurring with the feedback report, the rationale for the non-concurrence must be provided to the appropriate PMS CA.

#### 5.14.12 Technical Manual Deficiencies and Manual Change Requests.

5.14.12.1 Technical Manual Maintenance. Technical Manuals (TM) must be maintained current at all times. TMs associated with hardware must reflect current hardware configurations. Changes to hardware accordingly, must be accompanied by changes or revisions to the TMs. TMs must also be changed or revised to correct known deficiencies in the technical content in instances not related to hardware modifications.

5.14.12.2 Technical Manual Deficiency/Evaluation Report. The TMDER, NAVSEA/Space and Naval Warfare Systems Command (SPAWAR) Form 4160/1, (Appendix H of this chapter) is used to identify technical and non-technical discrepancies/deficiencies (non nuclear cognizant) in NAVSEA or SPAWAR technical manuals. It may be that a paragraph or page is missing, that measurements or troubleshooting procedures are incorrect, a safety step is omitted, instructions are unclear or that the text or illustrations are not legible. Whatever the issue, it must be corrected. The TMDER is a quick and efficient tool for reporting problems with technical manuals that are used every day.

#### 5.14.12.3 URGENT Deficiencies.

- a. URGENT deficiencies should be reported to the Naval Systems Data Support Activity (NSDSA) by priority Naval Message addressed to:
 

Commander, Naval Surface Warfare Center (NSWC PHD)  
Port Hueneme Division, Code 5E00,  
4363 Missile Way,  
Port Hueneme, CA 93043-4307
- b. Via the web at <http://nsdsa.phdnswc.navy.mil/tmder/tmder.htm> .
- c. For users with a Technical Data Management Information System (TDMIS) account, the most expedient manner of TMDER submission is via the TDMIS Web Site.
- d. Unclassified TMDERs can be submitted from the TDMIS database via the “deficiency module”. This method is strongly encouraged. Instructions for each method are detailed below.

#### 5.14.12.4 Routine Deficiencies.

- a. Routine TM documentation deficiencies and concerns are reported via the web or using a paper TMDER. The paper form should be available in the back of any ship or NAVSEA/SPAWAR system tech manual. If not, a copy should be requisitioned.
- b. Attach a copy of the TM title page and the marked-up pages (if available) to the TMDER and mail to Commander, Naval Surface Warfare Center, Port Hueneme Division at the address above or via the web at <http://nsdsa.phdnswc.navy.mil/tmder/tmder.htm>

- c. Again, TDMIS users may submit routine TMDERs via the “deficiency module” of TDMIS. Attachments may be uploaded in TDMIS.

5.14.12.5 Technical Manual Deficiency/Evaluation Report Process. TMDERs are received at NSDSA, logged into the TMDER tracking module and provided to the Technical Manual Maintenance Activity (TMMA) for review and response. The TMMA shall:

- a. Review, analyze and resolve TMDERs for all assigned TMs.
- b. Determine the accuracy and criticality of a reported deficiency.
- c. Inform the TMDER originator and update the deficiency data in the deficiency module of TDMIS: Urgent reports - 3 working days. Routine reports - 90 calendar days.
- d. Prepare or procure Field Change Bulletins, change packages and revisions or prepare changes, to correct TMDER reported deficiencies, using the Rapid Action Change process.
- e. Letters of response should include the appropriate status and shall be similar to the following:
  - (1) Your TMDER # \_\_\_\_\_ for TM # \_\_\_\_\_ has been received by this activity for action. We have determined that a change to the manual is required. A change package (or revision) is in work or work is planned to start this fiscal year. Distribution is scheduled on (Mo/Yr).
  - (2) Your TMDER # \_\_\_\_\_ for TM # \_\_\_\_\_ has been received by this activity for action. We have determined that a change to the manual is not required for the following reason(s):
  - (3) Your TMDER # \_\_\_\_\_ for TM # \_\_\_\_\_ has been received by this activity for action. We have determined that the deficiency reported will not impede the operation/maintenance of the equipment, and that it is not cost effective to prepare a change at this time. The deficiency will be considered for incorporation with the next change package or revision.
- f. Notify NSDSA and the Acquisition Manager, TMDER originator or Designated Ship Program Management Office when a TMDER for the assigned TM cannot be reviewed, resolved, or TM updated. This notification can be completed via the on-line TMDER form in the TDMIS deficiency module.

5.14.13 Fleet COSAL Feedback Report.

5.14.13.1 Usage. This report is used specifically to call attention to and seek correction of any technical deficiencies found on Allowance Parts Lists (APL)/Allowance Equipment Lists (AEL), including those covered under P-OMMS. For example:

- a. The part/item is not listed on the APL/AEL, but is considered to be a “maintenance significant item”.
- b. APL is incomplete or is missing information, such as characteristics data, technical manual number, etc.
- c. Incorrect part/item listed on APL/AEL.
- d. Allowed quantity insufficient for PMS requirements.
- e. Part number in technical manual does not agree with APL.
- f. Non-allowed part required for PMS.
- g. APL technical problem such as incorrect Minimum Replacement Unit assignment.
- h. Source, Maintenance and Recoverability Codes and Allowance Note Codes noted on APL/AEL are not defined in any publication held.

- i. Suspected error in code assignments, e.g., Source, Maintenance and Recoverability Codes, Note Codes, etc.
- j. Circuit symbol number in Electronics APL (Section B) crosses to incorrect reference number or stock number.

5.14.13.2 Misuse. This report is not to be used to:

- a. Address any matters relating to Nuclear Reactor Plant COSAL (“Q” COSAL). Matters relating to Q-COSAL should be addressed by LAR through A4W RPPY
- b. Report equipment configuration changes. Ship’s Configuration Change Form, OPNAV Form 4790/CK, is to be used for this purpose. RPCCR for nuclear cognizant systems.
- c. Request changes in allowance for repair parts or equipage. Use NAVSUP Form 1220-2, except in cases when the allowance problem is caused by technical deficiencies in the COSAL, such as incorrect Minimum Replacement Unit assignment, PMS requirement not reflected in Standard Navy Stock List/Installation Sequence List etc. See reference (aa) for further details concerning this form.

5.14.13.3 Form Location. The Fleet COSAL Feedback Report form (Appendix I of this chapter) can be found at [www.anchordesk.navy.mil](http://www.anchordesk.navy.mil) under the fleet support section. Distribution of the form should be as follows:

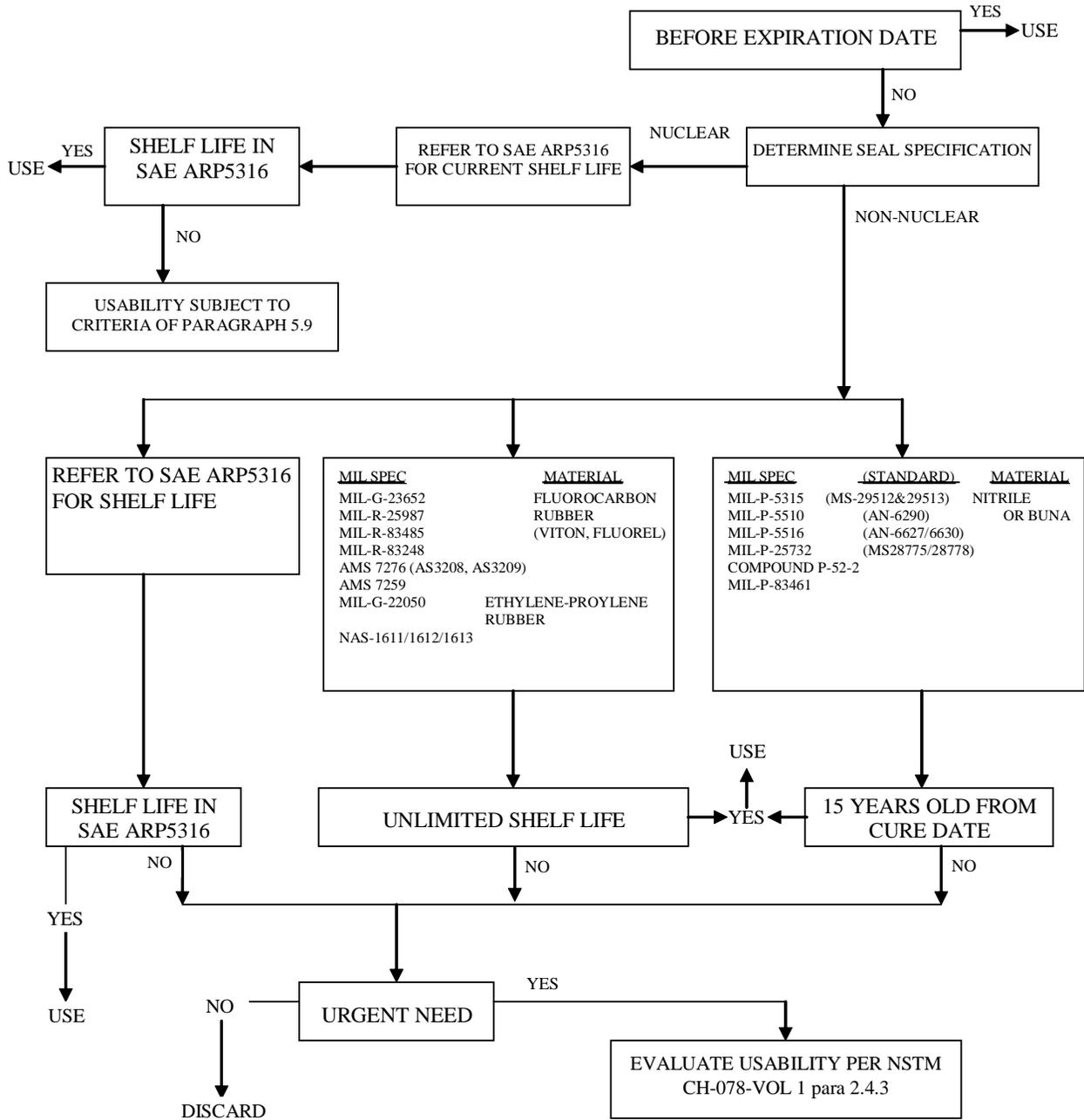
- a. Original to NAVSEALOGCEN Code N42.
- b. Copy to Ship’s Supply Officer.
- c. Copy retained by Originator.

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**APPENDIX A**

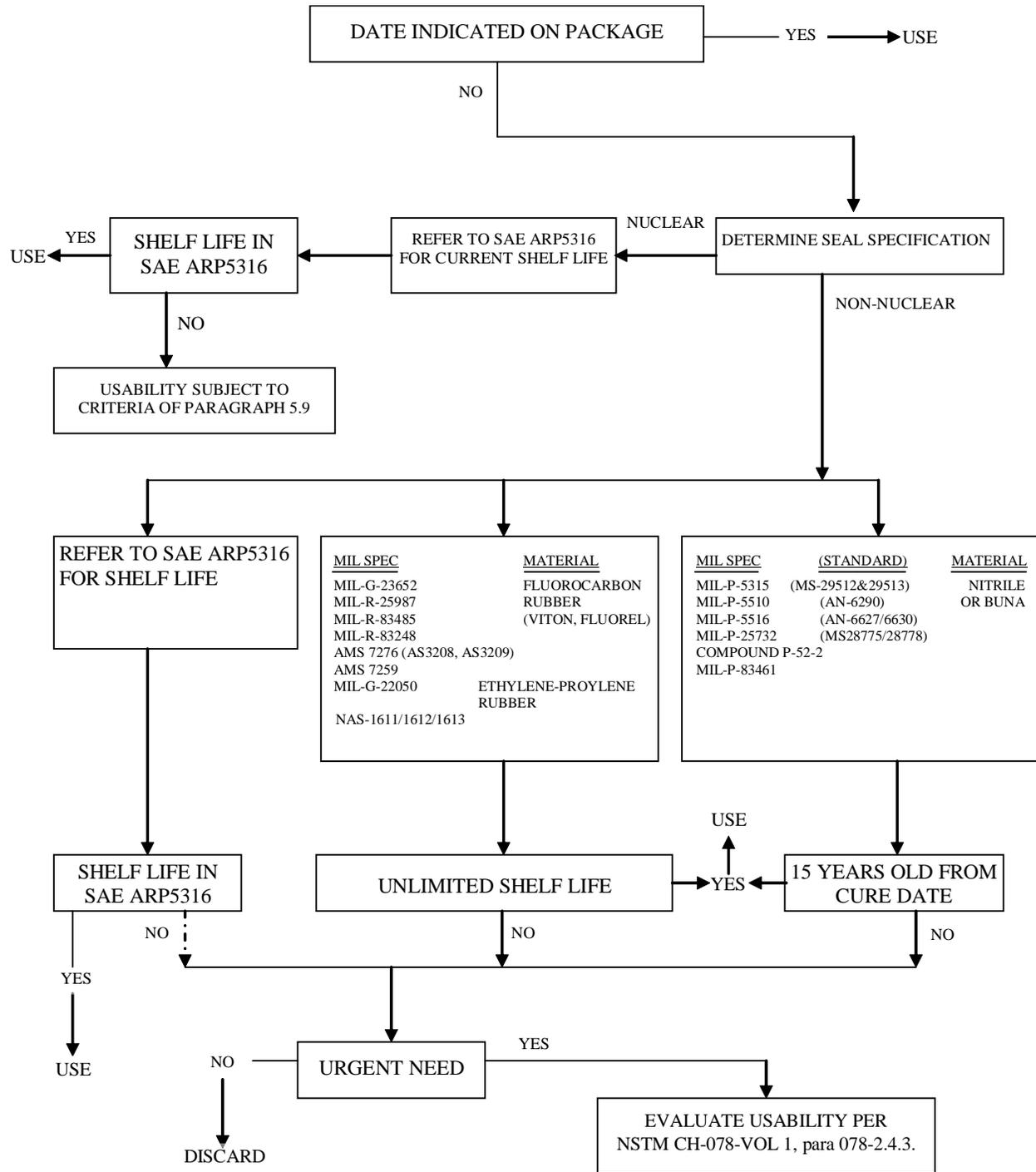
**DETERMINING SOFTWARE USABILITY**

**EXPIRATION DATE ON PACKAGE  
(SHELF LIFE MANAGED)**



**REFERENCES: NAVSEA S9086-CM-STM-010/CH78  
NAVSEA 0989-037-2000**

**"USE BEFORE" DATE ON PACKAGE**



**REFERENCES: NAVSEA S9086-CM-STM-010/CH78  
NAVSEA 0989-037-2000**

**APPENDIX B**

**FORMAT FOR SUBMARINE CERTIFICATION CONTINUITY REPORT**

From: USS (Ship's Name)  
 To: ISIC \_\_\_\_\_ (Note 1) Deployed ISIC (If applicable)  
 Info: Parent ISIC (Applicable in all cases when deployed)  
 Additional Addrees (Note 2)

Subj: CERTIFICATION CONTINUITY

Ref: (a) COMUSFLTFORCOMINST 4790.3 - Joint Fleet Maintenance Manual, Volume V  
 (b) NAVSEA 0924-LP-062-0010 - Submarine Safety (SUBSAFE) Requirements Manual  
 (c) NAVSEA T9044-AD-MAN-010 - Requirements Manual for Submarine Fly-By-Wire Ship Control Systems

1. In accordance with reference (a) and (b), all work performed within the SUBSAFE Boundary has been completed and satisfactorily retested except as noted in paragraph 2 below. There are no outstanding RECs for equipment/systems required for underway operations.
2. The following Controlled Work Packages/RECs were closed by transferring the remaining at-sea testing to a Departure from Specifications.

<u>CWP/REC Serial No.</u>	<u>DFS Serial No.</u>	<u>Type</u>	<u>Component</u>
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3. All URO MRC mandatory tests/inspections have been successfully accomplished within the required periodicity. The following URO MRC requirements which have become due since the last underway period or which would have become due during this scheduled at-sea period have been completed during the preceding inport period as indicated or require at-sea operations and will be accomplished prior to the listed due date:

<u>URO MRC</u>	<u>Component Ident</u>	<u>Next Due (MO/YR)</u>
----------------	------------------------	-------------------------

4. The URO MRC Automated Work Requests for Ship's Force accomplished items have been signed, the data report forms have been mailed, and copies have been provided to the ISIC.

5. In accordance with reference (a) and (c), all work performed within the Submarine Fly-By-Wire Ship Control System Boundary has been completed and satisfactorily retested. There are no outstanding MCRs for equipment/systems required for underway operations.

NOTE 1: THIS CERTIFICATION REPORT MAY BE PROVIDED TO THE ISIC IN THE FORM OF A MEMORANDUM, MESSAGE, OR LETTER.

NOTE 2: ADDITIONAL ADDEES SHOULD BE ADDED AS NECESSARY BASED ON SITUATION (E.G., REPORT FOR UNDERWAY TRIALS DURING MAJOR INDUSTRIAL AVAILABILITIES WOULD NORMALLY INCLUDE SHIPYARD, NAVSEA AND TYCOM).

NOTE 3: IF NONE WAS ENTERED IN PARAGRAPH 3 THEN PARAGRAPH 4 IS NOT REQUIRED. PARAGRAPH 4 IS ONLY REQUIRED IF URO MRC ITEMS WERE COMPLETED BY SHIP'S FORCE.

NOTE 4: IF NO WORK ON THE SUBMARINE FLY-BY-WIRE SHIP CONTROL SYSTEM WAS PERFORMED, PARAGRAPH 5 IS NOT REQUIRED. PARAGRAPH 5 IS ONLY REQUIRED IF WORK ON THE SUBMARINE FLY-BY-WIRE SHIP CONTROL SYSTEM WAS PERFORMED.

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**APPENDIX C**

**FORMAT FOR FLEET MAINTENANCE ACTIVITY CERTIFICATION REPORT TO TENDED SUBMARINE**

Ser

From: Commanding Officer, (FMA)  
 To: Commanding Officer, (Tended Submarine)

Subj: CERTIFICATION CONTINUITY OF USS (Tended Submarine)

Ref: (a) COMUSFLTFORCOMINST 4790.3 - Joint Fleet Maintenance Manual, Volume V  
 (b) NAVSEA 0924-LP-062-0010 - Submarine Safety (SUBSAFE) Requirements Manual  
 (c) NAVSEA T9044-AD-MAN-010 - Requirements Manual for Submarine Fly-By-Wire Ship Control Systems

Encl: (1) Copies of completed Re-entry Controls (REC)  
 (2) Copies of approved Departures from Specification (DFS) and Liaison Action Requests (LAR)  
 (3) Copies of completed MCRs for Submarine Fly-By-Wire Ship Control System

1. In accordance with reference (a), (b) and (c), certification of those SUBSAFE/Fly-By-Wire Ship Control Systems or portions of SUBSAFE/Fly-By-Wire Ship Control Systems, on which the FMA performed maintenance, has been sustained by the FMA. All required re-certification of the maintenance has been completed except as noted in paragraphs 2 and 3 below.

2. All CWPs for SUBSAFE/Fly-By-Wire Ship Control Systems opened by the FMA for maintenance have been closed and a copy of each completed REC/MCR is forwarded as enclosures (1) and (3) respectfully:

<u>CWP Serial No.</u>	<u>Task Description</u>	<u>Reason Deferred</u>
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3. The following Departures from Specifications (DFS) and Liaison Action Requests (LAR) for deviations from specification were approved as part of FMA maintenance in the SUBSAFE/Fly-By-Wire Ship Control System boundary. Copies of each are provided as enclosure (2):

<u>CWP Serial No.</u>	<u>DFS or LAR Serial No.</u>	<u>Type</u>	<u>Component</u>
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4. The following URO maintenance requirements were satisfied and are reported as complete by the FMA. The original data report forms will be mailed to SUBMEPP with copies to your ISIC within 30 days.

<u>URO MRC</u>	<u>EGL (if applicable)</u>	<u>Component Identification</u>	<u>JCN</u>
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Copy to:  
 Parent ISIC for ship  
 Parent ISIC for FMA

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**APPENDIX D**

**FORMAT FOR NON-FLEET MAINTENANCE ACTIVITY CERTIFICATION REPORT TO TENDED SUBMARINE**

From: Commander, <Activity Name>  
 To: Commanding Officer, <USS Ship Name and Hull Number> Commander <Squadron Number>  
 Subj: CERTIFICATION CONTINUITY OF USS <Ship Name and Hull Number>, <Availability Number>  
 Ref: (a) NAVSEA 0924-062-0010 <Insert Rev>, Submarine Safety (SUBSAFE) Requirements Manual  
 (b) SS800-AG-MAN-010/P-9290 <Insert Rev> - System Certification Procedures and Criteria Manual for Deep Submergences Systems (DSS)  
 (c) NAVSEA T9044-AD-MAN-010 <Insert Rev>, Requirements Manual for Submarine Fly-By-Wire Ship Control System (FBW SCS)  
 (d) COMUSFLTFORCOMINST 4790.3 <Insert Rev>, Joint Fleet Maintenance Manual  
 Encl: (1) List of Closed Re-Entry Controls <optional>  
 (2) List of Approved Departure From Specification (DFS) <optional>  
 (3) List of Scheduled URO-MRCs/HIPs Accomplished by the Activity <optional>

1. In accordance with references (a), (b), (c) and (d), certification of SUBSAFE/DSS/FBW SCS systems on which <Activity Name> performed maintenance has been sustained. All required recertification of the maintenance has been completed as noted in paragraphs 2 through 6 below.

2. All REC/MCRs for SUBSAFE/DSS/FBW SCS (SFCC) systems opened by <Activity Name> for maintenance have been closed as noted below:

<u>REC/MCR Serial No</u>	<u>Task Description</u>
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<See enclosure (1) if needed>

3. The following Departures From Specifications (DFSs) for SUBSAFE/DSS/FBW SCS (SFCC) systems were approved as part of <Insert Activity Name> maintenance:

<u>DFS Serial No.</u>	<u>Type</u>	<u>Component</u>
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<See enclosure (2) Part A if needed>

4. In addition to the DFSs listed above, the following DFSs were generated for work accomplished by <Activity Name> for the purpose of testing at Sea. If at sea testing is required, request Ship's Force report via naval message and inform <Maintenance Activity> of the results of at sea testing.

<u>DFS Serial No.</u>	<u>Type</u>	<u>Component</u>
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<See enclosure (2) Part B if needed>

5. The following Scheduled URO-MRCs/HIPs were completed. URO-MRC/HIP data will be forwarded by <Activity Name> to SUBMEPP:

<u>URO-MRC/HIPs</u>	<u>EGL (if applicable)</u>	<u>Component ID</u>	<u>JCN</u>
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<See enclosure (3) if needed>

6. <Note: This paragraph is only applicable to those activities acting as a NSA/LMA> In accordance with reference (d) <Activity Name>, as Naval Supervisory Activity, reports that certification of SUBSAFE/DSS/FBW SCS systems for work accomplished by outside activities has been maintained based on the SUBSAFE/DSS/FBW SCS Certification Continuity letters as identified below:

<u>Supervising Activity</u>	<u>Letter Ser No./Naval Message</u>	<u>Description</u>	<u>ALT</u>
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SY Commander

Copy to:  
COMSUBRON XXX <Assigned Squadron>  
NSSC QAO or RSG QAO <as applicable>  
NSRO <Shipyards performing work>  
NRRO <Shipyards performing work>

## APPENDIX B

## TESTING REQUIREMENTS FOR SUBMARINE SYSTEMS

<b>System</b>	<b>Column 1</b>	<b>Column 2</b>	<b>Special Notes</b>
<b>Note 1</b>	<b>Strength and Porosity Test Pressure</b>	<b>Mechanical Joint Tightness Test Pressure</b>	
	<b>Notes 2, 3 and 4</b>	<b>Notes 3, 4 and 5</b>	
Steam	135% system design pressure	100% nominal operating pressure	
Non-Nuclear structural tanks			Notes 13 and 18
Feed and condensate	135% system design pressure	100% nominal operating pressure	
Fuel oil service	135% system design pressure	100% nominal operating pressure	
Lube oil fill, transfer, and service	135% system design pressure	100% nominal operating pressure	Note 3
Oxygen (except surface ship divers' life support systems)	135% system design pressure	100% nominal operating pressure	Notes 10, 11 and 12
Nitrogen	135% system design pressure	100% nominal operating pressure	Note 11
Fresh water cooling, chilled water, potable water	135% system design pressure	100% nominal operating pressure	
Fuel oil filling and transfer	135% system design pressure (135% test depth pressure for those portions of submarine systems exposed to submergence pressure)	100% nominal operating pressure (100% test depth pressure for those portions of submarine systems exposed to submergence pressure)	
Compressed air including EMBT blow (except surface ship divers' life support systems, bleed air, and starting air)	135% system design pressure	100% nominal operating pressure. For submarines, this is up to the pressure hull cutout valve if the airline penetrates the pressure hull	Notes 6, 8 and 24
Hydraulic (e.g., ship service, steering and diving, windlass, flood control)	135% system design pressure	100% nominal operating pressure	Notes 3, 23 and 24
Hull glands, cables, shafts, masts			Notes 13, 25, 26 and 29
Escape trunks, hatches (including missile tube muzzle hatches on SSBN/SSGN Class Submarines), watertight bulkhead doors, Sonar Spheres			Notes 14, 21, 27, 28, 29, 32 and 33
Periscopes			Note 16

<b>System Note 1</b>	<b>Column 1 Strength and Porosity Test Pressure Notes 2, 3 and 4</b>	<b>Column 2 Mechanical Joint Tightness Test Pressure Notes 3, 4 and 5</b>	<b>Special Notes</b>
Antennas		In accordance with NAVSEA 0900-LP-016-7007 and SS-404-1971420	Note 31
Diesel Sea Water (DSW)			Notes 6 and 9
Hydrogen	135% design pressure	100% nominal operating pressure	Note 11
Hovering/depth control, sea water circulating (e.g., ASW, MSW, Air Conditioning Seawater)	150% test depth plus pump shutoff pressure	100% test depth pressure	Notes 6, 7, 24, and 30
Plumbing system subjected to submergence pressure	150% test depth	100% test depth pressure	Note 6
Trim and drain systems subjected to submergence pressure	150% test depth pressure	100% test depth pressure	Notes 6, 7 and 24
Torpedo tube system, including the entire SUBSAFE portion of the system	100% test depth pressure plus 90 psig	100% test depth pressure plus 90 psig	Notes 17 and 24
Signal ejectors			Notes 20, 24 and 32
SSBN/SSGN bulkhead penetrator holes/covers			Note 22
Snorkel induction and exhaust lines			Notes 15 and 32
Cable plugs to EHF's, EHP's, antennas, masts, radars and other component connection/joint exposed to submergence sea pressure (excluding shore power connectors and pressure proof caps used on EHF's and EHP's)			Note 31

NOTE 1: Testing requirements for submarine ship piping and for submarine pressure hull envelope systems and components not specified above will be 135% of system design pressure (150% of nominal operating pressure) where repairs meet the criteria of a major repair.

NOTE 2: Strength and porosity test - Where a major repair is accomplished on the pressure boundary of a piping system or component, that portion of the system or component will be pressure tested as indicated in the applicable TPD. The strength and porosity test pressure is identified on a TPD as the "H" pressure. In the absence of specific test pressure direction on a TPD, test pressure shall be per Note 1. Strength and porosity test duration is 30 minutes unless otherwise specified in a technical reference.

- a. Strength and porosity test pressure shall be not less than 50 psig unless otherwise specified in the TPD.
- b. New mechanical joints (as defined in the Glossary of Terms) are subjected to a strength and porosity test.

NOTE 3: Test fluid.

## c. Air Hose Test Method.

- (1) An air hose test may be used to verify the tightness of piping or electrical penetrations directly accessible on both sides of the bulkhead or pressure hull for observation. Extreme caution will be used when this method is used to test periscopes, hydraulic control rods or other movable cylinders that penetrate bulkheads or the pressure hull due to the possibility of blowing abrasive material into the seals. Also, ensure that openings exist to prevent ambient pressure buildup.
- (2) Air hose tests will be performed as follows:
  - (a) The air hose nozzle shall be about 3/8 inch in diameter and the pressure at the nozzle shall be about 90 psig.
  - (b) Apply a soapy solution to the structure on the side opposite from the side the stream of air is to be applied.

**WARNING: HIGH VELOCITY AIR IS A PERSONNEL HAZARD. ALL NON-ESSENTIAL PERSONNEL WILL BE CLEARED FROM THE AREA BEING TESTED. SAFETY GLASSES WILL BE WORN AT ALL TIMES. CARE MUST BE TAKEN SO THAT THE AIR STREAM IS NOT DIRECTED TOWARD ANY PERSONNEL.**

- (c) The air hose shall be located so as to produce a pressure differential in the same direction as would occur if a full compartment or tank test were performed. Hold the nozzle as close as possible to the joint/fitting under test and direct the air stream in the manner most likely to reveal leakage.
  - (d) Inspect the soapy solution for the formation of bubbles during the test, which would indicate leakage.
  - (e) Acceptance criteria for air hose tests will be no evidence of leakage.
- d. Pressurized Water Testing Method for Submarine Main Propulsion Shaft Primary Seals (Shaft Seal Cavity Testing in advance of Controlled Deep Dive).
- (1) Conduct pressurized water testing of the shaft seal cavity following assembly of any seal repaired in accordance with applicable tech manual or maintenance standard.
  - (2) If no pressurized water test procedure is available,
    - (a) Pressurize the repaired shaft seal cavity with fresh water to 100 (95 to 105) psig.
    - (b) Measure leakage rate past the affected seal into the ship. Allowable leakage is 16 oz/minute maximum. Test pressure must be held for 30 minutes minimum.

NOTE 26: For steering and diving penetrations (and other hull V-Ring packing installations including associated o-rings), perform a controlled assembly and initiate a minor DFS to document the requirement for inspections during a controlled dive to test depth in order to verify re-establishment of the watertight integrity for those joints.

NOTE 27: Removable Logistics Escape Trunks and Logistics Plug Trunks require an inter seal tightness test and a controlled dive to test depth. The inter seal tightness test will be accomplished using air or nitrogen to 100% test depth pressure with no pressure drop allowed in 10 minutes. In addition, immediately following the first controlled dive to test depth, enter the trunk and remove the cleanliness cap from the

drain/test connection and verify no leakage has occurred. A minor DFS will be used to document the requirement to inspect for leakage immediately following the dive to verify re-establishment of the watertight integrity for the reinstalled trunk.

NOTE 28: The Sonar Sphere requires a completion test and a controlled dive to test depth. The completion test is a 12 psig air test with no pressure drop allowed in 10 minutes. If unable to accomplish the completion test, perform an alternate test per note 25 of this Appendix. In addition, immediately following the first controlled dive to test depth, enter the sonar sphere and inspect for evidence of leakage. A minor DFS will be used to document the requirement to inspect for leakage immediately following the dive to verify re-establishment of the watertight integrity.

NOTE 29: Electrical/electronic hull fitting pressure proof caps manufactured in accordance with MIL-C-24231/12, 13 or 14 are not Level I or boundaries within the Subsafe Systems and do not require REC or testing when installed or operated.

NOTE 30: For preventative maintenance (e.g., PMS) to inspect and replace seawater heat exchanger pencil and disc type zinc anodes closed with an o-ring threaded plug with a nominal diameter of 1-5/8" or less (outside of a major availability) accomplished without additional testing, the following conditions must be met:

- a. Work will be performed using a CWP **within the SUBSAFE boundary and a Formal Work Package when performing work outside the SUBSAFE boundary.**
- b. The joint will be assembled as a controlled assembly and documented on QA form 34.
- c. Complete a surfaced condition maximum operating pressure test with zero leakage for 5 minutes. Operate seawater pumps at maximum speed without causing cavitations or violating operating procedure restrictions.
- d. List "SURFACED" as the actual pressure on QA forms.
- e. **No new pressure boundary parts are installed (excluding software).**

**CAUTION: APPLYING POWER TO ANTENNA CONTROL CABLES OR TRANSMITTING ON RADIO FREQUENCY CABLES THAT HAVE NOT HAD THE ELECTRICAL CHECKS COMPLETED CAN SIGNIFICANTLY DAMAGE EQUIPMENT/COMPONENTS. IF THE APPROPRIATE ELECTRICAL CHECKS CANNOT BE COMPLETED, CONSIDERATION OF AN EQUIPMENT TAG-OUT MAY BE APPROPRIATE.**

NOTE 31: Submarine outboard cable removal and replacement.

- a. Insert plugs with new O-ring each time the cable is unplugged from the EHP or EHF and assemble using a controlled assembly. The QA form 34 is required to be retained until the availability is complete or if accomplished outside of an availability, the QA form 34 will be retained until the package is closed and reviewed by the Quality Assurance Officer.
- b. After performing the deep dive, passive/pre-energize testing shall be performed in accordance with the system specific Technical Manuals or Maintenance Index Pages/Maintenance Requirement Cards to ensure the system is not grounded when required.
- c. Controlled Assembly Process used for Re-Entry Control (REC) Exceptions or Exceptions to Retest Requirements for Mechanical Joints and consists of:
  - (1) Verification that surface finishes of gasket/O-ring sealing surfaces are in accordance with applicable specifications.

- (2) Verification that fastener material and installation is in accordance with applicable specifications.
- (3) Verification that gaskets/O-rings are properly installed and in accordance with applicable specifications.
- (4) Assembly is documented on a Quality Assurance (QA) form 34.
- (5) Inspected by a Quality Assurance Inspector (QAI) or Quality Assurance Supervisor (QAS).

NOTE 32: A partial salvage inspection shall be accomplished in accordance with Volume IV, Chapter 18 of this manual for any item worked during an availability (i.e., hatches, salvage air valves, etc.).

NOTE 33: Repairs of escape trunk/Lock Out Chamber hatches within the certified Scope of Certification boundary require an 89 psig completion test. Minor repairs, in addition to an 89 psi completion test, require a minor DFS for a controlled dive to test depth to certify structural watertight integrity. Major repairs require a hydrostatic test at “H” pressure or an 89 psi completion test and a major DFS to perform a controlled dive to test depth to certify structural watertight integrity. Hydrostatic testing at “H” pressure satisfies all mechanical joint testing requirements for minor repairs.

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- (5) Reactor Plant Drawings.
- (6) NAVSEA instructions.
- (7) TYCOM instructions.
- (8) Reference (c).
- (9) Reference (d).

8.2 DEPARTURE FROM SPECIFICATION. A DFS (non-nuclear only) is a lack of compliance with any authoritative document, plan, procedure, instruction, etc. General guidance regarding DFS is as follows:

NOTE: FOR SURFACE **FORCE** SHIPS AND AIRCRAFT CARRIERS, THE TYCOM WILL PERFORM THE IMMEDIATE SUPERIOR IN COMMAND (ISIC) FUNCTIONS OF THIS CHAPTER.

- a. During a maintenance action, **including temporary repairs**, a DFS is required for lack of compliance with cognizant documents, drawings, etc. For "as found" conditions during maintenance, the ISIC, ship and Fleet Maintenance Activity (FMA) (if involved) must evaluate the non-compliance using the guidance of paragraph 8.2.4 and 8.2.5 of this chapter.
- b. For "as found" conditions or equipment failures during operations that result in non-compliance with cognizant documents, drawings, etc., the ship and/or ISIC (if in port) must evaluate the condition or failure using the guidance of paragraph 8.2.4 and 8.2.5 of this chapter to determine if the non-conforming condition meets the criteria as a Major DFS. **Non-conformances meeting the criteria as a major DFS shall be submitted to the ISIC for adjudication when in a port with a FMA and shall be approved by the Commanding Officer if at sea or in a port without an FMA. If the non-conformance is determined to be minor**, no DFS is required and the non-conforming condition will be entered in the ship's Current Ship's Maintenance Project (CSMP). If at sea, the guidance of paragraph 8.3.8 of this chapter will be followed.

8.2.1 Reporting Departures from Specification. It is incumbent upon ships, FMAs, and ISICs to discuss potential DFS as early as possible (prior to the work close out or component assembly if possible) to determine direction of actions, and alternatives to the DFS. Every effort must be made to correct each deficiency prior to equipment/system operation or underway of the ship. If a DFS has to be submitted, the request for it must be processed as soon as possible to enable a technical evaluation of the DFS request and final adjudication from the TYCOM.

8.2.2 Types of Departures from Specification. A DFS is classified as either Major or Minor depending on its significance. Major DFS are described in paragraph 8.2.4 of this chapter. Minor DFS are described in paragraph 8.2.5 of this chapter. Care must be exercised in evaluating and determining the type of DFS. All submarine DFS must be approved prior to ship's underway for submerged operations.

8.2.3 Permanent and Temporary Approval of Departure from Specification. DFSs are approved as either permanent or temporary depending on the nature of the non-compliance and technical determination of whether the condition needs to be repaired.

- a. A temporary DFS requires subsequent action to correct the non-compliance and is approved with specific direction regarding duration and actions necessary to clear. A Major DFS accepting a temporary repair or condition is approved by the TYCOM following concurrence by an Authorized Technical Authority. A Minor DFS accepting a temporary repair will be approved by the TYCOM or ISIC as specified in paragraph 8.2.5 of this chapter.
- b. Temporary deviation/waivers initiated by the Authorized Technical Authority per reference (a) require TYCOM concurrence prior to approval.

- c. A permanent DFS requires no additional repair effort and is approved by NAVSEA. Technical Authority within NAVSEA for approval of a permanent DFS is specified in reference (a). As an exception, a permanent DFS may be approved only by the TYCOM or ISIC as specifically allowed in paragraph 8.2.5.a. of this chapter when previously approved precedent setting documentation that directly applies to the DFS exists. The specific NAVSEA precedent must be referenced in the DFS approval.

NOTE: PARAGRAPH 8.2.4 OF THIS CHAPTER DOES NOT APPLY TO THE CATEGORY OF DFSs FOR CRANES COVERED UNDER REFERENCE (e). REFERENCE (e) LISTS THE CATEGORY REQUIREMENTS AND LEVEL OF APPROVAL FOR CRANE RELATED DFSs.

NOTE: AN OUT-OF SPECIFICATION PARAMETER IN A SUBMARINE FLY-BY-WIRE SHIP CONTROL SYSTEM FUNCTION MEASURED BY URO/MRC 019 IS ALSO CONSIDERED A MAJOR NON-CONFORMANCE WHETHER OR NOT THE URO/MRC IS DUE FOR ACCOMPLISHMENT. URO MRC 019 PROVIDES THE REQUIREMENTS FOR PROCESSING URO MRC RELATED NON-CONFORMANCES.

NOTE: THE BELOW LISTING IS NOT ALL INCLUSIVE AND SITUATIONS MAY ARISE WHERE DEFICIENCIES NOT LISTED MAY BE OF SUCH A NATURE TO WARRANT A MAJOR DFS. FOR EACH DEFICIENCY DETERMINED TO DIRECTLY INVOLVE SAFETY OF SHIP, SAFETY OF PERSONNEL, OR CAUSE A REDUCTION IN THE INTEGRITY OR OPERABILITY OF EQUIPMENT ESSENTIAL TO SHIP'S MISSION, A MAJOR DFS SHALL BE ISSUED.

8.2.4 Major Departure from Specification. A major DFS is one that affects (a) performance; (b) durability; (c) reliability or maintainability; (d) interchangeability; (e) effective use or operation; (f) weight or appearance (where a factor); (g) health or safety; (h) system design parameters such as schematics, flow, pressures, or temperatures; or (i) compartment arrangements or assigned function. The following list identifies some deficient conditions which require a major DFS:

NOTE: IN SOME INSTANCES, THESE MAJOR DEPARTURES MAY SUBSEQUENTLY BE RECATEGORIZED BY THE LOCAL TECHNICAL AUTHORITY FROM MAJOR TO A MINOR IN ACCORDANCE WITH REFERENCE (a).

- a. Use of unapproved joint design or additional joints.
- b. Non-conformances to plan specifications that result in a change in configuration. Examples are:
  - (1) Non-conformances to plan specifications resulting in a change in configuration or dimensions to pressure boundary parts or components. Examples would be "as found" dimensional or clearance differences from plan requirements for a Submarine Safety (SUBSAFE) valve bonnet and no authorization (e.g., Ship Alteration, Alteration and Improvement, Engineering Change Notice or NAVSEA letter) is available.
  - (2) Non-conformances to plan specification resulting in a change in configuration considered to be a permanent repair to pressure boundary parts. An example would be replacement of a failed valve of older design with one of more recent design because valves of the older design are no longer available and no authorization (e.g., Ship Alteration, Alteration and Improvement, Engineering Change Notice, NAVSEA letter) is available.
- c. Failure to meet all applicable standards for major repairs unless other alternatives are authorized by this volume. Examples are linear indications, failed tightness test, hydrostatic test, use of unqualified welder/brazer, failed radiography, inadequate bond during brazing, etc.
- d. Pipe or component wall thickness below minimum specification without restoration. Epoxy and shim methods for ball valve repairs are not considered restorations of component wall thickness.

- e. Manufacture of a part or component without use/availability of applicable technical documentation (e.g., manufactured per sample due to non-availability of detailed drawings), regardless of whether the repair is considered temporary or permanent. A DFS is not required if the part or component is non-level and in a non-controlled system, it is fabricated from the correct material and the lack of technical documentation does not affect: performance, durability, reliability or maintainability, interchangeability, use or operation, weight or appearance (where a factor), health or safety, or system design parameters.
- f. Failure to complete required retest of a SUBSAFE/Level I/Submarine Flight Critical Component (SFCC) component or system.
- g. Leakage from a SUBSAFE/Level I hull fitting, piping system, or component as follows:
  - (1) Hull valve/fitting to hull flange leakage.
  - (2) Leakage or weepage through a component body or pipe wall. Completion of temporary repairs (e.g., plastic pipe patch) does not negate the requirement for a DFS.
  - (3) Leakage or weepage from a welded or brazed joint. Completion of temporary repairs (e.g., plastic pipe patch) does not negate the requirement for a DFS.
  - (4) Leakage upper escape and access hatches, leakage from hull glands (e.g., cable stuffing tubes, shaft/mast packing glands, electrical/electronic hull fittings excluding the inboard packing assembly and pressure proof caps screwed onto Electrical Hull Fitting cable connection) that is in excess of the allowable specification that cannot be repaired, immediately, by a packing adjustment or greasing.
- h. Installation of new pressure boundary parts which do not meet all applicable material certification requirements. The following are some departable conditions:
  - (1) (Submarines only) Non-Level I valve internals (e.g., ball, disc, poppet, flapper) installed in seawater or sea-connected hull valves and backup valves.
  - (2) Non-Level I weld rod, insert material, brazing filler, etc. installed in a SUBSAFE/Level I system welded or brazed joint.
  - (3) Non-Level I pressure boundary parts (e.g., stem, bonnet, studs, nuts) installed in or on SUBSAFE or Level I components or systems.
- i. (Submarines only) For any Unrestricted Operation (URO) Maintenance Requirement Card (MRC) measured parameter found out of tolerance and not restored, whether the MRC is due or not.
- j. (Submarines only) Failure to complete any URO MRC within required periodicity.
  - (1) Non-conformance requests that result in a change of the URO MRC inspection periodicity (not authorized by the MRC), a change in a URO MRC technical requirement, or deferral of required work require NAVSEA approval. TYCOM or Authorized Technical Authority approval is not authorized for these non-conformances.
  - (2) To support operational commitments, TYCOMs may authorize temporary periodicity extensions (not authorized by MRC) after consultation with NAVSEA 07T. The periodicity extensions should be limited to the next availability or in port period, where a submarine maintenance activity is available, and shall be documented by a major DFS. The DFS shall then be submitted to NAVSEA for approval.

- (3) When a URO/MRC periodicity becomes due during a maintenance availability, a DFS is not required when the TYCOM/ISIC takes positive actions to restrict submerged operations. Prior to the ship conducting submerged operations, all URO/MRC requirements must be complied with or a Major DFS must be approved.
  
- k. (Submarines only) For all submarine hatch (Logistics Escape Trunks, Lock Out Chambers, Logistic Plug Trunks, etc.) deficiencies which will not be repaired prior to ships underway involving the following:
  - (1) Non-operational submarine access hatch. (Upper Hatch Operability and Remote Operating Devices)
  - (2) Hatch clearance reading out of specification. (Hatch-to-Seat Clearance)
  - (3) Locking ring hatch lug alignment out of specification. (Coaming Lugs and Locking Rings)
  - (4) Locking ring hatch/trunk coaming lug metal to metal contact out of specification. (In Service Lug Engagement)
  - (5) Hatch gasket groove and hatch trunk seating surface out of specification. (Gasket and seating surface inspection)
  
- l. (Submarines only) Non-operational Emergency Main Ballast Tank Blow Valve, seawater system hull or backup valve, Modified After Signal Ejector/signal ejector muzzle ball valve, salvage air valve, etc.
  
- m. (Submarines only) Failure to complete any category "A" Alteration and Improvement.
  
- n. (Submarines only) A fault condition or unsatisfactory test within the SFCC Boundary indicates a deficiency with a safety critical function per reference (f) and shall be classified as a Major non-conformance under the following conditions:
  - (1) When the system design employs more than two redundant SFCCs and a deficiency degrades the redundancy to only two remaining SFCCs.
  - (2) When the system design employs two redundant SFCCs or a non-redundant SFCC and a deficiency results in the loss of a SFCC.
  
- o. Headed fasteners locally manufactured from Level I material (i.e., capscrews, bolts, machine screws, etc.) which have not been certified by tensile and hardness testing specified in MIL-DTL-1222 (Studs, Bolts, Screws and Nuts for Applications Where a High Degree of Reliability is Required; General Specification for) or FF-S-86 (Federal Specification, Screw, Cap, Socket Head) as applicable.
  
- p. (Submarines only) All high pressure compressed gas flasks designed to MIL-F-22606 specifications shall be recertified at intervals not to exceed 20 years for SSN 688, SSN 21 and SSN 774 Classes and 21 years for SSBN/SSGN 726 Class. High pressure air moisture separator flasks shall be recertified at an interval not to exceed ten years for SSN 688, SSN 21, SSBN/SSGN 726 and SSN 774 Classes. All oxygen and gas management separator flasks designed to MIL-F-24032 specifications shall be recertified at an interval not to exceed nine years for SSN 688 and SSN 21 Classes and SSBN/SSGN 726 Class. A major DFS, approved by NAVSEA, is required for any flask that will exceed the recertification periodicity.
  
- q. (Submarines only) Propulsion shafts shall be replaced at intervals not to exceed six years for SSBN/SSGN 726 Class, seven years for SSN 688 and SSN 774 Classes and ten years for SSN 21 Class. A major DFS, approved by NAVSEA, with supporting operating information, including shaft turn count since shaft installation is required for shafts that will exceed planned replacement periodicity.

8.2.5 Minor Departure from Specification. A DFS which is not a Major DFS as defined in paragraph 8.2.4 of this chapter is considered to be a Minor DFS. All permanent Minor (and Major) DFSs will be approved by NAVSEA except those identified in paragraph 8.2.5.a. of this chapter, which may be dispositioned by the TYCOM or the ISIC. Temporary Minor DFSs identified in paragraph 8.2.5.b. of this chapter may also be dispositioned by the TYCOM or the ISIC. All other temporary Minor DFSs will be approved by the TYCOM. Paragraphs 8.2.5.a. through e. below identify some deficient conditions which require a Minor DFS:

- a. Any condition which could be considered a Major DFS except for the fact that specific and definite (TYCOM or NAVSEA) guidance is available based on documented action for another identical (same component, same application, and same class ship) request in which no restriction was imposed. An example would be a previous DFS which was approved as a precedent setting DFS.
- b. Any condition which is associated with exemptions/alternatives to non-nuclear retest requirements in Section 7.4 of Part I, Chapter 7, of this volume on testing, except where noted. Examples are:

NOTE: IF A MAINTENANCE CERTIFICATION RECORD/RE-ENTRY CONTROL IS CLOSED BY TRANSFERRING AT SEA TESTING TO A DFS (E.G., CONTROLLED DIVE TO TEST DEPTH FOR RETEST OF A PERISCOPE HULL GLAND, CONTROLLED DIVE FOR RETEST OF A SEA CONNECTED SYSTEM (E.G., MAIN SEAWATER, AUXILIARY SEAWATER) IN LIEU OF JOINT TIGHTNESS TEST TO "J" PRESSURE OF TEST PRESSURE DRAWING (TPD)), THE SHIP WILL BE RESTRICTED IN DEPTH AS REQUIRED IN PART I, CHAPTER 5, PARAGRAPH 5.10.5 OF THIS VOLUME.

- (1) (Submarines only) DFS for controlled dive following re-installation of a periscope.
  - (2) (Submarines only) DFS for controlled dive following work on a hatch exposed to sea pressure.
  - (3) (Submarines only) DFS for controlled dive following work on an Electrical/Electronic Hull Fitting.
- c. Associated with a temporary repair to a system or component not involving ship or personnel safety or not involving integrity or operability of equipment essential to ship's mission.
  - d. For any **material deficiency** discovered during a maintenance action that will not be corrected prior to the ship's underway, and is not categorized as a Major DFS in accordance with paragraph 8.2.4 of this chapter.
  - e. (Submarines only) Temporary DFSs initiated to document missing or damaged Special Hull Treatment (Molded in Place or tile), removed from external structure, DO NOT require NAVSEA approval, shall be marked minor and can be approved by the ISIC when the following conditions are met:
    - (1) The submarine is not currently in a Depot Level Availability.
    - (2) Repairs are conducted in accordance with the requirements of the class specific hull treatment repair and maintenance manual.
    - (3) Visual inspection and reporting of substrate conditions underneath Molded in Place/Special Hull Treatment removal sites shall be as follows:

Inspections not performed in an availability (any type), when qualified inspectors such as: (Civilian hull inspectors' (surveyors) and technical evaluators' training and experience shall be documented and acceptable to the Chief Engineer (or equivalent) of the inspecting activity. Civilian Nondestructive Test inspectors certified for Visual Testing in accordance with the

requirements of reference (c) and familiar with hull structural survey. Hull Technicians (HT-2 or higher), who are trained and experienced in submarine hull structural inspections or Nondestructive Test inspectors certified in Visual Testing in accordance with the requirements of reference (g) in addition to reference (h), who are familiar with hull structural survey.) are not available, Ship's Force shall inspect to the best of their ability and report back to the TYCOM any areas of extensive corrosion or damage.

- (4) The repair site(s) documented on the DFS CANNOT exceed a combined size equal to 1 standard tile (4 square feet).
- (5) The clearance date for the DFS CANNOT exceed the next scheduled Depot Level Availability.
- (6) Extensions of temporary DFSs, as a result of availability schedule shift, do not require NAVSEA approval as long as the extension does not exceed the next scheduled Depot Level Availability.

### 8.3 DEPARTURE FROM SPECIFICATION PROCEDURES.

NOTE: FOR SURFACE **FORCE** SHIPS AND AIRCRAFT CARRIERS, THE TYCOM WILL PERFORM THE ISIC FUNCTIONS OF THIS CHAPTER.

8.3.1 General Administrative Requirements. The following requirements pertain to all DFSs:

- a. Requests for DFS will be submitted, approved and cleared in accordance with paragraph 8.3.7 or 8.3.8 of this chapter. The Web Based Electronic Departure from Specification (E-DFS) and Electronic Waiver and Deviation (E-W/D) programs are acceptable for use unless directed otherwise by the respective TYCOM.

NOTE: THE FORMS (QUALITY ASSURANCE (QA) FORM 12, QA FORM 12A) MENTIONED IN THE FOLLOWING DISCUSSION ARE COMPLETED ELECTRONICALLY WHEN USING E-DFS or E-W/D.

NOTE: WHEN USING A NAVAL MESSAGE TO REQUEST A DFS OR REPORT A COMMANDING OFFICER APPROVED DFS THE EXACT FORMAT SHOWN IN APPENDIX A WILL BE USED. EACH PARAGRAPH IN THE NAVAL MESSAGE WILL HAVE A PARAGRAPH NUMBER, THE PARAGRAPH TITLE AND A COLON. ANY DEVIATION IN THE FORMAT MAY CAUSE A PROBLEM WITH THE AUTOMATIC DFS PROCESSOR. IF THE SHIP IS UNABLE TO CONNECT TO THE WEB-BASED ELECTRONIC NON-CONFORMANCE PROGRAM, A DEPARTURE MAY BE REQUESTED BY NAVAL MESSAGE USING THE FORMAT OF APPENDIX A.

- b. Requests for DFS will be normally submitted on a QA form 12. The approval of the DFS will normally be made on the QA form 12. If unable to use QA form 12, use the message format of Appendix A. Surface ships that are not able to generate a DFS using E-DFS have the option of generating DFS per existing message based system or Command E-mail. The Command E-mail shall be approved by the ship's Commanding Officer or his designated representative.
- c. The ship is responsible for all approved DFS relating to its systems/components until cleared or canceled. When a DFS is approved as a temporary repair requiring rework to correct the discrepancy, a CSMP entry for correction of the discrepant condition will be initiated by the ship or ISIC. The ship's Quality Assurance Officer (QAO) will ensure that this action is done. Verify an active Job Control Number (JCN) exists for all active temporary DFSs at the completion of all scheduled Fleet maintenance activity availabilities, major or minor, Chief of Naval Operations availabilities or at least quarterly and maintain an auditable record of the verification until superseded.

NOTE: IN THE FOLLOWING SECTION, IF USING E-DFS OR E-W/D, WHEN IT IS DIRECTED THAT THE QA FORM 12 IS SIGNED, AN ELECTRONIC SIGNATURE IS IMPLIED. ISIC AND UNITS ASSIGNED TO TYCOMs UTILIZING THE E-DFS OR E-W/D SYSTEMS WILL SUBMIT DFSs TO THE TYCOM VIA THE E-DFS OR E-W/D PROGRAMS. THESE PROGRAMS REQUIRE A USER IDENTIFICATION AND PASSWORD SUPPLIED BY THE TYCOM. THE FOLLOWING PROCESSES WILL BE EXECUTED UNDER THE E-DFS AND E-W/D PROGRAMS USING THE ELECTRONIC VERSION OF THE QA FORM 12 AND QA FORM 12A. THE SIGNATURES WILL BE ONLY THE PRINTED NAME AND TITLE OF THE INDIVIDUAL. SHIPS WITHOUT UNCLASSIFIED INTERNET ACCESS MAY SUBMIT DFSs AND DFS CLEARANCES TO THE ISIC VIA A MANUALLY PREPARED QA FORM 12/QA FORM 12A, THE STAND-ALONE MS ACCESS DATABASE FORMAT OR MESSAGE FORMAT IF AT SEA.

- a. The Work Center Supervisor/Leading Petty Officer/Craftsman/Quality Assurance Inspector will fill out the applicable portion of the QA form 12, ensuring the extent of the DFS and the recommendation for repair/re-certification must be clearly and completely stated, and deliver, after review by the cognizant division officer, to:
  - (1) For ship initiated DFS, the Ship's QAO or in his/her absence the Ship's Duty Officer.
  - (2) For FMA initiated DFS, the FMA QAO or in his/her absence the FMA Repair Duty Officer.
- b. The QAO or designated representative will:
  - (1) Review the QA form 12 for technical adequacy, accuracy, and completeness.
  - (2) Determine the latest time the answer must be received in order to carry out the ship's schedule, obtain and enter the next consecutive number from the affected ship's DFS log. For aircraft carriers, the numbering convention assigned by the Web Based E-DFS or E-W/D programs when submitting the DFS will be used.
  - (3) Deliver/forward to Department Head (ship)/Repair Officer (FMA).
- c. For ship initiated DFS, Ship Department Head (in his/her absence Ship's Duty Officer) will:
  - (1) Review the QA form 12 for technical adequacy, accuracy, and completeness.
  - (2) Sign the QA form 12 and deliver/forward to the cognizant ISIC QAO (in his/her absence ISIC Duty Officer).
- d. For FMA initiated DFS, FMA Repair Officer (in his/her absence his/her designated representative) will:
  - (1) Review the QA form 12 for technical adequacy, accuracy, and completeness.
  - (2) Sign the QA form 12 and deliver/forward it to the cognizant ISIC QAO (in his/her absence ISIC Duty Officer).
- e. For Depot initiated temporary waivers and deviations, responsible Depot personnel will:
  - (1) Review the waiver or deviation for technical accuracy, adequacy, and completeness.
  - (2) Utilize, prepare and sign a QA form 12 or E-DFS/E-W/D to document, attach the QA form 12 to the waiver or deviation and deliver/forward it to the cognizant ISIC representative QAO (in his/her absence the ISIC Duty Officer) for review and concurrence prior to approval. For a DFS initiated by a depot level activity, the ISIC will provide the JCN and the DFS serial

number to the depot level activity when requested. For carrier repair activities, the Web-Based Electronic Non-Conformance program will automatically supply the next open DFS serial number.

- (3) The ISIC representative QAO will review and concur with the waiver or deviation by signing the ISIC block of the QA form 12 or electronically signing in E-DFS/E-W/D prior to Depot approval and return the waiver or deviation to the Depot. For temporary waivers and deviations, the ISIC representative will contact the Ship's Maintenance Planner or the Ship's QAO for a JCN and a Departure serial number (if required) prior to returning the waiver or deviation to the Depot.
- f. The cognizant ISIC QAO (in his/her absence his/her designated representative) will:
- (1) Review the QA form 12 for technical adequacy, accuracy, and completeness.
  - (2) Issue instructions regarding clearance and approve/disapprove and return QA form 12 to the Department Head (Ship)/Repair Officer (FMA) for action and/or filing in QA files.
  - (3) Deployed Ships ISICs will ensure parent ISIC is an information addressee on all QA form 12s.
- g. Approval/disapproval of a DFS by the TYCOM or NAVSEA will be noted on the QA form 12.
- h. Upon completion of corrective action, the DFS will be cleared by the ship using the format of QA form 12A. The TYCOM will be informed by copy of QA form 12A or via message, when a major temporary DFS is cleared. The NAVSEA or TYCOM approval of a permanent repair requires no further administrative action.

NOTE: DO NOT DELETE ANY INFORMATION FROM AN E-DFS OR E-W/D ITEM THAT HAS RECEIVED TEMPORARY APPROVAL FROM EITHER THE ISIC, TYCOM OR AUTHORIZED TECHNICAL AUTHORITY.

NOTE: THE ABILITY TO ADD COMMENTS TO AN APPROVED DFS IS LIMITED BY THE ELECTRONIC SYSTEM'S ASSIGNED LEVEL OF ACCESS (I.E., ISICs CAN ADD COMMENTS ONLY TO THE ISIC PORTION OF THE DFS FORM).

#### 8.3.8 Departure from Specification Approval and Reporting for Ships While at Sea or at a Port Without a Fleet Maintenance Activity.

8.3.8.1 Evaluation. The Commanding Officer will evaluate any DFS and approve the corrective action to be taken including any necessary restrictions. The Commanding Officer will issue directions regarding clearance and approve/disapprove the DFS and return the QA form 12 to the Department Head for action and/or filing. For any Commanding Officer approved DFS, a report of the condition and intended action will be made at the first opportunity to the ship's ISIC/TYCOM utilizing either a naval message in the "EXACT" format of Appendix A or the E-DFS or E-W/D programs.

8.3.8.2 Condition not Corrected. If the condition is not planned to be corrected or cannot be corrected during the next inport period (a port with a fleet maintenance facility), the Commanding Officer approved DFSs must be submitted to the applicable approval authority for adjudication prior to getting underway.

- a. (Submarines only) All departures shall be adjudicated prior to the ship getting underway.
- b. (Aircraft Carriers and Surface Force Ships only) In the event the DFS evaluation is not completed prior to the ship's underway, the Commanding Officer approved DFS will remain in effect until the evaluation is completed and disposition provided.

## APPENDIX A

## DEPARTURE FROM SPECIFICATION REQUEST MESSAGE FORMAT

RTTUZYUW RUCBSRF0001 DDHHMM-UUUU--RUCBSUU.  
 ZNR UUUUU  
 R DDHHMMZ MMM YY ZYB  
 FM (COMMAND REQUESTING DFS)//  
 TO ISIC/TYCOM// (NOTE 1)  
 NAVSEALOGCEN MECHANICSBURG PA//  
 INFO COMNAVSEASYS COM WASHINGTON DC// (NOTE 2 and 3)  
 ISIC//  
 COGNIZANT IMA//  
 SHIP//  
 SUBMEPP PORTSMOUTH NH//(URO PROGRAM MANAGER)// (NOTE 4)  
 PEO CARRIERS//PMS312// (AS APPLICABLE FOR CARRIERS)//  
 PEO THEATER SURFACE COMBATANTS//PMS400F// (AS APPLICABLE FOR COMBATANTS)//  
 PEO EXW//PMS470/PMS325// (AS APPLICABLE FOR AUXILIARIES, LITTORALS AND PATROL CRAFT)//  
 PEO MUW//PMS490// (AS APPLICABLE FOR MINE WARFARE)//  
 NAVSPECWARCOM/N84// (WHEN DDS IS INSTALLED)//  
 BT  
 UNCLAS (OR CLAS)//N04855//  
 MSGID/GENADMIN/ (COMMAND REQUESTING DFS)/0000/FEB//  
 SUBJ/DFS REQUEST FOR (SHIP AND HULL NUMBER AND DEPARTURE NUMBER ASSOCIATED WITH  
 (COMPONENT/SHORT DESCRIPTION))/(NOTE 5)//  
 OR FOR A CO APPROVED DEPARTURE  
 NOTIFICATION OF COMMANDING OFFICER APPROVED DFS (SHIP AND HULL NUMBER AND  
 DEPARTURE NUMBER ASSOCIATED WITH (COMPONENT/SHORT DESCRIPTION))/(NOTE 5)//  
 REF/A/DOC/COMUSFLTFORCOMINST 4790.3// (NOTE 6)  
 POC//  
 AMPN/REF A IS THE JOINT FLEET MAINTENANCE MANUAL// (NOTE 7)  
 NARR//(NOTE 7)  
 RMKS/1. DFS NUMBER:  
 2. SHIP & HULL NUMBER:  
 3. JCN:  
 4. CWP NUMBER:  
 5. DATE OF DFS:  
 6. ORIGINATOR:  
 7. DEPARTURE TYPE  
   A. MAJOR:  
   B. MINOR:  
   C. SUBSAFE:  
   D. SOC:  
   E. FBW:  
   F. SFCC:  
 8. DEPARTURE CLASSIFICATION  
   A. DEVIATION:  
   B. WAIVER:  
   C. FBWDR:  
 9. SYSTEM/COMPONENT/LOCATION/ESWBS:  
 10. NAVSEA DRAWING/PLAN NUMBER/PIECE NUMBER:  
 11. REFERENCES:  
 12. APPLICABLE SPECIFICATIONS:  
 13. SITUATION/DEGREE OF NON-COMPLIANCE: (NOTES 8, 9 AND 10)  
 14. COMMENTS/RECOMMENDATION:

15. DATE ANSWER REQUESTED BY:

16. SUBMITTING ACTIVITY:

17. NEW JCN:

18. CO APPROVED DFS:

DECL: ODAR//

BT

NOTE: ENSURE MESSAGES ARE IN ACCORDANCE WITH NTP 3 FORMAT AND CURRENT PLAIN LANGUAGE ADDRESS DIRECTORY (PLAD) IS UTILIZED.

NNNN

NOTES:

1. Office codes for TYCOMs are: COMNAVAIRLANT N43/N9; COMNAVAIRPAC N434; COMNAVSURFLANT N434; COMNAVSURFPAC N434; COMNAVSURFLANT/AIRLANT SNPMTT N02NB; COMNAVSURFPAC N434 AND COMNAVAIRPAC N9/N434; PACIFIC FLEET CVNs – COMNAVAIRPAC N9/N434; COMNAVSURFLANT N434 AND COMNAVAIRLANT N9/N43; ATLANTIC FLEET CVNs - COMNAVAIRLANT N9/N43; COMSUBLANT N4322; COMSUBPAC N4, N4322.
2. Office codes for NAVSEA are: PMS 392 and SEA 07TC (All SSN and SSBN/SSGN); PMS 399 (DEEPSUBM and DDS); OOC (DDS and DLSS). For URO related DFS, also include the appropriate NAVSEA codes listed in the URO MRC.
3. Include NAVSEA 07Q for informational purposes on all SUBSAFE DFS messages. Include the applicable Program Manager at NAVSEA for informational purposes on all SOC DFS messages. Include the NAVSEA 07T for informational purposes on all Fly-By-Wire Ship Control System (FBW SCS) DFS messages.
4. Include SUBMEPP only on URO related DFS.
5. Comply with current annotation/declassification requirements for classified messages.
6. Year/Month/Day.
7. Enter date of most current revision.
8. When non-approved parts are used, identify part by NSN, Mil Spec, drawing and piece number and MIC level.
9. When DFS is the result of part non-availability, identify APL and NSN or drawing and piece number and state that the part is not available until (year, month, day) or unknown.
10. Where new welded or brazed pipe joints are added, state the welding or brazing procedure used. State the NDT procedure(s) used (if applicable). State completed, or to be completed tests.

INSTRUCTIONS:

1. From Line - Command requesting/submitting the DFS.
2. To Line - List the respective ISIC/TYCOM and NAVSEALOGCEN Mechanicsburg PA. (see note 1)

**APPENDIX B****DEPARTURE FROM SPECIFICATION CLEARANCE/CANCELLATION REPORT MESSAGE  
FORMAT**

RTTUZYUW RUCBSRF0001 DDHHMM-UUUU--RUCBSUU.  
 ZNR UUUUU  
 R DDHHMMZ MMM YY ZYB  
 FM (COMMAND REQUESTING DFS CLEARANCE/CANCELLATION)  
 TO ISIC/TYCOM//(NOTE 1)  
 INFO COMNAVSEASYS COM WASHINGTON DC//(NOTE 2)  
 ISIC//  
 COGNIZANT IMA//  
 SHIP//  
 SUBMEPP PORTSMOUTH NH//(URO PROGRAM MANAGER)//(NOTE 3)  
 PEO CARRIERS//PMS312// (AS APPLICABLE FOR CARRIERS)//  
 PEO THEATER SURFACE COMBATANTS//PMS400F// (AS APPLICABLE FOR COMBATANTS)//  
 PEO EXW//PMS470/PMS325// (AS APPLICABLE FOR AUXILIARIES, LITTORALS AND PATROL CRAFT)//  
 PEO MUW//PMS490// (AS APPLICABLE FOR MINE WARFARE)//  
 NAVSPECWARCOM/N84// (WHEN DDS IS INSTALLED)//  
 BT  
 UNCLAS (OR CLAS)//N04855//  
 MSGID/GENADMIN/(REQUESTING COMMAND)/0000/FEB//  
 SUBJ/MAJOR DFS (TYCOM NUMBER) FOR (COMPONENT/SHORT DESCRIPTION) ON (SHIP AND HULL NUMBER)/DFS  
 NUMBER/(NOTE 4)/(\*)//  
 REF/A/DOC/COMUSFLTFORCOMINST 4790.3//(NOTE 5)  
 REF/B/GENADMIN/ORIGINATOR OF DFS/DTG//  
 REF/C/GENADMIN/ORIGINATOR OF DFS APPROVAL/DTG//  
 REF/D/GENADMIN/-/DTG// (USE AS APPROPRIATE)  
 POC//  
 AMPN/REF A IS THE JOINT FLEET MAINTENANCE MANUAL//(NOTE 6)  
 RMKS/ 1. PER REF A REQUEST THE FOLLOWING DFS BE CLEARED FOR USS <SHIP NAME/HULL NO>:  

DFS NO.	DESCRIPTION	JUSTIFICATION
766-012-02	DSW-5	DEEP DIVE SAT
766-013-02	STBD IMPULSE TK	DEEP DIVE SAT

 2. CLEAR(CANCEL) SUBJECT DFS. REFS A, B, C AND D REFER.//  
 DECL: ODAR//  
 BT

NOTE: ENSURE MESSAGES ARE IN ACCORDANCE WITH NTP-3 FORMAT AND CURRENT PLAD IS UTILIZED.

**NOTES**

- Office codes for TYCOMs are: COMNAVAILANT N43/N9; COMNAVIRPAC N43; COMNAVSURFLANT N434; COMNAVSURFPAC N434; COMNAVSURFLANT/AIRLANT SNPMTT N02NB; COMNAVSURFPAC N434 AND COMNAVIRPAC N9/N432N; PACIFIC FLEET CVNs - COMNAVIRPAC N9/N432N/N432; COMNAVSURFLANT N434 AND COMNAVIRLANT N9/N43; ATLANTIC FLEET CVNs - COMNAVIRLANT N9/N43; COMSUBLANT N4322; COMSUBPAC N4, N4322.
- Office codes for NAVSEA are: SEA 07TC (All SSN and SSBN/SSGN); PMS 399 (DEEPSUBM and DDS); OOC (DDS and DLSS). For URO related DFS, also include the appropriate NAVSEA codes listed in the URO MRC. Include the NAVSEA 07T for informational purposes on all Fly-By-Wire Ship Control System (FBW SCS) DFS messages.

3. Include SUBMEPP only on URO related DFS.
  4. Subject line should be identical to subject line of TYCOM approval message.
  5. Year/Month/Day.
  6. Enter date of most current revision.
- (\*) Comply with current annotation/declassification requirements for classified messages.

- (4) All audits should be conducted on an annual basis unless a shorter period is specified. Those areas identified as weak should be audited more frequently. The periodicity of these audits shall be adjusted by the QAO based upon the results of previous audits/surveillance.
  - (5) Report results of all audits to the Commanding Officer with copies to the Repair Officer (Planning Officer at TRIDENT Refit Facilities) and cognizant Department Head/Division Officer.
- b. Administer an aggressive FMA QA surveillance program to ensure compliance with requirements and to support FMA work process improvements. The surveillance program must include the following elements:
- (1) Surveillance of in-process work of all types.
  - (2) Surveillance of calibration facilities in accordance with references (a) and (b).
- c. Evaluations. The FMA QAO will conduct a semi-annual evaluation of the overall adequacy and effectiveness of the FMA's QA program.
- (1) This evaluation should include the following areas:
    - (a) Findings of the annual internal audits.
    - (b) Results of the FMA's internal surveillance program.
    - (c) An evaluation of trends identified by the FMA QA audit and surveillance programs. Areas requiring additional monitoring should be identified.
    - (d) A review of external inspections/monitoring deficiencies (ISIC, Radiological Controls Practices Evaluation and Naval Reactors Representative's Office surveillance) that relate to the FMA QA program or QA records.
    - (e) The previous semi-annual evaluation to determine the effectiveness of corrective actions.
    - (f) Review of the last FMA assessment to check for recurring deficiencies and effectiveness of corrective action.
  - (2) Results of this evaluation will be provided to the Repair Officer, Department Head (Planning Officer at TRIDENT Refit Facilities) and Commanding Officer.

### 9.3.3 Immediate Superiors in Command Assessments, Audits, and Surveillance.

- a. QA Program Assessment.
- (1) ISICs shall schedule and conduct a QA Program assessment in conjunction with the Inter-Deployment Training Cycle (or as determined by each Type Commander (TYCOM)) of all assigned ships. This assessment will review the following areas:
    - (a) Vertical audit of CWPs.
    - (b) Material control.
    - (c) DFS.

- (d) Surveillance program.
  - (e) QA training and qualification.
  - (f) QA records and record retention.
  - (g) (Submarines only) SUBSAFE/REC, SOC and FBW program.
  - (h) (Submarines only) URO MRC Program.
- (2) (Submarines only) Electronic copies of the assessment reports will be forwarded to the TYCOM. Submission of the assessment may be via email with appropriate cover letter.
  - (3) (Surface Force Ships) Copies of the assessment reports will be forwarded to the TYCOM noting completion of assessment as satisfactory with findings documenting corrective action taken or proposed corrective action or corrective action required to be taken by the TYCOM or higher authority.
- b. ISICs will conduct the following additional periodic audits and surveillance:
- (1) Conduct periodic monitoring of Ship's Force controlled work and QA program on all assigned ships during maintenance periods.
    - (a) Perform at least one surveillance during each refit/upkeep/FMA availability.
    - (b) Conduct monitoring during industrial availabilities.
  - (2) Conduct monitoring of assigned FMA's QA. This monitoring will include:
    - (a) Review of work procedures including opening and closing practices.
    - (b) Monitoring of in progress work both on tended ships and in FMA work centers.
- c. (Submarines only) Additional ISIC Requirements.
- (1) On completion of a Selected Restricted Availability (SRA), Pre-Inactivation Restricted Availability (PIRA), Major Maintenance Period (MMP), Extended Refit Period (ERP) or Interim Drydocking (IDD), the ISIC will conduct an audit to include the following:
    - (a) Conduct a 100% audit of CWPs for SUBSAFE work accomplished by Forces Afloat (FMA and Ship's Force).
    - (b) Conduct an audit of UROs assigned to Forces Afloat (Ship's Force and the FMA) by the Availability Work Package (AWP) and ensure all URO MRCs have been satisfactorily completed and documented within the required periodicity. Verify that all URO MRC items coming due within six months of availability completion are complete or assigned to a follow-on fleet availability. ISICs are not responsible for auditing UROs assigned to the depot in the AWP.
    - (c) Conduct a review of all outstanding Forces Afloat DFSs.

## 10.5 SHIP'S QUALITY ASSURANCE RECORD RETENTION.

10.5.1 Controlled Work Package Log. The Quality Assurance Officer (QAO) will maintain a Controlled Work Package (CWP) log, using the QA form 11, for the life of the ship. Re-copying or consolidation of this log is not to be done.

10.5.2 Completed Controlled Work Packages. All CWPs (retain onboard per paragraph 10.2.2 of this chapter), which includes:

- a. Maintenance Certification Record (MCR)/REC (QA forms 9 and 10).
- b. References unique to this task (e.g., NAVSEA letters, Liaison Action Requests) will be retained with the CWP unless specifically identified to allow recall, if necessary.
- c. All enclosures documenting the OQE (e.g., QA forms and Ready for Issue (RFI) tags (NAVSEA 9210/2 and 9210)) will be retained.
- d. FWP's executed as the core of a CWP shall be retained with the CWP. After three years when CWPs are moved ashore or placed in storage, the FWP portion of the CWP may be discarded.

10.5.3 Controlled Material Records. Controlled material records will be maintained with the associated CWP. Those records not associated with a CWP will be maintained on file by the QAO.

- a. The Supply Officer will maintain on file the letter of certification from the Supervisor of Shipbuilding, for all lots of Level I/SUBSAFE/SFCC Stock Program material and Nuclear Repair Parts during the new construction period. When the material is issued, a copy of this letter should be attached to the QA form 1.

NOTE: MATERIAL CONTROL RECORDS (E.G., QA FORM 2s) ARE NOT REQUIRED TO BE RETAINED FOR REMOVED AND REINSTALLED **CONTROLLED** MATERIAL AFTER THE CWP IS CLOSED.

- b. The QAO will maintain controlled material records as outlined below. These records should be included in the appropriate CWP to the maximum extent practical. Retain material certification files for all Nuclear Level I, SUBSAFE, SFCC and Level I material installed.
  - (1) The RFI tags (Part II, Chapter 1, Appendix C, of this volume) for Nuclear Level I items installed.
  - (2) For any Nuclear Level I items received and installed without a RFI tag retain all OQE used to certify.
  - (3) All OQE used to upgrade material for non-nuclear "Level" use.
  - (4) All QA forms 3 for any rejected items accepted for use.
  - (5) A file of QA forms 1 with certification documentation.

10.5.4 Qualification Records. The QAO will maintain a master list of qualified Work Center Supervisors and Maintenance Planners, Controlled Material Petty Officers (CMPO), Cleanliness Inspectors, Quality Assurance Inspectors (QAI), Quality Assurance Supervisors (QAS), Oxygen Clean Workers and Oxygen Clean Instructors. The records will be retained for the duration the individual is onboard. The file will consist of:

- a. Date Personnel Qualification Standard completed. For Oxygen Clean Workers and Oxygen Clean Instructors, the date the required course of instruction is completed.

- b. Qualification test results. This includes a copy of the examination cover sheet. In addition, a copy of the examination given with answers shall be available either in electronic medium or hard copy. For Oxygen Clean qualifications, this entry is not required.
- c. A copy of the signed Final Qualification Page from the Personnel Qualification Standard.
- d. Copy of the signed oral interview sheets for each qualification record.

10.5.5 Departure from Specification Records.

- a. Outstanding DFS Files.
  - (1) An index that reflects the DFS unique serial number assigned, date approved, system or component including brief description, annotation for SUBSAFE and status.
  - (2) A copy of each outstanding DFS and all applicable correspondence.
- b. A copy of cleared DFS with an index will be retained for 24 months.
- c. A copy of all DFS approved as permanent repairs, with an index, will be retained until they are reflected in the ship's selected records and drawings or technical variation documents.

10.5.6 Assessments, Evaluations and Audits. The QAO will retain records of assessments, evaluation and surveillance for the past 24 months (unless otherwise stated). The records will consist of:

- a. QA form 14 index log that has the item numbers, work center responsible to correct and estimated date corrective action is due.
- b. Copy of last higher authority assessment and the corrective action for all items.
- c. Results of all Audits and Surveillances of the QA Program, including the root cause, immediate and permanent corrective action. (This may be kept with the rest of the monitor program records).
- d. Last annual QA Program evaluation performed.
- e. Maintain an auditable record of the most current Job Control Number to DFS verification.

10.5.7 Training. Training records will be retained in accordance with TYCOM instructions.

10.6 ADDITIONAL SUBMARINE/NUCLEAR UNIQUE QUALITY ASSURANCE RECORD RETENTION REQUIREMENTS.

10.6.1 Submarine Safety/Nuclear/Level I/Submarine Flight Critical Component/Scope of Certification/Other Certification. The ship will retain the following records for the life of the ship or as indicated below:

10.6.1.1 Reactor Plant Work Accomplishment Report (Submarines only). A copy of all completed Reactor Plant Work Accomplishment Reports.

10.6.1.2 Submarine Safety Material Certification (Submarines only). Copy of the TYCOM and NAVSEA SUBSAFE Material Certification message from new construction, DMP or overhaul until the ship's current status is reflected in reference (d). When the ship's current status is reflected in the notice, the messages may be destroyed, and the current notice will be retained.

10.6.1.3 End of Fleet Maintenance Availability Certification (Submarines only). Retain the last end of FMA Availability letter from the FMA.

10.6.1.4 Certification Continuity Reports (Submarines only). Retain the last certification continuity report sent by the ship.

10.6.1.5 Industrial Activity Certification Reports (Submarines only). A copy of all industrial activity/shipyard certification letters or messages from all SRA conducted between overhauls. In addition, a copy of the ISIC audit of SUBSAFE work performed by the industrial activity should also be kept. These may be disposed of at the next Extended Refit Period/SRA/DMP/EOH/ERO/RFOH/ROH.

10.6.1.6 Other Certification Reports (Submarines only). A copy of any other correspondence or messages that affect the certification of the ship or hull integrity.

10.6.1.7 Controlled Material (Submarines only). Ship's Force is not required to use a QA form 1 to document receipt inspection of Level I/SUBSAFE/SFCC/SOC material to be immediately installed for a specific maintenance action. A QA form 2 will be used to document receipt inspection of material to be immediately installed.

10.6.1.8 Nuclear Records. Nuclear records will be retained as required by reference (a). Reference (a) defines which nuclear records must be retained and length of retention as well as specifies requirements for retention of existing records. It is not intended to create new records for record retention requirements, if they do not already exist.

10.6.1.9 Nuclear Propulsion Plant Operator Welder Records (Submarines only). The Main Propulsion Assistant will retain the following qualification records in accordance with reference (f), for each welder as long as the welder is qualified onboard.

- a. Documentation certifying original weld school completion.
- b. QA form 20 for most current proficiency welds and qualification welds (the four most recent test assemblies).
- c. Copy of current eye examination report.

10.6.1.10 Re-Entry Control/Maintenance Certification Record Exception Objective Quality Evidence and Other Controlled Assembly Records. Retain a file of the most recent QA form 34 generated for each component or system assembled as a controlled assembly and performed as a REC/MCR exception per Part I, Chapter 5, paragraph 5.10.7, Note 3, Part I, Chapter 2, paragraph 2.2.5, Note 2 and Part III, Chapter 5, paragraph 5.11.6.1.b of this volume. Retain a file of the most recent QA form 34 record generated per Part I, Chapter 7, paragraph 7.4.1.c of this volume for non-controlled systems or components until the system or component testing is completed satisfactory.

10.6.1.11 Scope of Certification (Submarines only). Retain a copy of the NAVSEA and TYCOM, if applicable, Scope of Certification and/or Sustaining Survey Certification letter or message.

## 10.7 FLEET MAINTENANCE ACTIVITY QUALITY ASSURANCE RECORD RETENTION.

10.7.1 Submarine Safety/Nuclear/Level I/Scope of Certification/Other Certification. The QAO or designated officer will retain material certification (SUBSAFE, Nuclear, Level I, Scope of Certification and CWP category "Other") records for the life of each tended ship.

10.7.2 Reactor Plant Work Accomplishment Report (Submarines only). The Nuclear Repair Officer will retain a legible copy of all FMA generated Reactor Plant Work Accomplishment Reports.

10.7.3 Controlled Work Package Log. The QAO will maintain a CWP log, using the QA form 11, for the life of the ship. Re-copying or consolidation of this log is not to be done.

10.7.4 Completed Controlled Work Packages. All CWPs (retain onboard per paragraph 10.2.2 of this chapter), which includes:

- a. MCR/REC (QA forms 9 and 10).
- b. References unique to this task (e.g., NAVSEA letters, Liaison Action Requests) will be retained with the CWP unless specifically identified to allow recall, if necessary.
- c. All enclosures documenting the OQE (e.g., QA forms and RFI tags (NAVSEA 9210/2 and 9210)) will be retained.
- d. FWP's executed as the core of a CWP shall be retained with the CWP. After three years when CWPs are moved ashore or placed in storage, the FWP portion of the CWP may be discarded.

NOTE: MATERIAL CONTROL RECORDS (E.G., QA FORM 2s) ARE NOT REQUIRED TO BE RETAINED FOR REMOVED AND REINSTALLED CONTROLLED MATERIAL AFTER THE CWP IS CLOSED.

10.7.5 Controlled Material Records. Controlled material records will be maintained with the associated CWP. Those records not associated with a CWP will be maintained on file by the QAO. The QAO will maintain controlled material records as outlined below. These records should be included in the appropriate CWP to the maximum extent practical. Retain material certification files for all Nuclear Level I, SUBSAFE, SFCC, Level I and SOC material installed.

- a. The RFI tags (Part II, Chapter 1, Appendix C, of this volume) for nuclear Level I items installed.
- b. For any Nuclear Level I items received and installed without a RFI tag retain all OQE used to certify the material for installation.
- c. All OQE used to upgrade material for non-nuclear "Level" use.
- d. All QA forms 3 for any rejected items accepted for use.
- e. A file of QA forms 1 with certification documentation.
- f. All material control records from receipt inspection through installation will be maintained throughout the life of Deep Submergence Systems.

10.7.6 Assessment, Audits, Surveillance and Evaluations. The QAO will retain records for the past 18 months (unless otherwise stated). The records will consist of:

- a. Last year and present year internal audit schedule.
- b. Completed audit plans/guides and results (Associated QA forms 14 or other discrepancy reports).
- c. QA form 14 index log that has the item numbers, work center responsible to correct and estimated date corrective action is due.
- d. Copy of last higher authority assessment, surveillance and the corrective action for all items.
- e. Schedule and results of internal surveillance of the QA Program, including the corrective action. (This may be kept with the rest of the monitor program records).
- f. Last two semi-annual QA Program evaluations.
- g. Two years worth of records for calibration laboratory spot checks/sampling of outgoing work.

AND THAT PERSON SHALL UNDERSTAND HIS/HER SIGNATURE TO INDICATE THE FOLLOWING: *"THE PERSON DESIGNATED TO SIGN FOR AN ACTION VERIFIES, BASED ON PERSONAL OBSERVATION, AND CERTIFIES BY THEIR SIGNATURE THAT THE ACTION HAS ACTUALLY BEEN PERFORMED IN ACCORDANCE WITH THE SPECIFIED REQUIREMENTS."*

NOTE 2: DAMAGED EXISTING MATERIAL REMOVED FROM CONTROLLED SYSTEMS WHICH IS NOT INTENDED TO BE REPAIRED OR REUSED AND IS INTENDED TO BE DISPOSED OF AS TRASH DOES NOT REQUIRE A QA FORM 2 TO BE ATTACHED PROVIDED THE MATERIAL IS IMMEDIATELY DISCARDED. EXAMPLES OF THIS ARE DAMAGED VALVE STEMS, DAMAGED COMPONENT FASTENER NUTS AND STUDS. DOES NOT APPLY TO TURN-IN ITEMS SUCH AS DEPOT LEVEL REPAIRABLE.

BLOCK 1 - TAG (A) OF (B)

- a. Number the tags in sequential order as used (e.g., 1, 2, 3, etc.).
- b. The last number reflects the total number of tags written for each part removed from a disassembled component or system. This block is filled in by the craftsman at the same time Block 20 is signed for final installation of non-SUBSAFE/non-SOC systems. For SUBSAFE, Nuclear or SOC systems, the QAI will fill in this block at the time Block 21 is signed on the last tag (e.g., 3 of 3).

BLOCK 2 - MIC NO./SERIAL NO.

Enter the MIC etched on the material. If none, enter "NONE". For fasteners enter either the MIC number (when MIC number is marked on the fastener) or the material marking, color code, heat/lot number, and manufacturer's symbol (for nuts containing a self-locking insert, the color of the insert is the manufacturer's symbol). For rotatable items enter the appropriate rotatable pool serial number (e.g., rp-148a, tin-292-11893, etc.).

BLOCK 3 - MAT LEVEL

Check the EXISTING block and the appropriate block for Level of Essentiality [e.g., check LI/SS/NUC L/I, if Level I or Nuclear Level I, or check SOC if Scope Of Certification, or check "OTHER" (e.g., SAED Controlled)].

BLOCK 4 - MATL DESCRIPTION

Enter the quantity, size and noun name of the material (e.g., 6 each, 5/8" - 11 NICU studs, AHP-56 4500/2000 PSI Reducer).

BLOCK 5 - NSN/SMIC

Enter "NA".

BLOCK 6 - RECEIPT INSPECTION COMMENTS

Enter "NA".

BLOCK 7 - CMPO/CMH

Enter "NA".

BLOCK 8 - UIC, WC, JCN AND CWP SERIAL NO.

Enter the JCN, consisting of the UIC, WC, JSN, and CWP serial number in the appropriate blocks.

NOTE: CAUTION MUST BE TAKEN WHEN USING THE WORDS "REPAIRED", "REINSTALLED" TO ENSURE THAT THESE WORDS ARE USED PROPERLY.

TAG BACK SIDE

(This side is filled out by the QAI, CMPO, CMH or craftsman).

BLOCK 9 - WC NO.

Enter the number of the WC which completed Blocks 1-8 of the tag (e.g., 56X, EA01).

BLOCK 10 - DATE

Enter date material removed from system or component.

BLOCK 11 - REMARKS

Enter information regarding why component was removed (e.g., removed for repair of valve seats, removed for transfer to AS-40 for repair and testing).

BLOCK 12 - CRAFTSMAN/CMPO/CMH/QAI

The cognizant craftsman will print name and sign.

NOTE: IF MORE THAN ONE WC IS INVOLVED IN THE FABRICATION/REPAIR PROCEDURE, BLOCKS 13-16 WILL BE FILLED OUT BY THE COGNIZANT CRAFTSMAN IN THE SAME MANNER AS BLOCKS 9 THROUGH 12 AS THE ITEM IS TRANSFERRED FROM ONE WC TO ANOTHER FOR FABRICATION, ETC. FOR A TOTAL SHIP'S FORCE JOB, THESE BLOCKS ARE NORMALLY "NA", UNLESS ANOTHER WC HAS TO DO SOMETHING TO THE MATERIAL.

If used for transfer of material between organizations, Blocks 13-16 will be filled out by the receiving activity as follows:

BLOCK 13 - WC NO.

Enter the number of the WC receiving material (e.g., 56A, 38C).

BLOCK 14 - DATE

Enter date material received.

BLOCK 15 - REMARKS

Record work performed while in the custody of the WC.

BLOCK 16 - CRAFTSMAN/CMPO/CMH/QAI

Cognizant individual will print name and sign that all work performed was completed satisfactorily and in accordance with applicable technical requirements. This signature will be made prior to transferring the material back to the original organization from which it was received.

NOTE: BLOCKS 17 THROUGH 21 WILL CONTAIN THE RECORD OF FINAL INSTALLATION. IF ADDITIONAL TAGS ARE REQUIRED FOR THE MATERIAL DURING THE FABRICATION AND TRANSFER PROCESS (MORE THAN TWO WCs/PROCESSES INVOLVED IN THE REPAIR), BLOCKS 9 THROUGH 12 AND BLOCKS 17 THROUGH 21 MAY BE USED.

BLOCK 17 - WC NO.

Enter WC responsible for installation.

BLOCK 18 - DATE

Enter date of final installation.

BLOCK 19 - REMARKS

Enter the location where the material was installed into the system or component (e.g., installed in AHP-514, installed in system at joints ASW-70014(F) and ASW-70015(F), etc.).

BLOCK 20 - CRAFTSMAN

Cognizant craftsman print name and enter signature signifying that the material is installed correctly and in accordance with applicable technical specifications. Remove the QA form 2 and file with the CWP.

NOTE: QAI VERIFICATION IS REQUIRED FOR NUCLEAR LEVEL I PRESSURE BOUNDARY JOINTS OR WHEN TRANSFERRED/CANNIBALIZED MATERIAL IS INSTALLED WITHIN THE SUBSAFE OR SOC BOUNDARY.

BLOCK 21 - INSPECTOR

When required, inspector print name, and enter signature and date certifying that the material is the correct material, acceptable for application and correctly installed. Remove the QA form 2 and file with the CWP.

NOTE: IF, FOR ANY REASON, A CRAFTSMAN/CMPO/CMH/QAI REJECTS MATERIAL THEY WILL COMPLETE AND ATTACH A QA FORM 3, LEAVING THE QA FORM 2 ATTACHED. TAG USED ITEMS WHICH MUST BE TURNED IN TO SUPPLY AND ANY ITEM WHICH IS NOT PROMPTLY DISCARDED (E.G., AT THE END OF WORK DAY OR SHIFT).

NOTE: WHEN EXISTING CONTROLLED MATERIAL IS REINSTALLED INTO THE SYSTEM THE QA-2 WILL BE COMPLETED AND RETAINED WITH THE CWP UNTIL THE CWP IS CLOSED OUT. THE ACCOUNTABILITY FOR CONTROLLED MATERIAL REINSTALLATION IS ON THE APPLICABLE OQE RECORD (E.G., JOINT/COMPONENT REPAIR RECORD, QA-34). THE QA-2 MAY BE DISCARDED AFTER THE CWP IS CLOSED OUT.

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QA FORM 11 INSTRUCTIONSCONTROLLED WORK PACKAGE (CWP)/RE-ENTRY CONTROL (REC) LOG

PURPOSE: To provide a record of ship and repair activities entries into SUBSAFE, nuclear, Level I, Deep Submergence SOC and other certified systems or components. The CWP/REC Log will summarize the chronological record of CWP and REC for the life of the ship.

PROCEDURE: The numbered blocks on the CWP/REC Log, QA form 11 correspond to the same number below. A CWP/REC Log will be maintained by each ship, FMA and naval shipyard as follows:

- a. The log is maintained by the QAO for ships and repair activities.
- b. When the CWP/REC is performed by the ship alone, the serial number will be recorded in the ship's CWP/REC Log.
- c. The FMA will also have a tended ship CWP/REC Log that records entries for work on each tended ship.
- d. When the CWP/REC is a Ship's Force provided serial number, it will be recorded in both the ship's CWP/REC Log and in the FMA's tended ship CWP/REC Log.

BLOCK 1 - PAGE NO.

As each new page is started, the QAO will enter the appropriate page number(s).

BLOCK 2 - SHIP

The QAO will enter the ship's name and hull number. Locally pre-printed forms with the ship's name and hull number are acceptable.

BLOCK 3 - CWP/REC NUMBER

For controlled (i.e., Level I, Nuclear, Scope of Certification) or SUBSAFE work to be performed by Ship's Force only, the ship's QAO will issue the CWP/REC numbers sequentially for entry in Block 4 of the ship's QA form 9. For controlled or SUBSAFE work performed by the repair activity on, or for a tended ship, the ship's QAO will issue CWP/REC numbers sequentially to the repair activity for entry in Block 4 of the repair activity's QA form 9. For controlled or SUBSAFE work to be performed by the repair activity only, not associated with a specific ship (example – rotatable pool assets), the repair activity's QAO will issue the CWP/REC numbers sequentially for entry in Block 4 of the repair activity's QA form 9. The format of the CWP/REC serial numbers will be the serial number followed by the year (e.g., 1-90, 123-01).

**NOTE:** SOC IS A LEVEL OF WORK TERM FOR DEEP SUBMERGENCE SYSTEM WORK IN ACCORDANCE WITH NAVSEA SS800-AG-MAN-010/P9290 USED IN CONJUNCTION WITH WORK ON HOST SYSTEMS FOR DRY DECK SHELTERS.

BLOCK 4 - LEVEL OF WORK

The QAO will enter the level of the work (e.g., SUBSAFE, Nuclear, Level I, SFCC or SOC). For SUBSAFE/SOC work on a tended unit by a repair activity other than during a scheduled Chief of Naval Operations Availability, the repair activity will obtain a REC number from the ship's QAO and record it in this block (e.g., SUBSAFE/REC No.).

**NOTE:** IF THE MCR IS REVISED BEYOND REVISION "G", THE ADDITIONAL REVISION LETTERS WILL BE ENTERED AND CROSSED OUT IN THE REMARKS BLOCK, BLOCK 9.

BLOCK 5 - REVISIONS

The QAO will circle, cross out, and/or record the applicable revision. This column controls the revisions, with the first version being "-" (dash), the first revision being A, second revision being B, etc. When the initial CWP/REC number is issued the dash (-) will be circled, when subsequent revisions of the MCR are issued the appropriate letter (A, B, C) will be circled and the previously circled Revision Letter will be crossed out using an "X".

BLOCK 6 - SYSTEM/COMPONENT

The QAO will enter the same system as in Block 9 or component as in Block 11 of the QA form 9.

NOTE: COMPONENT IS PREFERRED IF IT IS A VALVE OR EQUIPMENT WITH A UNIQUE IDENTIFIER (e.g., ASW-617, NO. 1 MAIN CONDENSER, ETC.).

BLOCK 7 - PRIME RESPONSIBILITY WORK CENTER OR GROUP

The QAO will enter the division/organization responsible for the work. For a repair activity, this is the LWC as assigned by the Planning Officer. For the ship, this is the WC initiating the QA form 9.

NOTE: IF THE COMMANDING OFFICER OF THE SHIP IS REQUIRED TO REVIEW FOR CLOSING THE QA FORM 9, THEN THE DATE IN BLOCK 21 OF THE QA FORM 9 DOCUMENTING THE CO's REVIEW SHALL BE DOCUMENTED IN BLOCK 8 OF THE QA FORM 11.

BLOCK 8 - DATE

The QAO will enter the date the MCR serial number is assigned in the column "ISSUED". In the column "STARTED", the QAO will enter the same date as in Block 15D of the MCR as soon as Block 15 is dated. In the column "CLOSED", the QAO will enter the same date documented in Block 20 or 21, as applicable, of the QA form 9.

BLOCK 9 - REMARKS

This column is to be used to record revisions of the MCR/REC, if more revisions are issued after revision "G", and to summarize the work description and any other pertinent information (e.g., repair ASW-22, accomplish Unrestricted Operation (URO) Maintenance Requirement Card (MRC) 008 on ASW-7, overhaul number 2 periscope).

**DEPARTURE FROM SPECIFICATION REQUEST  
QA FORM 12**

1. DEPARTURE NO.	2. SHIP	3. JCN	4. CWP/REC SER. NO. <b>4A. TECHNICAL WORK DOCUMENT</b>	5. DATE
6. ORIGINATOR: NAME		7. DEPARTURE TYPE <input type="checkbox"/> MAJOR <input type="checkbox"/> MINOR <input type="checkbox"/> SUBSAFE <input type="checkbox"/> FBW <input type="checkbox"/> SFCC <input type="checkbox"/> SOC		<b>7A. ESTIMATED CLEARANCE DATE</b>
8. ADDITIONAL CLASSIFICATION (SHIPYARD AND SOC USE ONLY) ISIC CONCURRENCE (REQUIRED FOR CONDITIONAL DFS)		<input type="checkbox"/> WAIVER <input type="checkbox"/> YES	<input type="checkbox"/> DEVIATION <input type="checkbox"/> NO	<input type="checkbox"/> SDDR <input type="checkbox"/> TVD <input type="checkbox"/> FBWDR <input type="checkbox"/> N/A
9. SYSTEM/COMPONENT/LOCATION & SHORT DESCRIPTION				
10. NAVSEA DRAWING/PLAN NUMBER/PIECE NUMBER				
11. REFERENCES				
12. APPLICABLE SPECIFICATIONS				
13. SITUATION/DEGREE OF NON-COMPLIANCE				
14. COMMENTS/RECOMMENDATION (TEST CONDUCTED, AFFECTED SYSTEMS)				
15. DATE ANSWER REQUESTED BY:		16. SUBMITTING ACTIVITY: TYPED OR PRINT NAME/SIGNATURE (RO/DH)		
17. NEW JCN NUMBER FOR CONDITIONAL DEPARTURES (IF NECESSARY):				
18. <b>APPROVAL ACTIVITY</b>				
19. COPY TO:				

<b>ISIC / ORIGINATOR</b>				
APPROVED <input type="checkbox"/>	DISAPPROVED <input type="checkbox"/>	<b>TEMPORARY</b> <input type="checkbox"/>	<b>PERMANENT</b> <input type="checkbox"/>	FORWARD TO TYCOM FOR ACTION <input type="checkbox"/>
			FORWARD TO <b>LTA</b> FOR ACTION <input type="checkbox"/>	
ISIC COMMENTS (ENDORSEMENT)				
ISIC TYPED NAME (NAME, RANK, BILLET/CODE)			DATE	
<b>TYCOM</b>				
APPROVED <input type="checkbox"/>	DISAPPROVED <input type="checkbox"/>	CONCUR <input type="checkbox"/>	<b>TEMPORARY</b> <input type="checkbox"/>	<b>PERMANENT</b> <input type="checkbox"/>
			FORWARD TO <b>NAVSEA</b> FOR ACTION <input type="checkbox"/>	
			FORWARD TO <b>LTA</b> FOR ACTION <input type="checkbox"/>	
TYCOM COMMENTS (ENDORSEMENT)				
TYCOM TYPED NAME (NAME, RANK, BILLET/CODE)			DATE	
<b>LOCAL TECHNICAL AUTHORITY</b>				
APPROVED <input type="checkbox"/>	DISAPPROVED <input type="checkbox"/>	<b>TEMPORARY</b> <input type="checkbox"/>	<b>PERMANENT</b> <input type="checkbox"/>	FORWARD TO NAVSEA FOR ACTION <input type="checkbox"/>
LOCAL TECHNICAL AUTHORITY COMMENTS (ENDORSEMENT)				
LOCAL TECHNICAL AUTHORITY TYPED NAME (NAME, RANK, BILLET/CODE)			DATE	
<b>NAVSEA / NAVAIR TECHNICAL AUTHORITY</b>				
APPROVED <input type="checkbox"/>	DISAPPROVED <input type="checkbox"/>	<b>TEMPORARY</b> <input type="checkbox"/>	<b>PERMANENT</b> <input type="checkbox"/>	PRECEDENT SETTING <input type="checkbox"/>
NAVSEA / NAVAIR TECHNICAL AUTHORITY COMMENTS (ENDORSEMENT)				
NAVSEA / NAVAIR TECHNICAL AUTHORITY TYPED NAME (NAME, RANK, BILLET/CODE)			DATE	

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QA FORM 12 INSTRUCTIONS

DEPARTURE FROM SPECIFICATION REQUEST

PURPOSE: Used to report and request approval of a DFS.

PROCEDURE:

1. The activity finding or causing a DFS will immediately report the DFS to the appropriate approval authority using this form.
2. The numbered blocks on QA form 12 correspond with instructions listed below.

BLOCK 1 - DEPARTURE NO.

Enter the next sequential number from the affected ship serial file.

BLOCK 2 - SHIP HULL NO.

Enter the name and hull number of the ship on which the DFS occurred.

BLOCK 3 - JCN

Enter the JCN for the job upon which the DFS occurred or was identified.

BLOCK 4 - CWP/REC SER. NO.

Enter the CWP/REC serial number or enter N/A if no CWP/REC is required. Do not list the CWP/REC revision.

BLOCK 4A - TECHNICAL WORK DOCUMENT

(SHIPYARD USE ONLY) Enter the technical work document that identified the non-conformance.

BLOCK 5 - DATE

Enter the date the DFS request is filled out.

BLOCK 6 - ORIGINATOR

Print or type the name of the originator of the DFS.

BLOCK 7 - DEPARTURE TYPE

Enter the applicable departure type. (Major or Minor) and classification as necessary (SUBSAFE, SOC, FBW or SFCC).

BLOCK 7A - ESTIMATED CLEARANCE DATE

The activity performing final approval shall enter an expected clearance date in conjunction with approving the non-conformance. This date will normally be the expiration date but may be a date earlier than the expiration of the non-conformance. The Ship, ISIC or TYCOM may revise this date to be earlier than the expiration date of the non-conformance.

BLOCK 8 - ADDITIONAL CLASSIFICATION (SHIPYARD AND SOC USE ONLY)

Enter the necessary information as required. If the departure is conditional, mark the appropriate block to indicate that ISIC concurrence is required.

**BLOCK 9** - **SYSTEM/COMPONENT/LOCATION**

Enter the affected system, component, and location. A short description may be added if needed to fully identify the system/component/location.

**BLOCK 10** - **NAVSEA DRAWING/PLAN NUMBER/PIECE NUMBER**

Enter the NAVSEA drawing number, plan number and piece number, as applicable, that shows the component or system on which the DFS is initiated.

**BLOCK 11** - **REFERENCES**

Enter additional references used (e.g., Training Aid Booklet, Ships Information Book, Ships Systems Manual, Steam and Electric Plant Manual, SUBSAFE Certification Boundary Book, Tech Manual) as applicable.

**BLOCK 12** - **APPLICABLE SPECIFICATIONS**

Enter the applicable specifications. Be descriptive and specific. Enter the reference that provided the specification. This block should fully explain the specifications and include the JID or part applicable (e.g., perform "J" pressure test to test pressure depth after mechanical assembly of joints "XXXX" in which software was replaced). This block must be explicit, so that no reference is required to the work procedure to understand the specifications.

**BLOCK 13** - **SITUATION/DEGREE OF NON-COMPLIANCE**

Enter what the actual condition is. Sketches, drawings, QA forms, etc., may be attached, if they clarify the description of the non-conforming condition.

**BLOCK 14** - **COMMENTS/RECOMMENDATION (TEST CONDUCTED, AFFECTED SYSTEMS)**

Enter comments/recommendations pertinent to the job. The comments will include recommendation and justification for approval of the DFS. Enter tests conducted and the results, SAT or UNSAT.

**BLOCK 15** - **DATE ANSWER REQUESTED BY**

Enter date.

**BLOCK 16** - **SUBMITTING ACTIVITY**

Type or print name and enter signature.

**BLOCK 17** - **NEW JCN NUMBER FOR CONDITIONAL DEPARTURES**

Any departure that is conditional (requires future work to correct), Ship's Force will enter the new JCN that tracks the maintenance action to correct the deficient condition.

**BLOCK 18** - **APPROVAL ACTIVITY**

List the activity who will be the final approval.

**BLOCK 19** - **COPY TO**

Enter activities to receive copy.

For the ISIC, TYCOM, LOCAL TECHNICAL AUTHORITY and NAVSEA/NAVAIR TECHNICAL AUTHORITY blocks, the applicable activity will request, concur, approve, disapprove and indicate temporary, permanent or precedent setting as applicable. In the case of temporary non-conformances, specify the time duration (dd/mm/yyyy) that the noncompliance is acceptable prior to correction and list any restrictions.

ISIC / ORIGINATOR: Check the appropriate blocks. Check the FWD to TYCOM/LOCAL TECH. AUTHORITY FOR ACTION block for any DFS requiring TYCOM action and print name, sign and date.

- a. (Surface Forces only) The originator of the non-conformance will check the appropriate blocks to forward the non-conformance to the appropriate activity for action.
- b. For an at sea generated DFS, the Commanding Officer will use the ISIC section to indicate approval of the DFS.
- c. In the instances where a depot activity forwards a conditional departure to the ISIC for concurrence, the ISIC will check the block labeled CONCUR, FORWARDED TO TYCOM FOR ACTION. The ISIC will type or print name, sign and date.

TYCOM: Check the appropriate blocks. Type or print name, sign and date.

LOCAL TECHNICAL AUTHORITY: When appropriate, check the appropriate blocks and type or print name, sign and date. Check the FWD TO NAVSEA FOR ACTION BLOCK for any DFS requiring NAVSEA final approvals.

NAVSEA/NAVAL AIR SYSTEMS COMMAND (NAVAIR) action: The appropriate blocks will be checked and signed by NAVSEA.

NAME/SIGNATURE/DATE: The ISIC Material Officer, ISIC QAO, TYCOM Representative, Local Technical Authority Chief Engineer or Commanding Officer (for an at-sea initiated DFS) will type or print name and title, sign and date in the appropriate block signifying technical acceptance of the DFS. In the case of shipyard conditional departures, the ISIC signature only signifies acceptance that work to clear the deficient condition is acceptable to be delayed to a future time period. The ISIC signature in this case does not signify acceptance of the technical merit of the departure.

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QA FORM 20 INSTRUCTIONS

WELDING IN PROCESS CONTROL/NONDESTRUCTIVE TEST RECORD

PURPOSE: To document in process controls for welding and NDT of a completed weld.

PROCEDURE:

1. QA form 20 will be completed by the planner preparing the CWP, welder and NDT Inspector(s) observing or performing tests.
2. The numbered blocks on QA form 20 correspond to the instructions listed below. When the form is used for production welding, the blocks marked with a ♦ shall be completed by the planner.

BLOCK 1 - PAGE 1 OF

Enter the page number, starting with page 1, of total number of QA forms 20 and 20A, if used, associated with the joint (e.g., 1 of 3, 1 of 2).

BLOCK 2 - SHIP HULL NO.

Enter the ship's name and hull number.

BLOCK 3 - JCN

Enter the JCN.

BLOCK 4 - CWP/REC SER. NO.

Enter the CWP/REC Serial Number or enter N/A if no CWP/REC is required. Do not list the CWP/REC revision.

BLOCK 5 - LWC

Enter the shop number of the LWC.

BLOCK 6 - DATE

Enter the date this form is initiated.

BLOCK 7 - SYSTEM

Enter the noun name of the system.

BLOCK 8 - COMPONENT

Enter the noun name of component.

BLOCK 9 - DWG NO.

Enter the JID or mapping drawing, if applicable. If not applicable, the planner will enter the applicable arrangement drawing, system diagram, or component drawing number, or locally prepared JID sketch.

BLOCK 10 - CWP STEP NO.

Enter the appropriate step number(s) of the CWP.

BLOCK 11 - JOINT ID

Enter the JID from the joint identification or map plan if JID is unavailable, assign local JID. If for a qualification joint (and not production joint identification) enter individual name performing the qualification.

BLOCK 12 - JOINT DESIGN

Enter the joint design (e.g., P-73, PN-1A, P-14, PN-7) to be used.

BLOCK 13 - INST LOCATION

Enter the compartment, frame number, and check port, starboard, or centerline where the component is located.

BLOCK 14 - WELDED LOCATION

Check the appropriate block.

BLOCK 15 - COMPONENT A/B

Enter the component name (e.g., pipe, valve).

BLOCK 16 - MATERIAL

Enter the material type (e.g., CUNI, CRES).

BLOCK 17 - SIZE

Enter the iron pipe size/NPS.

BLOCK 18 - THICKNESS

For nuclear welds, enter the design material thickness. For non-nuclear welds, enter the nominal thickness or the actual measured thickness, if taken, for determining penetrometer selection for radiographed piping joints in accordance with NAVSEA T9074-AD-GIB-010/271, NAVSEA S9074-AR-GIB-010/278, and NAVSEA T9074-AD-GIB-010/1688 and for determining fillet legs on partial penetration welds in accordance with NAVSEA T9074-AD-GIB-010/271, NAVSEA T9074-AD-GIB-010/1688 and MIL-STD-1689 (for Surface Force Ships only).

BLOCK 19 - MATL SPEC

Enter the appropriate material specification for the material.

BLOCK 20 - MIC NO.

Enter the MIC number for component A and B, if applicable. Verify the MIC number from the QA form 2 for new material. For existing material, if the required MIC number is not readable enter "existing".

BLOCK 21 - [ ] SEAL RING [ ] BACK RING/STRIP

Check the appropriate block for the type of backing.

BLOCK 22 - MATERIAL

Enter the welding amperage actually used.

BLOCK 50 - INTERPASS TEMP

Enter the maximum interpass temperature as measured during the process.

BLOCK 51 - WELDER SIGNATURE

Print name and enter signature certifying the data recorded in Blocks 46-51 for the layer welded.

BLOCK 52 - DATE

Enter the date Block 51 is signed.

BLOCK 53 - REMARKS

Enter additional remarks or sketches. Enter the appropriate Test, Measuring and Diagnostic Equipment as defined in Part I, Chapter 5, paragraph 5.2.1 of this volume. If required, a continuation of Block 53 is on the back of the form at the bottom for additional information.

BLOCK 54 - INSPECTION STANDARD

Enter the applicable inspection standard.

BLOCK 55 - WELD CLASS

Enter class 1 or 2, per the requirements of NAVSEA 250-1500-1, for nuclear welds. The class (e.g., A-1, A-2, A-F, A-LT, M-1, P-1, PL-T, T-1) for non-nuclear welds.

BLOCK 56 - ACCEPTANCE STANDARD

Enter the applicable acceptance standard.

BLOCK 57 - ACCEPT CLASS

Enter acceptance class 1 or 2, per the requirements of NAVSEA 250-1500-1, for nuclear welds. The class (e.g., I, II, III) for non-nuclear welds.

BLOCK 58 - WELD PREP - COMPONENT A/B

Enter the component name (e.g., pipe, valve).

BLOCK 59 - INSPECTION METHOD

Enter the type and method of inspection performed (e.g., VT 5X, PT).

BLOCK 60 - ACCEPT/REJECT

Enter accept or reject to indicate disposition of the weld preps.

BLOCK 61 - NDT INSPECTOR SIGNATURE

NDT Inspector print name and enter signature certifying the disposition of the weld prep.

BLOCK 62 - DATE

Enter the date Block 61 is signed.

BLOCK 63 - JOINT FIT-UP

Enter results (i.e., inspection method, Accept/Reject, Inspector and date) of joint fit up inspections.

BLOCK 64 - INSP LAYER

Enter the weld layer inspected (i.e., tacks, root, intermediate, final, inside/backside, accessible/inaccessible).

BLOCK 65 - INSP METHOD

Enter the type and method of inspection performed (e.g., VT 5X, PT).

BLOCK 66 - INSP PROC NO.

Enter the inspection procedure number.

BLOCK 67 - ACCEPT/REJECT

Enter accept or reject to indicate disposition of the weld layer. If final disposition of the weld is rejectable, document reason(s) for rejection in Block 53 and description and location of defect(s) in Block 88.

BLOCK 68 - NDT INSPECTOR SIGNATURE

NDT Inspector print name and enter signature certifying the disposition of the weld layer.

BLOCK 69 - DATE

Enter the date Block 68 is signed.

NOTE: IF REPAIRS ARE REQUIRED TO THE JOINT, ENTER THE REPAIR NUMBER IN THE "REPAIR NO. \_\_\_" BLANK AND RECORD THE INSPECTIONS IN BLOCKS 70 THROUGH 75, 76 THROUGH 81, AND 82 THROUGH 87 IN THE SAME MANNER AS BLOCKS 64 THROUGH 69. BLOCKS NOT COMPLETED WILL BE LEFT BLANK.

BLOCK 88 - L W D

Enter the repair number and the location, length, width, and/or depth of any indications and/or defects noted during the inspections and their disposition.

BLOCK 89 - L W D

Enter the repair number and the location, length, width, and/or depth of any indications and/or defects noted during the inspections and their disposition.

BLOCK 90 - L W D

Enter the repair number and the location, length, width, and/or depth of any indications and/or defects noted during the inspections and their disposition.

BLOCK 91 - FINAL DISPOSITION

The NDT Inspector who completed the final inspection of the final weld will check acceptable or rejectable.

BLOCK 92 - NDT SUPERVISOR SIGNATURE DATE

NDT Supervisor print name, enter signature and date signifying all information in Blocks 1 through 90 is technically and administratively correct.

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QA FORM 20B (PART A) INSTRUCTIONSSTRUCTURAL PRIMARY RECORD

PURPOSE: To provide a standard form and instruction for documenting required structural welding and NDT completion data.

NOTES:

1. PLANNING AND ESTIMATING (P&E) SHALL COMPLETE BLOCKS 1-14, 20, 21, 22-24 (PARTIAL), AND 26 (IF NECESSARY) FOR SUBMARINE RECORDS. ANNOTATED PERSONNEL SHALL COMPLETE ALL REMAINING BLOCKS.
2. RECORD OF ACCOMPLISHMENT DEFINITION: A RECORD USED FOR SOME SUBMARINE WELDS THAT NAVSEA TECH PUB T9074-AD-GIB-010/1688 ALLOWS REDUCED NDT DATA REQUIREMENTS. IT IS PRIMARILY USED FOR MAGNETIC PARTICLE TESTING (MT) INSPECTION. MT INSPECTIONS THAT MAY USE A RECORD OF ACCOMPLISHMENT FOR COMPLETION DATA ARE DEFINED IN TABLES 6-1 AND 6-2 OF NAVSEA TECH PUB T9074-AD-GIB-010/1688, BY REFERENCE TO NOTE 8. NDT COMPLETION DATA FOR A RECORD OF ACCOMPLISHMENT IS DEFINED IN NAVSEA TECH PUB T9074-AD-GIB-010/1688, PARAGRAPH 5.3.1.
3. BLOCKS/ROWS OF THIS RECORD MAY BE EXPANDED OR DELETED TO SUIT THE WORK BEING DOCUMENTED.
4. EACH SIGNATURE WILL BE ACCOMPANIED BY A PRINTED NAME AND DATE. AN EMPLOYEE MAY USE THEIR INITIALS PROVIDED THEIR SIGNATURE AND PRINTED NAME APPEAR ELSEWHERE ON THE SAME PAGE.

SCOPE: The scope of this instruction is limited to structural welding and NDT for overhaul and repair governed by NAVSEA Tech Pub T9074-AD-GIB-010/1688, or MIL-STD-1689A as invoked by Naval Ships Tech Manual S9086-CH-STM-010/CH-074, through NAVSEA S9AA0-ABGOS-010/GSO, NAVSEA 0902-018-2010 or COMUSFLTFORCOMINST 4790.3 Joint Fleet Maintenance Manual.

BLOCK 1 - RECORD NO.

Enter the Part A record number. The numbering convention is A-01, A-02, A-03 etc., in numerical order, depending on how many Part A records are generated for the TWD. Keep the number of Primary Records generated to a minimum.

BLOCK 2 - LWC/SHOP

Enter local work center or lead shop.

BLOCK 3 - SHEET

(P&E/Craftsman/Inspector) Enter the sheet number of the Part A record or Part A continuation sheet. Total number of sheets generated (e.g., 2 of 3) will be added by the supervisor at time of signature in Block 27. It is pre-printed for the first sheet. All continuation sheet numbers must be added. Sheet numbers for Part A, B and C records are not associated. They are unique only to the record, Part A, B, or C that you are dealing with.

BLOCK 4 - SHIP/HULL NO.

Enter the ship name and/or hull type, SSN, SSBN/SSGN, CVN, etc., and unique hull number for the ship, 759, 732, or 65, etc.

BLOCK 5 - JCN

Enter the Job Control Number (JCN).

BLOCK 6 - CWP/REC

Enter the CWP/REC serial number or enter N/A if no CWP/REC is required. Do not list the CWP/REC revision.

BLOCK 7 - REFERENCES

Enter references, drawings etc. that are to be used to describe joints. Do not enter references that are associated only with joints that require a Part B record.

BLOCK 8 - JOINT NUMBER

Enter the Joint Numbers.

BLOCK 9 - SS/SOC

Check the block associated with each joint number if it is SUBSAFE or Scope Of Certification (SOC). All joints that involve the SUBSAFE boundary shall be checked whether they require re-entry control or not. For example, attachment welds to the boundary shall be checked even though this work is not subject to re-entry control. For surface ship welds, enter NA.

BLOCK 10 - REC (SHIPYARD USE ONLY)

Check the block associated with each joint number if the joint requires re-entry control.

BLOCK 11 - COMPONENT NUMBER 1 (Leave blocks blank for joints that require a Part B Record.)

Enter the letter associated with the drawing number in Block 7, which describes the component and enter the piece number (if necessary to describe the joint) for the component. For joints that may require explanation, enter "See remarks" as a reference in a Block 7, refer to this note as you would a drawing and give the explanation in remarks.

The term "EXISTING" may be used to describe existing ship structure, provided the other component in the joint defines the joint location. To do this, add "EXISTING" as a reference in Block 7, refer to it as you would a drawing, and "N/A" the piece number. Enter the base material type (OSS, HY-80, HSS, etc.), S-Group Number from Table 1 of NAVSEA S9074-AQ-GIB-010/248, and the drawing material thickness (decimal or fraction).

BLOCK 12 - COMPONENT NUMBER 2

Make entries for Component 2 as described in Block 11. For repair sites, enter N/A in Component 2 columns.

BLOCK 13 - WELD INFO (Leave blocks blank for joints that require a Part B Record.)

JOINT DESIGN: Enter the joint design in terms of MIL-STD-22 joint numbering system (PT2S.1, PT2V.1, C2V.2, B2V.3 etc.). Use Remarks (Block 14) to describe "Special Joints", as described in paragraph 11.4.7 of NAVSEA Tech Pub T9074-AD-GIB-010/1688 or paragraph 11.2.7 of MIL-STD-1689A, including any special weld buildup required for the joint.

WELD SIZE: Enter the weld size in terms of fractions. Enter N/A for butt welds, plug welds, base material repairs, weld surfacing, corner welds with no reinforcing fillet, clad welds, and edge welds. For PT2V.3 and PT2V.4, enter sizes for both reinforcing fillets. Use Remarks blocks for local joint clarification or joint or sketch numbers.

BLOCK 14 - REMARKS





QA FORM 34 INSTRUCTIONSJOINT/COMPONENT TORQUE AND ASSEMBLY RECORDREFERENCES:

- (a) NAVSEA 389-0317 - Procedures for Maintenance and Repair of Naval Reactor Plants (Nuclear)
- (b) NAVSEA SS800-AG-MAN-010/P-9290 - System Certification Procedures and Criteria Manual for Deep Submergence Systems

NOTE: PLANNING SHALL FILL IN BLOCKS IDENTIFIED BY A ♦ PRIOR TO ISSUING

PURPOSE: To provide a standard form to document the assembly and torquing of Nuclear Level I system piping joints, SUBSAFE, and SOC mechanical joints and assemblies listed in the requirements below. All other mechanical joints requiring assembly OQE, not listed below, may be documented on a QA form 34A.

REQUIREMENTS:

1. Torque documentation is required for the following joints and must be documented on a QA form 34.
  - a. All nuclear Level I system piping joints (i.e., flanges) governed by Chapter 14 of reference (a).
  - b. All joints assembled as a Controlled Assembly.

NOTE: ALTHOUGH JOINTS FOR CONTROLLED ASSEMBLIES AND NUCLEAR LEVEL I SYSTEM PIPING JOINTS ARE CERTIFIED ON THIS FORM, TORQUE VALUES MAY NOT APPLY TO ALL JOINTS.

- c. SUBSAFE:
  - (1) Sea Connected/Seawater bolted pressure boundary joints NPS 1/2 inch and larger from the inboard joint of the backup valve (or equivalent) outboard (i.e., Hull Integrity (HI) joints).
  - (2) All sea connected/Seawater bolted pressure boundary piping and component joints from systems NPS 4 inches and larger inboard of the inboard joint of the backup valve.
  - (3) Electrical Hull Fitting Installation joints including EHF to pressure hull and EHF Shore Power joints.

NOTE: BOLTED PRESSURE BOUNDARY JOINTS ARE DEFINED AS JOINTS WHICH UTILIZE BOLTS, NUTS, STUDS, STUD-BOLTS, OR SCREWS TO JOIN TWO PRESSURE BOUNDARY PARTS.

- d. Scope of Certification:
  - (1) All SOC bolted pressure boundary piping and SOC component joints.
  - (2) In-line SOC union piping joints with torque values specified on drawing or document.

PLANNING THE SCOPE OF A QA 34 FORM: In order to support the execution process, it is necessary to properly limit the scope of Assembly Records. The following rules are provided to ensure proper breakdown:

- a. Each shipboard piping joint shall have a unique joint record consisting of separate Block 9 entries.

- b. All Level I material must be traceable to a specific joint. To ensure unique joint traceability, if any identical Level I parts are used in multiple joints within an assembly (normally this applies to fasteners), the craftsman will annotate which joint (Block 9A, 9B, etc.) the material was installed in.
- c. For complex assemblies (e.g., Shaft Seal installations), assembly records should be scoped to support testing evolutions.

**PROCEDURE:** The numbered blocks on QA form 34 correspond with instructions listed below. Any block not used will be marked N/A. Planning shall fill in blocks identified by a ♦ prior to issuing the CWP. For QAI signatures, the planner will determine the need for a QAI prior to the start of the job. If no QAI is required, the planner will enter NA in the QAI signature block.

TOP OF FORM - PAGE \_\_\_\_\_ OF \_\_\_\_\_

Enter page numbers.

BLOCK 1 - SHIP/HULL NO.

Planner enter the ship's name and hull number, or enter the appropriate rotatable pool system designator (e.g., TRIPER, CCRP, AERP, SSN 688CL, etc.).

BLOCK 2 - JCN

Planner enter the Job Control Number (JCN).

BLOCK 3 - LWC/SHOP

Planner enter the lead shop assigned to assemble the joint (e.g., X31, X58, X56).

BLOCK 4 - CWP/REC SER. NO.

Planner enter the CWP/REC serial number or enter NA if no CWP/REC is required. Do not list the CWP/REC revision.

BLOCK 5 - SYSTEM/COMPONENT/ROTATABLE POOL SER NO.

Planner enter the noun name of the system and component (if applicable), (e.g., MSW-25). For Rubber Insert Sound Isolation Coupling (RISIC) enter the Selected Record Drawing (SRD) Line Item No. If Record is for in-shop restoration of rotatable pool material, enter the serial number of the material if known.

**NOTE:** ROTATABLE POOL SERIAL NUMBERS MAY BE ENTERED BY THE CRAFTSMAN IF NOT ENTERED BY THE PLANNER.

BLOCK 6 - REFERENCES

Planner enter all references used to identify component parts, joint, material and assembly information. Include revision letter and, when applicable, the assembly number (e.g., Assy D, Assy RA, etc.). Revisions for technical manuals are not required. If joint numbers are assigned via a sketch in a TWD or Planning sketch, include the TWD or Planning sketch number. Include both the assembly drawing and electrical holes assignment drawing for Electrical Hull Fittings. NAVSEA Technical Manual S9502-AM-GYD-010 may be abbreviated as "GYD-010" if needed.

## APPENDIX A

## MESSAGE FORMAT FOR CERTIFICATION CONTINUITY FOR DSS

(May be issued as a letter)

FM (SUBMITTING UNIT)  
 TO (ISIC)  
 (SUSTAINING ACTIVITY)  
 (DEPLOYED ISIC) (IF APPLICABLE)  
 INFO (PARENT ISIC) (APPLICABLE IN ALL CASES WHEN DEPLOYED)  
 (ADDITIONAL ADDEES)  
 BT  
 (CLASSIFICATION)//N04790//  
 SUBJ/CERTIFICATION CONTINUITY//  
 MSGID/GENADMIN/\_\_\_\_\_ (DSS UNIT)//  
 REF/A/DOC/COMUSFLTFORCOMINST 4790.3/DATE OF LATEST CHANGE//  
 REF/B/DOC/NAVSEA/DATE OF LATEST LETTER//  
 REF/C/DOC/NAVSEA/DATE OF LATEST LETTER//  
 REF/D/DOC/NAVSEA/DATE OF LATEST CHANGE//  
 AMPN/REF A IS JOINT FLEET MAINTENANCE MANUAL, REF B IS NAVSEA LTR FOR MISSION CONFIGURATION MATRIX, REF C IS NAVSEA CERTIFICATION LETTER, REF D IS SYSTEMS CERTIFICATION PROCEDURES AND CRITERIA MANUAL FOR DEEP SUBMERGENCE SYSTEMS//  
 RMKS/1. IAW REF A ALL WORK PERFORMED WITHIN THE SCOPE OF CERTIFICATION BOUNDARY FOR DESIGNATED MISSION CONFIGURATION(S) HAS BEEN COMPLETED AND SATISFACTORILY RETESTED. ALL SYSTEM/SUB-SECTIONS AND COMPONENTS REQUIRED BY THE MISSION CONFIGURATION MATRIX ARE OPERATING WITHIN APPROVED PARAMETERS AS SPECIFIED IN REF B. THERE ARE NO OUTSTANDING RECS FOR SCOPE OF CERTIFICATION EQUIPMENT/SYSTEMS.  
 2. THE MISSION CONFIGURATION, AS DEFINED IN REF B FOR INTENDED DIVES IS (ARE):  
 3. THE FOLLOWING EXTERNAL JOINT TIGHTNESS TESTS WILL BE CONDUCTED DURING A CONTROLLED DIVE TO TEST DEPTH.  
 4. THE FOLLOWING APPROVED DFS ITEMS ARE IN EFFECT:  
 DEPARTURE NO./MAJOR/MINOR SYSTEM/COMPONENT OPERATIONAL LIMITATIONS  
 5. THE FOLLOWING IS A LIST OF ALL APPROVED TEMPORARY MODIFICATIONS (TEMP MODS) WHICH ARE INSTALLED IN \_\_\_\_\_ (DSS UNIT):  
 INCLUDE TEMP MOD NUMBER AND STATE COMBINED IMPACT OF INSTALLED TEMP MODS ON VEHICLE STABILITY INCLUDING WEIGHT/MOMENT AND ANY OPERATION RESTRICTIONS ASSOCIATED WITH A SPECIFIC TEMP MOD.  
 6. ALL REQUIRED PMS WITHIN THE SCOPE OF CERTIFICATION BOUNDARY FOR \_\_\_\_\_ (DSS UNIT) HAS BEEN COMPLETED WITHIN THE REQUIRED PERIODICITY AND THE RESULTS ARE SATISFACTORY (EXCEPT AS NOTED BELOW).  
 7. ALL URO/HIP MRC MANDATORY TESTS/INSPECTIONS HAVE BEEN SUCCESSFULLY ACCOMPLISHED WITHIN THE REQUIRED PERIODICITY. THE URO/HIP MRC DATA REPORT FORMS HAVE BEEN MAILED AND COPIES HAVE BEEN PROVIDED TO THE ISIC.  
 8. THERE ARE NO OPEN CATEGORY IA, CATEGORY IB, OR CATEGORY IC SURVEY CARDS THAT AFFECT MANNED OPERATIONS. OPEN SURVEY CARDS ARE LISTED BELOW:  
 INCLUDE CARD NUMBER, CATEGORY, DESCRIPTION, DUE DATE//  
 BT  
 NOTE: ENSURE MESSAGES ARE IN ACCORDANCE WITH NTP-3 FORMAT AND CURRENT PLAIN LANGUAGE ADDRESS DIRECTORY (PLAD) IS UTILIZED.

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**APPENDIX B**

**LETTER FORMAT FOR CERTIFICATION REPORT TO TENDED DSS**

From: Commanding Officer, \_\_\_\_\_ (Sustaining Unit/Fleet Maintenance Activity (FMA)/Ship Yard/Contractor)  
 To: Commanding Officer/Officer in Charge \_\_\_\_\_ (TENDED DSS UNIT)  
 Subj: CERTIFICATION CONTINUITY OF \_\_\_\_\_ (TENDED DSS UNIT)  
 Ref: (a) COMUSFLTFORCOMINST 4790.3, Joint Fleet Maintenance Manual  
 Encl: (1) Copies of completed Quality Assurance Certification Form/Re-Entry Control Forms  
 (2) Copies of approved Departures from Specification

1. In accordance with reference (a), certification of those systems or portions of systems, on which (\_\_\_\_\_) performed maintenance has been sustained. All required re-certification of the maintenance has been completed except as noted in paragraph 2 and 3 below.

2. All CWPs opened for Scope of Certification maintenance have been closed. A copy of each completed QA-form 9 is forwarded as enclosure (1). RECs closed by transferring testing to a DFS are listed below:

<u>CWP/REC Serial Number</u>	<u>Task Description</u>	<u>Testing Required</u>
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3. The following Departures from Specifications (DFS) and Liaison Action Requests (LAR) for deviations from specification were approved as part of maintenance in this availability. Copies of each are provided as enclosure (2):

<u>CWP Serial No.</u>	<u>DFS or LAR Serial No.</u>	<u>Type</u>	<u>Component</u>
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4. The following HIP maintenance requirements were satisfied and are reported as complete by the (FMA/Ship Yard/Contractor). The original data report forms will be mailed to SUBMEPP with copies to your ISIC and TYCOM within 30 days.

<u>HIP</u>	<u>EGL (if applicable)</u>	<u>Component Identification</u>	<u>JCN</u>
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Signed by Fleet Maintenance Activity/  
 Ship Yard/Contractor

Copy to:  
 Parent ISIC  
 TYCOM

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**APPENDIX E**

**MESSAGE FORMAT FOR DDS ACCEPTANCE OF CUSTODY**

FM (HOST SUBMARINE OR DDS UNIT)  
TO (HOST SUBMARINE OR DDS UNIT)  
INFO ISIC// (NOTE 1)  
TYCOM// (NOTE 2)  
COMNAVSEASYS COM WASHINGTON DC//PMS 399/07Q4// (NOTE 3)  
(ADDITIONAL ADDEES)  
BT  
(CLASSIFICATION)//  
SUBJ/ACCEPTANCE OF CUSTODY OF DDS-\_\_\_\_//  
MSGID/GENADMIN/\_\_\_\_\_ (HOST SUBMARINE OR DDS UNIT)//  
REF/A/ DOC/COMUSFLTFORCOMINST 4790.3/DATE OF LATEST CHANGE//  
REF/B/ MSG OR DOC/HOST SUBMARINE OR DDS UNIT/DATE OF LETTER OR MESSAGE DTG//  
AMPN/REF A IS JOINT FLEET MAINTENANCE MANUAL, REF B IS TRANSFER OF CUSTODY MESSAGE  
OR LETTER//  
RMKS/1. PER REF A, \_\_\_\_\_ (HOST SUBMARINE OR DDS UNIT) HAS REVIEWED THE CONTENT OF  
REF B AND ACCEPTS CUSTODY OF DDS-\_\_\_\_.  
BT

- NOTE:
1. Office codes for ISICs are: COMNAVSPECWARGRU THREE N9; NSSC PEARL HARBOR HI N432; NSSC BANGOR WA N432; NSSC KINGS BAY GA N40A; COMREGSUPPGRUGROTON CT N40. Include NSW ISIC, Host Submarine home ISIC, and deployed ISIC (if applicable).
  2. Office codes for TYCOMs are: COMNAVSPECWARCOM CORONADO CA N844; COMNAVSUBFOR NORFOLK VA N4322; COMSUBPAC PEARL HARBOR HI N4322
  3. Include NAVSEA 07Q4 and PMS 399 Program Manager for informational purposes.
  4. Naval message is the preferred method to report acceptance of custody. Naval correspondence may be used only if message traffic is unavailable. If correspondence is used, ensure message distribution list is followed.

NOTE: ENSURE MESSAGES ARE IN ACCORDANCE WITH NTP-3 FORMAT AND CURRENT PLAD IS UTILIZED.

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**VOLUME V****PART III****CHAPTER 7****TESTING REQUIREMENTS****REFERENCES.**

- (a) NAVSEA SS800-AG-MAN-010/P-9290 - System Certification Procedures and Criteria Manual for Deep Submergence Systems
- (b) NAVSEA SS521-AA-MAN-010 - U.S. Navy Diving and Manned Hyperbaric Systems Safety Certification Manual
- (c) NAVSEA S9505-AF-MMA-010 - Submarine Non-Nuclear Piping Systems Test Manual

7.1 **PURPOSE.** To provide additional guidance for Deep Submergence Systems (DSS) that cannot be found in Part I, Chapter 7 of this volume.

7.2 **TESTING REQUIREMENTS.** Testing shall be in accordance with Part I, Chapter 7 of this volume with the following additions/exceptions:

- a. Hydrostatic Testing Requirements:
  - (1) Implodable/explodable testing shall be in accordance with references (a) and (b), as applicable. Additional implodable/explodable requirements may be contained in the applicable Scope of Certification Notebook.
  - (2) Pipe and piping components whose pressure boundary is externally loaded by sea pressure, but whose internal maximum operating pressure is equal to or greater than DSS design test depth pressure, shall only require an internal hydrostatic test.
  - (3) Pipe and piping components whose pressure boundary is externally loaded by sea pressure, but whose internal maximum operating pressure is less than DSS design test depth pressure, shall only require an external hydrostatic test. Additional guidance on external hydrostatic test requirements is contained in reference (a).
  - (4) Pipe and piping components that penetrate any hull integrity boundary where a single failure could result in internal flooding of the DSS unit shall be hydrostatically tested from the hull integrity boundary penetration inboard to the first isolation valve at a pressure equal to 150% of DSS design test depth or 150% of system maximum operating pressure, whichever is greater.
  - (5) Pipe and piping components open to internally pressurized tanks and/or enclosures (including hyperbaric chambers) shall be hydrostatically tested internally from the tank and/or enclosure penetration outboard to the first isolation valve at a pressure equal to the pressure used to hydrostatically test the tank and/or enclosure. These requirements are not applicable to piping and piping components open to compressed gas flasks.
  - (6) External hydrostatic test acceptance criteria of "no permanent deformation" for pipe shall, in addition to a complete visual inspection, be verified by out of roundness measurements. Out-of-roundness measurements not within the pipe specification, approved drawing or Military Standard 1627 (for pipe bends) shall be cause for rejection of the item.
- b. Joint Tightness Testing.

- (1) Pipe and piping components whose pressure boundary is externally loaded by sea pressure, but whose internal maximum operating pressure is equal to or greater than DSS design test depth pressure, shall only require an internal joint tightness test.
  - (2) Pipe and piping components whose pressure boundary is externally loaded by sea pressure, but whose internal maximum operating pressure is less than DSS design test depth pressure, shall require both external and internal joint tightness testing. Note that the ability to conduct external joint tightness testing is extremely limited. This testing is normally deferred using a Controlled Assembly in accordance with Part I, Chapter 7 of this volume, documenting a minor Departure from Specification and retesting during a dive to design test depth.
  - (3) Pipe and piping components that penetrate any hull integrity boundary, where a single failure could result in internal flooding of the DSS unit, shall be joint tightness tested from the hull integrity boundary penetration inboard to the first isolation valve at a pressure equal to 100% of DSS design test depth pressure or 100% of system maximum operating pressure, whichever is greater.
  - (4) Pipe and piping components open to internally pressurized tanks and/or structural enclosures (including hyperbaric chambers) shall be joint tightness tested internally from the tank and/or enclosure penetration outboard to the first isolation valve at a pressure equal to 100% of the maximum internal operating pressure of the tank and/or enclosure. These requirements are not applicable to piping and piping components open to compressed gas flasks.
- c. Pressure Drop Testing.
- (1) Pressure drop testing for oxygen, helium, helium-oxygen, nitrogen and hydrogen diving systems shall be as specified in reference (b).
  - (2) Pressure drop testing of submarine compressed air systems shall be as specified in reference (c).
- d. Objective Quality Evidence. Objective Quality Evidence (OQE) documenting the satisfactory accomplishment of all required testing shall be available and maintained in a format suitable for review and audit. Reference (a), Appendix J contains a detailed list of information which must be documented as OQE for testing. Existing forms contained in Part I, Chapter 11 of this volume do not capture all required OQE data. Forms contained in Part III, Chapter 11 of this volume should be used to support documentation of all reference (a), Appendix J OQE data. **All mechanical joint tightness and hydrostatic testing (both those utilizing an external pressure source or internal system pressure) should be documented on QA form 26A to ensure the requirements of reference (a), Appendix J are met.** In the event standardized forms are not available, it is permissible to modify and use the forms in Part 1, Chapter 11 of this volume and standardize these forms within the Sustaining Activity organization.
- e. Operational Test. A test of a system to nominal operating pressure using the system fluid, system pumps and installed system gage(s) vice test instrumentation to determine leak tightness.
- (1) A drop test meeting requirements of paragraph 7.2.c. above may be performed as an operational test.
  - (2) An operational test can be used to satisfy a mechanical joint tightness test.

**VOLUME V****PART III****CHAPTER 8****DEPARTURE FROM SPECIFICATIONS**REFERENCES.

- (a) NAVSEA SS800-AG-MAN-010/P-9290 - System Certification Procedures and Criteria Manual for Deep Submergence Systems

8.1 PURPOSE. To establish standard procedures to be used for reporting and requesting approval and clearance, at the earliest opportunity, of all non-conforming/departable conditions, Departures from Specification (DFS) associated with Scope of Certification (SOC) systems on Deep Submergence Systems (DSS). The guidance of Part 1, Chapter 8 of this volume and reference (a) should be used for handling DFS situations with the modifications listed below.

8.2 DEPARTURE FROM SPECIFICATION.

- a. A DFS is a non-conformance of any certification attribute from the intended or as-certified condition of the DSS. This includes non-conformances to approved drawings, components, specifications, technical manuals, operating and emergency procedures, maintenance procedures and any other authoritative document specifying a certification attribute of the DSS. DFS are identified as either a Deviation or Waiver.
- (1) Deviation: A DFS which is requested prior to a planned non-conformance.
  - (2) Waiver: A DFS which is requested subsequent to the non-conformance occurring.
- b. Should any system, equipment or component within the SOC fail to operate within specifications, regardless of how the deficiency is discovered, and repair at the Sustaining Activity level is not practicable prior to **manned operations**, a Major DFS shall be submitted.

8.2.1 Reporting Departures from Specification. It is incumbent upon User Activities, Sustaining Activities, Fleet Maintenance Activities and Immediate Superiors In Command to discuss potential DFS as early as possible (prior to the work close out or component assembly if possible) to determine direction of actions and alternatives to the DFS. Every effort must be made to correct each deficiency prior to equipment/system operation or underway of the DSS.

8.2.2 Approval of Departures from Specification. All SOC DFSs require Program Manager approval with System Certification Authority (SCA) concurrence prior to manned use of the DSS. Immediate Superiors In Command and Type Commanders are required to present all DFS items to the Program Manager for approval, except as noted in the SOC Notebook.

8.2.3 Major and Minor Departure from Specification Classification. These are specified in Part 1, Chapter 8 of this volume and each activities SOC notebook.

8.2.4 General Administrative Requirements. The following requirements pertain to all DFS:

- a. The User Activity and Sustaining Activity are responsible for all approved DFS relating to their systems/components until cleared or canceled. When a DFS is approved as a temporary repair requiring rework to correct the discrepancy, the ship referencing the DFS sequential number will initiate a Current Ship's Maintenance Project entry for correction of the discrepant condition. The ship's Quality Assurance Officer will ensure that this action is done.

- b. The Sustaining Activity shall maintain a master departure log of all waivers and deviations approved for each DSS. The log shall contain, as a minimum, the following:
  - (1) DSS unique identifier.
  - (2) Departure number.
  - (3) Departure title.
  - (4) Classification (Major or Minor).
  - (5) Type of departure (Deviation or Waiver).
  - (6) Date requested.
  - (7) Date resolved/approved.
  - (8) Approval or disapproval status.
  - (9) Conditional approval comments (if applicable).
  - (10) A copy of all applicable Naval Sea Systems Command correspondence delegating local approval of DFSs.
- c. Each activity shall maintain all DFSs in a form suitable for audit including supporting justification, technical documentation, calculations, rationale and related correspondence.
- d. When an activity performs work which results in a conditionally approved DFS or waiver which requires future action (e.g., re-inspection, repair), the ship will submit an OPNAV 4790/2K (or equivalent) with a new Job Sequence Number. This Job Sequence Number will be added to the DFS prior to submission to the Immediate Superior In Command. The Current Ship's Maintenance Project Job Sequence Number will be included in Block 17 of the DFS form.

#### 8.2.5 Submission and Approval of Departures from Specification.

- a. A copy of the waiver or deviation shall be forwarded to the applicable asset and its planning yard. This applies to both approved and/or disapproved waivers and deviations to ensure the planning yard is kept fully informed and for maintenance of the asset historical file.
- b. The approval and routing actions are the same as listed in Part 1, Chapter 8, paragraph 8.3.7 of this volume with the User Activity performing the ship functions and the Sustaining Activity performing the Fleet Maintenance Activity functions.
- c. Unless specifically delegated by the Program Manager and approved by the SCA, the Program Manager must approve all DFSs and obtain SCA concurrence.

#### 8.2.6 Departure from Specification Approval and Reporting for DSSs While at Sea. The Commanding Officer or Officer in Charge will evaluate any DFS and approve the corrective action to be taken including any necessary restrictions.

- a. The decision to continue manned operation of the DSS shall be made only after a careful review of the impact the deficiency will have on DSS personnel safety under all normal and emergency conditions. A report to the Program Manager via the chain of command will be made at the first opportunity.

QA FORM 26A INSTRUCTIONSHYDROSTATIC/PNEUMATIC TEST RECORD

**PURPOSE:** To document hydrostatic/pneumatic tests accomplished on Scope of Certification piping systems or portions of a system to recertify the system after maintenance. It also provides a method for the Fleet Maintenance Activity to specify the required retests for work they performed. **This form should be utilized to document mechanical joint tightness testing utilizing both an external pressure source and internal system pressure.**

**PROCEDURE:** The numbered blocks on QA form 26A correspond with the instructions listed below. Any block not used will be marked NA. The planning organization shall fill in blocks identified by a ♦ prior to issuing the Controlled Work Package (CWP).

**BLOCK 1** - DSS Platform/Hull Number

Enter the Deep Submergence System (DSS) or ship's name and hull number.

**BLOCK 2** - JCN

Enter the Joint Control Number (JCN).

**BLOCK 3** - LWC

Enter the shop number of the Lead Work Center (LWC).

**BLOCK 4** - CWP SER. NO.

Enter the CWP serial number.

**BLOCK 5** - SYSTEM/COMPONENT

Enter the name of the system and component to be tested.

**BLOCK 6** - TEST REFERENCES

Enter the applicable test reference and/or other applicable references (e.g., drawing number and revision used to obtain the required test pressure and conducting of the test).

**NOTE:** ENTER "S9505-AF-MMA-010/PIPING SYSTEMS" WHICH PROVIDES REQUIREMENTS FOR SHIP'S FORCE TO SET-UP AND CONDUCT TESTING.

**BLOCK 7** - REQUIRED TEST AND INSPECTION POINTS

Enter the specific test requirements necessary to recertify the work. Specify test requirements (i.e., type of test, special valve position, duration, acceptance criteria, joints to be tested (if entire component/system is tested, so state)).

**BLOCK 8** - DIAGRAM OF TEST AREA

Enter a diagram of the test area. Be specific. Include such things as relief valve locations, gage locations, blanks, gags, and valve positions, etc. The Quality Assurance Inspector (QAI) will verify the diagram prior to performance of the test. For nuclear tests identify major components to be isolated or vented to preclude unnecessary pressurization.

NOTE: ALL VALVES WITHIN THE TEST BOUNDARIES MUST BE IDENTIFIED AND THEIR POSITION (OPEN/SHUT) DURING THE TEST ANNOTATED.

NOTE: IF DRAWINGS OR ADDITIONAL INFORMATION IS REQUIRED TO SUPPLEMENT THIS REPORT, EACH DRAWING, ETC., WILL BE NUMBERED AND AUTHENTICATED WITH THE SIGNATURE BY THE CRAFTSMAN AND QAI MAKING UP THE REPORT.

NOTE: SHIPS, FLEET MAINTENANCE ACTIVITIES AND REGIONAL MAINTENANCE ACTIVITIES MANAGED BY FLEET FORCES COMMAND OR TYCOMS SHALL DISREGARD THE BLOCK 8 DIAMOND WHEN TESTING IS PERFORMED BY AN ACTIVITY OTHER THAN THE ACTIVITY PERFORMING REPAIR. THE ACTIVITY PERFORMING THE TESTING SHALL COMPLETE THE DIAGRAM REQUIRED BY BLOCK 8.

BLOCK 9 - GAGE DATA

Enter the Primary and backup gage data. Backup gage data is not required when performing an operational test as defined in Part I, Chapter 7 of this volume when a second system gage is not available.

BLOCK 10 - REQUIRED TEST FLUID

Enter the required test fluid.

BLOCK 11 - REQ'D TEST PRESSURE (PSIG)

Enter the required test pressure. If listing the value would classify the CWP then the symbols "J" or "H" with the applicable reference may be used instead of classifying the document.

BLOCK 12 - ACTUAL TEST PRESSURE (PSIG)

Enter the actual test pressure. If listing the value would classify the CWP then the symbols "J" or "H" with the applicable reference may be used instead of classifying the document.

BLOCK 13 - REQUIRED TEST DURATION

Enter the required test duration including units.

BLOCK 14 - ACTUAL TEST DURATION

Enter the actual test duration including units.

BLOCK 15 - ALLOWABLE LEAKAGE

Enter the allowable leakage including units for the leakage.

BLOCK 16 - MEASURED LEAKAGE

Enter the actual measured leakage including units for the leakage.

BLOCK 17 - INSPECTION RESULTS

- a. Check "SAT" block, if all inspections specified by Block 7 are complete and satisfactory.
- b. Check "UNSAT" block, if test results are unsatisfactory. Identify the specific inspection and reason for failure in the remarks section.