

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

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**JOINT FLEET MAINTENANCE MANUAL**

**VOLUME V**

**QUALITY MAINTENANCE**

**RECORD OF CHANGES**

CHANGE NO.	DATE	TITLE OR BRIEF DESCRIPTION	ENTERED BY (INITIALS)

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FOLD

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Commanding Officer

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OFFICIAL BUSINESS

Commanding Officer  
Submarine Maintenance Engineering,  
Planning and Procurement (SUBMEPP) Activity  
Attn: Code 1832JM  
P.O. Box 2500  
Portsmouth Naval Shipyard  
Portsmouth, NH 03804-2500

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**VOLUME V****PART I****FOREWORD****QUALITY MAINTENANCE**LISTING OF APPENDICES.

- A List of Acronyms
- B Glossary of Terms

1.1 PURPOSE. To provide procedures and guidance to ensure, with a reasonable level of confidence, that work performed on or for Navy ships is accomplished with first time quality. Further, it is to give the sailors who serve on our ships the confidence that their equipment and systems will operate reliably and safely, in peace or when in harms way.

1.2 SCOPE.

- a. The guidance contained in this volume is applicable to every ship and activity of the fleet. The requirements are applicable to Ship's Force when performing maintenance on their own ship, to each Fleet Maintenance Activity (FMA) when performing work on tended ships, and to outside organizations (shipyards, contractors, Regional Maintenance Centers) performing work on ships. This volume does not currently apply to outside organizations (shipyards, contractors) when an availability is conducted in a depot facility and the contract specifies the use of other specifications.
- b. This volume is directive in nature and may be cited as authority for action as the need dictates. Where higher authority imposes more stringent requirements or conflicts exist with previously issued Fleet directives, such requirements shall have precedence. When such conflicts are identified, they should be reported immediately to the Fleet and Type Commanders (TYCOM).

1.3 MANUAL ORGANIZATION.

1.3.1 Basic Maintenance Principles. In order for repairs to be conducted reliably and with first time quality, several principles must be adhered to:

- a. The worker must have a process that guides him or her in the performance of maintenance (see Part I Chapter 2 of this volume).
- b. The worker must be trained so that work can be done safely and effectively (see Part I Chapter 3 of this volume).
- c. The worker must have the proper technical direction (see Part I Chapter 5 of this volume).
- d. The worker must have the proper material (see Part I Chapter 6 of this volume).
- e. For essential and critical systems, confidence must be established by appropriate testing (see Part I Chapter 7 of this volume).

1.3.2 Special Circumstances and Maintenance Support. In the course of conducting maintenance, special actions are required if technical requirements cannot be met. Other actions not directly related to conducting maintenance are required to support the conduct of maintenance. Other chapters in this volume discuss these:

- a. Resources (Organization) (see Part I Chapter 1 of this volume).

- b. Departure from Specification (DFS/Waivers/Nuclear Liaison Action Request) (see Part I Chapter 8 of this volume).
- c. Audits and surveillance (see Part I Chapter 9 of this volume).
- d. Retention of records (see Part I Chapter 10 of this volume).
- e. Blank reproducible forms and form instructions (see Part I Chapter 11 of this volume).

1.3.3 Order of Precedence. Guidance documents originate from a variety of sources. When a conflict exists, the following tables are provided to assist in determining precedence of the governing document on a case-by-case basis. However, the tables may not be exact for a particular case and may require adjudication by your Immediate Superior In Command. Equipment and material under the cognizance of Naval Sea Systems Command Nuclear Propulsion Directorate (NAVSEA 08) is maintained in accordance with NAVSEA 08 directives.

NOTE 1: TABLE 1 AND 2 ESTABLISH THE ORDER OF PRECEDENCE FOR OPERATIONS AND MAINTENANCE TECHNICAL DOCUMENTATION GUIDANCE.

NOTE 2: THE EXAMPLES PROVIDED IN THE TABLES ARE NOT LISTED IN ANY PARTICULAR ORDER OF PRECEDENCE.

1.3.3.1 Operations. Table 1 identifies guidance for aligning, starting, stopping and changing modes of operation of systems and equipment.

Table FWD-1 Operating Systems and Equipment

	Precedence	Examples
1	Operating Setting Advisories Issued Before October 2009	Operating Advisories (Fleet Advisories, Class Advisories). Gas Turbine Technical Directives (GTBs, AYBs, etc.)
2	Operating Procedures	Operating Sequence Systems (EOSS, CSOSS, AFOSS, etc.) Reactor Plant Manual, Steam Plant Manual, Steam & Electric Plant Manual, Ships System Manuals
3	Technical Manuals	Component Technical Manuals, NSTM, OEM Technical Manual
4	Directives	SORM, EDORM, NAVORDS
5	Instructions	NAVSEA Letters
6	Locally Generated OSS	In accordance with Operating Sequencing Systems (OSS) Users Guide

1.3.3.2 Maintenance and Technical. Table 2 identifies guidance used for preventive maintenance, troubleshooting, assessment, alignment, calibration and TEMPALTs.

Table FWD-2 Maintenance and Technical Documents

	Precedence	Examples
1	DFS/Requirement Setting Advisories Issued before October 2009	DFS/LAR-Waiver, Fleet Advisories, Class Advisories, Gas Turbine Technical Directives (GTBs, AYBs, etc.)
2	PMS	MRCs, PMRs, Steam Plant Manual, Steam & Electric Plant Manual, Maintenance Requirements
3	Requirements	JFMM, P9290, 7010, 0010, SSCB, FBW, CRL, CMP, DDGOS, GSO, URO-MRC, SOC Notebook

4	Drawings	NAVSHIP drawings, BUSHIP Drawings, NAVAIR Drawings TVDs, SYSCOM Approved Vendor Drawings, DDS/ASDS Approved Drawings
5	Technical Manuals	Component Technical Manuals, NSTMs
6	Directives	SORM, EDOM, NAVORD, SYSCOM Technical Bulletins, Type Commander Technical Notes
7	Instructions	NWPs, SYSCOM Instructions
8	Maintenance Procedures	FWPs, CWPs, TWDs, UIPIs, PPIs, Maintenance Standards, Handbooks

The following abbreviations are used in the table above:

0010	SUBSAFE Manual
7010	Material Control Standard
AFOSS	Aviation Fuels Operational Sequencing System
ASDS	Advanced SEAL Delivery System
AYB	Ancillary Equipment Bulletin
CMP	Class Maintenance Plan
CRL	Calibration Requirements List
CSOSS	Combat Systems Operational Sequencing System
CWP	Controlled Work Package
DDGOS	Deep Diving General Overhaul Specifications
DDS	Dry Deck Shelter
DFS	Departures From Specification
EDOM	Engineering Department Organizational Manual
EOSS	Engineering Operational Sequencing System
FBW	Fly-By-Wire
FWP	Formal Work Package
GSO	General Specifications for Overhaul
GTB	Gas Turbine Bulletins
JFMM	Joint Fleet Maintenance Manual
LAR	Liaison Action Requests
NAVORD	Naval Ordinance
NSTM	Naval Ships Technical Manual
NWPs	Naval Warfare Publications
OEM	Original Equipment Manufacturer
OSS	Operational Sequencing System
P9290	System Certification Procedures and Criteria Manual for Deep Submergence Systems
PMR	Planned Maintenance Requirements
PPI	Portsmouth Process Instruction
SOC	Scope of Certification
SORM	Ships Organization Requirements Manual
SSCB	SUBSAFE Certification Boundary Book
SYSCOM	System Command
TVD	Technical Variance Document
TWD	Technical Work Document
UIPI	Uniform Industrial Process Instruction
URO MRC	Unrestricted Operations Maintenance Requirement Card

1.3.4 Advisories. Commencing with Revision B CH-2, advisories (bulletins, class advisories, Fleet advisories, In-Service Engineering Activity advisories, etc.) will no longer be used to change or set requirements. Any change to requirements will be done by an appropriate document change form (e.g., Advance Change Notice (ACN)).

#### 1.4 NEED FOR QUALITY MAINTENANCE PROCESSES.

- a. Quality maintenance processes play a vital role in the mission capability and personnel safety of many organizations. The three examples below demonstrate how actions, which seem small and insignificant can result in severe consequences. In all cases, if a strong and effective quality process had been in effect, the tragic results may have been averted.
  - (1) On April 10, 1963, while engaged in a sea trials deep dive off the coast of Maine, a flooding casualty occurred in the engine room of the USS THRESHER (SSN 593). A piping failure in one of the salt water systems was subsequently determined to be the most likely cause for the loss of the ship and all personnel onboard. The comprehensive investigation, which followed, recommended numerous changes in the design and maintenance processes for submarines resulting in the Submarine Safety (SUBSAFE) Program, as we know it today.
  - (2) On January 28, 1986 the space shuttle Challenger was launched from Cape Canaveral Florida. Seventy-three seconds into flight, the spacecraft exploded and seven astronauts lost their lives. Subsequently, on June 6, 1986 a Presidential Commission concluded that the cause of the Challenger accident was the failure of the pressure seal in the aft field joint of the right solid rocket motor. Neither the National Aeronautics Space Administration nor the rocket engine builder developed a solution to the unexpected occurrences of O-ring erosion and blow-by, even though this problem was experienced frequently during shuttle flight history. The commission further concluded that a quality program would have tracked and discovered the reason for increasing erosion and blow by. Additionally, the commission found that the pressure to fly a launch schedule of 24 flights a year created pressure throughout the agency that directly contributed to unsafe launch operations. In short, the syndrome of "we've operated with that problem before and the risk is small" prevailed. The safety and technical requirements became secondary to operational commitments.
  - (3) On October 30, 1990, a major steam leak occurred in the fire room on board USS IWO JIMA (LPH 2) resulting in the deaths of ten watch standers. The investigation determined the cause to be failure of the bonnet fasteners of a ship service turbine generator root valve. The valve had just been repaired by a shipyard where the bonnet fasteners were replaced with mismatched and incorrect material. The required fasteners were heat-treated steel studs and nuts. The fasteners installed during the maintenance were a mixture of bolts, studs and black oxide coated brass nuts. The high temperature and pressure placed on the fasteners during plant light off caused the brass nuts to fail catastrophically, which allowed the valve bonnet assembly to separate from the body. The replacement fasteners were furnished by Ship's Force, but no one (ship or shipyard) checked the fasteners, prior to installation, to ensure that the requirements of the technical manual and drawings were met.
- b. The above examples clearly demonstrate that, with the technical complexity of present day surface ships and submarines, the need for special administrative and technical controls necessary to ensure conformance to technical specifications during maintenance and testing is necessary. The necessity to perform the work correctly and in accordance with technical specifications is paramount in order to preclude loss of life or loss of a ship. The quality program was developed to assure maintenance of the modern day Fleet is performed in accordance with technical specifications, thus ensuring the highest state of material readiness.

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

ACCOMP	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
FTSCLANT	Fleet Technical Support Center Atlantic
FTSCPAC	Fleet Technical Support Center Pacific
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
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 <b>Naval</b> Nuclear Plant Maintenance By Forces Afloat.</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.

Hull Integrity Fasteners	Hull Integrity Fasteners (HF) are male threaded type items such as bolts, socket head capscrews, studs and bolt studs which are loaded by the differential sea pressure and internal hull pressure, and which are a part of pressure hull integrity components or of systems penetrating the Pressure Hull Structure, from the pressure hull to and including the inboard joint of the backup valve or its equivalent. Nuts and lock-washers are specifically excluded.
Hull Valve	A valve which, when closed, provides, in part or in whole, the first isolation boundary to sea pressure. The hull valve may also be referred to as the primary closure.
Immediate Superior In Command	<p>The ISIC is defined as follows:</p> <ul style="list-style-type: none"> <li>a. For Submarines - The Squadron/Group.</li> <li>b. For Aircraft Carriers - The TYCOM. The TYCOM may designate a representative in carrying out certain Immediate Superior in Command functions.</li> <li>c. For Surface Forces - The Command holding administrative control.</li> </ul>
Industrial Activity	The activity responsible for accomplishing construction or repair of ships whether private or public. This includes Naval shipyards, private shipyards, shipbuilders, vendors, Naval Aviation Depots, Naval Ship Repair Facilities, and other Naval Repair/Technical Activities (i.e., Naval Underwater Weapons Center, Naval Ships Weapons Center, etc.).
Initial Dive	For purposes of seawater valve and system testing, as defined in NAVSEAINST C9094.2, the first dive to a depth not previously reached during the trials.
Initial Tightness Dive	First submergence (a submarine's Alpha Trial).
In-Process Surveillance	The review of work in progress by personnel not directly involved with the work to assess such attributes as tagging and installation of controlled material, compliance with technical procedures, and recording of required data.
In-Service	Nuclear powered ships are assigned an active status of In-Service approximately two to four weeks (two to four months for Nuclear Powered Aircraft Carriers) prior to the commencement of Sea Trials and maintain this status until commissioning.
Inspection	A certification conducted by a separate individual qualified as an inspector (QAS, QAI, Cleanliness Certifier/Cleanliness Inspector, Nondestructive Test (NDT), Radiological Controls Monitor, Radiological Controls Shift Supervisor) on any system or component, which by its nature, is critical to the successful completion of the task.
Inspection Record	Record data showing the results of an inspection with appropriate identifying information as to the characteristics inspected and item inspected.

INSURV	Prior to the acceptance and delivery of a new ship, whether built by a private or naval industrial activity, all machinery, electronics and weapons systems installed shall be subjected to acceptance trials to determine that the installations are capable of meeting performance specifications. Depending upon your platform, these trials are referred to as either Acceptance Trials, Combined Trials or INSURV. This independent verification of the ship's readiness for acceptance and recommendation for fleet introduction is the responsibility of the President, Board of Inspection and Survey.
Leading Petty Officer/Work Center Supervisor	That person as defined by the appropriate Organization and Regulations Manual, responsible for ensuring the quality of work performed by his/her work center.
Lead Work Center	The Work Center or group on board ship or at a repair activity with prime responsibility for accomplishment of a work/maintenance procedure.
Level I	A designation for systems and components for which the Navy requires a high degree of assurance that chemical composition and mechanical properties of the installed materials meet the specified requirements.
Level of Essentiality	<p>A range of controls in two broad categories representing a high degree of confidence that procurement specifications for piping system components have been met. These categories are:</p> <ol style="list-style-type: none"><li>a. Verification of material, which ensures that the manufacturer has complied with procurement requirements for chemical composition and physical properties of the material.</li><li>b. Confirmation of satisfactory completion of tests and inspections required by the ordering data (e.g., Liquid Penetrant Testing (PT), dimensions, hydrostatic strength and porosity).</li></ol>
Liaison Action Request	A request for technical concurrence from Planning Yard or NAVSEA. Procedures for requesting information from the Reactor Plant Planning Yard are contained in Commissioned Submarine General Reactor Plant Overhaul and Repair Specification (NAVSEA 0989-LP-037-2000), Nuclear Support Facilities Overhaul and Repair Specification (NAVSEA 0989-LP-058-1000), Commissioned Surface Ship General Reactor Plant Overhaul and Repair Specification (NAVSEA 0989-043-0000) and TYCOM instructions. For non-nuclear systems and components, the LAR can be in any format which is convenient for the user, provided that it is identified as a LAR, clearly defines the exact information needed, lists the drawings in question, and states the date by which a reply is requested to support ship schedules. Volume II of the Fleet Modernization Program Management and Operations Manual contains a format for a non-nuclear LAR which FMAs may adapt for their use.
Loss of Traceability	A situation in which controlled material cannot be positively traced to the results of chemical and physical testing performed to prove that the material is that required by the specification to which it was made or bought. In each instance of loss of traceability, the FMA or ship Quality Assurance Officer must initiate action to restore traceability or use alternate, traceable material.

- (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	RECERTIFICATION
	REQUIREMENT	TESTING
Cleaning shaft seal Auxiliary Sea Water strainer/filter	Controlled assembly (Notes 1 and 2)	None
Cleaning of Auxiliary Sea Water system strainers	Controlled assembly (Notes 1 and 2)	None
Cleaning evaporator and distilling plant supply seawater strainers	Controlled assembly (Notes 1 and 2)	None

- (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 FWPs 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 FWPs 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. FWPs 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 CWPs), 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 FWPs the LPO/LWC supervisor shall verify that all references are current. For FMA Standardized FWPs the Planning Officer shall perform the verification. If changes are required, the FWP must be revised and routed for approval.
- f. For FWPs 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

APPENDIX D

TECHNICAL WORK DOCUMENT REVIEW AND APPROVAL MATRIX

TWD TYPE	Work Performed By	Opening (1)								Closing (1)					
		P&E OFF	AWC DIV OFF	LWC DIV OFF		QAO	DEPT HEAD (4)	SHIP ENG	SHIP CO	ISIC	AWC DIV OFF	LWC DIV OFF	QAO	DEPT HEAD	SHIP CO
MP	SF			R											
	FMA	R	R	R											
FWP	SF		R	R (2)		A				R (8)	A (8)				
	FMA	R (2)	R	R		A				R (8)	A (8)				
SF Prepared CWP	Other		R	R		R	A			R	R	R	A (4)		
	L/I		R	R		R	A			R	R	R	A (4)		
	O2		R	R		R	R	A		R	R	R	A		
	NUC		R	R		R	R	A	A (3)	R (6)	R	R	R	R (4)	A (3)
	SS/SOC		R	R		R	R	A			R	R	R	A (5)	S
	SFCC		R	R		R	R	A			R	R	R	A	S
RMC/FMA Prepared CWP	Other	R	R	R		R	A			R	R	R	A (4)		
	L/I	R	R	R		R	A			R	R	R	A (4)		
	O2	R	R	R		R	A	S (7)		R	R	R	A (4)	S (7)	
	NUC	R (9)	R	R		R	A	S (3)(7)		R (6) (10)	R	R	R	A (4)	S (3)(7)
	SS/SOC	R	R	R		R	A	S (7)			R	R	R	A (4)	S (7)
	SFCC	R	R	R		R	A	S (4)			R	R	R	A	S

Notes:

- R = Review (May require signature on FWP Cover Sheet and/or QA-9),  
 A = Approve (Approval Signified by signature on FWP Cover Sheet and/or QA Form 9),  
 S = Acknowledgement signature noting that the REC or CWP has been opened/closed by the approving authority.  
 For opening, this signature also grants permission for work to be conducted. Review and/or Approval signifies the following:
  - The FWP is correct both in sequence and requirements to satisfactorily accomplish the maintenance.
  - The CWP provides the correct technical specifications or requirements (e.g., torque values, dimensions, NDT inspections, cleanliness requirements, critical inspections, recertification tests) for certification attributes on the appropriate QA form.
- For FWPs previously approved by the Department Head, the FWP may be authorized and issued as a standardized FWP per paragraph 2.3.7.10 of this chapter.
- (Nuclear aircraft carriers only) The Reactor Officer will sign.
- For items requiring Department Head approval the following signature requirements shall apply:  
 FMA - Repair Officer (unless formally delegated for Other and L/I)  
 SF - Cognizant Department Head (Principal Assistant for aircraft carriers)
- Entries are to be signed by the Ship's Engineer only.
- (Submarines only) ISIC Material Officer will review SF CWPs for retesting FMA accomplished nuclear work.
- This block is not applicable for FMA only MCR/RECs.

8. Accomplished by WC Supervisor.
9. Nuclear Repair Officer if assigned.
10. Applicable to Fleet I-Level activities only. Does not apply to I-Level activities controlled by Naval Shipyards.

**VOLUME V****PART I****CHAPTER 3****PERSONNEL QUALIFICATION AND TRAINING**REFERENCES.

- (a) NAVEDTRA 43523 - Personnel Qualification Standard for Quality Maintenance Program
- (b) COMSUBFORINST C5400.30 - Engineering Department Organization Manual
- (c) NAVSEAINST C5511.32 - Safeguarding of Naval Nuclear Propulsion Information
- (d) MIL-STD-1330 - Standard Practice for Precision Cleaning and Testing of Shipboard Oxygen, Helium, Helium-Oxygen, Nitrogen and Hydrogen Systems
- (e) NAVSEA T9044-AD-MAN-010 - Requirements Manual for Submarine Fly-By-Wire Ship Control Systems

LISTING OF APPENDICES.

- A Outlines of Typically Effective Training Topics
- B Recommended Training Topics for Selected Positions
- C NAVEDTRA 43523 Qualification Matrix

3.1 PURPOSE. To define the requirements and guidance necessary to establish a standard qualification and training program for personnel who plan, perform, inspect or supervise the maintenance tasks listed in Chapter 2, paragraph 2.2.1 of this volume.

3.2 GENERAL. Personnel who screen, plan, perform, inspect and supervise the maintenance tasks listed in Chapter 2, paragraph 2.2.1 of this volume shall be trained and qualified in accordance with this volume and reference (a) including the maintenance listed as Material Certification Record (MCR)/Re-Entry Control (REC) exceptions per **Part I, Chapter 2, paragraph 2.2.5 and** Part I, Chapter 5, paragraph 5.10.7 of this volume.

3.2.1 Discussion. A continuing training and qualification program is essential for all maintenance personnel to achieve a maintenance program with high standards of quality. Personnel involved in the approval, supervision, planning or performance of shipboard maintenance will be participants in the training and qualifications associated with this volume.

3.2.2 Training. The training topics of Section 3.5 of this chapter should be fully integrated into the Engineering Department Training Plan in accordance with reference (b). Appendix A provides information on program elements normally contained in effective maintenance training programs. It is provided as information only and is not a mandatory listing. Appendix B provides recommended training topics for mechanics, Nondestructive Test (NDT) technicians, welders and planners.

3.3 QUALIFICATION. Qualification procedures established herein shall be formal, and designed to heighten awareness of those tasked with the responsibility of administering, managing and executing the Fleet Quality Maintenance (QM) program.

- a. Each organization shall maintain a personnel qualification list per Part I, Chapter 10, of this volume.
- b. Each organization shall maintain a list of personnel authorized to sign off portions of reference (a).

- c. Maintenance personnel shall be qualified through completion of formal qualification programs (e.g., Job Qualification Requirements/Personnel Qualification Standard (PQS), written exams, oral boards and formal schools). Reference (a) provides the standard PQS for the majority of QM qualifications. Appendix C provides a qualification matrix for maintenance personnel PQS requirements.
- d. All personnel performing the maintenance identified in Part I, Chapter 2, paragraph 2.2.1 of this volume shall be 3-M 301 qualified and Craftsman 301 qualified or an equivalent Quality Assurance (QA) qualification for non-naval personnel.

3.3.1 Re-qualification. Personnel with prior documented qualifications may be re-qualified by written exam and/or oral board as directed by Quality Assurance Officer (QAO) or Department Head. Personnel found to be deficient in level of knowledge will be required to complete an upgrade program established by the QAO prior to re-qualification.

3.3.2 Maintenance of Qualification. All personnel involved with planning, performing and supervising controlled work will be trained on topics of Section 3.5 of this chapter, using the following guidance:

- a. Incorporate the topics outlined in Section 3.5 of this chapter into the Engineering Department's long and short range training schedules.
- b. Include the training with existing topics where possible (i.e., Controlled Material Petty Officer (CMPO) training held with Repair Parts Petty Officer training). However, some areas may require separate training to be held.
- c. Joint training between departments and organizations is acceptable. The Department Head will coordinate with the QAO on training concerning QM. It is not the intent to create a separate training program, nor is the intent to hold one annual training session that covers all of the topics.
- d. In order to assess the effectiveness of the training program, the QAO should:
  - (1) Periodically monitor training.
  - (2) Assess knowledge level retention in conjunction with the conduct of annual QM program assessment.

3.3.3 Required Service Record Entries. Record of qualification will be inserted in the individual's service record.

### 3.4 QUALIFICATION REQUIREMENTS.

#### 3.4.1 Ship's Quality Assurance Officer.

- a. Should be a commissioned officer with engineering/repair experience.
- b. (Submarines only) Submarine officer must have completed submarine qualification and for nuclear powered ships should be nuclear trained.
- c. Designated in writing by the Commanding Officer.
- d. QA Officer course requirements are as follows:
  - (1) A surface ship QAO shall be a qualified Quality Assurance Supervisor (QAS) and shall be a graduate of a QAO course.

3.4.11 Oxygen Clean Instructors. An Oxygen Clean Instructor will be certified in accordance with reference (d). Oxygen Clean Instructors will re-qualify every three years. If an individual is scheduled for transfer within six months after the expiration of qualification, it is permissible to extend the qualification until transfer. The local command may exempt the senior instructor from re-qualification.

3.4.12 Ship's and Fleet Maintenance Activity Oxygen Clean Workers. Oxygen Clean Workers will be certified in accordance with reference (d). Oxygen Clean Workers will re-qualify every three years. If an individual is scheduled for transfer within six months after the expiration of qualification, it is permissible to extend the qualification until transfer.

3.4.13 Oxygen Calibration Technicians. Oxygen Calibration Technicians qualify to perform oxygen instrument cleaning and calibration by satisfactory completion of Oxygen Calibration School. Naval Sea Systems Command certifies successful candidates for two years following a report of satisfactory completion of Oxygen Calibration School. Local Regional Maintenance Center re-certifies Oxygen Calibration Technicians during the calibration capability reviews of FMAs or Strategic Systems Program Office capabilities and proficiency evaluation of SSBN/SSGN FMAs.

3.4.14 Work Center Supervisors and Planners. The qualification of QA Maintenance Planners and QA Work Center Supervisors is required in all work centers that perform corrective maintenance tasks outlined in Chapter 2, paragraph 2.2.1 of this volume. Work Center Supervisors and Maintenance Planners will, as a minimum, complete the applicable qualifications of reference (a) prior to performing any unsupervised maintenance tasks. QA Maintenance Planners prerequisite qualifications (QAI and Cleanliness Inspector) may be deleted in work centers that do not perform controlled work. Activities with separate planning organizations are exempt from having planners assigned to individual work centers.

3.4.15 Qualification Requirements for Submarine Nuclear Propulsion Plant Operator Welders (Navy Enlisted Classification Code 3351 and Supervisor Welders 3361).

NOTE: INFORMATION ON THIS SUBJECT IS SAFEGUARDED IN ACCORDANCE WITH REFERENCE (c) AND IS CONTAINED IN PART II, CHAPTER 1 OF THIS VOLUME.

3.4.16 Qualification Requirements for Submarine Fly-By-Wire Ship Control System Maintenance Technician (Navy Enlisted Classification Code 14NP). Qualification requirements will be in accordance with paragraph 2.2 of reference (e).

### 3.5 TRAINING.

NOTE: PERSONNEL INVOLVED IN PERFORMING MAINTENANCE ON NUCLEAR SYSTEMS/COMPONENTS WILL ALSO BE TRAINED IN THE REQUIREMENTS OF PART II, CHAPTER 1 OF THIS VOLUME.

3.5.1 Maintenance Personnel Training. Using Appendices A and B of this chapter and Part II, Chapter 1, Appendix A of this volume (where applicable), the QAO shall provide a list of applicable training topics to the Engineer and Engineering Department Master Chief for various ship's departments for inclusion in the training plans for their work centers. These topics shall be reviewed and updated annually or whenever a new long range training plan is generated. Findings from QA form 14s, audits, assessments and surveillance should be included, when appropriate, to re-emphasize the most recent problems experienced in the department.

3.5.2 Quality Assurance Training. The QAO shall submit to the Engineer and Engineering Department Master Chief a separate advanced training program for personnel responsible for planning, approving, inspecting or supervising maintenance on systems/equipment included in the QM Program. At a minimum, the following items shall be covered:

- a. Requirements and generation of a controlled work package and formal work package including objective quality evidence, required inspections and critical QM points.
- b. Material certification, control and stowage requirements.
- c. In-process control including torquing, controlled assembly, system cleanliness requirements for specific systems (e.g., air systems, hydraulic systems) and common mistakes noted in completed QA forms.
- d. Testing.
- e. Departure from specifications.

3.5.3 Submarine Safety Awareness Training (Submarines and Submarine Repair Facilities only). All hands shall receive Submarine Safety (SUBSAFE) awareness and Fly-By-Wire Ship Control (if assigned to, work on or oversee 21 Class or 774 Class submarines) training during initial indoctrination and annually thereafter. ISIC and TYCOM staff members that routinely review SUBSAFE objective quality evidence, make determinations on SUBSAFE Departures from Specifications and perform other SUBSAFE work oversight will receive annual SUBSAFE awareness training to keep knowledge and proficiency levels high.

- (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) COMFLTFORCOMINST 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: COMFLTFORCOMINST 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 **Naval** Nuclear Plant Maintenance by Forces Afloat
- (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) NAVSEAINST 4790.8 - Ship's Maintenance and Material Management (3-M) Manual
- (z) 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.

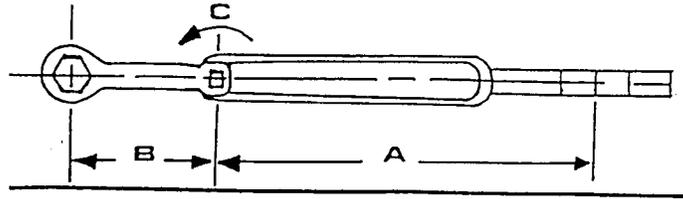
$$T_{ind} = \frac{T_{act} \times L_1}{L_1 + L_2}$$

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**

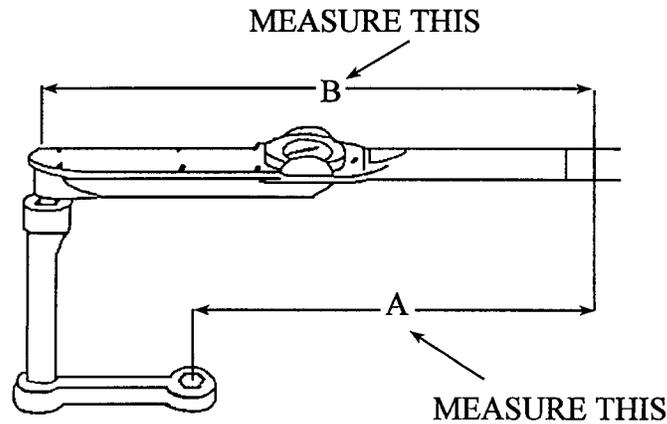
C = ACTUAL TORQUE APPLIED TO WRENCH  
 B = LENGTH OF ADAPTER

A = DISTANCE FROM DRIVE TO PULLER'S HANDGRIP  
 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 =  $A \div B = 18 \div 24 = 0.75$

**FORMULA FOR USE OF CORRECTION FACTOR**

D = Required Torque Value

C = Correction Factor

$D = \frac{200}{.75} \quad D = 266$

- c. Joint Assembly. When the alignment requirements are met assemble the joint.
  - (1) Exercise caution during installation of the O-Ring to ensure grit or other foreign material is not present since particulate contaminants are the worst enemy of O-Ring installations. Cloths used for cleaning shall be lint free, since one small thread can cause leakage.
  - (2) Lubricate the joint threads using approved system fluids for O-Ring joints; i.e., system fluid for hydraulic systems and an approved lubricant from Table 5-1 of this chapter for air and gas systems.
  - (3) Lubricate the O-Ring with lubricant as called out in Table 5-4 of this chapter and spread lubricant lightly over the surfaces that will contact the O-Ring.
  - (4) Thread the union together as far as possible by hand.
  - (5) If required by a technical document, torque the union nut to the required torque listed in the technical document. If the technical document does not provide torque values, torque the union nut to the values listed in Table 5-6 below. If no specific requirement to torque the union nut exists, torque the union per paragraph 5.5.5.1.c (5) of this chapter.

**Table 5-6 Torque Requirements for O-Ring Union Joints for Gas Systems 3000 psi or Greater**

Pipe Size	Torque (ft-lbs ± 5%)	
	Minimum	Maximum
1/8	20	23
1/4	44	46
3/8	87	95
1/2	104	110
3/4	115	125
1	208	230
1-1/4	250	267
1-1/2	383	420
2	540	585
2-1/2	625	670

NOTE: FLANGE AND UNION O-RING SEALS ARE DISCUSSED IN SECTION 5.5 OF THIS CHAPTER.

5.6 O-RING SEALS.

5.6.1 Types of O-Ring Seals.

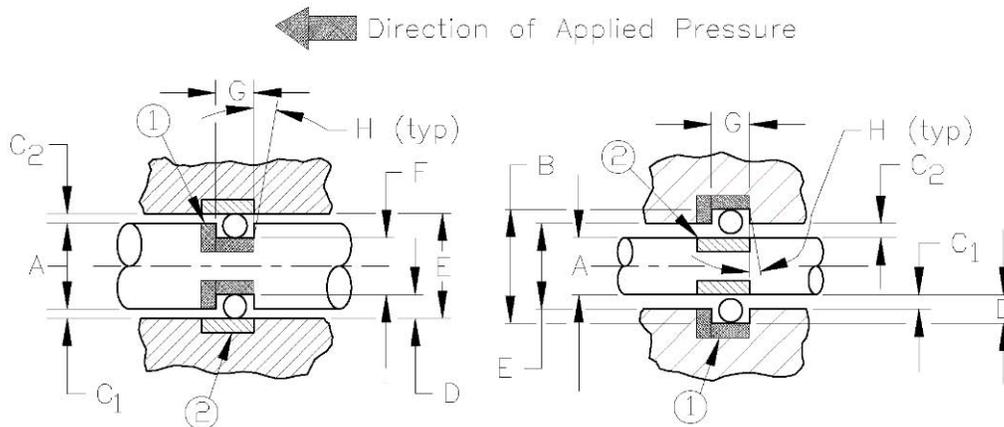
- a. Static radial seals provide a seal between two stationary components.
- b. Dynamic radial seals provide a seal between a stationary component and a moving component.
- c. Static face seals provide a seal between two stationary surfaces such as between a valve bonnet and valve body.
- d. Straight thread tube fitting boss seals provide a seal between a straight thread tube fitting and its boss.

5.6.2 General Acceptance Criteria and Guidance for O-Ring Seals, Grooves and Mating Sealing Surfaces. The acceptance criteria are complex for these types of seals. The craftsman and planning department personnel must correctly define the type of seal and the appropriate MS to determine acceptability of sealing surface finishes and defect correction.

- a. The size and spacing of surface defects may be estimated visually.
- b.  $R_a$  surface finish requirements apply only to surfaces surrounding acceptable surface defects and not to the surface defect areas themselves.
- c. Hair-like visible defects with width and depth of 0.001" or less are acceptable regardless of length or location.
- d. Diametral clearance, gland depth, and groove width and depth requirements apply to surfaces surrounding acceptable surface defects and not to the surface defect areas themselves.
- e. The acceptance criteria in this section apply to O-Ring grooves designed to MIL-P-5514E and MIL-G-5514F. For O-Ring grooves not manufactured to MIL-G-5514F or MIL-P-5514E, or grooves formed by several mating parts, or where mating parts are not available for measurement, only surface defect and finish requirements apply. Diametral clearance and groove width requires engineering evaluation.
- f. Any metal removal shall be held to the minimum necessary to meet acceptance criteria.
- g. Where original design drawing allowances exceed criteria specified in this section, the maximum allowed on the drawing applies.
- h. For static radial seals (see Figure 5-10 of this chapter), and static face seals (see Figure 5-12 of this chapter), measurement and recording of diametral clearance, gland depth, groove width, and depth to meet requirements of Table 5-7 and Table 5-9 of this chapter is required only when surfaces are reworked to eliminate unacceptable defects.
- i. For dynamic radial seals (see Figure 5-11 of this chapter), measurement and recording of groove width to meet the requirements of Table 5-8 of this chapter are required only when surfaces are reworked to eliminate unacceptable defects. The diametral clearance and gland depth must always be measured to meet the requirements of Table 5-8 of this chapter; however, recording of these measurements is required only when surfaces are reworked to eliminate unacceptable defects.
- j. Surfaces in contact with backup ring(s) are considered non-sealing surfaces. Non-sealing surface defect criteria apply.

5.6.3 Static Radial Seals. Items a. through j. of paragraph 5.6.2 of this chapter are applicable to this type of seal.

**Figure 5-10 Static Radial Seals**



preservation failures, extensive early corrosion, or severe damage shall be reported immediately to NAVSEA (07T12) via TYCOM by telefaxed letter or message to determine if there is a structural integrity problem.

5.8.4 Cleanliness Inspections. Cleanliness controls are required to prevent the entry of foreign material which could interfere with the operation of any system or component. Cleanliness controls are essential during maintenance with the degree of control depending upon the system and work to be accomplished. Steam plant system cleanliness controls are necessary to minimize corrosion of steam plant materials and prevent the entry of foreign materials into the steam plant. Improper cleanliness controls can result in damage to operating machinery, chloride contamination, or fouling of system components. The time spent making sure the work site is clean and system openings are properly controlled will help prevent premature component failure and rework.

- a. Cleanliness Inspectors are individuals who are trained and qualified to perform CI required by work procedures for systems/components requiring cleanliness controls. At the TRIDENT Refit Facilities, they are called Cleanliness Certifiers.

NOTE: ALL SYSTEMS REQUIRE VARYING DEGREES OF CLEANLINESS CONTROLS, BUT MAY NOT REQUIRE AN INDEPENDENT INSPECTOR. CRITICAL QUALITY CONTROL POINT INSPECTIONS BY SUPERVISORY PERSONNEL SHOULD BE USED WHERE APPROPRIATE.

- b. Acceptance inspections of cleanliness by an independent inspector (Cleanliness Certifier/Inspector) are required for the following as a minimum:
  - (1) Oxygen, nitrogen, and hydrogen systems per reference (k).
  - (2) Naval Nuclear Propulsion systems in accordance with Part II, Chapter 1, Appendix B of this volume.
- c. Results of cleanliness acceptance inspections required by paragraph 5.8.4.b of this chapter shall be documented in the Technical Work Document and certified by a signature. These inspections will be identified by a (CI) or circle CI in the left margin, if performed by an independent inspector.
- d. There are no specific requirements for independent CI/acceptance by a Cleanliness Certifier/Inspector, during steam plant (nuclear or fossil fuel) system maintenance. However, for maintenance involving steam plant (nuclear) systems, the cleanliness requirements for steam plant (nuclear) systems from Chapters 1 and 3 of reference (o) apply. For steam plant (fossil fuel) or general shipboard systems listed in paragraph 5.8.6 of this chapter, the cleanliness requirements shall be determined during the work planning phase. Many jobs may be performed using craftsman to verify cleanliness vice requiring independent Cleanliness Inspector presence. When the risk or consequence of loss of cleanliness is minimal during a maintenance action, such as work requiring bonnet removal from a small steam valve, maintenance of cleanliness may be verified by the craftsman. When the risk or consequences of loss of cleanliness is significant, such as when removing the bonnet from a main steam root valve, work involving opening of turbine throttles, or when the type or quantity of detrimental materials (e.g., cutting oils) pose a significant risk, the use of an independent inspector to verify maintenance of cleanliness should be considered by the Department Head, Quality Assurance Officer (QAO), and Planning Officer (if assigned).
- e. It is the responsibility of Ship's Force to ensure the appropriate cleanliness control requirements are incorporated in any maintenance for which clear responsibility for cleanliness is not assigned.

#### 5.8.5 Nuclear Propulsion Plant and Nuclear Support Facility General Cleanliness Requirements.

##### 5.8.5.1 Reactor Plant.

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

5.8.5.2 Steam Plant. Reference (o) provides a list of applicable steam plant systems and the minimum steam plant cleanliness requirements. It applies to all steam plant work performed in naval nuclear powered ships when not at a shipyard. This chapter also applies to steam plant work performed by forces afloat when at a shipyard.

- a. Nuclear powered ship steam plant maintenance affecting those systems listed in Chapter 1 of reference (o) shall be assigned only to activities that have reference (o) in force.
- b. The Steam Plant Manual/Steam and Electric Plant Manual shall be consulted for cleanliness requirements when performing steam plant maintenance.
- c. If a loss of cleanliness occurs as explained in reference (o), then cleanliness shall be reestablished according to the requirements and procedures of reference (o). Additionally, upon a loss of cleanliness the QAO, the Lead Work Center Division Officer, and appropriate Department Head(s) will approve the recovery procedure.
- d. Control of tools and maintenance products will be per reference (o).
- e. Reference (o) cleanliness requirements for Nuclear Aircraft Carrier catapult steam and drain systems shall be complied with regardless of which Department Head has responsibility for the system.

5.8.5.3 Nuclear Support Facility.

- a. Reference (p) provides specific cases that invoke reference (o) and reference (q).
- b. Where the above references do not address a specific Nuclear Support Facility system or component, reference (o) may be used for guidance as determined to be appropriate. The component technical manuals and NSTMs should also be consulted for cleanliness requirements as appropriate.

5.8.5.4 Standard Lubricants and Penetrating Fluid. General overhaul specifications for reactor plants and Nuclear Support Facility Manuals for Destroyer Tenders and Submarine Tenders require the use of reference (r). Reference (o) contains requirements to control detrimental materials.

5.8.6 General Shipboard Steam Plant (Fossil Fuel) Systems Cleanliness Requirements.

5.8.6.1 Purpose. To define the general requirements for cleanliness controls during maintenance/repair of steam plant systems on fossil fueled surface ships.

5.8.6.2 Applicability. The requirements of this paragraph are applicable to the following steam plant systems:

- a. Main Steam.
- b. Auxiliary Steam (Defined as steam which returns to the boiler).
- c. Feedwater.
- d. Condensate.
- e. High Pressure Drains.
- f. Reserve Feedwater.
- g. Heating steam and condensate return piping from distilling units.

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.

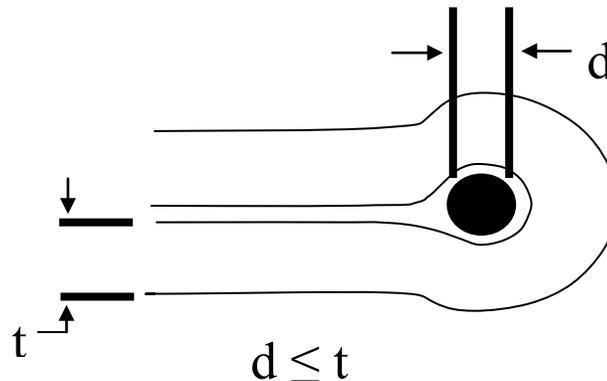
5.8.7 Set Stud Inspection. During disassembly or reassembly, inspect set studs to ensure no rotation is exhibited during nut loosening and tightening. Where direct visual inspection is not possible, marking the top of the stud (e.g., felt tip marker) to a reference point on the assembly may be used. Rotation of any stud during disassembly is cause for rejection 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.

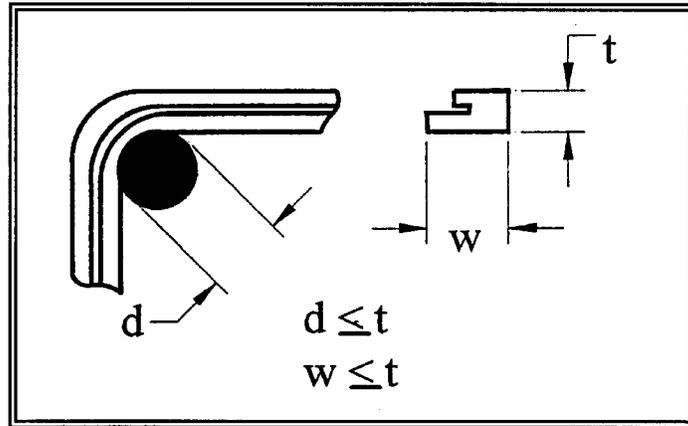
- a. It is Fleet policy that software (e.g., O-Rings, gaskets) will be reused only as a last resort. If new software is not available, software may be used after satisfactory inspection for damage, resiliency, discoloration, or cracking in accordance with reference (j).
- b. In all cases, the guidance 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	FWP, Controlled assembly (Notes 2 and 3)	None
Fresh Water Flushing of Towed Array Handling System Valve/Seal Assembly	FWP, 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	FWP, Controlled assembly (Notes 2 and 3)	None
Cleaning Sea Water Cyclone Separator	FWP, 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:

5.13.1.1 General.

- a. Reference (w) establishes the FBW SCS certification criteria which must be accomplished on all applicable submarines in order to maintain system certification throughout the operating cycle of the ship. Once a submarine FBW SCS has been certified for unrestricted use or is accepted by the shipbuilder, all work within the SFCC Boundary and testing to support that work shall be accomplished, controlled, and documented in accordance with reference (w).
- b. All other Performance testing within the FBW SCS Boundary, for work within the FBW SCS Boundary shall be accomplished to support system certification and documented using the activity's normal work control processes.
- c. Work is defined as an action that actually or potentially changes (including disassembly and testing) the approved configuration of any part of the FBW SCS or SFCC Boundaries.
- d. The objective of this work control process for work within the SFCC Boundary is to provide maximum confidence that any work and all applicable testing is authorized, controlled, identifiable, and auditable. It provides positive assurance that all SFCC equipment and FBW SCS is restored and tested to a fully certified condition.

5.13.1.2 Applicability. The requirements in this section shall apply to SEAWOLF and VIRGINIA Class Submarine FBW SCSs.

5.13.1.3 Submarine Flight Critical Component Boundary. The Submarine FBW SCS Boundary shall consist of electronic hardware and software within the submarine FBW Boundary (see reference (x)) that process safety critical functions and data elements.

- a. Safety critical electronic components within the SFCC Boundary shall be determined per references (w) and (x) and shall be identified as SFCCs.
- b. Safety critical software units within the SFCC Boundary shall be determined per references (w) and (x). Safety critical software units shall require additional testing and/or analysis, be marked, configuration managed, and controlled per the requirements in reference (w).

5.13.2 Submarine Flight Critical Component Boundary Work Control Procedures.

- a. All fleet activities, In-Service Engineering Activity, repair activities or shipyards (public or private) must use CWPs, Task Group Instructions (TGI), or ripouts to document the accomplishment of work within the SFCC Boundary. CWPs/TGIs/ripouts shall provide greater assurance that any work accomplished is authorized, documented and executed in accordance with specifications and requirements, and is supported by OQE.
- b. Work control documents shall be clearly marked as SFCC for auditing purposes.
- c. Closed TGIs/CWPs/ripouts shall be retained by the work accomplishing activity and are subject to audit by cognizant activities (TYCOM, ISIC, shipyard, supervising authority or NAVSEA) during audits such as functional or certification audits.

5.13.3 Submarine Flight Critical Component Boundary Work Control Closeout.

- a. All CWPs/TGIs/ripouts for work in the SFCC Boundary shall be closed prior to the system being released for unrestricted use/Fast Cruise/Sea Trials. As part of the work control procedure closeout process, CWPs/TGIs/ripouts shall receive an independent review within the activity performing the work to verify:

- (1) Work was authorized and approved.
  - (2) Work stayed within the authorized boundaries.
  - (3) Post work/maintenance testing was accomplished satisfactorily.
  - (4) Appropriate Quality Assurance Forms are included to document Certification of Maintenance, and all forms are completed with required signatures.
- b. All testing of the FBW SCS Boundary shall be verified closed prior to the system being released for unrestricted use/Fast Cruise/Sea Trials.
- c. As a policy, CWPs/TGIs/ripouts for work within the SFCC Boundary or test documents within the FBW SCS Boundary shall not be closed out until resolution of all actions necessary to verify certification has been maintained when any breach of the boundary has occurred. An acceptable alternative, however, is to close out a CWP/TGI/ripout or test documents within the FBW SCS Boundary by transferring remaining at sea testing actions to a separate auditable accountability system (e.g., Sea Trial Agenda). All CWPs/TGIs/ripouts closed in this manner shall be annotated by the activity with the reference documents that contained the transfer actions. This policy shall be verified by the activity accomplishing the work, supervising authority, submarine Commanding Officer and ISIC.
- d. Prior to each underway for submerged operations, Commanding Officers of FBW SCS submarines will submit to ISIC (deployed ISIC, if deployed), a written certification continuity report, which addresses the status of Ship's Force FBW SCS CWP, testing of FBW SCS, URO maintenance requirements in the format of Appendix B. If no FBW SCS controlled work or testing were accomplished, no report is required.

5.13.4 Objective Quality Evidence to Support Controlled Work on Fly-By-Wire Ship Control System Submarine Flight Critical Component. To standardize maintenance OQE, the following section provides guidance on the key elements needed to be documented to certify the work process, whether routine maintenance, major repairs, system upgrades or alterations. This section lists applicable key source documents OQE requirements including additional attributes to be included as part of the SFCC Boundary work control process. This information should be used as follows:

- a. Activities performing work on FBW SCS within the SFCC Boundary should use this information, along with source documents, as a guide in developing OQE records that document work, inspections and tests performed within the SFCC Boundary.
- b. The elements listed are technical specifications and process documents required for a typical repair or system upgrade/alteration process.
- c. If Upgrades/Alterations or Major Repair Work of the FBW SCS was performed, the ISIC will accomplish a 100% audit, as defined in Part I, Chapter 9 of this volume, of the work. ISIC and TYCOM will use the FBW message reporting process for certification specified in Volume II, Part I, Chapter 3 of this manual, for availabilities of less than six months duration.

#### 5.14 AIRCRAFT CARRIER MAINTENANCE DOCUMENTS.

5.14.1 Purpose. The purpose of this section is to provide amplifying/clarifying information on the processes involved and appropriate use of specific aircraft carrier maintenance related documents. Including:

- a. Request for Departure from Specification (DFS), Waivers or Deviation.
- b. Nuclear Liaison Action Request (LAR).
- c. Nuclear Liaison Inquiry (NLI).

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, NLI's 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.

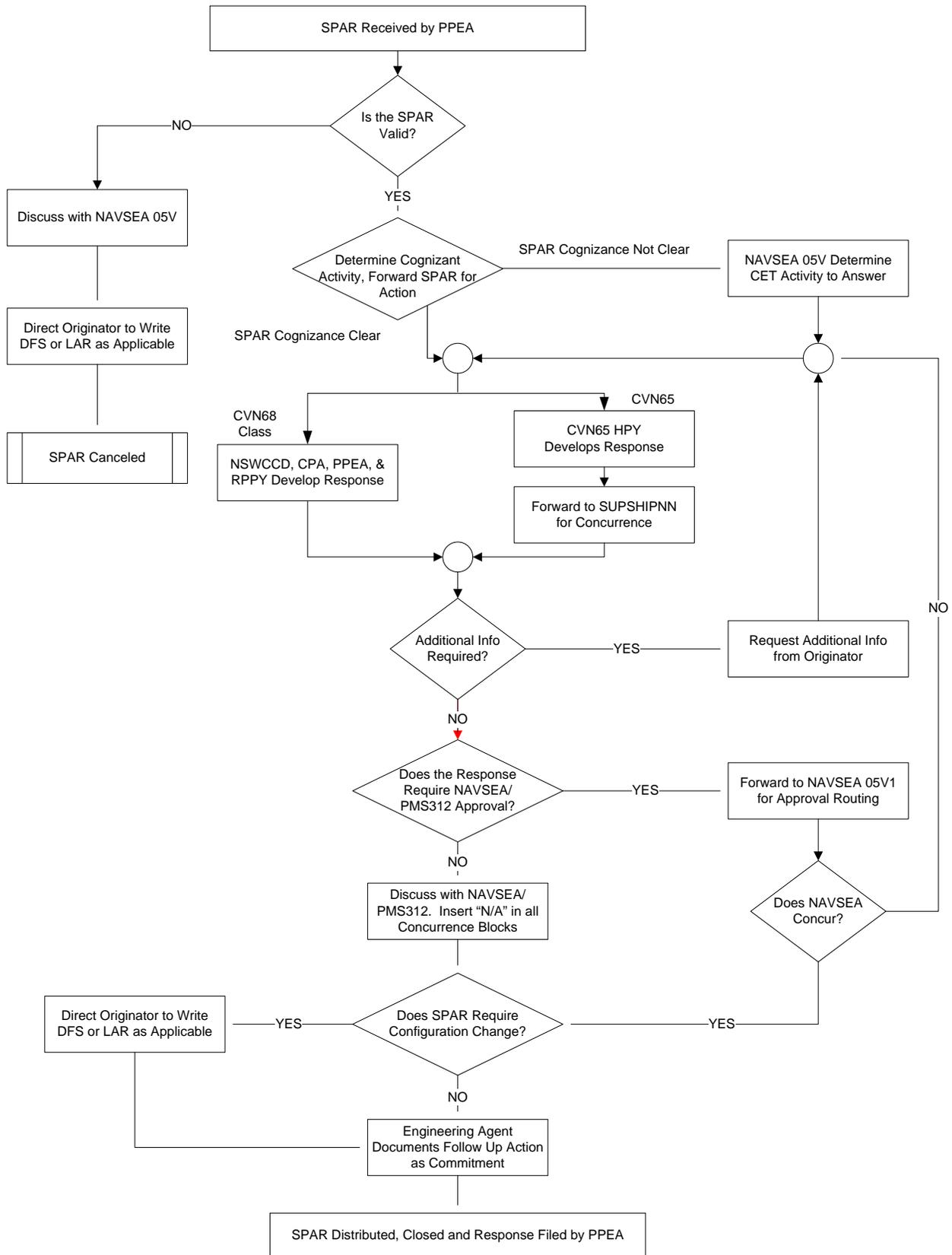
5.14.8 Preventive Maintenance System Feedback Reports. The PMS Feedback Reports (PMS FBR) (OPNAV form 4790.7B) of reference (y) is used specifically to notify Fleet Technical Support Center Atlantic (FTSCLANT)/Fleet Technical Support Center Pacific (FTSCPAC) of matters related to PMS. The FBR form is composed of an original and four copies. Instructions for preparation and submission of the form are printed on the back of the last copy. 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 both FTSCLANT and FTSCPAC 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



- 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 (z) 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.

- (1) For lack of seat tightness testing, measure and document the following as applicable:
  - (a) A seat blue check for non-ball valves (100% contact required).
  - (b) For soft seated valves, such as Parker check valves, where a blue check is not practical, re-assemble the valve, perform the appropriate mechanical joint tightness test, and applicable portions of the Unrestricted Operation Maintenance Requirement Card (if applicable). A minor DFS is required to document the lack of seat tightness testing and the requirements to conduct inspections during a controlled dive to test depth to verify seat tightness.
  - (c) Dimensional verification/stack height for ball valves (satisfactory seat compression required).
  - (d) For welded or brazed in-line SUBSAFE valves (hull and backup valves are specifically excluded) and all non-nuclear, non-SUBSAFE valves repaired in place, no DFS is required.
  - (e) For bolted-in SUBSAFE valves repaired in place, initiate a major DFS to the Type Commander in accordance with Part I, Chapter 8 of this volume to document the lack of seat tightness test.
- (2) For lack of mechanical joint tightness testing for valves in submarine sea connected systems, perform a controlled assembly of the valve(s) mechanical pressure boundary joints and initiate a minor DFS to document the lack of test. Clearance will require that the affected joints be visually inspected during the first controlled dive.

c. Welded joint options. Reference (c) contains options for testing welded joints.

NOTE: ELECTION TO INVOKE THE OPERATING PRESSURE TEST OPTION REQUIRES A CLEAR UNDERSTANDING OF THE SYSTEM OPERATING, TEST AND INSPECTION REQUIREMENTS OF REFERENCES (c), (d) AND APPLICABLE TEST METHODS. CONSIDERATION MUST BE GIVEN TO SAFETY, MAINTENANCE COST, TIME AND THE SPECIFIC SYSTEM UNDERGOING REPAIR. THE OPERATING PRESSURE TEST OPTION MUST BE PART OF THE PRE-PLANNED REPAIR PROCESS INCORPORATED INTO A CWP.

d. Nuclear interface systems. Nuclear interface systems should be tested in accordance with reference (a).

e. Brazed joints.

- (1) A hydrostatic test is not required after brazed repairs or replacements if all of the following criteria are met:
  - (a) System is a reduced energy system. (Normal operating pressure 200 psig or less and normal operating temperature 200 degrees F or less). Joints are not in "lethal" system as defined in reference (n). Joints are not in sea water or sea connected systems or portions thereof, which are subject to submergence pressure below 200 feet or to sections of piping that pass through sea pressure rated bulkheads and which are rated for submergence pressures greater than 200 feet.
  - (b) All applicable NDT on brazed joints is performed.
  - (c) Visually inspect for leakage during the first system pressurization to normal operating pressure.

- (2) When a brazed joint of a system and/or component cannot be strength tested due to configuration, the following is considered to be an acceptable alternative:
  - (a) Initiate a major DFS to document the lack of strength test.
  - (b) Visually inspect the joint for leakage during first system pressurization to nominal/system operating pressure and document on a QA form 17.
- f. Mechanically attached fittings are not welded or brazed fittings. They must meet all QA requirements as specified in the applicable Uniform Industrial Process Instruction or Process Instruction for mechanically attached fitting installation per reference (c). Election of the operating pressure test option will not require a DFS if pre-planned into the repair process to ensure all original QA requirements and additional NDT required by reference (c) are performed.
- g. (Submarines only) When post deep dive passive/pre-energize testing is required by system specific Technical Manuals or Maintenance Index Pages/Maintenance Requirement Cards, outboard electrical connections subject to full submergence sea pressure will be documented on a QA form 12 as a minor departure to accomplish post deep dive passive/pre-energize testing. The departure will also indicate if a controlled assembly was performed.

#### 7.5 REACTOR PLANT AND NUCLEAR SUPPORT FACILITY TESTING.

7.5.1 Hydrostatic/Pneumatic Tests or Drop Tests. A QA form 26 and QA form 27, will be used to document the OQE that the hydrostatic/pneumatic or drop testing was completed satisfactorily.

- a. When unable to accomplish the required test, a Liaison Action Request will be initiated in accordance with Part I, Chapter 8, of this volume.
- b. When unable to satisfactorily test repaired valves due to out of specification seat leakage, Part I, Chapter 8, of this volume describes the procedure to defer work and close out the CWP.
- c. Reference (a) contains the hydrostatic test requirements for reactor plant fluid systems and portions of systems. It contains requirements for test rigs, test gauges, and test precautions.
- d. Some reactor plant fluid systems have specific system hydrostatic test instructions and special test requirements in the RPM. Others must have local procedures prepared based on the requirements of reference (a) and the RPM.
- e. The Immediate Superior in Command will review Ship's Force test procedures for FMA accomplished nuclear work and will resolve questions or problems with test requirements.
- f. The System Test Check List in Volume IV, Chapter 9 of this manual will be used in preparation, conduct and recovery from test.

#### 7.5.2 Mechanical Joint Fasteners.

- a. When mechanical joint fasteners are removed and re-installed or replaced one at a time and torqued in accordance with an approved procedure, refer to reference (a) to determine the extent of test required.
- b. Test requirements for mechanical fasteners within the reactor plant SUBSAFE boundary are contained in Appendix 8 of reference (h).
- c. Replacement of fasteners shall be controlled by a CWP in accordance with Part I, Chapter 2, of this volume, for hydrostatic tests and tests above normal operating pressure when an external source is required.

7.5.3 Valve Seat Leak Tests. Valve seat leak tests shall be performed according to the cognizant RPM (Corrective Maintenance Instruction, the RPM Principles of Maintenance section, etc.) and the applicable technical manual. A Fleet Maintenance Support Branch Quality Engineering Division Note summarizes the requirements for troubleshooting and leak testing reactor plant valves.

## 7.6 SUPPLEMENTAL TEST CRITERIA (NON-NUCLEAR).

7.6.1 Purpose. This section is provided along with section 7.4 of this chapter to identify test requirements that may be used when more authoritative requirements are not available, or are incomplete. The performance of tests in accordance with these requirements will constitute satisfactory testing. A DFS will not be required unless specifically required as part of the alternative test. The applicable ship class source documents take precedence over Appendices A and B. Notes in the appendices also provide testing guidance that is to be applied even when the testing requirements are specified by TPD or other authoritative guidance. Appendix A applies to Surface ships systems and Appendix B applies to Submarines.

- a. Appendices A and B are intended as a general guide for testing where specific guidance is not provided. All portions of a given system may not necessarily be tested to the pressure specified (e.g., the 30 psig portions of a submarine Fuel Oil Filling, Transfer, and Compensating Water System should not be tested to 150% of test depth pressure).
- b. For component testing where a TRS/MS has been used for restoration or overhaul, TRS/MS testing requirements should be followed. TRS/MS requirements may differ from the test specifications on the drawing for the component. The drawing specifications are generally intended as manufacturing acceptance tests. Though no specific guide to precedence can be made, good engineering judgment and conservative approach to testing should prevail. If only part of a TRS/MS was used in component maintenance, the testing requirements in the TRS/MS may not apply. The use of submarine TRS/MS in the testing phase of maintenance has, in the past, required an inordinate amount of work during submarine upkeep and refit periods. Where only minor repairs (as defined in the glossary) are accomplished using a TRS/MS, only the applicable test requirements should be accomplished.

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## 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 and 32
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, EHPs, 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.

Errors in any TPD should be reported to SUBMEPP via SUBMEPP Feedback Form provided as Appendix C of this chapter.

**CAUTION: CRYSTALLIZATION/MELTING OF MAIN BALLAST TANK HULL STOP VALVE SEATS AND DOWNSTREAM EMERGENCY MAIN BALLAST TANK BLOW VALVE SEATS MAY RESULT FROM RAPID PRESSURIZATION OF THE EMERGENCY MAIN BALLAST TANK BLOW PIPING AGAINST SHUT MAIN BALLAST TANK HULL STOP VALVES.**

NOTE 8: 4500 psig air system hull stop and bank stop valves will not be used as a boundary for hydrostatic test pressures greater than 4500 psig unless valve seats and software are replaced after the test and a mechanical joint tightness is performed.

NOTE 9: For repairs to the DSW system, inboard of the hull and backup valve, the column 1 test pressure is 122 psig and the column 2 test pressure is 88 psig. This is to prevent damaging the attached DSW pump.

NOTE 10: Where oxygen piping or system components are re-installed by mechanical joints, these portions of the system will be tested to 100% operating pressure using nitrogen in accordance with reference (o). System fluid (oxygen) may be used in at-sea situations when use of nitrogen is not practical. The test pressure will be held for a minimum of 15 minutes plus the time required to conduct inspection of joints under test.

NOTE 11: Refer to reference (o) for testing requirements and procedures for oxygen, nitrogen, and hydrogen systems.

NOTE 12: Before testing oxygen stop valves with Kerotest Co. cartridges in accordance with Kerotest Drawing 72594765, ensure the valve is assembled in accordance with Kerotest Instruction K-673 and that the union is torqued to 160 - 170 ft.-lbs. This is necessary to ensure the cartridge is not damaged.

**CAUTION: WHEN TESTS INVOLVE NUCLEAR BOUNDARIES, REFER TO REFERENCE (h), REFERENCE (p), AND THE APPLICABLE RPM BEFORE TESTING.**

NOTE 13: When packing glands, stuffing tubes, manhole covers, etc., in hull envelope boundary tanks are entered and remade, the assembled unit will be tested by conducting a 12 psig air tightness test. With 12 psig air within the tank, apply soap solution to the work area and inspect for leakage. No leakage is allowed.

NOTE 14: Escape trunk penetrations not exposed to sea pressure during normal ship operation, escape and access lower hatches, and watertight bulkhead doors require only a completion test. 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. No inspection following the controlled dive is required.

NOTE 15: Where repairs are performed on the snorkel induction or exhaust piping or valves, refer to reference (q) for test requirements.

NOTE 16: Periscope Types 2, 8, 15 and 22, after re-assembly, will be verified by gas testing to 50 psig internal pressure for 30 minutes with soap bubble test of work areas affecting periscope tightness. Periscope Types 2, 8, 15 and 22, as an alternative, may be tested using the Nitrogen/Halogen leak check method for internal low pressure testing as detailed in NAVSEA S9425-AW-PRO-010 Change A, Submarine Periscope Pressure Test, Evacuation/Charging and Dewpoint Test Procedures. Nitrogen/Halogen leak check, as detailed in NAVSEA S9425-AW-PRO-010 Change A, is the only method for internal low pressure testing of Type 18 periscope assemblies.

NOTE 17: Where minor repairs have been accomplished on torpedo tubes (including attached piping) and/or impulse tanks, the applicable portion of the system will be tested by performing sub-paragraph a., b. or c. below.

NOTE: WHEN REMOVAL OF THE TORPEDO TUBE SIGHT GLASS (SSN688/SSB(G)N726 CLASS) OR LIGHT PIPE (SSN21 AND 774 CLASSES) ASSEMBLIES IS REQUIRED TO INSTALL TEST INSTRUMENTATION, REINSTALLATION OF THE SIGHT GLASS SHALL INCLUDE A VISUAL INSPECTION OF THE GLASS (CHECK FOR CHIPPING, CRACKS, ETC.) AND/OR IF THE SIGHT GLASS HAS BEEN REMOVED FOR REPAIRS (LEAKS, BROKEN GLASS, STRIPPED THREADS, ETC.), TESTING SHALL BE ACCOMPLISHED PER SUB-PARAGRAPH b. BELOW.

- a. "J" pressure hydrostatic test pierside.
- b. Controlled assembly of components exposed to sea pressure, completion test and a water tight integrity test.
  - (1) For Torpedo Tubes and piping: The affected joints shall be assembled as a controlled assembly and subjected to a 12 psig air tightness test for 10 minutes. Accomplish a soap bubble test of the affected joints. In addition, a minor DFS will be used to document requirement for inspections during a controlled dive in order to verify re-establishment of the watertight integrity for those repaired joints.
  - (2) If air soap test is impractical, or if the affected joint is inaccessible, a drop test may be conducted by pressurizing to 12 psig air, allowing time for pressure/temperature to stabilize. Hold for 30 minutes, pressure drop shall not exceed 10 oz. A minor DFS and inspection during controlled dive is required.
- c. For Impulse Tank: The affected joints shall be assembled as a controlled assembly and subjected to a drop test by pressurizing to 12 psig air. Allow time for pressure/temperature to stabilize, hold for 10 minutes. No drop allowed. In addition, a minor DFS will be used to document requirement for inspections during a controlled dive in order to verify re-establishment of the watertight integrity for those repaired joints.
  - (1) When drop test is conducted in drydock, record the highest pressure held. Minimum pressure shall be 5 psig. No drop allowed. Repeat at 12 psig when waterborne.
  - (2) In lieu of drop test, the affected joints shall be assembled as a controlled assembly and the tank subjected to a 12 psig air tightness test for 10 minutes. Accomplish a soap bubble test of the affected joints. A minor DFS and inspection during controlled dive is required.

**CAUTION: WHEN PERFORMING TESTING OF TANKS, COMPLY WITH REFERENCE (p), SECTIONS 50 THROUGH 54.**

NOTE 18: NAVSEA drawing 126-5792666 provides the detailed requirements and guidance for tank testing.

NOTE 19: **DELETED**

NOTE 20: Signal ejectors/launchers are special purpose devices, which require tests beyond those normally required of hull and/or backup valves. The specific testing required for the re-certification of signal ejector or launcher after maintenance must be determined from ship's plans and/or other reference documentation. A good reference to ensure adequate testing is the Index of SUBMEPP Standardized Test Procedures SSN/SSBN/SSGN Submarines.

NOTE 21: Upper escape and access hatches (including missile tube muzzle hatches on SSBN/SSGN Class Submarines) and escape trunk penetrations exposed to sea pressure during normal ship operation require a completion test and a controlled dive to test depth. The completion test is a 12 psig air test conducted per Note 25 of

this Appendix for 10 minutes. In addition, a minor DFS will be used to document the requirement to inspect for leakage by opening the escape trunk drain at depths for hull valve cycling in accordance with NAVSEA Instruction C9094.2B to verify re-establishment of the watertight integrity for the repaired items.

NOTE 22: Bulkhead penetration hole covers will be tested using the air hose test alternative of Note 25, step c. of this appendix. Upon successful completion of the air hose test, document test on a QA Form 17 and submit to the ship's Quality Assurance Officer. A DFS is not required.

**CAUTION: CARE MUST BE EXERCISED WHEN HYDRAULIC OIL IS USED AS A TEST LIQUID TO PREVENT SPRAY OR LEAKAGE FROM BECOMING A FIRE OR CONTAMINATION HAZARD.**

NOTE 23: Where shop pre-tested hydraulic system components or hydraulic system piping are reinstalled by mechanical joints, those portions will be tested to column 2 requirements using hydraulic oil as the test fluid.

NOTE 24: For maintenance involving a system or component monitored under the Unrestricted Operation Maintenance Requirement Card program, partial or full performance of in-periodicity operational Unrestricted Operation Maintenance Requirement Cards may be required as a retest. Consult NAVSEA 0924-062-0010, Submarine Safety Requirements Manual, Section 6.4.5 for additional information. Perform applicable portions of Unrestricted Operation-Maintenance Requirement Card 025. For "O" and "I" level activities, when a component in the Emergency Flood Control System is disturbed, the retest shall consist of testing the entire Emergency Flood Control System, e.g., if a component in the Engine Room was disturbed, a retest of the entire Engine Room is required. If a component in the Forward Emergency Control System is disturbed, a retest of the entire Emergency Flood Control System in the Forward compartment is required.

NOTE: NAVSEA DRAWING 126-5792666 ALSO CONTAINS INFORMATION REGARDING TESTING OF SUBMARINE TANKS AND COMPARTMENTS.

NOTE 25: 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 EHF cable connection). Hull glands require a completion test (12 psig compartment test) and an acceptance/structural watertight integrity test (where the joint is exposed to full submergence depth pressure). If the structural watertight integrity test will be accomplished by performing a controlled dive to test depth, the work is required to be accomplished using a controlled assembly, and a minor DFS for the controlled deep dive is required. The affected joints will be inspected during the first controlled dive. Performance of alternate completion tests are acceptable in lieu of a 12 psi compartment test and do not require a DFS. In the event that a 12 psig compartment test or an alternate completion test cannot be accomplished and the structural watertight integrity test will be accomplished by performing a controlled dive to test depth, the work is required to be accomplished using a controlled assembly and a major DFS for the controlled deep dive is required. The affected joints will be inspected during the first controlled dive. If required, perform one of the following alternate completion test methods when a 12 psi compartment test is not scheduled or practical.

- a. Cofferdam Test Method.
  - (1) A pressure cofferdam can be used to verify the tightness of hull or bulkhead patches or components after re-installation where it is physically possible to cover the item. A simple cofferdam can be constructed from six inch diameter or larger pipe with length determined by item to be tested. One end of the pipe is capped and the other fitted with a suitable gasket to provide a seal. Sufficient pipe threaded penetrations should be provided for air supply, gauge, and relief valve fittings.
  - (2) Cofferdam tests, used in lieu of 12 psig compartment air tests, will be performed as follows:

- (a) Install the cofferdam over joint/fittings to be tested so that the pressure differential will be in the same direction as a full compartment or tank test. Secure the cofferdam by use of shores and wedges or hydraulic jacks braced against sound structure. Attach air supply and non-isolable gauge and relief valves.
- (b) Pressurize the air space inside the cofferdam to the test pressure specified for the test of the applicable tank or compartment, as shown in the ship's test drawing.
- (c) Apply a soapy solution to the opposite side of the structure and inspect for leakage.
- (d) Acceptance criteria for cofferdam tests will be no evidence of leakage.
- (e) Where the opposite side of the structure is inaccessible, an alternate method of providing tightness is to measure the drop in pressure within the cofferdam over a ten minute period. The gasket and fittings in the cofferdam should be checked for leakage using a soapy solution.
- (f) Acceptance criteria for this alternate cofferdam test will be no drop in pressure.

b. Vacuum Box Test Method.

- (1) A vacuum box can be used to test the same items tested by the cofferdam method. However, since the pressure differential is now in the opposition direction, it may be used in many locations where a cofferdam is not suitable. Several portable vacuum pumps capable of pulling a vacuum in a small displacement test vessel are commercially available. An air eductor can be used to pull a vacuum for testing penetrations through the deck over a submarine battery space.
- (2) Vacuum box tests used in lieu of 12 psig compartment air tests, will be performed as follows:
  - (a) Apply a soapy solution to the joint to be tested.
  - (b) Install the vacuum box over the joint or fitting to be tested so that the pressure differential will be in the same direction as a full compartment or tank test.

**CAUTION: PROVIDE SUPPORT FOR THE VACUUM BOX WHERE A CHANGE IN THE INTERNAL PRESSURE COULD CAUSE THE BOX TO FALL.**

- (c) Draw a vacuum to obtain a pressure differential comparable to the test pressure specified in the ship's test drawings.
- (d) Inspect the joint or fitting for leakage by observing through the Plexiglas cover of the vacuum box for the formation of bubbles which would indicate leakage.
- (e) Acceptance criteria for vacuum box tests will be no evidence of leakage.
- (f) An alternate test method of proving tightness with the vacuum box is to measure the rise in pressure within the vacuum box over a ten minute period.

**NOTE: A SOAPY SOLUTION SHOULD BE APPLIED TO THE GASKET, COVER, AND FITTINGS INSIDE THE VACUUM BOX. FORMATION OF BUBBLES ON THE INTERIOR OF THE VACUUM BOX INDICATES A LEAK IN THE BOX.**

- (g) Acceptance criteria for this alternate vacuum box test will be no rise in pressure.

## 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 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.
- 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.

**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.

**VOLUME V****PART I****CHAPTER 8****DEPARTURE FROM SPECIFICATION  
(DFS/WAIVERS/NUCLEAR LIAISON ACTION REQUEST/STEAM PLANT ACTION REQUESTS)**REFERENCES.

- (a) NAVSEAINST 5400.95 - Waterfront Engineering and Technical Authority Policy
- (b) NAVSEA 0989-LP-037-2000 - Commissioned Submarine General Reactor Plant Overhaul and Repair Specification
- (c) NAVSEA 0989-LP-043-0000 - Commissioned Surface Ship General Reactor Plant Overhaul and Repair Specification
- (d) NAVSEA 0989-LP-058-1000 - Destroyer Tender and Submarine Tender Nuclear Support Facilities Overhaul and Repair Specification
- (e) NAVSEA S9086-T4-STM-010 - NSTM Chapter 589 (Cranes)
- (f) NAVSEA T9044-AD-MAN-010 - Requirements Manual for Submarine Fly-By-Wire Ship Control Systems
- (g) NAVSEA S9086-CH-STM-020/CH-074 V2 (NSTM, Chapter 074, Vol 2) - Nondestructive Testing of Metals, Qualification and Certification Requirements for Naval Personnel (Non-Nuclear)
- (h) NAVSEA T9074-AS-GIB-010/271 - Requirements for Nondestructive Testing Methods
- (i) NAVSEAINST C9210.4 - Changes, Repairs and Maintenance to Nuclear Powered Ships
- (j) NAVSEA SL720-AA-MAN-010 - Fleet Modernization Program (FMP) Management and Operations Manual

LISTING OF APPENDICES.

- A Departure From Specification Request Message Format
- B Departure From Specification Clearance/Cancellation Report Message Format

8.1 PURPOSE. To establish standard procedures to be used by the Fleet and all maintenance activities for reporting, requesting approval and clearance, at the earliest opportunity, of all non-conforming/departable conditions, Departures from Specification (DFS).

8.1.1 Background. Specifications are engineered requirements such as type of materials, dimensional clearances, vibration levels, flow rates, and physical arrangement to which ship components are purchased, installed, tested, and maintained. All ships are designed and constructed to specific technical and physical requirements. It is imperative that every effort be made to maintain all ship systems and components to their designed specifications. There are occasions when the applicable specifications cannot be met. In these cases, the non-conformance to specifications is controlled with a DFS.

8.1.2 Terminology.

- a. A DFS is the mechanism used to document and resolve a lack of compliance with any authoritative document, plan, procedure, instruction, etc.
- b. Authorized Technical Authority. An Authorized Technical Authority is a representative designated by reference (a) to act for Naval Sea Systems Command (NAVSEA) in dispositioning non-conformance issues. They are also charged with providing technically sound maintenance alternatives to the Fleet upon which maintenance and operational decisions can be made.

- c. The terms deviation and waiver are often used synonymously. The principle difference being that deviations are requested prior to conducting work that will result in a non-conformance and waivers are requested after a non-conformance has been discovered.

8.1.3 Specification. Technical specifications originate from a variety of sources. When a conflict exists between specifications the governing requirement has to be determined on a case by case basis. The following listing is provided to assist in determining the governing specification. This listing may not be exact for a particular case and all pertinent technical documents will require review:

- a. Non-Nuclear listing of specifications which may be consulted when determining the governing specification:
  - (1) Volume V (Quality Maintenance) of the Joint Fleet Maintenance Manual.
  - (2) Fleet/Type Commander (TYCOM) Technical Notes.
  - (3) Ship's plans/drawings, NAVSEA Standard and Type drawings, and approved Technical Repair Standard or Maintenance Requirement Procedure, or Maintenance Standard.
  - (4) NAVSEA letters and Liaison Action Requests (LAR).
  - (5) The Military Standard (MIL-STD) and Military Specification (MIL-SPEC) series. MIL-SPEC for specific components being procured or manufactured, MIL-STD for specific processes being performed.
  - (6) NAVSEA approved component technical manuals.
  - (7) NAVSEA 0902-018-2010; General Overhaul Specifications for Deep Diving SSBN/SSN Submarines.
  - (8) TYCOM Instructions.
  - (9) Naval Ships' Technical Manuals and Technical Specifications.
  - (10) NAVSEA Instructions.
  - (11) NAVSEA S9AA0-AB-GOS-010; General Specifications for Overhaul of Surface Ships.

NOTE: WHERE THIS MANUAL IS MORE RESTRICTIVE THAN OTHERS, THIS MANUAL WILL TAKE PRECEDENCE UNLESS SPECIFICALLY STATED THAT IT PROVIDES GUIDANCE ONLY. UNRESOLVED QUESTIONS ON PRECEDENCE SHOULD BE REFERRED TO THE TYCOM FOR RESOLUTION. IN SOME INSTANCES A SPECIFICATION OF LESSER PRECEDENCE MAY MODIFY OR SUPERSEDE A MORE SENIOR SPECIFICATION, I.E., A NAVSEA LETTER OR LAR RESPONSE COULD SPECIFICALLY MODIFY A TECHNICAL STANDARD PENDING REVISION.

- b. Nuclear listing of specifications which may be consulted when determining the governing document:
  - (1) Reactor Plant Manual.
  - (2) Reactor plant component technical manuals.
  - (3) NAVSEA technical manuals (e.g., NAVSEA 250-1500-1 Welding Standard).
  - (4) Reference (b).

- (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 SHIPS AND AIRCRAFT CARRIERS, THE TYCOM WILL PERFORM THE IMMEDIATE SUPERIOR IN COMMAND (ISIC) FUNCTIONS OF THIS CHAPTER.

- a. During a maintenance action, 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. If not, 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.
- 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 as found condition 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) Material deficiencies in the SUBSAFE boundary that were discovered outside a regularly scheduled FMA upkeep (excluding voyage repair and planning availability). These deficiencies will be tracked with a CSMP entry and scheduled for repair during the next regular upkeep after the discovery of the non-conforming condition. Deferral of the repair past the next upkeep will require a Minor DFS with proper justification as to why the condition was not corrected during the upkeep and any supply information for outstanding repair parts that were not repaired during subsequent regularly scheduled availability (excluding voyage repair and planning availability).
  - f. (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 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.

- d. The ISIC is responsible for all DFSs which have been approved or forwarded to TYCOM for approval until the DFS is cleared, canceled or formally transferred to another TYCOM. The ISIC is also responsible for ensuring that the CSMP entry is annotated on the DFS for temporary repairs.
- e. All DFS must be reported and controlled. Each activity must have an auditable system for reporting and controlling DFS. Deviation/waivers will be retained and tracked in an auditable fashion within the DFS system by Ship's Force and the ISIC/TYCOM until permanent documentation is confirmed to reflect the specific non-compliance. Use of the Web Based E-DFS or E-W/D programs will facilitate meeting these requirements.
- f. When work performed results in a DFS and requires future action (e.g., re-inspection, repair), the ship will submit an OPNAV 4790/2K (or equivalent) with a new Job Sequence Number. The CSMP Job Sequence Number will be included in Block 17 of the DFS. This Job Sequence Number will be added to the DFS prior to submission to the ISIC. The DFS or waiver will be retained in an auditable fashion with the DFS file. **DFSs and waivers written exclusively to transfer accountability for testing do not require an OPNAV 4790/2K (or equivalent) with a new Job Sequence Number.**
- g. To preclude last minute ship's operational delays, DFS should be processed as early as possible. Any request for approval for a DFS must contain all pertinent information on materials, processes, testing and procedures used, so that a complete and educated engineering evaluation can be made by the TYCOM, Local Technical Authority or System Command. 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.
- h. The activity originally requesting the DFS will track the DFS until it is approved/disapproved.
- i. For any DFS, Non-Conformance, deviation or waiver that has been adjudicated, the approving activity is required to provide a copy of the DFS, Non-Conformance, deviation or waiver to the ship's QAO for retention and tracking per paragraph 8.3.1e. of this chapter.
- j. (Submarines only) All departures shall be adjudicated prior to the ship getting underway for submerged operations.

8.3.2 Review of Outstanding Departures from Specification. Commands responsible for tracking approved DFS will review them prior to each upkeep to establish FMA/shipyard work requirements to clear the DFS. DFSs should be cleared as soon as possible based on:

- a. Approval as a permanent repair.
- b. Condition has been corrected.
- c. Condition is no longer applicable as a result of an alteration.
- d. Condition is no longer applicable as a result of a change in the specification that originally resulted in the DFS request.

8.3.3 Clearing of Departure from Specification by Exposing Sea Connected Systems and Hull Integrity Boundary Items to Submergence Pressure (Submarines only). SUBSAFE certified submarines will submerge to 95% of design test depth, as a minimum, as measured to the keel, for clearing certain "Controlled Dive" DFSs. Satisfactory completion of the test and clearance of the DFS will be in the format of QA form 12A. If unable to use QA form 12A, use message format of Appendix B.

8.3.4 Incorporation of Departure from Specification in Selected Record Drawings/Data or Technical Variance Documentation.

- a. Those DFSs for a change in configuration which NAVSEA accepts as a permanent repair will be maintained in an auditable file by the ship and the ISIC until reflected in ship's selected record drawings/data or technical variance documentation. Examples are:
  - (1) An oversized shaft and bushing.
  - (2) A seal welded mechanical joint.
  - (3) Addition of piping joints or fittings.
  - (4) Different style/type valve.
- b. For DFS approved as a permanent repair for material/component substitution, the ship will ensure that a Ship's Configuration Change Report (OPNAV 4790/CK) and a Fleet COSAL Feedback Report (NAVSUP 1371) are submitted to ensure accurate configuration accounting and technical/supply support are maintained.
- c. The activity causing or discovering the non-conformance/departable condition that the DFS approved as a permanent repair, and affects selected drawings and records, will provide a copy of the marked up drawing to Ship's Force prior to underway and will forward a copy of the applicable portions of the work package and a marked up copy of the affected drawing or record to the planning yard as soon as practical. The ship and accomplishing activity will maintain a copy of the correspondence until the technical variance documentation or selected record drawing is issued.

8.3.5 Preparations for Correction of Departure from Specification and Clearance During Depot Level Availabilities. The following procedures will be used to schedule DFS for correction and report correction of DFS in depot level availabilities:

- a. Ship's Force and/or the parent ISIC will provide copies of DFS outstanding at the Availability Planning Conferences for incorporation into the work package as required by the Availability Baseline Work Package.
- b. DFS deferred to a Depot Availability for correction must be cleared by the submission of a QA form 12A as the shipyard accomplishes the work or upon completion of shipyard period, provided that the shipyard "scope of work" corrected the DFS. Completion reports from shipyards are not required. These forms are submitted by Ship's Force to the ISIC. If unable to use a QA form 12A, use the message format of Appendix B.

8.3.6 Numbering of Departures from Specification. All DFSs will be identified by a unique sequential number issued by the affected ship. The sequential number will consist of the ship's designation and hull number, a hyphen, the sequential number portion, a hyphen, and the last two digits of the year (e.g., SSN 674-13-90, CVN 70-30-94). DFSs already assigned a number under another numbering system will be retained, as there is no intent to revise the numbers already used. DFSs established using the Web Based E-DFS or E-W/D programs will use the numbering conventions of those systems. Approved temporary departures requiring extension will not be assigned new Departure numbers.

8.3.7 Submission and Approval of Departures from Specification. The activity finding or causing a DFS will normally report the DFS to the appropriate approval authority using either a QA form 12, a naval message or electronically using the E-DFS or E-W/D programs. The DFS Request will be completed in accordance with the instructions. If unable to use QA form 12 or the electronic web based programs, use the naval message request format of Appendix A.

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 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.

NOTE: AN EXTENDED DEPARTURE WILL NOT BE ASSIGNED A NEW DEPARTURE NUMBER THAT CANCELS AND/OR SUPERSEDES THE ORIGINAL DEPARTURE NUMBER.

8.3.9 Extending a Temporary Departure. In the event that a departed condition will not be corrected by the expiration date, the Ship's QAO is responsible to submit the departure(s) to the ISIC requesting an extension. The extension request will explain why the departure will not be corrected. The extension request shall be made sufficiently in advance to allow the evaluation process to be completed before the expiration date. The Departure extension will be routed to the same level of approval authority as the original Departure.

- a. Non-conformances are expected to expire. It is acceptable for non-conformances to expire while the ship or Deep Submergence System (DSS)/Scope of Certification (SOC) asset is in a scheduled availability.
- b. (Submarines/DSS/SOC assets only) Expired non-conformances must be adjudicated prior to at sea operation and/or prior to manned use for DSS/SOC systems/assets.
- c. Extension requests via the E-DFS program shall be accomplished using the Request Extension feature accessed by clicking the associated button at the top of the QA form 12 for the most recent approved active DFS extension. Changes to an existing non-conformance in the E-DFS program that do not affect the expiration date shall be accomplished by submittal of an "UPDATE" as directed in paragraph 8.3.10.c of this chapter.
- d. The Request Extension feature is not included in the E-W/D program. Extension requests via the E-W/D program shall be accomplished by submittal of an "UPDATE" as directed in paragraph 8.3.10.c of this chapter.

8.3.10 Electronic Non-Conformance Administration.

- a. User access requires TYCOM or initiating agencies Point Of Contact (POC) approval for all levels of access.
- b. All attachments to the electronic non-conformances are preferred to be in Adobe Acrobat PDF format. If another format is used, ensure it is one that is readily available on government computers, such as Microsoft Word or Excel format. Non-conformances with attachments that cannot be opened by the ISIC or TYCOM will be rejected.
- c. Changes to an existing electronic non-conformance is normally accomplished by submittal of an "UPDATE" to the QA form 12.
  - (1) To enter changes, the initiator of the change will enter the current calendar date and the word "UPDATE": in the user's comment block followed by the relevant information and ending the comments with the user Name, Rank (if applicable) and Title. Do not write over any existing comments, Names or dates in the comment block.
  - (2) Changes or Updates shall be disseminated via an e-mail alert.
  - (3) Deletion of QA form 12s will not be supported. Clear or cancel QA form 12s with a QA form 12A.
- d. Naval Sea Logistics Center (NAVSEALOGCEN) assistance is required to change an archived non-conformance. NAVSEALOGCEN will use the following process to change an electronic non-conformance:
  - (1) Database non-conformance changes (change to a QA form 12) will only be accomplished if requested by the TYCOM or the initiating agencies POC.

- (2) Archived non-conformances requiring changes which were signed by multiple TYCOMS and/or multiple initiating agencies:
  - (a) Requires e-mail concurrence of all POC signatory users to the non-conformance prior to NAVSEALOGCEN making database changes or unarchiving the non-conformance (i.e., Supervisor of Shipbuilding/TYCOM/NAVSEA signed QA form 12).
  - (b) If a non-conformance is unarchived to allow TYCOMs or agency users to make changes, change will be accomplished in accordance with the requirement cited in paragraph 8.3.10.c. above.
  - (c) Each signatory level user should indicate their concurrence to the change in accordance with the requirement cited in paragraph 8.3.10.c. above.
- (3) Archived non-conformances requiring change which were signed by a single TYCOM and/or single initiating agency:
  - (a) Requires e-mail concurrence of the POC signatory user to the non-conformance prior to NAVSEALOGCEN making database changes or unarchiving the non-conformance (i.e., Supervisor of Shipbuilding/TYCOM/NAVSEA signed QA form 12).
  - (b) If a non-conformance is unarchived to allow a TYCOM or agency user to make changes, change will be accomplished in accordance with the requirement cited in paragraph 8.3.10.c. above.

8.4 NUCLEAR COGNIZANT AREAS. Request for DFS for nuclear systems will be neither requested nor approved. If a ship or FMA has a question, problem, or is unable to comply with nuclear specifications, request for technical resolution will be made using a LAR. Formal resolution of the LAR is required prior to reactor plant or propulsion plant startup.

8.4.1 Nuclear Powered Surface Ships. 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. This may be useful to Forces Afloat as an aid in directing inquiries and correspondence and has been distributed to all nuclear surface ships as a NAVSEA letter Ser 08J/C90-5873, dated 7 AUG 90.

8.4.2 Reactor Plant Systems. If a nuclear powered ship or nuclear capable FMA is unable to comply with specifications for reactor plant systems or components listed in enclosure (1) to reference (i) and also those systems identified as nuclear by the appropriate nuclear/non-nuclear interface diagram (references (b) and (c)), then a review of NAVSEA 08 requirements shall be requested. In general, technical resolution to questions or problems for reactor plant systems or components requires use of a liaison inquiry according to the requirements of references (b) and (c).

- a. References (b) and (c) provide the requirements on submission of LARs for nuclear powered surface ships and submarines.

NOTE: LARs SUBMITTED MUST CONTAIN ALL INFORMATION REQUIRED BY REFERENCE (b) AND REFERENCE (c) TO ENSURE A RAPID, ACCURATE RESPONSE.

- b. Reference (d) provides the requirements on submissions of LARs for nuclear support facilities.
- c. A LAR should not be submitted for cases of out of specification seat leakage of nuclear valves after 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 following method may be used to defer rework and close out the Controlled Work Package (CWP):

NOTE: THIS ALTERNATIVE TO SATISFACTORY COMPLETION OF RETEST IS APPLICABLE ONLY TO VALVE SEAT LEAKAGE.

- (1) The ship must inform TYCOM (via squadron/group for submarines) by message with an info copy to NAVSEA 08. The message must include a description of the initial problem, repairs conducted, seat leakage rate, leak specification, dates of next availability, status of paragraphs (2) through (5) below, and request for authorization to continue operation with out-of-specification seat leakage.
  - (2) All hydrostatic and tightness test requirements must be satisfactorily completed.
  - (3) All other portions of the CWP must be properly completed.
  - (4) A new maintenance deferred action must be submitted to the ISIC for repair of the valve seat leakage at the next FMA availability.
  - (5) The valve seat leakage must not constitute an operational problem (for submarines, Group/Squadron's determination and justification statement required).
  - (6) Based on Ship's justification statement, TYCOM will respond by message to all concerned regarding deferral of corrective maintenance. After satisfactory final review, close-out of the CWP can be made with an approved deferral of corrective maintenance in lieu of a satisfactory seat leakage test.
- d. A liaison action file, with a sequential index and containing all submitted Nuclear LARs, shall be maintained by the originating activity. The file shall contain a copy of LARs submitted. A copy of the liaison action shall be kept with liaison requests in the Answered LARs section and in the CWP/Formal Work Procedure if applicable.
- e. Request for DFS for nuclear systems will be neither requested nor approved. If a ship, FMA or shipyard has a question, problem or is unable to comply with nuclear specifications, request for technical resolution will be made using an LAR or Trouble Record.

8.4.3 Propulsion Plant Systems (Aircraft Carriers only). If a ship or FMA has a question, problem or is unable to comply with non-nuclear specifications, technical assistance is available from the Propulsion Plant Engineering Activity (PPEA). The PPEA was formed to provide an additional technical resource for assisting operational aircraft carriers with technical or operational issues not associated with Ship Alteration installation and configuration control. PPEA Liaison services are requested using the Steam Plant Action Request (SPAR). The SPAR allows the Fleet and overhaul activities to submit requests to the PPEA for technical assistance on non-Ship Alteration related issues; the SPAR is not intended to replace the LAR process described above or non-nuclear LARs submitted to the Hull Planning Yard in accordance with reference (j). The PPEA can request information, disseminate technical information associated with the Steam Plant to the Fleet/overhaul activities, or direct work that does not require a drawing change or affect system configuration control using the Steam Plant Liaison Inquiry. Procedures for preparing SPARs are discussed in reference (c).

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- (d) QA records and record retention.
  - (e) Departure from Specification (DFS).
  - (f) Cleanliness controls to include:
    - 1 Training and qualification.
    - 2 Local directives.
  - (g) Technical documentation availability and controls.
  - (h) Shipboard calibration facilities.
  - (i) (Submarines only) Submarine Safety (SUBSAFE)/REC, Fly-By-Wire (FBW) and Scope of Certification (SOC) program compliance.
  - (j) (Submarines only) Unrestricted Operation (URO) Maintenance Requirement Card (MRC) Program.
- (2) **Perform a closeout audit.**
- (a) Perform a closeout vertical audit of all CWPs on a quarterly basis, **except RECs**, when not in a Chief of Naval Operations availability.
  - (b) **Perform a post closeout audit of all RECs within 60 days following availability completion or within 60 days of work completion if work was not accomplished in availability.**
- (3) Written audit guides shall be used for each audit. The QAO will develop audit guides for all audits. The audit guides should be tailored and customized for the specific organization or area being audited. One successful technique is to acquire a collection of audit findings from previous audits or other ships and incorporate these into the audit guides.
- (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) **Maintain an auditable record of the most current Job Control Number to DFS verification.**
- c. Administer an aggressive QA surveillance program to ensure compliance with all QA requirements and to support work process improvements. The surveillance program must include the following elements:
- (1) Surveillance of in-process work of all types.
  - (2) Surveillance of shipboard calibration facilities.

- d. Report results of all audits and Surveillances to the Commanding Officer with copies to the Executive Officer and cognizant Department Head/Division Officer.
- e. Annually the ship's QAO will evaluate the effectiveness of the QA Audit and Surveillance program. This reviews the results of the internal Audit and Surveillance program to identify trends or areas requiring additional monitoring. It should also review external inspections/monitoring deficiencies to determine if immediate and permanent corrective actions have been effective or if additional surveillance is required in a specific area.

9.3.2 Fleet Maintenance Activity Audit, Surveillance and Evaluation Program.

- a. FMAs will schedule and conduct the following audits:
  - (1) Annual audits to be conducted:
    - (a) Material control.
    - (b) QA audit and surveillance program.
    - (c) QA, NDT, and brazer/welder training and qualification.
    - (d) QA records and record retention.
    - (e) Cleanliness controls to include:
      - 1 Training and qualification.
      - 2 Local directives.
      - 3 Facilities such as permanent oxygen clean work areas, oxygen clean material storage areas and special clean/cleaning rooms (except for oxygen clean instrument room).
    - (f) Technical documentation availability and controls.
    - (g) Test equipment (mechanical, electrical and electronic) control, issue, receipt and maintenance.
    - (h) Audits of calibration facilities in accordance with references (a) and (b).
    - (i) (Submarine repairs only) Submarine Safety (SUBSAFE)/REC, SOC and FBW program compliance.
  - (2) Perform a post closeout audit of all CWP's.
    - (a) Perform a post closeout audit of all CWP's quarterly except RECs.
    - (b) Perform a post closeout audit of all RECs within 60 days following availability completion.
  - (3) Written audit guides shall be used for each audit. The FMA will develop audit guides for all audits. The audit guides should be tailored and customized for the specific organization or area being audited. One successful technique is to acquire a collection of audit findings from other FMAs and incorporate these into the audit guides.

- (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 Ships only) 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.

NOTE: UPON COMPLETION, PROVIDE THE SHIP'S COMMANDING OFFICER AND THE FMA COMMANDING OFFICER A COPY OF THE RESULTS FROM THE REVIEWS CONDUCTED IN ACCORDANCE WITH PARAGRAPH 9.3.4 OF THIS CHAPTER AND IDENTIFY ANY DEFICIENCY THAT MUST BE CORRECTED/RESOLVED PRIOR TO UNDERWAY. REPORT SIGNIFICANT DEFICIENCIES TO THE TYCOM.

- (2) For submarines scheduled to and undergoing a Post Shakedown Availability (PSA), Depot Modernization Period (DMP), Engineered Overhaul (EOH), Engineered Refueling Overhaul (ERO), Refueling Overhaul (RFOH) or Regular or Refueling Overhaul (ROH), the following audits will be performed:
  - (a) Vertical audits of all Forces Afloat (including FMA) CWPs done since commencement of the PSA, DMP, EOH, ERO, RFOH or ROH prior to cold operations and prior to Fast Cruise. CWPs audited for cold operations do not have to be re-audited for Fast Cruise. These audits must be done sufficiently early to avoid impact on the PSA, DMP, ERO, EOH, RFOH or ROH schedule. If deemed necessary by the ISIC or based on the amount of Forces Afloat work, the ISIC may conduct vertical audits prior to other Key Events (e.g., hot operations, criticality, undocking).
  - (b) Prior to commencement of Fast Cruise for the PSA, DMP, EOH, ERO, RFOH or ROH conduct an audit of the following:
    - 1 Conduct an audit of UROs assigned to Forces Afloat (Ship's Force and the FMA) by the 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.
    - 2 All outstanding Forces Afloat DFS.
    - 3 Verify any non-conformance of a temporary nature has been correctly resolved per Part I, Chapter 8 of this volume.
- (3) The ISIC will perform a Submarine Operating Cycle Extension Assessment of each submarine in accordance with reference (c) when required by TYCOM.
- (4) Conduct a 100% audit if Upgrades/Alterations or Major Repair Work of the FBW system were performed. Use the FBW message reporting process for certification specified in Volume II, Part I, Chapter 3 of this manual for availabilities of less than six months duration.

9.3.4 Type Commander Assessments. TYCOM QA Assessments of ISICs, where applicable, and submarine maintenance FMAs will be conducted annually, not to exceed 18 months. Assessments by TYCOMs will be accomplished concurrently with FMA assessments, explained in Volume IV, Chapter 2 of this manual, when scheduled in the same calendar year. Assessments will include review of the following areas:

- a. Level I, Submarine Flight Critical Components per reference (d) and nuclear work (i.e., CWPs).
- b. Material identification and control including procurement, receipt inspection, marking, storage, issuing, and in-process use.
- c. Qualification and training of QA personnel.
- d. Metal fabrication including welding, brazing, NDT, qualification, and processes.

- e. DFS program.
- f. Cleanliness program.
- g. Audit and surveillance program.
- h. QA records and record retention.
- i. Effectiveness of corrective actions for previous audit findings.
- j. (Submarines only) SUBSAFE/REC, SOC and FBW program compliance.
- k. (Submarines only) URO MRC program.

9.4 REPORTING AUDIT, SURVEILLANCE AND ASSESSMENT RESULTS AND CORRECTIVE ACTION.

9.4.1 Reporting Requirements for External Audits, Surveillances and Assessments. Each Audit, Assessment and Surveillance Report finding should be a concise statement of the situation, complete to the extent that it will stand on its own as a summary of the condition. It should include the requirement for immediate corrective action where such action is indicated. **In the event the finding is not a direct violation of a requirement or the nature of the finding does not warrant specific oversight from the auditing activity, yet it offers room for process improvement, no official response is required. These findings are offered to commands as a tool to improve their processes. Such findings will be clearly identified in the audit report reflecting that no official response is required.** A discussion should generally be included to amplify the nature of the finding. If not included in the finding, identify positively what directives were violated. TYCOM/ISIC audit/assessment/surveillance findings will be reported using the format of Appendix D. Each finding will provide space for the corrective action response, which includes a root cause/immediate corrective action/permanent corrective action, and when returned to the originator, provides the complete record of the finding and response. The TYCOM/ISIC cover letter forwarding the QA Audit/Assessment/Surveillance Discrepancy forms (Appendix D) will include a summary of all areas. When repeat findings are noted the effectiveness of the corrective action taken in response to previous audits should be addressed.

- a. Ship's Force will provide a report to the ISIC of completed corrective action, proposed corrective action and schedule of accomplishment within 60 days of receipt of the ISIC Official Audit/Assessment/Surveillance Report. Those items determined to require immediate correction should be addressed on a case basis.
- b. (Submarines/Submarine Repair Activities) For immediate corrective action items (items that must be corrected prior to certain operations):
  - (1) (Within the SUBSAFE Boundary) The immediate corrective action must be complete and verified with the ISIC prior to the ship's next underway for submerged operations. All deficiencies which affect certification shall be categorized as "IMMEDIATE CORRECTIVE ACTION".
  - (2) (Within the SOC Boundary) The immediate corrective action must be clearly identified as to whether it must be completed prior to manned operations whether in-port or at-sea, or prior to unmanned operations at-sea. This may require discussions with the Program Manager and/or the System Certification Authority (SCA). The corrective action must be complete and verified with the ISIC prior to the operation being conducted that was restricted.
  - (3) (Within the Level I Boundary) The immediate corrective action must be clearly identified as to what system operation restrictions must be in place prior to the completion of the corrective actions. The corrective action must be complete and verified with the ISIC prior to the operation of the system if restricted or prior to at-sea operations.

- (4) (Within the FBW Boundary) The immediate corrective action must be complete and verified with the ISIC prior to the ship's next underway for surfaced or submerged operations. All deficiencies which affect certification shall be categorized as "IMMEDIATE CORRECTIVE ACTION".
- c. FMAs will provide a report to TYCOM via ISIC (if applicable) on completed corrective action, assessment of root cause, proposed permanent corrective action, and schedule of accomplishment within 60 days of receipt of the TYCOM QA Audit/Assessment/Surveillance Official Report. Those items determined to need immediate correction should be addressed on a case basis. No official response is required for those items indicated as not requiring a response.
- d. Naval Sea Systems Command (NAVSEA) Deep Submergence System/SOC Surveys. Findings for Deep Submergence System/SOC Surveys are reported in accordance with Part III paragraphs 9.3.4.2 or 9.3.6.3 of this volume, as applicable. Survey findings will be formally forwarded to the Sustaining Activity via the operational chain of command and maintenance activity, as applicable. The Sustaining Activity response will be provided to the SCA via the operational chain of command. Survey findings to allow manned operations will be processed as follows:
  - (1) When action identified by a specific card has been completed, a brief summary of the corrective action shall be written on the card and the card shall be signed by the Command responsible for the corrective action. All applicable Objective Quality Evidence (OQE) documenting the corrective action taken shall be attached to the signed card and forwarded to the SCA via the operational chain of command.
  - (2) For Category 1A, Category 1B and applicable Category 1C findings affecting manned operations, the corrective action must be completed and verified with the SCA prior to manned operations whether in-port or at-sea, or prior to unmanned operations at-sea, or within 30 days of receipt of the Official NAVSEA Survey Report, which ever is shorter.
  - (3) For all other findings, the Sustaining Activity will provide a report to NAVSEA, via the ISIC, of completed corrective action, proposed corrective action and schedule of accomplishment within 60 days of receipt of the Official NAVSEA Survey Report.

#### 9.4.2 Correcting Deficiencies in Certified Controlled Work Packages or Objective Quality Evidence Records.

Deficiencies identified in Objective Quality Evidence (OQE) of certified (closed) CWP or OQE records (such as retained for REC exceptions) require action to update or correct the OQE to support continued certification of the system. No changes are permitted to a certified CWP, the certified supporting documents listed on the Maintenance Certification Record/REC or certified OQE record except as noted below. Additional OQE that is generated to clarify the certified documents can include: providing additional administrative information to clarify the OQE documentation, re-performance of the maintenance and/or performance of certification testing. The CWP/OQE record shall be annotated to associate the additional information to the document(s) as follows:

- a. A QA form 14 shall be generated for each OQE deficiency identified. Each QA form 14 shall identify the deficiency, root cause and corrective action required or completed. The corrective action taken shall clearly identify the revised OQE attributes such as data, an attached certified QA form, a separate CWP number (to document a rework such as performance of a required test, inspection or assembly process) and/or approved DFS (if applicable).
- b. The QA form 14 serial number(s) shall be annotated at the top of the QA form 9 or QA form to clearly indicate a QA form 14 has been generated to revise or update the OQE.

- c. Once all required actions are completed to revise or update the OQE, a copy of the completed QA 14 forms and any additional documentation generated shall be attached to the CWP/QA form record such that it is clear that the OQE was revised or updated and certification of the system was restored. The QA form 14 index log shall be updated to indicate the action was completed and the log shall be retained per Part I, Chapter 10 paragraph 10.5.6 of this volume.

## 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 NUCLEAR LEVEL I 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 NUCLEAR LEVEL I 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.

- h. Two years worth of records for Field Calibration Activity spot checks/sampling of outgoing work, as applicable.

10.7.7 End of Fleet Maintenance Activity Certification Report to Tended Submarines (Submarines only). The QAO will retain a copy of the last End of Fleet Maintenance Activity Certification Report to tended submarines issued per Part I, Chapter 5, paragraph 5.10.8.b. or Part III, Chapter 5, paragraph 5.11.7.b of this volume, as applicable.

10.7.8 Nuclear/Submarine Safety/Scope of Certification Work. The master lists of qualified CMPO/Controlled Material Handler, Cleanliness Inspector/Certifier, QAI and QAS (if assigned), will be maintained by name, for the duration the individual is assigned to the repair activity.

NOTE: AT A FMA, CIVILIAN EMPLOYEE CONTINUING TRAINING KNOWLEDGE EXAMINATION QUESTIONS AND ANSWERS WILL BE RETAINED FOR TWO YEARS.

10.7.9 Qualification Record. The QAO will maintain a master list of qualified CMPOs/Controlled Material Handlers, Cleanliness Inspectors, QAIs, QASs, Oxygen Clean Workers and Oxygen Clean Instructors and a qualification file on each CMPO/Controlled Material Handler, Cleanliness Inspector, QAI and QAS. 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. For Oxygen Clean qualifications, this entry is not required.

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**VOLUME V****PART I****CHAPTER 11****QUALITY ASSURANCE FORMS AND FORM INSTRUCTIONS**

11.1 PURPOSE. Provide Quality Assurance (QA) forms and tags with instructions for preparation and usage.

11.2 LIST OF FORMS. This chapter provides copies of the QA forms and tags discussed throughout this volume.

- |    |               |   |   |
|----|---------------|---|---|
| a. | QA form 1.    | - | Material Receipt Control Record.  |
| b. | QA form 2.    | - | Material ID/Control Tag.  |
| c. | QA form 3.    | - | Controlled Material Reject Tag.   |
| d. | QA form 9.    | - | Maintenance Certification Record/Re-Entry Control.                                  |
| e. | QA form 10.   | - | Maintenance Certification Record/Re-Entry Control Supplement Sheet.                 |
| f. | QA form 11.   | - | Controlled Work Package (CWP)/Re-Entry Control (REC) Log.                           |
| g. | QA form 12.   | - | Departure From Specification Request.   |
| h. | QA form 12A.  | - | Departure Clearance Report.   |
| i. | QA form 14.   | - | Surveillance/Monitoring/Audit Discrepancy Record.                                   |
| j. | QA form 17.   | - | Test and Inspection Record.   |
| k. | QA form 17A.  | - | Epoxy Repair Record.  |
| l. | QA form 17B.  | - | Electroplating Repair Record.   |
| m. | QA form 17C.  | - | Component Repair Record.  |
| n. | QA form 17D.  | - | Submarine Flight Critical Component (SFCC) Access, Removal and Installation Record. |
| o. | QA form 17SI. | - | Stud Installation Record.   |
| p. | QA form 17W.  | - | Handling Equipment Test Record.   |
| q. | QA form 18.   | - | Silver Braze Fabrication and Inspection Record.                                     |
| r. | QA form 18A.  | - | Ultrasonic Inspection Record.   |
| s. | QA form 20.   | - | Welding In Process Control/Nondestructive Test Record.                              |
| t. | QA form 20A.  | - | Radiographic Test Inspection Record.  |

- |     |                          |   |  |
|-----|--------------------------|---|--|
| u.  | QA form 20B.<br>(Part A) | - | Structural Primary Record.   |
| v.  | QA form 20B.<br>(Part B) | - | Structural Weld History.   |
| w.  | QA form 20B.<br>(Part C) | - | Structural Defect Record.  |
| x.  | QA form 20C.             | - | Pipe, Machinery and Pressure Vessel Weld Record/Weld Defect<br>Repair Sheet. |
| y.  | QA form 26.              | - | Hydrostatic/Pneumatic Test Record.   |
| z.  | QA form 27.              | - | Drop Test Record.  |
| aa. | QA form 28.              | - | Shop Test Record.  |
| ab. | QA form 34.              | - | Joint/Component Torque and Assembly Record.                                  |
| ac. | QA form 34A.             | - | Joint/Component Assembly Record.   |
| ad. | QA form 35.              | - | Thickness Measurement Record.  |
| ae. | MAT-1.                   | - | Ship to Shop Tag MAT-1 (General Use).  |

QA FORM 1 INSTRUCTIONSMATERIAL RECEIPT CONTROL RECORD

PURPOSE: To document the proper receipt, control, end use and certification of material to the required "Level of Essentiality" for controlled material.

PROCEDURE: The numbered blocks on QA form 1 correspond with the instructions listed below.

NOTE: SHIP'S FORCE IS NOT REQUIRED TO COMPLETE A QA FORM 1 TO DOCUMENT THE RECEIPT INSPECTION OF CONTROLLED MATERIAL IF THE ITEM(S) IS TO BE IMMEDIATELY INSTALLED FOR A SPECIFIC MAINTENANCE ACTION. IN THESE CASES, THE RECEIPT INSPECTION WILL BE CAPTURED ON A QA FORM 2. IF THE MATERIAL IS NOT UTILIZED DURING THE SPECIFIC MAINTENANCE ACTION FOR WHICH IT WAS PROCURED IT SHOULD BE TURNED BACK IN TO SUPPLY. IF THE MATERIAL IS TO BE RETAINED FOR A FUTURE MAINTENANCE ACTION, A QA FORM 1 MUST BE FILLED OUT PRIOR TO PLACING THE MATERIAL IN A CONTROLLED MATERIAL STORAGE LOCKER/AREA.

NOTE: IF THE COMPONENT HAS A SHORTENED MATERIAL IDENTIFICATION AND CONTROL (MIC) MARKING, ENSURE THE FULL MIC MARKING FROM THE SHIPPING DOCUMENTS, TAGS, AND/OR PACKAGING IS ENTERED ON QA FORM 1 AND QA FORM 2.

NOTE: IF PORTIONS OF A COMPONENT WILL BE CANNABALIZED FOR INSTALLATION VICE INSTALLING THE ENTIRE COMPONENT, DISPOSITION IN ACCORDANCE WITH PART I, CHAPTER 6, PARAGRAPH 6.3.9.1.D OF THIS VOLUME.

BLOCK 1 - MATERIAL NOMENCLATURE

Enter the noun name of the material (e.g., 5/8" - 11 NICU studs, 10" O.D. CUNI Barstock).

BLOCK 2 - LEVEL OF ESSENTIALITY

Enter the applicable Level of Essentiality (SUBSAFE, Level I, Nuclear Level I, Submarine Flight Critical Component (SFCC) or Scope of Certification (SOC) Material Control Division (MCD)) for the material received. For assemblies such as valves, the Level of Essentiality will be the Level of Essentiality for the entire assembly, not individual parts.

## a. Nuclear Level I:

- (1) Material received with a "Target" Ready for Issue (RFI) tag or Naval Sea Systems Command (NAVSEA) Prime Contractor Material determined to be Nuclear Level I.
- (2) Material from stock system required to be certified as Nuclear Level I.

## b. SUBSAFE:

- (1) SS, SB Special Material Identification Code (SMIC) material with valid MIC markings.
- (2) Submarine Antenna Engineering Directorate (SAED), (Submarine Antenna Quality Assurance Material) SS, SMIC material.
- (3) Open purchased and stock system non-level material required to meet SUBSAFE requirements.

- c. Level I:
  - (1) L/I, C1, S1 or D1 SMIC material with valid MIC markings.
  - (2) Non-level material required to be upgraded to Level I requirements.
- d. SOC MCD A, MCD B or MCD C: The entry will be based on the SOC Level of Essentiality as determined in Part III, Chapter 6 of this volume.

BLOCK 3 - MIC NO./I.D. NO.

NOTE: THE PNSY "TRACE CODE" RESEMBLES A MIC NUMBER BUT DOES NOT INCLUDE THE GENERIC MATERIAL DESIGNATOR (E.G., 98205-003A).

- a. Enter the MIC or the identification number/name plate data (I.D. No. if no MIC No.) etched on the major part of the assembled material received (some individual parts may also have MIC numbers that need not be recorded). Fleet Maintenance Activity (FMA) will enter MIC upon completion of upgrading for FMA certified/upgraded material. Ships (Non-FMA) will enter the FMA MIC No. for material that the FMA certifies for the ship. For rotatable items enter the appropriate rotatable pool serial number (e.g., rp-148a, tin-292-11893, etc.).
- b. For fasteners enter either the MIC number (when MIC number is marked on the fastener or the individual tag for some small fasteners) or the color code and the PNSY "trace code" provided on the shipper and the package/box.
- c. If the material is MCD B, enter Markings on the material or documented on the shipping papers providing identification to material type or military specification.

BLOCK 4 - REQUISITION NUMBER (REQ. NO.)

Enter the Requisition No. (invoice number) that was used to order the material or appears on shipping documents (if provided).

BLOCK 5 - JULIAN DATE

Enter the five digit Julian Date (e.g., 90121, 91200, 92030) the material is received.

BLOCK 6 - NUMBER RECEIVED

Enter the total number received (must agree with the invoice). If the material is, for example, "Barstock" enter the number of pieces and total length. Only one QA form 1 is required if the entire lot has the same MIC number and is receipt inspected on the same day.

BLOCK 7 - NSN/SMIC

Enter the National Stock Number (NSN), including the SMIC, of material received. If material is identified only by drawing and piece number, enter them.

BLOCK 8 - VENDOR'S MARKINGS

- a. Enter any Vendor's Marking (heat, lot) present on the material.
- b. For fasteners, enter the heat/lot number, material type, and manufacturer's symbol (for nuts containing a self-locking insert, the color of the insert is the manufacturer's symbol).

BLOCK 9 - REQUIRED CERTIFICATION DOCUMENTS FURNISHED (SIGNATURE AND DATE)

- a. If required certification documentation is provided, and the item passes receipt inspection in accordance with Chapter 6, enter an "X" in the "YES" block. Controlled Material Petty Officer (CMPO)/Controlled Material Handler (CMH) print name, sign and date the block to certify the item passed receipt inspection. Blocks 10 through 15 are left blank. Attach a QA form 2. A copy of any certification documentation will be attached to the QA form 1.
- b. If the certification documentation is unacceptable or the material fails receipt inspection or the item is non-level material undergoing upgrading, enter an "X" in the "NO" block, attach a QA form 3 to the item, and notify the Quality Assurance Officer (QAO)/Quality Assurance Supervisor (QAS). CMPO/CMH print name, sign and date the block.

BLOCK 10 - ENTER APPROPRIATE CODE

QAO/QAS will mark the applicable blocks signifying attributes that must be verified for receipt inspection, by referring to the appropriate references, using the appropriate code; "X" (whenever records are required) or "O" (whenever records are not required, e.g., visual inspection).

BLOCK 11 - INSPECTION RESULTS, REMARKS, SIGNATURE AND DATE

- a. CMPO/Quality Assurance Inspector (QAI)/QAS will enter the results of all inspections and, if unsatisfactory, state the reason for failure.
- b. Print name, sign and date all entries which certifies the above inspections, issues, and records.

NOTE: BLOCKS 12, 13 AND 14 ARE COMPLETED AS REQUIRED, INCOMPLETE BLOCKS ARE LEFT BLANK.

BLOCK 12 - DISPOSITION

Check the appropriate block based upon inspection results documented in Block 11 and fill out Blocks 13 or 14 as applicable.

BLOCK 13 - CERTIFIED

Check the appropriate block signifying the level of essentiality to which the material has been inspected/certified. For SOC material, enter the applicable MCD designator (A, B or C) in the blank.

NOTE: NON-LEVEL ITEMS UPGRADED OR CERTIFIED WILL HAVE THE ASSIGNED MIC NUMBER ENTERED IN BLOCK 3 ABOVE PRIOR TO SIGNATURE IN BLOCK 15.

BLOCK 14 - DOWNGRADE

Check the appropriate block, if "reject" is checked in Block 12.

BLOCK 15 - SIGNATURE AND DATE

QAO/QAS responsible for Blocks 10-14 will print name, sign and date certifying the record as correct.

BLOCK 16 - Same as Block 1.

BLOCK 17 - Same as Block 2.

- BLOCK 18 - Same as Block 3.
- BLOCK 19 - Same as Block 4.
- BLOCK 20 - Same as Block 7.
- BLOCK 21 - Same as Block 6.
- BLOCK 22 - Enter the date that the material is issued.
- BLOCKS 23A, 23B, AND 23C - Enter the Unit Identification Code (UIC), Work Center (WC), and the job sequence number that the material is issued against.
- BLOCK 24 - Enter the system that the material is issued for.
- BLOCK 25 - Enter the Controlled Work Package (CWP) serial number that the material is issued for.
- BLOCK 26 - Enter the amount of material issued.
- BLOCK 27 - Enter the amount of material remaining after issue.
- BLOCK 28 - CMPO/CMH issuing material, print name.
- BLOCK 29 - Enter "Yes" or "No" as appropriate.
- BLOCK 30 - Enter Level the material was downgraded to.
- BLOCK 31 - QAO sign, signifying authorization to downgrade material.

NOTE: THE COMPLETED QA FORM 1 WILL BE FORWARDED TO THE QA OFFICE, WHEN THE MATERIAL HAS BEEN ISSUED FOR INSTALLATION.

block. The information provided in Block 6 does not need to be repeated in Block 13. The description of work on each REC revision shall detail the total revised Scope of Work. Cumulative partial descriptions do not satisfy this requirement.

BLOCK 14 - APPLICABLE JOINT NO(s), OR, IF NOT SUPPLIED, SPECIFIC BOUNDARIES

Enter the JID to be repaired/re-entered. If joint numbers are not supplied, specify boundaries in specific terms (e.g., body to bonnet joint of valve ASW-29) or assign local joint numbers. If local joint numbers are assigned, the sketch used to identify the joints must be included as OQE in the completed CWP. Listing of work boundary "end points" in lieu of listing discrete individual joints does not satisfy this requirement.

BLOCK 15 - PRIME APPROVAL SIGNATURE

- a. BLOCK 15A. The QAO will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date indicating the package is technically correct.
- b. BLOCK 15B. The Department Head will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date granting permission for work to be conducted. **No work can start prior to this signature.**
- c. BLOCK 15C. For nuclear system work, the ship's Commanding Officer (Reactor Officer for CVNs) will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date granting permission for work to be conducted in accordance with Part I, Chapter 2, Appendix D of this Volume. **No nuclear work can start prior to this signature.** The Immediate Superior In Command (ISIC) Material Officer will counter sign and enter his/her badge/grade/rank to indicate review for testing of repair activity accomplished nuclear work in accordance with Part I, Chapter 2, Appendix D of this Volume. For oxygen, SUBSAFE, Scope of Certification or Safety of Flight Critical Component work, the ship's Engineer Officer (Chief Engineer for CVNs) will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date, granting permission for work to be conducted in accordance with Part I, Chapter 2, Appendix D of this Volume. **No nuclear, oxygen system, SUBSAFE, Scope of Certification or Safety of Flight Critical Component work can start prior to this signature.**
- d. BLOCK 15D. The Officer Of the Deck/Duty Officer or Engineering Officer of the Watch/Engineering Duty Officer, depending on the work to be performed, will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date authorizing the work to start. The signature establishes the work and CWP start date and signifies that the system/component is in a condition to accomplish the work.

NOTE: COMPLETE BLOCKS 16, 17 AND 18 BEFORE PERFORMING ANY SHIPBOARD TESTING. IF REWORK BECOMES NECESSARY AS THE RESULT OF SHIPBOARD TESTING, THE REQUIREMENTS OF PART I, CHAPTER 2, PARAGRAPH 2.3.7.2 OF THIS VOLUME SHALL BE FOLLOWED. FOR SHIP-TO-SHOP MAINTENANCE, BLOCKS 16, 17 AND 18 DO NOT NEED TO BE COMPLETED FOR IN-PROCESS TESTING IDENTIFIED AS PART OF THE CWP "PROCEDURE" SECTION. AFTER COMPLETING THE PROCEDURE AND BEFORE PERFORMING THE CWP "TESTING AND INSPECTION" SECTION, COMPLETE BLOCKS 16, 17, AND 18.

BLOCK 16 - SUPPORTING DOCUMENTATION

The Lead Work Center (LWC) Division Officer will identify all supporting documentation required and generated (QA forms 2, 12, 17, 17A, 17B, 17C, 18, 18A, 20, 20A, 20B, 20C, 26, 27, 34, 35) as established by the CWP. A typical entry would be: Non-nuclear - QA2(3), QA10(1), QA12(1, SSN765-001-93), QA26(1), QA34(1); Nuclear – QA2(1), QA10(1), QA26(1), QA34(1), RFI Tag(1). List only QA form 2s for new material installed in the system or component.

BLOCK 17 - VERIFICATION OF WORK COMPLETION

The LWC Division Officer will sign, legibly print or stamp his/her name (and badge/grade/rank) and enter the date certifying that the production work described by the MCR/REC has been accomplished in accordance with the specified instructions and that the required documentation for the production work as described in Block 16 has been completed, reviewed and is correct.

BLOCK 18 - CERTIFICATION OF DOCUMENTATION OF PRODUCTION WORK

The QAO will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date certifying that all documentation for the production work specified in Block 16 has been reviewed for accuracy and completeness and is complete and accurate.

BLOCK 19 - CERTIFICATION OF TESTING RESULTS

The QAO will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date certifying that the testing invoked for this MCR/REC has been completed satisfactorily. The test documentation specified in Block 16 has been completed, has been reviewed, and is complete and accurate.

BLOCK 20 - FINAL MCR/REC CLOSEOUT CERTIFICATION

The Department Head will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date certifying that all documentation related to this MCR/REC has been reviewed for accuracy and completeness and is complete and accurate. For oxygen, SUBSAFE, Scope of Certification or Safety of Flight Critical Component work, the ship's Engineer Officer (Chief Engineer for CVNs) shall perform this certification and sign, legibly print or stamp his/her name and badge/grade/rank and enter the date.

BLOCK 21 - SHIP'S COMMANDING OFFICER SIGNATURE

The ship's Commanding Officer (Reactor Officer for CVNs) will sign, legibly print or stamp his/her name and grade/rank and enter the date acknowledging that the MCR/REC has been closed by the Department Head in accordance with Part I, Chapter 2, Appendix D of this Volume.

**SITUATION 2. CONTROLLED WORK (NUCLEAR/LEVEL I/SOC/OTHER)/SUBSAFE REC BY REPAIR ACTIVITY AND SHIP OR REPAIR ACTIVITY ONLY.**

- a. The following instructions contain the minimum information and controls necessary to maintain certified systems on board ship, or to document new work for eventual certification when work is performed by Ship's Force and a repair activity or by a repair activity only on a certified ship or component.
- b. Each block number on the MCR/REC, QA form 9 corresponds to the same number below. The number identifies the purpose and use of the entry on the MCR/REC.
- c. The planner will fill in Blocks 1 – 14. All other blocks will be filled in/signed by the personnel assigned or their authorized representatives. Such authorized representatives will be designated in writing in an approved ship's/activity's instruction.

BLOCK 1 - PAGE 1 OF

Enter the total number of pages (QA form 9 plus any QA form 10 used as a supplement).

BLOCK 2 - [ ] SUBSAFE/REC [ ] NUCLEAR [ ] LEVEL I [ ] SCOPE OF CERTIFICATION [ ] SFCC [ ] OTHER

Check or "X" the appropriate block and, if "OTHER" is checked, will enter the appropriate level of control (e.g., P-1, P-3a, P-LT).

BLOCK 3 - SHIP HULL NO.

Enter ship's name and hull number.

BLOCK 4 - CWP SERIAL NO.

- a. For Ship's Force and FMA work, obtain the next CWP serial number from the ship's QAO and enter it in the block. 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) obtain the next CWP serial number from the FMA QAO and enter it in the block. Revision "-" (dash) will be entered on the initial version of all MCR/RECs. When a revision is required, enter the next revision letter. If necessary, prepare a new MCR/REC using the original numbers plus the next revision letter.
- b. For FMA work on a SUBSAFE system, the REC number will be obtained from the ship's QAO and entered after the CWP number (e.g., CWP/REC number). Upon issuance of each REC revision, all prior revisions are canceled and superseded and shall be so annotated and retained as OQE. A REC revision must go through the same approval process as the original REC. REC Supplement or continuation sheets (QA-10) shall not be used as an alternate to revision of the REC.

BLOCK 5 - J.O./JCN

Enter the JCN for the maintenance action.

BLOCK 6 - ASSOCIATED CWP(s)/REC(s)

Shipyard use only.

BLOCK 7 - ORIGINATOR

Enter the name (and badge/grade/rank) of the person preparing the CWP.

BLOCK 8 - ORGANIZATION

Enter the division of the person preparing the CWP.

BLOCK 9 - SYSTEM REPAIRED/RE-ENTERED

Identify the system(s) being repaired/re-entered.

BLOCK 10 - REPAIR/RE-ENTRY LOCATION

Identify the physical location (i.e., ship or shop) of the work.

BLOCK 11 - COMPONENT(s)

Identify the noun name of the component(s) being repaired/re-entered.

BLOCK 12 - JID MAP/DWG WITH REV

- a. Enter the number and revision of the appropriate mapping drawing(s) for the work. If no mapping drawing is available, list the most appropriate arrangement or component drawing or diagram. For component repair, enter the applicable document (Standard Navy Valve Drawing, Vendor Drawing, etc.) which depicts the disturbances of the item (work in place or shop work). Based on the scope of work planned, several drawings may need to be referenced. If necessary, local sketches are authorized.
- b. The general order of precedence for entering JID is:
  - (1) JID number from the SUBSAFE Joint Mapping Plan, if there is one.
  - (2) JID number from the Joint Index Drawing, ship or class, for welding.
  - (3) Joint description/JID from Assembly or Arrangement/Installation Drawing. The drawing chosen must adequately portray the joints to be broken.
  - (4) Drawings/diagrams from technical manual.
  - (5) A locally prepared sketch where other alternatives do not adequately describe the joints to be broken. Since the sketch will not be retrievable elsewhere, it must be kept in the REC package as OQE.

BLOCK 13 - WORK AND TESTING TO BE PERFORMED AND WORK AND TEST REFERENCE DOCUMENTS

Enter the total scope of work and testing required for certification of this repair/re-entry (e.g., ripout, repair, restore, replace, reinstall). Enter the work and test description and make positive reference to the TWD, which contains the detailed work procedure, material requirements, testing and certification to be performed. If additional space is needed to properly identify all elements, then a QA form 10 will be used to supplement this block. The information provided in Block 6 does not need to be repeated in Block 13. The description of work on each REC revision shall detail the total revised Scope of Work. Cumulative partial descriptions do not satisfy this requirement.

BLOCK 14 - APPLICABLE JOINT NO(s), OR, IF NOT SUPPLIED, SPECIFIC BOUNDARIES

Enter the JID to be repaired/re-entered. If joint numbers are not supplied, specify boundaries in specific terms (e.g., body to bonnet joint of valve ASW-29) or assign local joint numbers. If local joint numbers are assigned, the sketch used to identify the joints must be included as OQE in the completed CWP. Listing of work boundary "end points" in lieu of listing discrete individual joints does not satisfy this requirement.

BLOCK 15 - PRIME APPROVAL SIGNATURE

- a. BLOCK 15A. The QAO will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date indicating the package is technically correct. **No work can start prior to this signature.**
- b. BLOCK 15B. The Department Head will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date granting permission for work to commence. **No SUBSAFE work can start prior to this signature.**
- c. BLOCK 15C. For nuclear, oxygen, SUBSAFE, Scope of Certification or Safety of Flight Critical Component work, the ship's Engineer Officer (Reactor Officer for CVNs) will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date, granting permission for work to be conducted. **No nuclear, oxygen system, SUBSAFE, Scope of Certification or Safety of Flight Critical Component work can start prior to this signature.**

- d. BLOCK 15D. The Officer Of the Deck/Duty Officer or Engineering Officer of the Watch/Engineering Duty Officer, depending on the work to be performed, will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date, authorizing the work to start. This signature establishes the work and CWP start date and signifies that the system/component is in a condition to accomplish the work. This signature is not required for repair activity generated MCR/RECs to repair ship to shop items from tended ships (e.g., periscopes, relief valves, antennae).

NOTE: COMPLETE BLOCKS 16, 17, AND 18 BEFORE PERFORMING ANY SHIPBOARD TESTING. IF REWORK BECOMES NECESSARY AS THE RESULT OF SHIPBOARD TESTING, THE REQUIREMENTS OF PART I, CHAPTER 2, PARAGRAPH 2.3.7.2 OF THIS VOLUME SHALL BE FOLLOWED. FOR SHIP-TO-SHOP MAINTENANCE, BLOCKS 16, 17, AND 18 DO NOT NEED TO BE COMPLETED FOR IN-PROCESS TESTING IDENTIFIED AS PART OF THE CWP "PROCEDURE" SECTION. AFTER COMPLETING THE PROCEDURE AND BEFORE PERFORMING THE CWP "TESTING AND INSPECTION" SECTION, COMPLETE BLOCKS 16, 17, AND 18.

BLOCK 16 - SUPPORTING DOCUMENTATION

- a. The LWC Division Officer will identify all supporting documentation required and generated (QA forms 2, 12, 17, 17A, 17B, 17C, 18, 18A, 20, 20A, 20B, 20C, 26, 27, 34, 35) as established by the CWP. A typical entry would be: Non-nuclear - QA2(3), QA10(1), QA12(1, SSN765-001-93), QA20(2), QA20A(2), QA26(1), QA34(1); Nuclear - QA1(1), QA2(1), QA10(1), QA20(2), QA20A(2), QA26(1), QA34(1), RFI Tag(1).
- b. For activities using the Task Group Instruction (TGI) process. Deficiency Logs (DL) do not have to be listed in this block since DLs are integral to the TGI. The TGI should be cited in Block 16 if not already cited in Block 13. QA forms and other individual OQE records must be listed.

BLOCK 17 - VERIFICATION OF WORK COMPLETION

The LWC Division Officer will sign, legibly print or stamp his/her name (and badge/grade/rank) and enter the date, certifying that the production work described by the MCR/REC has been accomplished in accordance with the specified instructions and that the required documentation for the production work as described in Block 15 has been completed, reviewed and is correct.

BLOCK 18 - CERTIFICATION OF DOCUMENTATION OF PRODUCTION WORK

The QAO will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date, certifying that all documentation for the production work specified in Block 16 has been reviewed for accuracy and completeness and is complete and accurate.

BLOCK 19 - CERTIFICATION OF TESTING RESULTS

The QAO will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date, certifying that the testing invoked for this MCR/REC has been completed satisfactorily. The test documentation specified in Block 16 has been completed, reviewed, and is complete and accurate.

BLOCK 20 - FINAL MCR/REC CLOSEOUT CERTIFICATION

The Department Head will sign, legibly print or stamp his/her name and badge/grade/rank and enter the date, certifying that all documentation related to this MCR/REC has been reviewed for accuracy and completeness and is complete and accurate.

BLOCK 21 - SHIP'S COMMANDING OFFICER SIGNATURE

For "Ship's Force and FMA" MCR/REC, the ship's Commanding Officer (Reactor Officer for CVNs) will sign, legibly print or stamp his/her name and grade/rank and enter the date, in accordance with Part I, Chapter 2, Appendix D of this Volume, acknowledging that the MCR/REC has been closed by the Repair Officer. For "FMA ONLY" MCR/REC, this block is marked N/A.

QA FORM 10 INSTRUCTIONS

MAINTENANCE CERTIFICATION RECORD/RE-ENTRY CONTROL SUPPLEMENT SHEET

PURPOSE: MCR/REC Supplement Sheets are used to record supplemental data required by the MCR/REC, QA form 9. Examples of supplemental data are:

- a. Continuation of Blocks 12, 13, 14 and 16 of the QA form 9.
- b. Rework.

PROCEDURE: The MCR/REC Supplement Sheet, QA form 10 may be used, as required, to record supplemental data required by the MCR/REC, QA form 9 (page number will normally be 2 of \_). Record the QA form 9 block number and supplemental data. Record name and signature of the person recording the information (normally the person who is signing QA form 9) and date, except where the entry is preprinted by Planning prior to initial review for approval/opening.

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**DEPARTURE FROM SPECIFICATION REQUEST  
QA FORM 12**

1. DEPARTURE NO.	2. SHIP	3. JCN	4. CWP/REC SER. NO.	5. DATE
6. ORIGINATOR: NAME		7. DEPARTURE TYPE <input type="checkbox"/> MAJOR <input type="checkbox"/> MINOR <input type="checkbox"/> SUBSAFE <input type="checkbox"/> SOC <input type="checkbox"/> FBW <input type="checkbox"/> SFCC		
8. ADDITIONAL CLASSIFICATION (SHIPYARD AND SOC USE ONLY) <input type="checkbox"/> WAIVER <input type="checkbox"/> DEVIATION <input type="checkbox"/> SDDR <input type="checkbox"/> TVD <input type="checkbox"/> FBWDR ISIC CONCURRENCE (REQUIRED FOR CONDITIONAL DFS) <input type="checkbox"/> YES <input type="checkbox"/> NO				
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:				
18. DFS APPROVAL COMMENTS				
ISIC <input type="checkbox"/> APPROVED <input type="checkbox"/> DISAPPROVED <input type="checkbox"/> CONCUR, FORWARDED TO TYCOM LOCAL TECH AUTHORITY FOR ACTION				
NAME		SIGNATURE		DATE
TYCOM <input type="checkbox"/> CONCUR <input type="checkbox"/> APPROVED <input type="checkbox"/> DISAPPROVED <input type="checkbox"/> FORWARDED TO NAVSEA/NAVAIR/LOCAL TECH AUTHORITY FOR ACTION				
NAME		SIGNATURE		DATE
LOCAL TECHNICAL AUTHORITY <input type="checkbox"/> APPROVED <input type="checkbox"/> DISAPPROVED <input type="checkbox"/> FORWARDED TO NAVSEA/NAVAIR FOR ACTION				
NAME		SIGNATURE		DATE
NAVSEA/NAVAIR <input type="checkbox"/> APPROVED <input type="checkbox"/> DISAPPROVED <input type="checkbox"/> TEMPORARY <input type="checkbox"/> PERMANENT <input type="checkbox"/> PRECEDENT				
NAME		SIGNATURE		DATE
19. COPY TO:				

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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 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 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 - DFS APPROVAL COMMENTS

- a. Approval Activity Comments: The activity approving the DFS will enter remarks as appropriate and specify the time duration that the noncompliance is acceptable prior to correction. (Enter a date.)
- b. ISIC: 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.
- c. For an at sea generated DFS, the Commanding Officer will use the ISIC section to indicate approval of the DFS.
- d. 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/LOCAL TECH. AUTHORITY FOR ACTION. The ISIC will type or print name, sign and date.
- e. TYCOM: Check the appropriate blocks. Type or print name, sign, and date.

QA FORM 17 INSTRUCTIONSTEST AND INSPECTION RECORD

PURPOSE: To provide a report form for work, tests and inspections not covered by other QA forms. This form can be used for flushes, operational testing, shop inspections, cleanliness inspections, generic material identity test, and other tests, inspections, and information deemed necessary.

PROCEDURE: The numbered blocks on QA form 17 correspond with the instructions listed below. The planning organization shall fill in Blocks 1 through 8 (identified by a ♦) prior to issuing the CWP.

BLOCK 1 - SHIP HULL NO.

Enter the ship's name and hull number.

BLOCK 2 - JCN

Enter the JCN.

BLOCK 3 - LWC

Enter the shop number of the LWC.

BLOCK 4 - CWP/REC SERIAL 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 - SYSTEM/COMPONENT

Enter the noun name of the system or component to be tested or inspected.

BLOCK 6 - REFERENCES (COMPONENT ASSY/DETAIL DRAWING AND REVISION)

Enter all references used to identify component parts, material information, and required test/inspection including revision letter and if applicable, the assembly number (Assy D, Assy RA, etc.). For original issue drawings (no revisions) enter a dash (-). For vendor drawings, include vendor name. Revisions for technical manuals are not required.

BLOCK 7 - PART DESCRIPTION/PIECE NO.

Enter the part number/description (pc 5, bonnet, stem bore, backseat, etc.).

BLOCK 8 - DESCRIPTION OF TEST AND/OR INSPECTION

Enter a detailed description of tests/inspections/work to be performed or note the reference used and paragraph/note number that specifies the inspection or test. Enter the required pressure, duration, medium and acceptance criteria of the test. If the test or inspection has a numerical value (e.g., maximum and/or minimum value), the values will be written in. If listing the pressure values would classify the work procedure, then the symbols "J" or "H" with the applicable reference may be used instead of classifying the document.

NOTE: WHEN MANUFACTURING PARTS, ENTER THE MATERIAL SPECIFICATION OR NSN FOR RAW STOCK AND RECORD THE PLAN AND WHEN APPLICABLE, THE PIECE NUMBER OF THE PART MANUFACTURED.

NOTE: FOR URO MRCs TO BE PERFORMED AS A RETEST, LIST THE SPECIFIC APPLICABLE PORTIONS OF THE URO MRC REQUIRED TO RECERTIFY THE SYSTEM.

BLOCK 9 - RESULTS

Enter the specific results of the test, inspection or work specified in Block 8. Indicate satisfactory or unsatisfactory results or completion. If UNSAT, the craftsman will:

- a. Initiate action to resolve the condition.
- b. Record actions taken in this block to correct the unsatisfactory condition.
- c. Sign in this block (Block 9).

Do not sign Block 10 unless signing for satisfactory results or completion are obtained or for an UNSAT condition that has been accepted.

NOTE: IF THE TEST OR INSPECTION REQUIRES THE USE OF TMDE, RECORD THE INSTRUMENT, RANGE AND SERIAL NUMBER AND CAL DUE DATE IN THE RESULTS BLOCK.

NOTE: WHEN VULCANIZING O-RINGS, ENTER THE STOCK NUMBER AND EXPIRATION DATE (IF PROVIDED).

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

NOTE: FOR OPERATIONAL JOINT TIGHTNESS TESTS ENTER ACTUAL PRESSURE AND DURATION. TEST DURATION WILL INCLUDE THE REQUIRED TEST PERIOD AND THE TIME REQUIRED TO COMPLETE THE INSPECTION. FOR URO MRCs PERFORMED AS A RETEST, COMPLETE REQUIRED PORTIONS OF THE URO MRC DATA FORMS AND ENTER SATISFACTORY OR UNSATISFACTORY IN BLOCK 9.

BLOCK 10 - CRAFTSMAN/DATE

Craftsman print name, enter signature and date after completing Block 9. Do not sign Block 10 unless satisfactory results or completion are obtained or the UNSAT condition has been accepted.

NOTE: FOR NDT INSPECTIONS, THE NDT INSPECTOR WILL SIGN BLOCK 10 AS THE CRAFTSMAN AND THE NDT SUPERVISOR WILL SIGN BLOCK 11 FOLLOWING REVIEW OF THE FORM.

BLOCK 11 - QA INSPECTOR/DATE

Inspector print name, enter signature and date verifying the accuracy of the data recorded in Block 9.

BLOCK 12 - RECORD HAS BEEN REVIEWED FOR COMPLETENESS

QAS or QAO will print name, enter signature and date for final review, signifying the accuracy of the completed form for SUBSAFE/SOC/SFCC items only. For other components, the Work Center supervisor shall sign and date the form signifying the accuracy of the completed form.

QA FORM 17SI INSTRUCTIONS  
STUD INSTALLATION RECORD

PURPOSE: To document the proper OQE for installing Level One studs in a SOC, SUBSAFE or Level One application when directed by the work procedure.

PROCEDURE: The numbered blocks on QA form 17SI correspond with the instructions listed below. Blocks marked with a ♦ shall be completed by the planner prior to issue.

BLOCK 1 - SHIP HULL NO.

Enter the ship's name and hull number.

BLOCK 2 - JCN

Enter the JCN.

BLOCK 3 - LWC

Enter the shop number of the LWC.

BLOCK 4 - CWP/REC SERIAL 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 - SYSTEM/COMPONENT

Enter the noun name of the system and component being repaired. (e.g., MSW-25 Hull Insert). If the record is for in-shop repair/manufacture of rotatable pool item, enter the serial number of the item.

BLOCK 6 - NEW MATERIAL DESCRIPTION

NOTE: THE CRAFTSMAN SHALL COMPLETE ALL SECTIONS OF BLOCK 6.

MATERIAL DESCRIPTION

Enter a description of the new studs installed in the joint. Include diameter, thread, and length (e.g., Stud, 5/8"-11x3").

QTY - Record the quantity of the new studs installed.

LOE - Enter the Level of Essentiality as "I" or "NA" as appropriate.

IDENTIFICATION/MIC/TRACEABILITY NO.

Document the markings from the fastener to include either:

- (1) The color code and the heat/lot number, material type and manufacturer's symbol (for nuts containing a self-locking insert, the color of the insert is the manufacturer's symbol).
- (2) The MIC number (when MIC number is on the fastener or on the individual tag for some small fasteners).

BLOCK 7 - DESCRIPTION OF STUD DATA REQUIREMENTS

NOTE: THE PLANNER SHALL COMPLETE ALL SECTIONS OF BLOCK 7.

JOINT MAPPING DRAWING & REV

Enter the joint mapping drawing and revision. Enter NA when no mapping drawing exists.

JOINT NO/JOINT DESCRIPTION

Enter the joint number if applicable or clearly describe the installation location. If joint numbers are assigned via a sketch in the TWD, identify the sketch enclosure number and TWD number.

REQUIRED STUD DIAMETER & THREAD SERIES

Enter the required diameter and thread series of the replacement stud.

DETAIL DRAWING & REV

Enter the detailed drawing and revision number. For original issue (non revised) drawings, enter a dash (-). Include vendor name for vendor drawings. Revisions for Technical Manuals are not required.

STUD PIECE NO.

Enter the detailed drawing pertaining to the stud.

REQUIRED STUD LENGTH

Enter the required length of the stud.

REQUIRED CLASS OF FIT AUTHORIZED INSTALLATION METHOD

Mark the appropriate block for the required class of fit.

TORQUE REFERENCE

Enter the source for the torque value (e.g., NAVSEA S9505-AM-GYD-010, SAE J2270, drawing, MS, etc.).

REQUIRED MIN BREAKAWAY TORQUE OR STUD SETTING TORQUE

Enter the required minimum breakaway torque, the tolerance or range, and mark the appropriate torque units box (ft-lb or in-lb).

BLOCK 8 - STUD INSTALLATION DOCUMENTATION

REQUIRED ANAEROBIC LOCKING COMPOUND: GRADE

Planner enter the required grade of anaerobic locking compound. Leave blank for Class 5 installation method.

ACTUAL ANAEROBIC LOCKING COMPOUND MANUFACTURER & GRADE

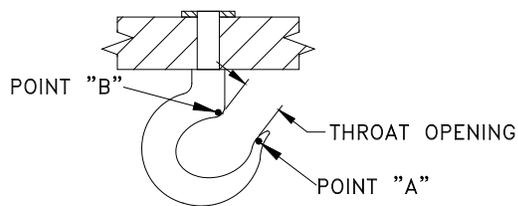
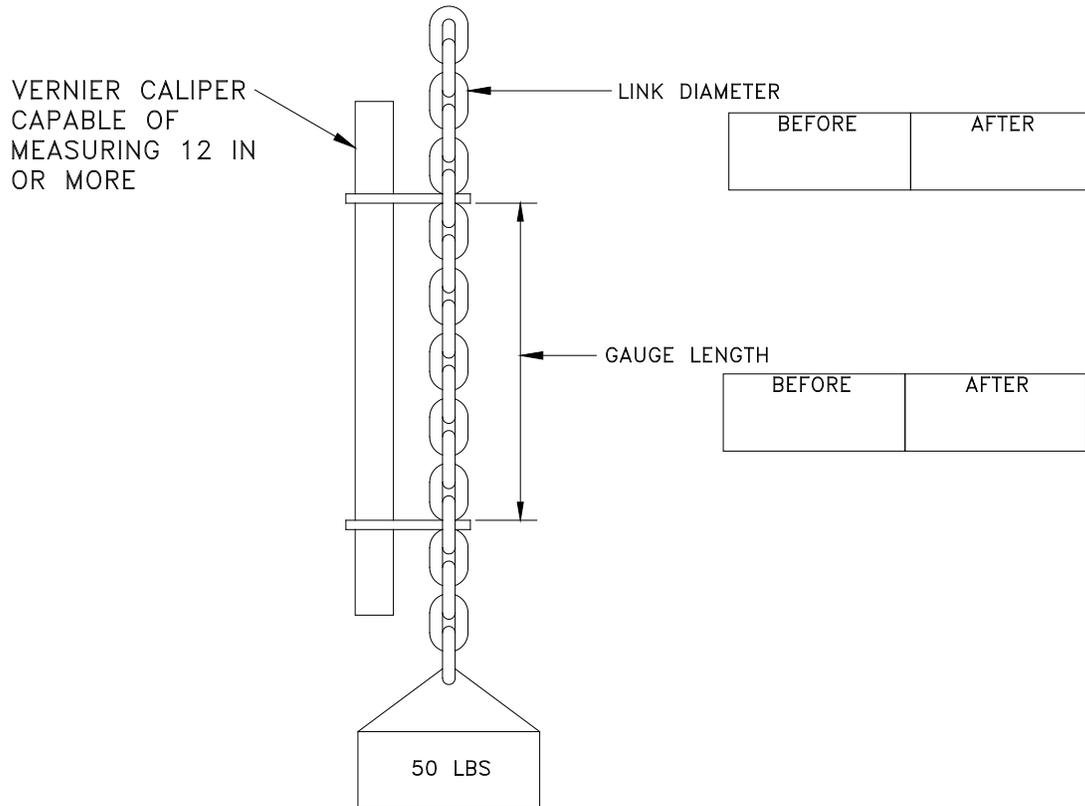
Record the manufacturer and grade of the thread locking compound used. Leave blank for Class 5 installation method.

**HANDLING EQUIPMENT TEST RECORD**

QA FORM 17W (Front) For CWPs, planning shall fill in blocks identified by a ♦ prior to issuing  
 Page \_\_\_ of \_\_\_

♦1. SHIP HULL NO.		♦2. JCN		♦3. LWC/SHOP		♦4. CWP/REC SER NO.	
♦5. Equipment Description:							
♦6. Log I.D. Number:				♦7. Manufacturer or Local Serial Number (Hull No.- Work Center-Number):			
♦8. NAVSEA Drawing Number/Revision used for Test:							
♦9. Safe Working Load (SWL) in pounds:				♦10. Dynamic Test Load (DTL) in pounds:			
♦11. Static Test Load (STL) in pounds:				♦12. STL Frequency in months:			
13a. Test Type		13b. Testing Activity		13c. Test Activity Witness		13d. Quality Assurance	
Action				Signature		Signature	
Date				Print Name		Print Name	
Action				Signature		Signature	
Date				Print Name		Print Name	
Action				Signature		Signature	
Date				Print Name		Print Name	
Action				Signature		Signature	
Date				Print Name		Print Name	
Action				Signature		Signature	
Date				Print Name		Print Name	
14. Remarks:							

**HANDLING EQUIPMENT TEST RECORD**  
 QA FORM 17W (Back) FIGURE 1



	THROAT OPENING		POINT A AND B	
TOP	BEFORE	AFTER	BEFORE	AFTER
BOTTOM	BEFORE	AFTER	BEFORE	AFTER

QA FORM 17W INSTRUCTIONSHANDLING EQUIPMENT TEST RECORD INSTRUCTIONS

PURPOSE: To provide a report form for work, tests and inspections not covered by other QA forms. This form can be used for handling equipment weight testing except cranes and strategic weapons handling equipment.

PROCEDURE: The numbered blocks on QA form 17W correspond with the instructions listed below. When this form is used to certify manufacture or repair of handling equipment, the planning organization shall fill in Blocks 1 through 11 (identified by a ♦) prior to issuing a procedure requiring use of this form. When this form is used to perform periodic handling equipment testing, the weight test supervisor/shop supervisor shall fill in Blocks 1 through 12 (identified by a ♦) prior to performing testing.

BLOCK 1 - SHIP HULL NO.

Enter the ship's name and hull number.

BLOCK 2 - JCN

Enter the JCN.

BLOCK 3 - LWC/SHOP

Enter the shop number of the LWC.

BLOCK 4 - CWP/REC SERIAL NO.

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

BLOCK 5 - EQUIPMENT DESCRIPTION

Enter the name and a readily understood description of the equipment or component name from the TLMD. If the equipment is permanently installed (e.g., a monorail or padeye, etc.), enter the compartment location, (e.g., torpedo room, port, overhead, and frame 21.)

BLOCK 6 - LOG I.D. NUMBER

Enter log identification number from the Test Load Methods Drawing (TLMD) when applicable.

BLOCK 7 - MANUFACTURER OR LOCAL SERIAL NUMBER

Enter the manufacturer or Local Serial Number when applicable (i.e., Hull No. - Work Center - Number).

BLOCK 8 - NAVSEA DRAWING NUMBER/REVISION

Enter NAVSEA drawing number and revision for drawing used to conduct the test.

BLOCK 9 - SAFE WORKING LOAD (SWL)

Enter the item's Safe Working Load (SWL), in pounds, from the TLMD.

NOTE: LIST THE SWL FOR BOTH THE SHORT AND LONG POSITIONS FOR LOADING POLES.

BLOCK 10 - DYNAMIC TEST LOAD (DTL)

Enter the item's Dynamic Test Load (DTL), in pounds, from the TLMD.

BLOCK 11 - STATIC TEST LOAD (STL)

Enter the item's Static Test Load (STL), in pounds, from the TLMD.

BLOCK 12 - STL FREQUENCY

Enter the frequency required for the static test in months.

NOTE: STRATEGIC WEAPONS HANDLING EQUIPMENT COVERED UNDER THE PREVENTIVE MAINTENANCE MATERIAL PROGRAM (PMMP) DOES NOT REQUIRE A QA FORM 17W. EQUIPMENT NOT COVERED UNDER THE PMMP MUST MEET THE REQUIREMENTS OF THIS MANUAL.

BLOCK 13 - TEST TYPE

Enter the test date, the action taken (e.g., STL, DTL, MT, VT, tension, compression, short/long for loading poles) and the name or hull number of the testing facility. Print the name (e.g., first name, middle initial and last name) of the test facility witness. The test facility witness shall then sign the block above the name. If test facility witness signature and/or QA signature cannot be obtained, the source document bearing that signature will be obtained and retained in the weapons handling test record log. Only the latest source document applicable to any particular piece of equipment/component need be retained.

BLOCK 14 - REMARKS

(Craftsman/QAI/QAS/Planning) Enter any pertinent remarks or additional information related to the repair/assembly of the component. Each entry shall contain signature, badge number and date except where the entry is pre-printed on the form by Planning.

FIGURE 1 Record measurement in blocks provided on the back of the QA form 17W when applicable.

- a. Hook throat opening measurements and tram point pre/post test measurements when new, or as first recorded, per NSTM 700 or PMS.
- b. Length and link diameters of hoist load chains when new, or as first recorded, per NSTM 700 or PMS.

**SILVER BRAZE FABRICATION & INSPECTION RECORD**

QA FORM 18 (NEW 09/05) (Work planning to fill in blocks/evaluate block options identified by a ♦ prior to release)

♦ 1. SHIP		♦ HULL NO.		♦ 2. JCN		♦ 3. LWC/SHOP		♦ 4. CWP/REC SER NO.		♦ 5. SYSTEM/COMPONENT						
♦ 6. PURPOSE:		<input type="checkbox"/> PRODUCTION <input type="checkbox"/> QUAL		♦ 7. INSTALLATION DWG.		♦ 8. JOINT ID/DESCRIPTION										
<input type="checkbox"/> RE-QUAL <input type="checkbox"/> MAINTENANCE OF QUAL																
♦ 9. JOB DESCRIPTION						♦ 10. MAP JOINT DWG			♦ 11. <input type="checkbox"/> P-3A SPECIAL <input type="checkbox"/> P-3A <input type="checkbox"/> P-3B							
♦ 12. BRAZE PROC.		♦ 13. BRAZE PROCESS <input type="checkbox"/> H101 <input type="checkbox"/> H103 <input type="checkbox"/> NA		14. JOINT DESIGN		<input type="checkbox"/> SOCKET <input type="checkbox"/> SLEEVE		<input type="checkbox"/> DOUBLE INSERT <input type="checkbox"/> EQUAL LAND		15. ACCESS <input type="checkbox"/> RESTRICTED (<4") <input type="checkbox"/> UNRESTRICTED						
				<input type="checkbox"/> FACE FEED <input type="checkbox"/> SINGLE INSERT		<input type="checkbox"/> UNEQUAL LAND				16. <input type="checkbox"/> ORIGINAL <input type="checkbox"/> REPAIR (1) <input type="checkbox"/> REPAIR (2)						
17. FITTING, PIPE, AND TUBE MATERIALS																
♦ DWG PC NO.	♦ SIZE	THICKNESS	♦ MIL-SPEC		♦ P-NUMBER		♦ NEW OR EXIST	IDENT (E.G., MIC NO./NSN/TRACEABILITY NO.)								
							<input type="checkbox"/> NEW <input type="checkbox"/> EXISTING									
							<input type="checkbox"/> NEW <input type="checkbox"/> EXISTING									
18. LAND WIDTH	PIPE	FITTING	CENTER	SOCKET DEPTH		19. FLUX		♦ <input type="checkbox"/> MINIMUM FLUX FED SPEC O-F-499: <input type="checkbox"/> TYPE A <input type="checkbox"/> TYPE B								
20. BRAZE ALLOY		MIL-SPEC		F- NUMBER		GRADE	IDENT (E.G., MIC NO./NSN/TRACEABILITY NO.)									
INSERT RING																
ROD																
<b>JOINT DATA IS CORRECT, JOINT AND MATERIAL MEETS SPECIFIED REQUIREMENTS</b>						21. CRAFTSMAN SIGNATURE/BADGE			DATE							
22. INSPECTION TYPE			23. ACCEPT	24. REJECT	25. SIGNATURE (Inspector/Craftsman)			BADGE NO.	DATE							
NDT EXISTING PPG <input type="checkbox"/> NOT REQD	<input type="checkbox"/> VT5X <input type="checkbox"/> PT															
NDT EXISTING FTG <input type="checkbox"/> NOT REQD	<input type="checkbox"/> VT5X <input type="checkbox"/> PT															
DIAMETRICAL CLEARANCE																
FIT UP INSPECTION																
ALLOY DRAW																
EVIDENCE OF ALLOY																
BOTTOM CLEARANCE																
26. BRAZED POSITION <input type="checkbox"/> VERT <input type="checkbox"/> HORZ		<b>BRAZING REQUIREMENTS ARE SATISFACTORY</b>				27. BRAZER SIGNATURE/BADGE NO.			DATE							
♦ 28. <input type="checkbox"/> NO. UT INSPECTION REQUIRED (NON P-3 A SPECIAL)						NDT PROCEDURE NO.			ACCEPTANCE STANDARD: NAVSEA 0900-LP-001-7000							
29. SCANNING METHOD <input type="checkbox"/> STATIC <input type="checkbox"/> CONTINUOUS		30. EQUIPMENT MFG.			MODEL		SERIAL NO.		CAL DUE DATE							
31. TRANSDUCER MFG.			SIZE	SERIAL NO.		FREQUENCY		32. COUPLANT TYPE								
33. LAND	1	2	3	4	5	6	7	8	9	10	11	12	13	14	TOT.	AVG.
PPG																
MID																
FTG																
34. TOTAL % BOND		35. DISPOSITION <input type="checkbox"/> ACCEPT <input type="checkbox"/> REJECT			36. UT INSPECTOR/BADGE						DATE					
37. REMARKS (SHOP REMARKS ALSO)																
FINAL DISPOSITION		38. SUPERVISOR (Signature/Badge/Date)					39. WCS (QAS For SUBSAFE/SOC Only) (Signature/Badge/Date)									

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QA FORM 18 INSTRUCTIONS

SILVER BRAZE FABRICATION AND INSPECTION RECORD

PURPOSE: To provide a standard form for documenting OQE for a silver brazed joint.

PROCEDURE: The numbered blocks on QA form 18 correspond with the instructions listed below. The planner preparing the work procedure will complete blocks identified with the diamond symbol. The craftsman will complete blocks without the diamond symbol. The NDT Supervisor will verify the completed form and sign in Block 38. A QA form 18A will be attached to this form to complete each brazed joint record.

NOTE: BLOCKS 13, 17, P-NUMBER, 20, F-NUMBER, AND 26 ARE FOR QUALIFICATION USE ONLY AND ARE NOT REQUIRED FOR PRODUCTION BRAZES.

PAGE OF Enter the page number, starting with page 1, of total number of QA forms 18 and 18A associated with the joint (e.g., 1 of 2, 1 of 3).

BLOCK 1 - SHIP HULL NO.

Enter the tended ship's name and hull number.

BLOCK 2 - JCN

Enter the JCN.

BLOCK 3 - LWC/SHOP

Enter the shop number for the LWC.

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 - SYSTEM/COMPONENT

Enter the system/component noun name.

BLOCK 6 - PURPOSE

Check appropriate block.

BLOCK 7 - INSTALLATION DRAWING

Enter the installation drawing number and revision.

BLOCK 8 - JOINT ID/DESCRIPTION

Enter the map joint number from the applicable plan (Block 10). If not a mapped joint, assign a local unique joint ID number or enter a description of the joint.

BLOCK 9 - JOB DESCRIPTION

Enter a brief statement describing the work.

BLOCK 10 - MAP JOINT DWG

Enter ship's plan number and revision, which show and identify the map number of the joint being brazed or enter "NA" if there isn't a map drawing.

BLOCK 11 - P-3A SPECIAL/P-3A/P 3B

Enter an "X" in the appropriate box.

BLOCK 12 - BRAZE PROCEDURE

Enter the braze procedure used, including revision and change.

BLOCK 13 - BRAZE PROCESS

Enter an "X" in the appropriate block per NAVSEA 0900-LP-001-7000.

BLOCK 14 - JOINT DESIGN

Enter an "X" in the appropriate boxes.

BLOCK 15 - ACCESS

Enter an "X" in the appropriate box.

BLOCK 16 - ORIGINAL/REPAIR

Enter an "X" in the appropriate box.

BLOCK 17 - FITTING, PIPE AND TUBE MATERIALS

- a. Enter the fitting piece and pipe/tube piece number from the installation drawing (Block 7) or NA if not available.
- b. Enter the size of the fitting and pipe/tube (e.g., 1/2 Normal Pipe Size (NPS)).
- c. Enter the thickness (.127 inches).
- d. Enter the actual thickness (minimum value) of the fitting and pipe/tube.
- e. Enter the material specification of the component (from Table 4-4 of NAVSEA 0900-LP-001-7000), when known. If existing, enter "existing".
- f. For qualification purposes, enter the applicable P-number from Table 4-4 of NAVSEA 0900-LP-001-7000.
- g. Enter an "X" in the appropriate New/Exist box.
- h. Enter the material marking of the component. Enter the MIC Number for new level I material installed or N/A. Enter other material markings if material is not required to be level I and marking is present. If fitting is existing and is not marked, an acid check when required by the TWD to ensure generic material is correct shall be accomplished and documented in remarks block.

BLOCK 18 - LAND WIDTH

Enter the land width or socket depth for fittings without inserts. N/A blocks that are not applicable.

BLOCK 19 - FLUX

- a. Enter an "X" if minimum flux technique was used.
- b. Enter an "X" for flux type per FED-SPEC O-F-499.

BLOCK 20 - BRAZE ALLOY

Enter the Mil-Spec and the alloy grade. Enter the MIC Number when new level I brazing material is installed in a Level I application or enter "NA" for non-level applications when material is not required to be level I.

BLOCK 21 - JOINT DATA IS CORRECT/CRAFTSMAN SIGNATURE

Verify data entered is correct and actual material to be used/installed is as specified. Sign name, enter date and badge number to certify information is correct.

BLOCK 22 - INSPECTION TYPE

- a. Mark the appropriate type of inspection.
- b. Diametrical Clearance – Enter the actual measurement. Acceptance criteria is per Table 5.2 of NAVSEA 0900-LP-001-7000.
- c. Fit up Inspection-Acceptance criteria of paragraph 7.2.1.a of NAVSEA 0900-LP-001-7000.
- d. Alloy Draw-Acceptance criteria per paragraph 7.2.1.d of NAVSEA 0900-LP-001-7000.
- e. Evidence of Alloy-Acceptance criteria per paragraph 7.2.1.e of NAVSEA 0900-LP-001-7000.
- f. Clearance Acceptance criteria per paragraph 7.2.1.f of NAVSEA 0900-LP-001-7000.

BLOCK 23/24 - ACCEPT/REJECT

Mark the appropriate column.

BLOCK 25 - SIGNATURE

Enter the signature, badge number and date.

BLOCK 26 - BRAZED POSITION

Mark the appropriate block for position brazing performed.

BLOCK 27 - BRAZE PROCEDURE IS SATISFACTORY

Brazer sign name and enter Brazer badge number and date to certify all joint information is correct.

BLOCK 28 - NDT REQUIREMENTS

- a. Enter an "X" if Ultrasonic Testing (UT) is not required.
- b. Enter the NDT procedure number.

BLOCK 29 - SCANNING METHOD

Enter an "X" in the appropriate box.

BLOCK 30 - EQUIPMENT MANUFACTURER

Enter Equipment Manufacture Name, Model, Serial number and calibration Due Date of Equipment.

BLOCK 31 - TRANSDUCER MANUFACTURER

Enter Equipment Manufacture Name, Size, Serial number, and Frequency of Equipment.

BLOCK 32 - COUPLANT TYPE

Enter the name of the fluid used.

BLOCK 33 - LAND/PIPE/MID/FTG

Enter the percent of bond for the various segments of the lands. Enter NA as applicable. Enter the total for all segments used and the average percent bond for the lands (or passes of a non insert fitting).

BLOCK 34 - TOTAL % BOND

Calculate and enter the total % bond for the joint.

BLOCK 35 - DISPOSITION

Enter an "X" in the appropriate box to accept or reject the joint.

BLOCK 36 - INSPECTOR/BADGE/DATE

UT inspector will sign, enter badge number and date, signifying the technical accuracy of the data recorded and acceptance/rejection of the joint.

BLOCK 37 - REMARKS

Enter any additional information.

BLOCK 38 - FINAL DISPOSITION/SUPERVISOR

NDT Supervisor enter signature, badge number and date signifying the joint is satisfactory and that all data on the form is completed satisfactorily.

BLOCK 39 - FINAL DISPOSITION/RECORD HAS BEEN REVIEWED FOR  
COMPLETENESS/QAS

QAS or QAO will print name, enter signature and date for final review, signifying the accuracy of the completed form for SUBSAFE/SOC items only. For other components, the Work Center supervisor shall sign and date the form signifying the accuracy of the completed form.

**ULTRASONIC INSPECTION RECORD**  
**QA FORM 18A**

PAGE            OF

2. SHIP		HULL			3. JCN			4. LWC/SHOP			5. CWP/REC SERIAL NO.			
<b>ULTRASONIC EQUIPMENT AND INSPECTION DATA</b>														
6. EQUIPMENT MANUFACTURER		7. MODEL NO.		8. SERIAL NO.		9. TRANSDUCER MANUF.			10. SIZE/FREQ		11. SERIAL NO.			
12. SCANNING METHOD [ ] STATIC [ ] CONTINUOUS		13. COUPLANT TYPE		14. CAL EXP DATE		15. JOINT ID NO.			16. DWG NO.					
17. REMARKS/NOTES														
18. LAND%	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	TOTAL BOND
PIPE														
MIDDLE														
FITTING														
19. DISPOSITION [ ] ACCEPT [ ] REJECT		20. TOTAL % BOND			21. INSPECTOR/DATE									
<b>ULTRASONIC EQUIPMENT AND INSPECTION DATA</b>														
6. EQUIPMENT MANUFACTURER		7. MODEL NO.		8. SERIAL NO.		9. TRANSDUCER MANUF.			10. SIZE/FREQ		11. SERIAL NO.			
12. SCANNING METHOD [ ] STATIC [ ] CONTINUOUS		13. COUPLANT TYPE		14. CAL EXP DATE		15. JOINT ID NO.			16. DWG NO.					
17. REMARKS/NOTES														
18. LAND%	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	TOTAL BOND
PIPE														
MIDDLE														
FITTING														
19. DISPOSITION [ ] ACCEPT [ ] REJECT		20. TOTAL % BOND			21. INSPECTOR/DATE									

NOTES: 1. INCREMENTS FOR WHICH NO ULTRASONIC READING CAN BE OBTAINED WILL BE MARKED AS FOLLOWS:  
 "X" - INCREMENTS THAT ARE INACCESSIBLE DUE TO FITTING CONFIGURATION.  
 "NA" - INCREMENTS THAT ARE INACCESSIBLE DUE TO PIPING CONFIGURATION OR LOCATION.  
 "NP" - INCREMENTS IN WHICH THERE IS NO ULTRASONIC PENETRATION.

2. INCREMENTS OF THE ABOVE TYPE WILL BE ASSIGNED PERCENT BOND VALUES AS FOLLOWS:  
 "NA" = 0% BOND.  
 "NP" AND "X" = INCREMENTS UP TO A TOTAL LENGTH NOT EXCEEDING 20% OF THE CIRCUMFERENCE OF THE LAND WILL BE ASSIGNED A % BOND VALUE EQUAL TO THAT OF THE LOWEST READABLE INCREMENTS ADJACENT TO THE "X" OR "NP" INCREMENTS OR 60% WHICHEVER IS THE LEAST. "X" AND "NP" INCREMENTS IN EXCESS OF 20% OF CIRCUMFERENCE WILL BE ASSIGNED A BOND VALUE OF 0%. THE INSPECTOR MAY AT HIS/HER DISCRETION, SHIFT THE INCREMENTAL SCALE SO THAT THE MINIMUM NUMBER OF INCREMENTS CONTAIN "X", "NP" OR "NA" VALUES.

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QA FORM 18A INSTRUCTIONSULTRASONIC INSPECTION RECORD

PURPOSE: To supplement the QA form 18 to document UT inspection date, equipment used, and acceptability of UT results.

PROCEDURE: QA form 18A will be completed by the planner and/or UT NDT Inspector. The numbered blocks on QA form 18A correspond with the instructions listed below.

BLOCK 1 - PAGE OF

Enter the page number, starting with page 2, of total number of QA forms 18A associated with the joint (e.g., 2 of 3, 3 of 3). The associated QA form 18 is always page 1 of \_\_.

BLOCK 2 - SHIP HULL NO.

Enter the tended ship's name and hull number.

BLOCK 3 - JCN

Enter the JCN.

BLOCK 4 - LWC/SHOP

Enter the LWC/Shop.

BLOCK 5 - CWP/REC SERIAL NO.

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

BLOCKS 6-11 - EQUIPMENT MANUFACTURER/MODEL NO./SERIAL NO./TRANSDUCER MANUFACTURER/SIZE/FREQUENCY/SERIAL NO.

Enter the information for the equipment used to conduct the inspection.

BLOCK 12 - SCANNING METHOD

Place an "X" in the appropriate box.

BLOCK 13 - COUPLANT TYPE

Enter the name of fluid used.

BLOCK 14 - CAL EXP DATE

Enter the calibration expiration date of the equipment listed in Blocks 6-11.

BLOCK 15 - JOINT ID NO.

Enter the JID of the joint being UT inspected. If it is a qualification joint and not an actual production joint, enter the individual's name performing the qualification.

BLOCK 16 - DWG. NO.

Enter the number of the drawing or plan that identifies the joint listed in Block 15 if a production braze.

BLOCK 17 - REMARKS/NOTES

Enter any applicable remarks or notes.

BLOCK 18 - LAND/PIPE/MIDDLE/FITTING

Enter the various segments of the lands, enter % bond, X, NA or NP as applicable. Enter the total for all segments used and the average percent bond for the lands (or passes of a no-insert fitting).

BLOCK 19 - DISPOSITION

Place an "X" in the appropriate box to accept or reject the joint.

BLOCK 20 - TOTAL % BOND

Calculate and enter the total % bond for the joint.

BLOCK 21 - INSPECTOR/DATE

NDT Inspector print name, enter signature and date, signifying the technical accuracy of the data recorded and acceptance/rejection of the joint.

**WELDING IN PROCESS CONTROL/NONDESTRUCTIVE TEST RECORD**  
**QA FORM 20 (FRONT)**

When the form is used for production welding, the blocks marked with a ◆ shall be completed by the planner.

◆ 2. SHIP HULL NO.		◆ 3. JCN		◆ 4. CWP/REC SER. NO.		◆ 5. LWC		◆ 6. DATE		
◆ 7. SYSTEM		◆ 8. COMPONENT		◆ 9. DWG NO.		◆ 10. CWP STEP NO.				
◆ 11. JOINT ID		◆ 12. JOINT DESIGN		13. INST LOCATION: <input type="checkbox"/> STBD COMPT: <input type="checkbox"/> C/L FR: <input type="checkbox"/> PORT		14. WELDED LOCATION: <input type="checkbox"/> SHOP <input type="checkbox"/> FIELD				
<b>BASE MATERIAL DATA</b>										
15. COMP DATA	16. MATERIAL		17. SIZE		18. THICKNESS		19. MATL SPEC	20. MIC NO.		
COMPONENT A:										
COMPONENT B:										
21. <input type="checkbox"/> SEAL RING <input type="checkbox"/> BACK RING/STRIP	22. MATERIAL		23. SIZE		24. THICKNESS		25. MATL SPEC	26. MIC NO.		
<b>WELDING MATERIAL SPECIFICATIONS AND DATA</b>										
27. TYPE OF FILLER(S)		28. SIZE		29. MATL		30. MIL-SPEC		31. MIC NO.		
<b>WELD HISTORY</b>										
◆ 32. WELDING STANDARD:	33. WELDING PROCEDURE:		34. DATA SHEET	35. POSITION: <input type="checkbox"/> VERT <input type="checkbox"/> FLAT <input type="checkbox"/> FIXED <input type="checkbox"/> 45 DEG <input type="checkbox"/> HORZ <input type="checkbox"/> OVHD <input type="checkbox"/> ROLLED						
36. ACCESSIBILITY: <input type="checkbox"/> 12" OR LESS <input type="checkbox"/> UNRESTRICTED	37. PREHEAT TEMP		38. PREHEAT METHOD			39. POST HEAT.		START TIME:		
						TEMP REQD:		STOP TIME:		
40. PURGE GAS:	41. FLOW RATE	42. SHIELD GAS		43. FLOW RATE		44. CUP SIZE		45. TUNGSTEN SIZE		
46. WELD LAYER	47. PROCESS	48. QUAL EXP DATE	49. AMPS	50. INTERPASS TEMP	51. WELDER SIGNATURE			52. DATE		
53. INSPECTION DATA CONTAINED ON REVERSE OF THIS PAGE										
REMARKS:										
91. FINAL DISPOSITION: <input type="checkbox"/> ACCEPT <input type="checkbox"/> REJECT			92. NDT SUPERVISOR				DATE			

THE PERSON DESIGNATED TO SIGN FOR AN ACTION VERIFIES, BASED ON PERSONAL OBSERVATION OR CERTIFIED RECORDS, AND CERTIFIES BY HIS/HER SIGNATURE THAT THE ACTION HAS BEEN PERFORMED IN ACCORDANCE WITH THE SPECIFIED REQUIREMENTS.

**WELDING IN PROCESS CONTROL/NONDESTRUCTIVE TEST RECORD  
QA FORM 20 (BACK)**

NDT INSPECTION DATA					
54. INSPECTION STANDARD		55. WELD CLASS	56. ACCEPTANCE STANDARD		57. ACCEPT CLASS
58. WELD PREP	59. INSP METHOD	60. ACCEPT/REJECT	61. NDT INSPECTOR SIGNATURE		62. DATE
COMPONENT A		[ ] ACCEPT [ ] REJECT			
COMPONENT B		[ ] ACCEPT [ ] REJECT			
63. JOINT FITUP		[ ] ACCEPT [ ] REJECT			
64. INSP LAYER	65. INSP METHOD	66. INSP PROC NO	67. ACCEPT/REJECT	68. NDT INSPECTOR SIGNATURE	69. DATE
			[ ] ACCEPT [ ] REJECT		
			[ ] ACCEPT [ ] REJECT		
			[ ] ACCEPT [ ] REJECT		
			[ ] ACCEPT [ ] REJECT		
			[ ] ACCEPT [ ] REJECT		
NDT INSPECTION DATA REPAIR NO. _____					
70. INSP LAYER	71. INSP METHOD	72. INSP PROC NO.	73. ACCEPT/REJECT	74. NDT INSPECTOR SIGNATURE	75. DATE
			[ ] ACCEPT [ ] REJECT		
			[ ] ACCEPT [ ] REJECT		
NDT INSPECTION DATA REPAIR NO. _____					
76. INSP LAYER	77. INSP METHOD	78. INSP PROC NO.	79. ACCEPT/REJECT	80. NDT INSPECTOR SIGNATURE	81. DATE
			[ ] ACCEPT [ ] REJECT		
			[ ] ACCEPT [ ] REJECT		
NDT INSPECTION DATA REPAIR NO. _____					
82. INSP LAYER	83. INSP METHOD	84. INSP PROC NO.	85. ACCEPT/REJECT	86. NDT INSPECTOR SIGNATURE	87. DATE
			[ ] ACCEPT [ ] REJECT		
			[ ] ACCEPT [ ] REJECT		
88. L                      W                      D	89. L                      W                      D		90. L                      W                      D		
REPAIR NO.	REPAIR NO.		REPAIR NO.		
53. REMARKS (Continued):					

THE PERSON DESIGNATED TO SIGN FOR AN ACTION VERIFIES, BASED ON PERSONAL OBSERVATION OR CERTIFIED RECORDS, AND CERTIFIES BY HIS/HER SIGNATURE THAT THE ACTION HAS BEEN PERFORMED IN ACCORDANCE WITH THE SPECIFIED REQUIREMENTS.

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

BLOCK 23 - SIZE

Enter the ring size.

BLOCK 24 - THICKNESS

Enter the actual measured thickness of the ring or strip.

BLOCK 25 - MIL-SPEC

Enter the appropriate MIL-SPEC for the ring or strip.

BLOCK 26 - MIC NO.

Enter the MIC number of the ring or strip, if applicable. Verify the number from the QA form 2.

BLOCK 27 - TYPE OF FILLER(S)

Enter the type of the filler material(s) used (e.g., 9010, 11018, 304, RN62).

BLOCK 28 - SIZE

Enter the size rod, wire, insert, etc.

BLOCK 29 - MATL

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

BLOCK 30 - MIL-SPEC

Enter the appropriate MIL-SPEC for the filler and insert (if applicable) material.

BLOCK 31 - MIC NO.

Enter the appropriate MIC number for the filler and insert (if applicable) material. Verify the number from the QA form 2.

BLOCK 32 - WELDING STANDARD

Enter the applicable welding standard.

BLOCK 33 - WELDING PROCEDURE

Enter the weld procedure number.

BLOCK 34 - DATA SHEET

Enter the weld procedure technique sheet number.

BLOCK 35 - POSITION

Check the appropriate block for the weld position.

BLOCK 36 - ACCESSIBILITY

Check the proper block for the actual accessibility.

BLOCK 37 - PREHEAT TEMP

Enter the actual preheat temperature as measured just prior to welding.

BLOCK 38 - PRE-HEAT METHOD

Enter the required pre-heat method.

BLOCK 39 - POST HEAT TEMP START TIME AND STOP TIME

Enter the temperature required for the post weld heat and the start and stop time for post heat.

BLOCK 40 - PURGE GAS

Enter the type of purge gas.

BLOCK 41 - FLOW RATE

Enter the actual flow rate of the purge gas.

BLOCK 42 - SHIELD GAS

Enter the type of shield gas.

BLOCK 43 - FLOW RATE

Enter the actual flow rate of the shield gas.

BLOCK 44 - CUP SIZE

Enter the gas cup size.

BLOCK 45 - TUNGSTEN SIZE

Enter the tungsten size.

BLOCK 46 - WELD LAYER

Enter the layer of welding (i.e., tacks, root, intermediate, and final).

BLOCK 47 - PROCESS

Enter the type of welding process used (e.g., SMAW, GTAW).

BLOCK 48 - QUAL EXP DATE

Enter qualification expiration date.

BLOCK 49 - AMPS

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. 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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**RADIOGRAPHIC TEST INSPECTION RECORD**  
QA FORM 20A

PAGE \_\_\_ OF \_\_\_

2. SHIP AND HULL NO.			3. JCN:			4. CWP/REC SERIAL NO.			
5. CWP STEP NO.		6. JOINT ID			7. REPAIR NO.		8. INSP STD & CLASS		
9. QUALITY LEVEL		10. RT COVERAGE REQD: ( ) 60 DEG ( ) 360 DEG ( ) 100%			11. PENETRATOR: SIZE ___ GROUP ___		SOURCE SIDE ( ) FILM SIDE ( )	12. SPECIMEN MATL	
13. TM	14. TS	15. EXPOSURE TECH ( ) SWE/SWV ( ) DWE/DWV ( ) DWE/SWV		16. FILM: TYPE _____ BRAND _____ LOADED ( ) SINGLE ( ) DOUBLE		17. ISOTOPE: TYPE _____ DIMENSIONS _____ CURIE _____			
18. X-RAY MACHINE MFG _____ MODEL/TYPE _____ VOLTAGE RATING _____				19. X-RAY PARAMETERS KV ___ MA ___ FFS ___			20. SFD		
21. RADIOGRAPHIC SHOOTING SKETCH  Depict the following: (1) Direction of radiation (2) Placement of penetrometer (3) Location of location marker (4) Location of shims (if used) (5) Location of Pb "B" (6) Location & thickness of back filter (7) Location of film (8) Blocking/masking technique used (if applicable) NOTE: REFERENCE TO A STANDARD SETUP IS ACCEPTABLE						22. SHIM MATL _____ TM _____			
						23. LEAD SCREENS THICKNESS F _____ B _____			
						24. REMARKS			
25. RADIOGRAPHER						DATE:			

26. RADIOGRAPHIC INTERPRETATION

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THE PERSON DESIGNATED TO SIGN FOR AN ACTION VERIFIES, BASED ON PERSONAL OBSERVATION OR CERTIFIED RECORDS, AND CERTIFIES BY HIS/HER SIGNATURE THAT THE ACTION HAS BEEN PERFORMED IN ACCORDANCE WITH THE SPECIFIED REQUIREMENTS.

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QA FORM 20A INSTRUCTIONS

RADIOGRAPHIC TEST INSPECTION RECORD

PURPOSE: To provide a supplement to the QA form 20 to document the technical aspects of the radiograph and the acceptance or rejection of the item radiographed. Both the QA form 20 and QA form 20A are required for a complete radiographic record of a joint.

PROCEDURE: QA form 20A will be completed by the radiographer and the RT inspector. The numbered blocks on QA form 20A correspond with the instructions listed below.

BLOCK 1 - PAGE OF

Enter the page number, starting with page 2, of the total number of QA forms 20A associated with the joint (e.g., 2 of 3, 3 of 3). The associated QA form 20 is always page 1 of \_\_\_\_\_.

BLOCK 2 - SHIP AND HULL NO.

Enter the tended ship's name and hull number.

BLOCK 3 - JCN

Enter the JCN.

BLOCK 4 - CWP/REC SERIAL 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 - CWP STEP NO.

Enter the CWP step number(s).

BLOCK 6 - JOINT ID

Enter JID.

BLOCK 7 - REPAIR NO.

Enter ORIG or repair number (e.g., R-1, R-2).

BLOCK 8 - INSP STD & CLASS

Enter the inspection standard and class.

BLOCK 9 - QUALITY LEVEL

Enter the quality level required.

BLOCK 10 - RT COVERAGE REQ'D

Indicate the RT coverage required.

BLOCK 11 - PENETRAMETER

Record the penetrameter size and group. Indicate use of source or film side penetrameter.

BLOCK 12 - SPECIMEN MATL

Enter the material type of the item being radiographed (e.g., NICU, CFE).

BLOCK 13 - TM

Enter the nominal or actual, or design material thickness of the item being radiographed per NAVSEA 250-1500-1 or NAVSEA T9074-AS-GIB-010/271.

BLOCK 14 - TS

Enter the total specimen thickness.

BLOCK 15 - EXPOSURE TECH

Check the appropriate technique used (e.g., if a pipe was radiographed through two walls and the image of both walls are to be viewed for acceptance, enter an "X" in the brackets next to DWE/DWV).

BLOCK 16 - FILM

Enter the film type and brand. "X" the appropriate method used to load the film cassette.

BLOCK 17 - ISOTOPE

Record the listed information when using the source.

BLOCK 18 - X-RAY MACHINE MFG

Record the listed information when using the X-ray machine.

BLOCK 19 - X-RAY PARAMETERS

Record the listed information when using the X-ray machine.

BLOCK 20 - SFD

Enter the source to film distance used.

BLOCK 21 - RADIOGRAPHIC SHOOTING SKETCH

The radiographer will draw a sketch indicating the items listed.

BLOCK 22 - SHIM

Enter the shim material used and thickness.

BLOCK 23 - LEAD SCREENS THICKNESS

Record thickness, front and back of the intensifying screens.

BLOCK 24 - REMARKS

The radiographer will use this block to record any unusual technique requirements.

BLOCK 25 - RADIOGRAPHER

The radiographer will print name, sign and date upon verifying that all the information in Blocks 1 through 21 is correct.

BLOCKS 26 - RADIOGRAPHIC INTERPRETATION  
thru 28

NOTE: BLOCK 26 WILL BE COMPLETED BY THE RT INSPECTOR AS THE FILM IS READ.

- a. One RT Inspector will evaluate the radiograph, check ACCEPT/REJECT as appropriate in Block 27, print name, enter signature and date in Block 28.
- b. It is important to note that all indications read must be recorded on the QA form 20A and dispositioned in the appropriate block.
- c. Additional sheets may be added to the report by the RT Inspector. The additional sheets will be properly numbered and will be authenticated with printed name and signature on each sheet by the RT Inspector making up the report.

BLOCK 29 - RT EXAMINER

The Command RT Examiner will review the weld record (including radiographic film) for completeness accuracy and compliance with applicable standards, print name, enter signature, unique identification number, and date.

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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 COMFLTFORCOMINST 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

Enter any joint clarifying comments. This block may also be used to specify any special heat restriction instructions (e.g., preheat and interpass requirements). Each entry shall contain signature, printed name and date except where the entry is pre-printed on the form by P&E.

NOTE: BLOCKS 15-18 ARE RESERVED FOR FUTURE USE.

BLOCK 19 - NDT METHODS & ACCEPTANCE PROCEDURES/REV/CHG

(INSPECTOR) Enter the NDT methods and acceptance standard procedure, revision, and change for NDT listed in Block 21 as the inspection is performed. This entry is not required for joints that do not list required NDT or that have Block 24 checked off. Leave unused blocks blank.

BLOCK 20 - JOINT NO.

(P&E) Repeat joint numbers listed in Block 8.

BLOCK 21 - NDT OR DATA REQUIREMENT

NOTE: LEAVE THIS BLOCK BLANK IF A PART B RECORD IS REQUIRED. IF A PART B RECORD IS NOT USED, ENTER REQUIRED NDT OR DATA REQUIREMENTS AS FOLLOWS:

- a. DATA REQUIREMENTS: List WELD COMPL (weld complete) as the first entry for each joint listed in Block 20 that does not require a Part B record.
- b. NDT REQUIREMENTS: List required NDT for the joint. List each required NDT as a separate line item in approximate order in which they will occur. Use the following convention: List NDT Type first (VT, 5X VT, MT, PT, ET, RT or UT), Wait Time second (8HR, 24HR, 7DAY, or AH (for after hydro) etc.), and Phase last (EXCAV, BACKGOUGE or FINAL). It is not necessary to give a wait time for ambient temperature NDT; it is assumed if not given. Typical examples are: MT EXCAV, MT BACKGOUGE, MT FINAL, ET FINAL, PT FINAL, RT 8HR FINAL, MT 24HR FINAL, MT 7DAY FINAL, MT AH FINAL, and VT FINAL.
- c. WORKMANSHIP AND VT SPECIAL REQUIREMENTS:
  - 1) Workmanship inspections are not normally listed as required NDT. Certification of satisfactory completion is made either by TWD signature when the joint does not require documentation using a Part A or Part B record, or by signature on the Part A or Part B record when the joint does require documentation.
  - 2) Joints that require VT only do not require a structural record. The VT is specified and certified by TWD. Certification of satisfactory VT completion for VT only welds can be made by a NDT inspector signature in the body of the TWD.

BLOCK 22 - CERTIFICATION OF DATA ENTRY OR SAT NDT

- a. (P&E) Enter "See Part B record" for joints that require a Part B record.
- b. (WELDER) Enter signature, printed name, and date beside each WELD COMPL data entry to certify that the weld is complete, and that fit-up and weld workmanship inspection requirements have been met. The weld is complete when all weld metal has been deposited, required weld soaks are completed, preheat is removed, weld has cooled to ambient temperature and the weld has been prepared to ensure the weld is ready for final NDT. When required, include the ambient temperature time in Block 23 as described in Block 23 instructions.

- c. (NDT INSPECTORS) Enter signature, printed name, and date for each NDT when the NDT is satisfactory. Except when a Part C record is required, this signature is made when the weld is complete and the NDT is satisfactory. Part C records are required only if local instructions require them or if the note "Initiate a Part C record if NDT fails" appears in Block 23. If a Part C record is required and the NDT you are performing rejects the weld, enter an X in Block 24 for the NDT that generated the reject and initiate a Part C record. Your signature in Block 22, in this case, indicates the NDT failed and a Part C record was generated. If indications are cleared by grinding/polishing only and the subsequent VT (final) is satisfactory, a Part C record is not required.

BLOCK 23 - DATA ENTRY OR ADDITIONAL NDT REQMT

a. (P&E)

- 1) Enter any NDT clarifying comments, (i.e., partial inspections and/or expansion requirements).
- 2) Enter "AMB TIME:" for each WELD COMPL data requirement listed in Block 21.

NOTE: THE AMBIENT TIME IS ONLY REQUIRED IF SUBSEQUENT NDT HAS A WAIT TIME, SUCH AS A 24 HOUR MT.

- 3) Enter "PENETRANT:" for each PT requested in Block 21.
- 4) Enter "EQUIP No:" for each ET requested in Block 21.
- 5) For submarine envelope attachment weld MT inspections, enter "Initiate a Part C record if NDT fails" and "EQUIP No:".
- 6) For submarines, enter "Initiate a Part C record if NDT fails" for RT/UT listed in Block 21 (expansions are required when repair welding is required as a result of RT or UT inspection).

- b. (WELDERS) Enter military time when the weld reaches ambient temperature beside the "AMB TIME:" entry associated with each WELD COMPL data requirement. If this data is entered by someone other than who signed Block 22, a signature, printed name and date is required.

NOTE: THE AMBIENT TIME IS ONLY REQUIRED IF SUBSEQUENT NDT HAS A WAIT TIME, SUCH AS A 24 HOUR MT.

c. (NDT INSPECTORS)

- 1) Enter penetrant used, manufacturer's brand and type, beside each "PENETRANT:" entry.
- 2) Enter equipment information as follows beside each MT or ET with "EQUIP No:" entry:
  - (a) ET: Enter unique equipment identification, or instrument manufacturer and model number used.
  - (b) MT: If AC yoke is used enter the word "Yoke". Otherwise, enter unique equipment identification, or instrument manufacturer and model number used.

BLOCK 24 - SUPPLEMENTAL RECORD (CHECK IF REQD)

(NDT INSPECTORS) When required by local procedures to document deficiencies, or if the note "Initiate a Part C record if NDT fails" is listed in Block 23, a Part C record shall be initiated to document defects. If a part C record is initiated, check the box in the row associated with the required NDT.

BLOCK 25 - RECORD NO. OF REPAIR CYCLES (SURFACE SHIPS ONLY)

(INSPECTOR/WELDER) Enter the number of repair cycles required to obtain a satisfactory NDT, (i.e., "1" for the first cycle, "2" for the second, etc.).

BLOCK 26 - REMARKS

(ALL) Enter any clarifying comments associated with the record. Add or refer to any expansion requirements here or in Block 14. Each entry shall contain signature, printed name, and date except where the entry is pre-printed on the form by P&E.

BLOCK 27 - SUPERVISOR

(WELD SUPERVISOR) Certify final disposition of all welding and NDT for all joints listed in Block 20 (including continuation sheets) by entering signature, printed name, and date. This includes certification of any Part C records generated. Ensure that page numbering is correct.

BLOCK 28 - QAS (SUBSAFE/SOC ONLY)

(QAS) Enter signature, printed name, and date to certify completeness of entries. To aid the certification process, this block is repeated on the Part B record in Block 34. For joints being documented by Part B record, the individual signing for all joints shall review the certification signature(s) on the Part B record(s) and sign the Part A record based on the Part B signature(s).

STRUCTURAL PRIMARY RECORD CONTINUATION SHEET: Follow corresponding block instructions in this attachment.

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<b>STRUCTURAL WELD HISTORY</b> QA FORM 20B (PART B) (FRONT)				1. JOINT NO.		2. LWC/SHOP:		3. SHEET 1 OF		
				4. SHIP HULL NO.		5. JCN		6. CWP/REC: <input type="checkbox"/> YES <input type="checkbox"/> NO		
<b>7. REFERENCES</b>										
A.			B.			C.				
<b>JOINT IDENTIFICATION</b>										
8. COMPONENT NUMBER 1				9. COMPONENT NUMBER 2				10. WELD INFO		
REF	PC NO.	MATL TYPE	MATL THICK	REF	PC NO.	MATL TYPE	MATL THICK	JOINT DESIGN	WELD SIZE	REMARKS
11. REMARKS										
12. NEW MATERIAL: MATL DOCUMENTATION REQUIRED <input type="checkbox"/> Y <input type="checkbox"/> N    CRAFTSMAN/QAI: ENTER TRACEABLE MATERIAL MARKING (E.G., MIC NO., TCSM NO., HEAT NO., OR OTHER) FOR THE PIECE NUMBER (PC NO.) BELOW, UNLESS USE OF EXISTING MATERIAL IS SPECIFIED.										
REF	PC NO.	TRACEABLE MATL MARKING						CRAFTSMAN/QAI: MATERIAL VERIFICATION (SIGNATURE/DATE)		
<b>WELD HISTORY</b>										
13. WELD PROCEDURE, REV., CH, AND TECHNIQUE SHEETS:						14. MIN PREHEAT:		15. MAX INTERPASS:		
16. WELD FILLER MATERIAL (WELDER) ENTER TRACEABLE FILLER MARKING (MIC NO.)										
LETTER	GRADE/TYPE	MIC NO.			LETTER	GRADE/TYPE	MIC NO.			
A					C					
B					D					
17. FITUP SAT: CRAFTSMAN/QAI (SIGNATURE/DATE)										
18. PHASE LETTER KEY: F=BUILDUP OF BASE MATERIAL FOR FIT-UP; W=TACKING OR WELDING JOINT; BG=BACKGOUGE WORKMANSHIP SAT. (VERIFY BG NDT PRIOR TO WELD IF REQD)										
19. PHASE LETTER	20. FILLER LETTER	21. PREHEAT & INTERPASS TEMP		22. WELDER & WELD WORKMANSHIP (WELDER SIGNATURE/DATE)				23. REMARKS		
		<input type="checkbox"/> SAT								
		<input type="checkbox"/> SAT								
		<input type="checkbox"/> SAT								
		<input type="checkbox"/> SAT								
		<input type="checkbox"/> SAT								
		<input type="checkbox"/> SAT								
<input type="checkbox"/> SEE STRUCTURAL WELD HISTORY CONTINUATION SHEET										
24. WELDING COMPLETE			WELDER (SIGNATURE/DATE)							
25. JOINT IS AT AMBIENT TEMP			WELDER (SIGNATURE/DATE)					MILITARY TIME AT AMBIENT TEMP:		
26. JOINT IS COMPLETE AND READY FOR FINAL NDT			CRAFTSMAN/CRAFTSMAN SUPERVISOR (SIGNATURE/DATE)							
<b>REQUIRED NDT</b>										
27. REQD NDT (TYPE, WAIT TIME, & PHASE)		28. NDT & ACCEPTANCE PROCEDURE, REV, CH		29. NDT RPT/EQPT (FOR ET OR MT, RECORD SERIAL # OF MANF & MODEL NO.) (FOR MT BY YOKE, ENTER "YOKE"). FOR PT, ENTER TYPE OF LIQUID PENETRANT, FOR RT/UT, ENTER REPORT #			30. RESULTS A OR R (NOTE 1)	31. INSPECTOR (SIGNATURE/DATE)		
MT EXCAV (NOTE 2)				ENTRY NOT REQUIRED						
MT BACKGOUGE (NOTE 2)				ENTRY NOT REQUIRED						
MT EVERY LAYER (NOTE 2&3)				ENTRY NOT REQUIRED						
VT FINAL				NA						
RT 8 HR FINAL										
UT 8 HR FINAL										
MT AMBIENT FINAL										

<b>QA FORM 20B (PART B) (BACK)</b>				
<b>REQUIRED NDT (CONT.)</b>				
27. REQD NDT (TYPE, WAIT TIME, & PHASE)	28. NDT & ACCEPTANCE PROCEDURE, REV, CH	29. NDT RPT/EQPT (FOR ET OR MT, RECORD SERIAL # OF MANF & MODEL NO.) (FOR MT BY YOKE, ENTER "YOKE"). FOR PT, ENTER TYPE OF LIQUID PENETRANT, FOR RT/UT, ENTER REPORT #	30. RESULTS A OR R (NOTE 1)	31. INSPECTOR (SIGNATURE/DATE)
MT 24 HR FINAL				
MT 7 DAY FINAL				
PT FINAL				
MTAH FINAL				
ET FINAL				
ETAH FINAL				
<p>NOTE 1: ANY WORK &amp; FINAL NDT INSPECTIONS TO RESOLVE DOCUMENTED REJECTS ON THIS RECORD SHALL BE DOCUMENTED ON PART C RECORDS UNLESS NOTE 2 IS INVOKED IN BLOCK 27. DEFECTS REMOVED IN-PROCESS OF ANY VT, MT, OR PT DO NOT HAVE TO BE DOCUMENTED ON A PART C RECORD.</p> <p>NOTE 2: DEFECTS DO NOT HAVE TO BE DOCUMENTED. A PART C RECORD IS NOT REQUIRED. CERTIFY AFTER ALL DEFECTS ARE REPAIRED AND THE NDT IS SATISFACTORY.</p> <p>NOTE 3: MT EVERY LAYER SIGNIFIES MT INSPECTION AFTER DEPOSITION OF EACH LAYER, OR 3/8 INCH THICKNESS, WHICHEVER IS GREATER.</p>				
32. REMARKS				
FINAL DISPOSITION	33. WELD SUPERVISOR (SIGNATURE/DATE)		34. (SUBSAFE/SOC/REC ONLY) QAS: (SIGNATURE/DATE)	

**STRUCTURAL WELD HISTORY CONTINUATION SHEET**  
**QA FORM 20B (PART B)**

4. SHIP HULL NO.		5. JCN		1. JOINT NO.		3. SHEET OF	
6. CWP/REC: <input type="checkbox"/> YES <input type="checkbox"/> NO							
<b>WELD HISTORY</b>							
13. WELD PROCEDURE, REV., CH, AND TECHNIQUE SHEETS: <input type="checkbox"/> SAME AS ORIGINAL				14. MIN PREHEAT:		15. MAX INTERPASS:	
16. WELD FILLER MATERIAL (WELDER) ENTER TRACEABLE FILLER MARKING (MIC NO.)							
LETTER	GRADE/TYPE	MIC NO.		LETTER	GRADE/TYPE	MIC NO.	
A				C			
B				D			
18. PHASE LETTER KEY: F=BUILDUP OF BASE MATERIAL FOR FIT-UP; W=TACKING OR WELDING JOINT; BG=BACKGOUGE WORKMANSHIP SAT. (VERIFY BG NDT PRIOR TO WELD IF REQD)							
19. PHASE LETTER	20. FILLER LETTER	21. PREHEAT & INTERPASS TEMP		22. WELDER & WELD WORKMANSHIP (WELDER SIGNATURE/DATE)		23. REMARKS	
		<input type="checkbox"/> SAT					
		<input type="checkbox"/> SAT					
		<input type="checkbox"/> SAT					
		<input type="checkbox"/> SAT					
		<input type="checkbox"/> SAT					
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		<input type="checkbox"/> SAT					
		<input type="checkbox"/> SAT					
		<input type="checkbox"/> SAT					
<input type="checkbox"/> SEE STRUCTURAL WELD HISTORY CONTINUATION SHEET							
32. REMARKS							

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QA FORM 20B (PART B) INSTRUCTIONSSTRUCTURAL WELD HISTORY

NOTE: P&E PERSONNEL SHALL COMPLETE BLOCKS 1, 2, 4, 5, 7-11, 12 (PARTIAL), 14-15 (IN SPECIAL SITUATIONS), 27, AND 32 (IF NECESSARY). ANNOTATED PERSONNEL SHALL COMPLETE ALL REMAINING BLOCKS. FOR CONTINUATION SHEETS GENERATED DURING PLANNING, P&E SHALL COMPLETE BLOCKS 1, 4, 5 AND 32 (IF NECESSARY). ANNOTATED PERSONNEL SHALL COMPLETE ALL REMAINING BLOCKS. FOR CONTINUATION SHEETS GENERATED DURING EXECUTION, ANNOTATED PERSONNEL SHALL COMPLETE ALL BLOCKS.

NOTE: BLOCKS/ROWS OF THIS RECORD MAY BE EXPANDED OR DELETED TO SUIT THE WORK BEING DOCUMENTED.

BLOCK 1 - JOINT NO.

Enter Joint Number. If the Part B record is referenced from a Part A record, the joint number on both records must match.

BLOCK 2 - LWC/SHOP

Enter lead work center.

BLOCK 3 - SHEET

(CRAFTSMAN/INSPECTOR/P&E) Enter the sheet number(s) of Part B continuation sheets generated. Inspector/Craftsman enter total number of sheets generated, (e.g., 1 of 3, 2 of 3 at the time of completion). (The first sheet, the Part B record, is pre-printed as "Sheet 1 of"). 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

Check the [ ] Y box if CWP or REC is required, and enter CWP or REC number. Check the [ ] N box if a CWP or REC is not required.

BLOCK 7 - REFERENCES

Enter references, drawings etc. that are to be used to describe joints or material requiring traceability.

BLOCK 8 - COMPONENT NUMBER 1

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 Block 7, refer to this note as you would a drawing and give the explanation in remarks. When piece number, material type, or material thickness is provided in Remarks, these columns should be left blank, or a dash entered.

The term "EXISTING" may be used to describe existing ship structure, provided the application is not SUBSAFE/SOC, and 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 I of NAVSEA S9074-AQ-GIB-010/248 and the component thickness (decimal or fraction). If a component has more than one thickness or material type, enter each one on a separate row, or use Block 11 (Remarks).

BLOCK 9 - COMPONENT NUMBER 2

Make entries for Component 2 as described in Block 8. For repair sites, enter N/A in Component 2 columns.

BLOCK 10 - WELD INFO

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 11) to describe "Special Joints", as described in paragraph 11.4.7 of NAVSEA Tech Pub T9074-AD-GIB-010/1688, including any special weld buildup required for the joint. For base material repairs and weld surfacing, enter N/A, or describe the repair or surfacing in Remarks (Block 11).

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

BLOCK 11 - REMARKS

Enter any joint clarifying comments. Add or refer to any expansion requirements here or in Block 32. Each entry shall contain signature, printed name and date except where the entry is pre-printed on the form by P&E.

BLOCK 12 - NEW MATERIAL

- a. (P&E) Check the box "[ ] Y or [ ] N", to indicate that material documentation is or is not required and enter reference letter from Block 7 and the associated piece number to describe the material requiring traceability. Block 12 is marked "No" when electrode only is installed (e.g., repair of a pit, or for cladding) because electrode is entered in Block 16.
- b. (CRAFTSMAN/QAI) At the time of installation, enter traceable material marking (e.g., MIC No., TSCM No., Heat No., or other) for the piece number listed and certify (signature, printed name, and date). If existing material is being reinstalled, enter "EXISTING" in the TRACEABLE MATERIAL-MARKING column and sign. If "No" is Checked by P&E, no entry is required.

BLOCK 13 - WELD PROCEDURE, REV, CH, AND TECHNIQUE SHEET(S)

(WELDER) Before welding, enter the Weld Procedure to be used. Include Technique Sheet if applicable.

BLOCK 14 - MINIMUM PREHEAT

(WELDER) Before welding, enter the required minimum preheat. In certain situations, when heat must be controlled using non-standard temperatures, P&E may complete this block.

BLOCK 15 - MAXIMUM INTERPASS

(WELDER) Before Welding, enter the required maximum interpass temperature. In certain situations, when heat must be controlled, P&E may complete this block.

BLOCK 16 - WELD FILLER MATERIAL

(WELDER) Just prior to welding, enter grade/type (e.g., MIL-11018-M or 11018-M) and MIC Number (e.g., WCAF 9093 202A) of electrode used. Filler letters, A, B, C, etc., are provided so that the data needs only to be entered once for that electrode and its corresponding traceability number. Enter the filler letter, A, B, C, etc., corresponding to the electrode used during the weld process in the FILLER LTR block, Block 20. The filler material information recorded in this block only applies to weld phases being documented on this sheet. If a continuation sheet is used, the filler material used to document welding on that continuation sheet shall be recorded in Block 16 of that sheet.

BLOCK 17 - FITUP SAT

(CRAFTSMAN/QAI) Enter signature, printed name, and date when the workmanship inspection for fit-up or base material preparation for weld surfacing/repair is satisfactory. This signature certifies that the joint or base metal surface is ready for welding. For weld repairs, the signature certifies the excavation is ready for NDT (if required).

BLOCK 18 - PHASE LETTER KEY

No entry is required for this block. Use Phase Letter Key given to complete Block 19.

BLOCK 19 - PHASE LETTER

(WELDER) Using the Phase Letter Key given, enter the phase being accomplished during the weld process in the PHASE LETTER blocks provided. Check the box, "[ ] (See Structural Weld History Continuation Sheet)" when the record has insufficient room for the number of entries, and a continuation sheet is needed.

BLOCK 20 - FILLER LETTER

(WELDER) Enter the letter corresponding to the filler material information entered in Block 16 of the sheet you are completing. If the phase does not involve the addition of filler metal, enter N/A.

BLOCK 21 - PREHEAT & INTERPASS TEMP

(WELDER) Check Preheat and Interpass Temperature for the phase being accomplished. Mark the block when satisfactory. Take corrective action if it is not satisfactory. Enter "NA" for phases that do not involve welding, (e.g., backgouge phases).

BLOCK 22 - WELDER AND WELD WORKMANSHIP

(WELDER) Enter signature, printed name, and date for the associated phase. Signing of this block certifies that all welding has been performed in accordance with the welding procedure entered in Block 13; the MIC number of welding rod(s) used is recorded in Block 16; Blocks 19, 20, and 21 are completed and required information is correct and that all weld workmanship inspection requirements have been satisfied. For backgouge phase, the signature certifies that the weld has been backgouged and the root meets the workmanship requirements. Block 22 signatures shall be made based on personal observation.

BLOCK 23 - REMARKS

(WELDER) Enter remarks if necessary. If the remark is made by someone other than the welder who signed Block 22, entry shall contain signature, printed name, and date except where the entry is pre-printed on the form by P&E.

BLOCK 24 - WELDING COMPLETE

(WELDER/WELDER SUPERVISOR) Enter signature, printed name, and date when welding is complete, all metal has been deposited, required weld soaks are completed, preheat is removed and weld meets workmanship inspection requirements. This signature shall be made based on personal observation or by normal trade supervisory controls.

BLOCK 25 - JOINT IS AT AMBIENT TEMP

(WELDER OR WELDER SUPERVISOR) Enter military time weld reached ambient temperature and sign name (include name and date). NOTE: The ambient time is only required if subsequent NDT has a wait time, such as a 24 hour MT.

BLOCK 26 - JOINT IS COMPLETE AND READY FOR FINAL NDT

(CRAFTSMAN) Enter signature, printed name, and date when the joint is complete and ready for final NDT (i.e., meets workmanship inspection requirements).

BLOCK 27 - REQUIRED NDT

(P&E) Choose the required NDT from the menu given or add NDT if necessary. The NDT menu given lists most NDT required by NAVSEA Tech Pub T9074-AD-GIB-010/1688. Choose the NDT you desire by deleting the rows from the form for NDT that is not required. Include the Notes block at the bottom of the menu. After deleting NDT that is not required, ensure that the required NDT list will fit on a single page. If "MT EXCAV", "MT BACKGOUGE", and "MT EVERY LAYER" are not used, delete Note 2 from the note block. If "MT EVERY LAYER" is not used, delete Note 3 from the Note block.

BLOCK 28 - NDT & ACCEPTANCE PROCEDURE REV, CH

(INSPECTOR) Enter the NDT methods and acceptance standard procedure used.

BLOCK 29 - NDT REPORT, EQUIPMENT

(INSPECTOR) Enter NDT Report number or equipment used as directed on the form. Enter "Yoke" when performing an MT by yoke method. Equipment information is not required for MT by yoke. If "MT EXCAV", "MT BACKGOUGE" or "MT EVERY LAYER" is the NDT listed in Block 27, "Entry Not Required" may be entered in Block 29. (See example of Part B form).

BLOCK 30 - RESULTS A OR R

(INSPECTOR) Enter "A" for accept or "R" for reject to indicate the inspection result. If indications are cleared by grinding/polishing only, and the subsequent VT (final) is satisfactory, a Part C record is not required.

BLOCK 31 - INSPECTOR

(INSPECTOR) Enter signature, printed name, and date for the inspections performed. When a NDT results in a deficiency, the results of any other NDT not performed yet in the process will be documented on the Part C record generated for the failed NDT. All blocks for NDT not yet performed will be left blank on this sheet.

BLOCK 32 - REMARKS

(ALL) Enter remarks. Add or refer to any expansion requirements here or in Block 11. Each entry shall contain signature, printed name, and date except where the entry is pre-printed on the form by P&E.

BLOCK 33 - WELD SUPERVISOR

(WELD SUPERVISOR) Certify final disposition of all welding and NDT for the joint listed in Block 1 by entering signature, printed name and date.

NOTE: WHEN PERFORMING RECORD REVIEW, ALL CERTIFICATION DATA TO REPAIR DEFECTS (I.E., DEFECT EXCAVATION INFORMATION, REPAIR WELD HISTORY, FINAL NDT OF DEFECTS AND CERTIFICATION SIGNATURES, ETC.) ARE DOCUMENTED ON ASSOCIATED PART C RECORDS FOR THE JOINT AND PAGE NUMBERING IS CORRECT, INCLUDING ANY PART C RECORDS.

BLOCK 34 - QAS (SUBSAFE/SOC/REC ONLY)

(QAS) Enter signature, printed name, and date to certify completeness of entries for joints listed in Block 1.

STRUCTURAL WELD HISTORY CONTINUATION SHEET:

Follow corresponding block instructions in this attachment except as noted below:

(WELDER) Transcribe entries from the associated Part B record (sheet 1) onto the continuation sheet for Blocks 1, 4, 5 and 6.

BLOCK 13 - WELD PROCEDURE, REV, CH, AND TECHNIQUE SHEET(S)

(WELDER) Check the box provided if the weld procedure and technique sheet (if applicable) used for the Block 19 phase(s) is the same as shown on the associated Part B record (sheet 1). Otherwise, enter the weld procedure and technique sheet (if applicable) used for the Block 19 phase(s) that you are documenting on the continuation sheet.

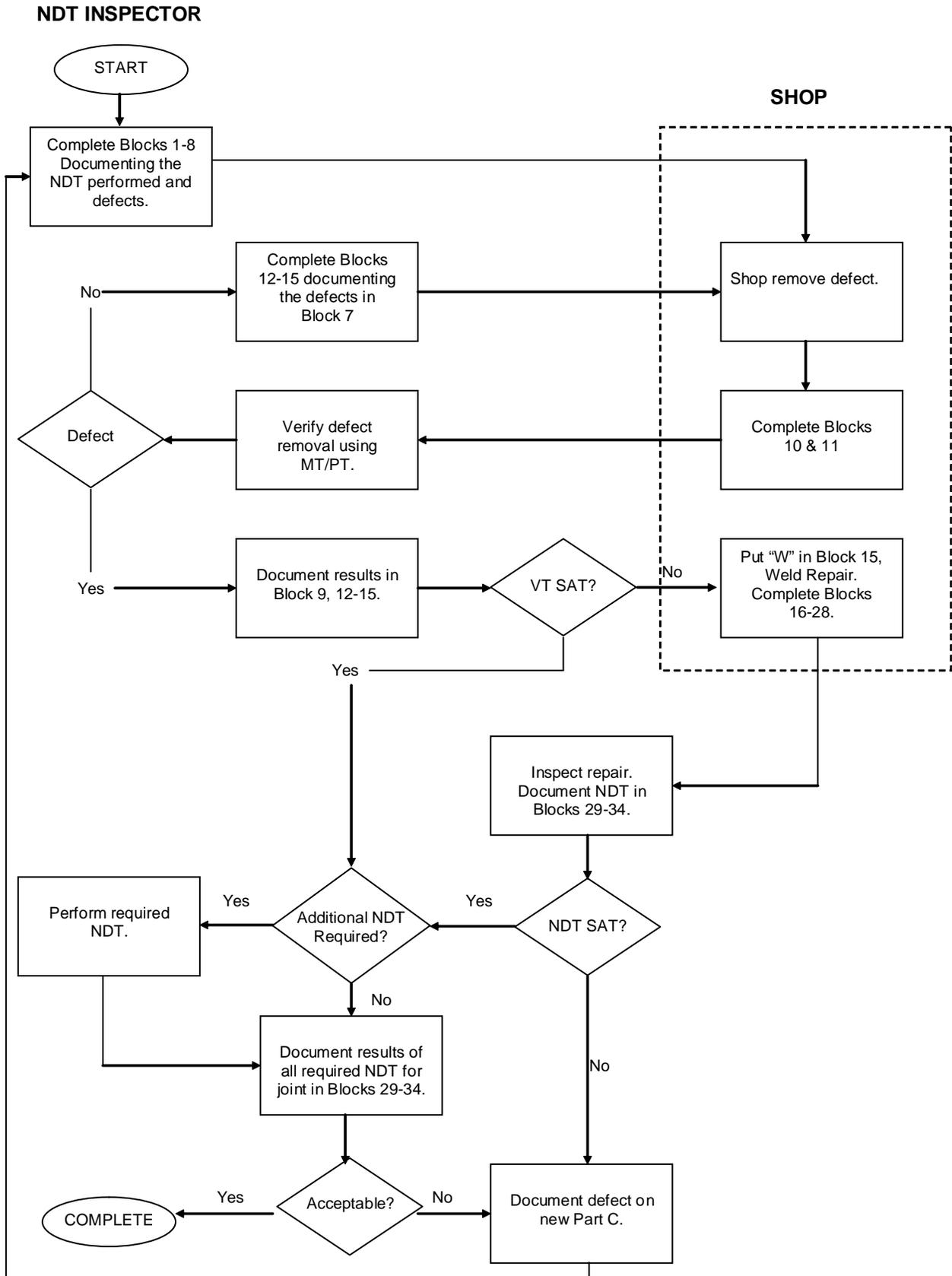
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**STRUCTURAL DEFECT RECORD**  
**QA FORM 20B (PART C)**

3. SHIP HULL NO.		4. JCN		1. JOINT NO.		2. SHEET OF	
5. CWP/REC: <input type="checkbox"/> YES <input type="checkbox"/> NO							
6. METHOD OF REJECTED INSPECTION: <input type="checkbox"/> PT <input type="checkbox"/> MT <input type="checkbox"/> UT <input type="checkbox"/> VT <input type="checkbox"/> RT <input type="checkbox"/> OTHER (SPECIFY):							
7. DESCRIPTION OF DEFICIENCY (NUMBER EACH DEFICIENCY WITH AN INDICATION NUMBER):							
<input type="checkbox"/> SEE REPORT NO. 8. ALL AREAS REQUIRING INSPECTIONS ARE SATISFACTORY EXCEPT AS NOTED IN BLOCK 7      INSPECTOR (SIGNATURE/DATE):							
<b>REPAIR</b>							
9. NDT EQUIPMENT (FOR ET OR MT, RECORD SERIAL # OR MANF & MODEL NO.) (FOR MT BY YOKE, ENTER "YOKE". FOR PT, ENTER TYPE OF LIQUID PENETRANT):							
A:		B:			C:		
10. IND NO.	11. DEFECT REMOVAL (SIGNATURE/DATE)	12. NDT	13. NDT EQUIP LTR	14. REASON FOR REJECT OR EXCAVATION (LENGTH, WIDTH, DEPTH)	15. FINAL NDT FOR DEFECT REMOVAL. ENTER "A", "R" OR "W". SEE BLOCK INSTRUCTIONS.		
					SIGNATURE/DATE		
<input type="checkbox"/> (SEE ADDITIONAL STRUCTURAL DEFECT RECORD)							
<b>WELD HISTORY</b>							
16. WELD PROCEDURE, REV., CH, AND TECHNIQUE SHEETS: <input type="checkbox"/> SAME AS ORIGINAL				17. MIN PREHEAT:		18. MAX INTERPASS:	
19. WELD FILLER MATERIAL (WELDER) ENTER TRACEABLE FILLER MARKING (MIC NO.)							
LETTER	GRADE/TYPE	MIC NO.		LETTER	GRADE/TYPE	MIC NO.	
A				C			
B				D			
20. PHASE LETTER KEY: F=BUILDUP OF BASE MATERIAL FOR FIT-UP; W=TACKING OR WELDING JOINT; BG=BACKGOUGE WORKMANSHIP SAT. (VERIFY BG NDT PRIOR TO WELD IF REQD)							
21. IND NO.	22. PHASE LETTER	23. FILLER LETTER	24. PREHEAT & INTERPASS TEMP	25. WELDER (SIGNATURE/DATE)		26. REMARKS	
			<input type="checkbox"/> SAT				
			<input type="checkbox"/> SAT				
			<input type="checkbox"/> SAT				
			<input type="checkbox"/> SAT				
			<input type="checkbox"/> SAT				
			<input type="checkbox"/> SAT				
<input type="checkbox"/> (SEE ADDITIONAL STRUCTURAL DEFECT RECORD)							
27. IND NO(S).		28. COMPLETE & READY FOR NDT - CRAFTSMAN (SIGNATURE/DATE)		27. IND NO(S).		28. COMPLETE & READY FOR NDT - CRAFTSMAN (SIGNATURE/DATE)	
<b>REQUIRED NDT</b>							
29. IND NO.	30. REQD NDT (TYPE & METHOD)	31. NDT & ACCEPTANCE PROCEDURE, REV, CH		32. NDT RPT/EQPT (FOR ET OR MT, RECORD SERIAL # OF MANF & MODEL NO.) (FOR MT BY YOKE, ENTER "YOKE"). FOR PT, ENTER TYPE OF LIQUID PENETRANT, FOR RT/UT, ENTER REPORT #		33. RESULTS A OR R	34. INSPECTOR (SIGNATURE/DATE)
<input type="checkbox"/> (SEE ADDITIONAL STRUCTURAL DEFECT RECORD)							
35. REMARKS							

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QA-20B PART C FLOWCHART



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QA FORM 20B (PART C) INSTRUCTIONSSTRUCTURAL DEFECT RECORD

PURPOSE: To document defect completion data noted by failed NDT associated with a QA Form 20B Part A, Part B, or (if continued repair cycles are necessary) other Part C records. This form is only required for defects on the skin of the ship.

PROCEDURE: The numbered blocks on the QA Form correspond with instructions listed below. The P&E organization shall complete Blocks 17, 18 (in special situations) and 35 (if necessary). The blocks/rows of this record may be expanded to suit the work being documented. Unused rows for multiple entries (i.e., Blocks 10-15) may be deleted as necessary such that the form fits on a single page. If unable to keep on a single page a continuation sheet shall be used.

NOTE: EACH SIGNATURE WILL BE ACCOMPANIED BY A PRINTED NAME AND DATE. AN EMPLOYEE'S INITIALS MAY BE USED PROVIDED THEIR SIGNATURE AND PRINTED NAME APPEAR ELSEWHERE ON THE SAME PAGE.

NOTE: BLOCKS 1 - 10 WILL BE FILLED IN BY THE NDT INSPECTOR.

BLOCK 1 - JOINT NO.

Enter Joint Number.

BLOCK 2 - SHEET

Enter the sheet number of Part C record and additional Part C records generated and total number of sheets generated, (e.g., 1 of 2) at the time of completion. 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 3 - SHIP/HULL NO.

Enter the ship name and hull number.

BLOCK 4 - JCN

Enter the Job Control Number (JCN).

BLOCK 5 - CWP/REC NO.

Check the [ ] N box if a CWP or REC is not required. Check the [ ] Y box if CWP or REC is required, and enter CWP or REC number. This information can be obtained from the associated Part A or B record.

BLOCK 6 - METHOD OF REJECTED INSPECTION

Check the box or indicate what NDT method has rejected.

BLOCK 7 - DESCRIPTION OF DEFICIENCY

Sketch, describe, or reference supporting documents to show defects. Label defects with an indication number. The numbering scheme must be consistent throughout the record.

BLOCK 8 - INSPECTOR

The inspector that rejected the NDT shall sign name and date for the NDT with exceptions for defects noted. (Signature certifies that all areas requiring inspection are satisfactory, except as noted in Block 7). If associated records are used to document acceptance, refer to the applicable records (e.g., RT, UT records).

BLOCK 9 - NDT EQPT

Enter equipment number or "YOKE" when MT is performed by Yoke method, or PT penetrant as directed on the form. The letters are to be annotated in Block 13 to correlate the equipment used with the NDT being performed. Check the box "[ ] (SEE ADDITIONAL STRUCTURAL DEFECT RECORD)" in the REPAIR section of the form when Block 10 has insufficient rows for the required number of entries.

BLOCK 10 - IND NO.

For each NDT performed on the repair excavation, list the indication number associated with the NDT being performed.

BLOCK 11 - DEFECT REMOVAL

(CRAFTSMAN) Enter signature and date for defect removal certifying the defect has been removed and the site is ready for VT and other NDT to verify defect removal.

NOTE: THE PURPOSE OF BLOCKS 12-15 IS TO DOCUMENT THE STEPS TAKEN TO EITHER BRING THE DEFECT TO THE POINT OF BEING CLEARED WITH NO ADDITIONAL ACTION OR TO THE POINT THAT REQUIRES WELD REPAIR.

BLOCK 12 - NDT

(INSPECTOR) Enter the NDT performed on the excavation site using one line per NDT entry. This shall include all VT and other NDT performed to verify defect removal. Unless otherwise directed by TWD or DL, NDT of the excavation site to verify defect removal shall be as follows:

- a. For defects discovered by VT, MT or PT, defect removal shall be verified by the NDT method (VT, MT or PT) that discovered the defect. All original required NDT must be accomplished and meet requirements to certify the weld.
- b. For defects discovered by ET, RT, or UT, defect removal shall be verified by MT (Ferrous) or PT (Non-Ferrous). All original required NDT must be accomplished and meet requirements to certify the weld.

NOTE: THE MT OR PT PROVES SOUND METAL AFTER THE DEFECT IS REMOVED. ACTUAL DEFECT REMOVAL IS VERIFIED BY THE VOLUMETRIC INSPECTION THAT FOUND THE DEFECT (AFTER WELD REPAIR).

BLOCK 13 - NDT EQUIP LTR

(INSPECTOR) Enter the letter from Block 9 that corresponds to the equipment or penetrant used in the inspection. Enter N/A if not applicable.

BLOCK 14 - REASON FOR REJECT OR EXCAVATION

(INSPECTOR) If the inspection fails, indicate reason for failure (e.g., type, dimensions and location of indication). If it is a VT failure indicate length, width, and depth of excavation. To show locations, modify sketch/description in Block 7 if possible. Such modifications shall contain signature, printed name, and date.

BLOCK 15 - FINAL NDT FOR DEFECT REMOVAL

(INSPECTOR) Enter "A", "R", or "W" to indicate results of inspection and enter signature and date. "A" means the inspection is acceptable. "R" means reject, (i.e., defect is not removed). "W", which is entered by the VT inspector and means weld repair is required, (i.e., defect is removed but the weld does not meet criteria for completed weld). Check the box "[ ] (SEE ADDITIONAL STRUCTURAL DEFECT RECORD)" in the REPAIR section of the form when Block 10 has insufficient rows for the required number of entries.

BLOCK 16 - WELD PROCEDURE, REV, CH, & TECHNIQUE SHEET(S)

(WELDER) Check the box provided if Weld Procedure and Technique Sheet (if applicable) to be used for repair welding is the same as shown on the associated Part B record. Otherwise, before welding enter the Weld Procedure (including Revision and Change used for repair welding). Include Technique Sheet if applicable.

BLOCK 17 - MINIMUM PREHEAT

(WELDER) First, see Part A (Block 14) or B record (Block 14), to verify that no special heat restrictions apply. If no special restrictions apply, before welding enter the required minimum preheat temperature. If special heat restrictions apply, before welding, enter the preheat temperature applied as specified by the Part A or Part B record.

BLOCK 18 - MAXIMUM INTERPASS

(WELDER) First, see Part A (Block 14) Part B record, (Block 15), to verify that no special heat restrictions apply. If no special restrictions apply, before welding, enter the required maximum interpass temperature. If special heat restrictions apply, before welding, enter the interpass temperature applied as specified by the Part A or Part B record.

BLOCK 19 - WELD FILLER MATERIAL

(WELDER) Just prior to welding, enter grade/type (e.g., MIL-11018-M or 11018-M) and MIC Number (e.g., WCAF 9093 202A) of electrode used in repair welding. Filler letters A and B are provided so that the data needs only to be entered once for that electrode and its corresponding traceability number. Enter the filler letter, A or B, corresponding to the electrode used during the weld repair process in Block 23. The filler material recorded here is only applicable to this sheet. If an additional Part C sheet is used, the filler material used to document weld phases on that sheet is recorded in Block 19 of that sheet.

BLOCK 20 - PHASE LETTER KEY

No entry is required for this block. Use Phase Letter Key given to complete Block 22. NOTE: Check the box "[ ] (SEE ADDITIONAL STRUCTURAL DEFECT RECORD)" in the REPAIR section of the form when Block 21 or 22 has insufficient rows for the required number of entries.

BLOCK 21 - IND NO.

(WELDER) Enter the indication number(s) for the defect(s) that is/are being worked on.

BLOCK 22 - PHASE LETTER

(WELDER) Using the Phase Letter Key given, enter the phase being accomplished during the weld repair process in the PHASE LETTER blocks provided. For most repairs, the last entries for each indication must be "WC" (weld complete) and "AMB" (ambient temperature). Multiple phases may be accomplished and certified as one line item entry (e.g., "WC/AMB").

BLOCK 23 - FILLER LTR

(WELDER) Enter the letter corresponding to the filler material information entered in Block 19 of this sheet. If the phase does not involve the addition of filler material, enter NA.

BLOCK 24 - PREHEAT & INTERPASS TEMP

(WELDER) Check Preheat and Interpass Temperature for the phase being accomplished. Mark the block when satisfactory. Take corrective action if it is not satisfactory. Enter NA for phases that do not involve welding (e.g., WC and AMB).

BLOCK 25 - WELDER

(WELDER/WELDER SUPERVISOR) Enter signature, printed name, and date for the associated phase. Signing of this block certifies that all welding has been performed in accordance with the applicable welding procedure entered in Block 16, the traceability number of the filler material used is recorded in Block 19, Blocks 21 through 24 are completed and required information is correct, and that all weld workmanship inspection requirements have been satisfied. This signature shall be made based on personal observation. For Phase Welding Complete (WC), signature indicates welding is complete, all metal has been deposited, required weld soaks are completed, preheat is removed and weld meets workmanship inspection requirements. This signature shall be made based on personal observation or by normal trade supervisory controls. For Phase "AMB" enter military time that the weld reached ambient temperature (less than 125 Deg. F) in Block 26 and sign Block 25.

NOTE: THE AMBIENT TIME IS ONLY REQUIRED IF SUBSEQUENT NDT HAS A WAIT TIME, SUCH AS A 24 HOUR MT.

BLOCK 26 - REMARKS

(WELDER) Enter remarks if necessary. Ensure ambient temperature time is noted for the ambient temperature (AMB) phase after reaching ambient temperature (See note in Block 25 above). Each entry shall contain signature, printed name and date except (1), where the entry is pre-printed on the form by P&E, or (2) for ambient temperature time if "AMB" is listed in Block 22. These signature requirements are not necessary if the Block 26 entry is made by the welder who has signed for the acceptance requirements in Block 25.

BLOCK 27 - IND NO(S)

(CRAFTSMAN/SUPERVISOR) Enter indication numbers that you are certifying ready for NDT in Block 28. The block is large enough to enter several indication numbers. Two blocks are provided if different craftsmen are signing for different indications. Unused blocks may be left blank.

BLOCK 28 - COMPLETE & READY FOR NDT

(WELDER, WELDER SUPERVISOR or CRAFTSMAN) Enter signature, printed name, and date when the weld is ready for final NDT (i.e., meets workmanship inspection requirements). This signature shall be made based on personal observation or by normal trade supervisory controls. This block may be signed by other than welder for non-weld issues.

NOTE: THE PURPOSE OF BLOCKS 29-34 IS TO PICK-UP THE JOINT NDT PROCESS AT THE POINT THE PART C RECORD WAS GENERATED AND TO DOCUMENT THE PROCESS FROM THAT POINT FORWARD. CHECK THE BOX "[ ] (SEE ADDITIONAL STRUCTURAL DEFECT RECORD)" IN THE REPAIR SECTION OF THE FORM WHEN BLOCK 29 OR 30 HAS INSUFFICIENT ROWS FOR THE REQUIRED NUMBER OF ENTRIES.

BLOCK 29 - IND NO.

(INSPECTOR) At the point the Part C record was generated, some required NDT may have already been completed and certified except for indications noted in Block 7. Other required NDT may yet need to be performed on the entire joint. Make block entries as follows:

- a. For inspections of repairs to clear indications in Block 7, list the indication number you are inspecting.
- b. For inspections on the entire joint that are not yet completed on a Part A or Part B Record, enter "N/A" beside the required NDT. The N/A entry means the required NDT applies to the entire joint.

BLOCK 30 - REQUIRED NDT

(INSPECTOR) List all required NDT to certify the defect you are inspecting as follows:

- a. Ensure all the required NDT for the entire joint is documented and certified, including NDT previously certified on previous Part A, Part B, or Part C records (if required by local instruction), and all other NDT required to complete the joint, plus repair NDT. On the Part C record, at a minimum, list all NDT required to clear the defect and any remaining (not previously certified) NDT required to certify the joint. All NDT required, (previously certified and repair NDT) may be listed if required by local instructions. Required NDT can be found in Block 21 of the Part A record, in Block 27 of the Part B record, or in Block 30 of other Part C records generated for previous repair cycles. See discussion on expansion requirements in Block 35.
- b. On rare occasion the required NDT may change. In this case, the substituted NDT shall be listed, not the original required NDT. These changes may be specified by P&E through TWD revisions.

BLOCK 31 - NDT & ACCEPTANCE PROCEDURE REV, CH

(INSPECTOR) Enter the NDT methods and acceptance standard procedure used for the NDT listed in Block 30.

BLOCK 32 - NDT REPORT, EQUIPMENT

(INSPECTOR) The purpose of this block is to record data for equipment or PT penetrant used. Enter equipment or PT penetrant information for the required NDT listed in Block 30 as directed on the form or list the NDT Report number that gives this information. Enter "Yoke" when performing an MT by yoke method. Equipment information is not required for MT by yoke. If the NDT listed is NDT previously completed satisfactorily and does not have to be repeated, enter "See Part (A or B or C)" as applicable. If "MT EXCAV", "MT BACKGOUGE" or "MT EVERY LAYER" is the NDT listed in Block 27, "Entry Not Required" may be entered in Block 29. (See example of Part B form). NA VT only inspections.

BLOCK 33 - RESULTS A OR R

(INSPECTOR) Enter "A" for accept or "R" for reject to indicate the inspection result. For NDT that has been accepted up to this point in the process enter "A". In this case, your entry is based on entries and certification signatures made on associated Part A, B, or C records.

BLOCK 34 - INSPECTOR

Enter signature, printed name, and date for entries in Blocks 29 through 33. Your signature for previous, acceptable NDT is based on entries and certification signatures made on associated Part A, B, or C records.

BLOCK 35 - REMARKS

(ALL) Enter remarks. Expansion requirements should be documented or referred to in this block. Each entry shall contain signature, printed name and date except where the entry is pre-printed on the form by P&E.

NOTE: EXPANSION REQUIREMENTS MAY BE SPECIFIED BY P&E THROUGH TWDS.

**PIPE, MACHINERY AND PRESSURE VESSEL WELD RECORD**

QA FORM 20C (NEW 09/05) (WORK PLANNING TO FILL IN BLOCKS/EVALUATE BLOCK OPTIONS IDENTIFIED BY

A ♦ PRIOR TO RELEASE)

♦1. SHIP		♦ HULL NO.		♦2. JCN		♦3. LWC/SHOP		♦4. CWP/REC SER NO.			
♦5. SYSTEM/COMPONENT			♦6. FABRICATION STD: <input type="checkbox"/> 278 <input type="checkbox"/> 250-1500-1		♦7. WELD CLASS	♦8. JT DESIGN	♦9. SSMAP/JT ID DWG & REV		♦10. JOINT NO. <input type="checkbox"/> MARK JNT		
11. PART NO. 1	♦ DESCRIPTION	♦ SIZE (NPS)		♦ SCHED/CLASS		PART NO. 2	♦ DESCRIPTION		♦ SIZE (NPS)	♦ SCHED/CL.	
♦ DWG NO. & REV.		♦ PC. NO.		♦ MATL.		♦ DWG NO. & REV.		♦ PC. NO.		♦ MATL.	
INSTALLATION	12. PART NO. 1 <input type="checkbox"/> EXISTING <input type="checkbox"/> EXST MATL MKS <input type="checkbox"/> GEN MATL TEST <input type="checkbox"/> NEW    MATERIAL MRKS/TEST RESULT:		15. LEVEL I NO./OTHER TRACEABILITY NUMBER/MATERIAL/SPECIFICATION MARKINGS		PART NO. 2 <input type="checkbox"/> EXISTING <input type="checkbox"/> EXST MATL MKS <input type="checkbox"/> GEN MATL TEST <input type="checkbox"/> NEW    MATERIAL MRKS/TEST RESULT:						
	<b>NEW MATERIAL (INCLUDING CONSUMABLE INSERTS, BACKING MATERIAL, ETC.)</b>										
	13. PART NO.	14. DESCRIPTION		15. LEVEL I NO./OTHER TRACEABILITY NUMBER/MATERIAL/SPECIFICATION MARKINGS			16. FITTER/INSPECTOR (Signature, Badge, Date)				
	17. PART NO. 1	WALL THICKNESS: ♦18. REQD    19. ACTUAL ♦ Nom:    Min: ♦ Min:		PREWELD NDT <input type="checkbox"/> COMP	JOINT DESIGN INSTALLED	FITUP: <input type="checkbox"/> SAT	FITTER (Signature, Badge, Date)	21. VERIFICATION			
	NO. 2	♦ Nom:    Min: ♦ Min:		♦ <input type="checkbox"/> NA		♦ <input type="checkbox"/> NA	INSPECTOR (250-1500-1 welds) (Signature, Badge, Date)				
WELDING	22. WELD PROC/REV/CH & TECH DATA SHEET			23. POSITION HFP VFP OOP	24. MIN PREHEAT TEMP: MAX INTERPASS TEMP: <input type="checkbox"/> SAT		25. FABRICATION LOCATION: SHOP/BLDG _____ <b>SHIPBOARD</b> COMPT:                      FRAME                      LEVEL                      P                      C                      S				
	26. LAYER(S) (T/R/L/F)	27. FILLER TYPE	28. FILLER SERIAL NO. (e. g., Level I No.)			29. WELDER (Signature, Badge, Date)					
						<input type="checkbox"/> SAT					
						<input type="checkbox"/> SAT					
						<input type="checkbox"/> SAT					
♦30. STRESS RELIEF REQD <input type="checkbox"/> YES <input type="checkbox"/> NO		31. PROCEDURE: _____ TEMPERATURE:                      DURATION                      HR                      MIN			32. HEAT TREATER (Signature, Badge, Date)						
33. WELDING COMPLETE, SURFACE IS PREPPED AND READY FOR FINAL NDT, AND JOINT NUMBER IS PERMANENTLY MARKED NEAR JT IF "MARK JT" BOX IN BLOCK 10 IS CHECKED.					WELDER or FITTER (Signature, Badge, Date)						
<b>WELD INSPECTIONS: (I) = INTERMEDIATE, (F) = FINAL # = PREWELD INSPECTION (EXCAVATION, END-PREP, ETC.) ## = NUCLEAR ONLY</b>											
♦34. ACCEPTANCE STANDARD:					♦ CLASS						
♦35. INSP	♦36. INSPECTION TYPE					37. PROCEDURE USED		38. INSPECTOR (Signature, Badge, Date)			
♦ <input type="checkbox"/> # <input type="checkbox"/> NA	♦ <input type="checkbox"/> 5X <input type="checkbox"/> RT <input type="checkbox"/> PT TYPE II-C <input type="checkbox"/> MT EQPT NO: _____							<input type="checkbox"/> SAT <input type="checkbox"/> REJ			
♦ <input type="checkbox"/> TACK ## <input type="checkbox"/> NA	♦ <input type="checkbox"/> VT <input type="checkbox"/> 5X <input type="checkbox"/> PT TYPE II-C <input type="checkbox"/> MT EQPT NO: _____							<input type="checkbox"/> SAT <input type="checkbox"/> REJ			
♦ <input type="checkbox"/> ROOT <input type="checkbox"/> NA	♦ <input type="checkbox"/> VT <input type="checkbox"/> 5X <input type="checkbox"/> PT TYPE II-C <input type="checkbox"/> MT EQPT NO: _____							<input type="checkbox"/> SAT <input type="checkbox"/> REJ			
♦ <input type="checkbox"/> BKGGOUGE <input type="checkbox"/> NA	♦ <input type="checkbox"/> 5X <input type="checkbox"/> PT TYPE II-C <input type="checkbox"/> MT EQPT NO: _____							<input type="checkbox"/> SAT <input type="checkbox"/> REJ			
♦ <input type="checkbox"/> PT/MT (I) <input type="checkbox"/> NA	♦ <input type="checkbox"/> PT TYPE II-C <input type="checkbox"/> MT EQPT NO: _____							<input type="checkbox"/> SAT <input type="checkbox"/> REJ			
♦ <input type="checkbox"/> VT (F) <input type="checkbox"/> NA	♦ OUTSIDE (ALL VTs) <input type="checkbox"/> INSIDE INACCESSIBLE <input type="checkbox"/> INSIDE <input type="checkbox"/> PARTIAL INSIDE INSP							<input type="checkbox"/> SAT <input type="checkbox"/> REJ			
♦ <input type="checkbox"/> PT/MT (F) <input type="checkbox"/> NA	♦ <input type="checkbox"/> 24 HR. MT <input type="checkbox"/> PT TYPE II-C <input type="checkbox"/> MT EQPT NO: _____							<input type="checkbox"/> SAT <input type="checkbox"/> REJ			
♦ <input type="checkbox"/> PT/MT-ID <input type="checkbox"/> NA (F)	♦ <input type="checkbox"/> PT TYPE II-C <input type="checkbox"/> MT EQPT NO: _____ <input type="checkbox"/> INACCESSIBLE <input type="checkbox"/> PARTIAL INSP DONE							<input type="checkbox"/> SAT <input type="checkbox"/> REJ			
♦ <input type="checkbox"/> RT (F) <input type="checkbox"/> NA	♦ <input type="checkbox"/> 8 HR. <input type="checkbox"/> 60 <input type="checkbox"/> 360 <input type="checkbox"/> 100%							<input type="checkbox"/> SAT <input type="checkbox"/> REJ			
39. REMARKS (SHOP REMARKS ALSO)											
FINAL DISPOSITION	40. SUPERVISOR (Signature, Badge, Date)					41. LOCAL GOVERNMENT INSP./QAS (Signature, Badge, Date)					



<b>PIPE, MACHINERY AND PRESSURE VESSEL WELD RECORD – WELD DEFECT REPAIR SHEET</b>				
QA FORM 20C-2				
SHIP:	DWG/JCN:	JOINT NO.:	PAGE	OF
<b>52. DEFECT DESCRIPTION</b>				
<input type="checkbox"/> CRACK	<input type="checkbox"/> INCOMP INSERT FUSION	<input type="checkbox"/> INCOMPLETE FUSION	<input type="checkbox"/> ARC STRIKE	<input type="checkbox"/> ROUNDED
<input type="checkbox"/> SLAG	<input type="checkbox"/> CRATER PIT	<input type="checkbox"/> BURN THRU	<input type="checkbox"/> WELD SPLATTER	<input type="checkbox"/> OTHER: (ENTER BELOW)
<input type="checkbox"/> POROSITY	<input type="checkbox"/> INTERNAL CONCAVITY	<input type="checkbox"/> MELT THRU	<input type="checkbox"/> ROOT EDGE FUSION COND	
<input type="checkbox"/> UNDERCUT	<input type="checkbox"/> INTERNAL CONVEXITY	<input type="checkbox"/> TUNGSTEN	<input type="checkbox"/> LINEAR	
<input type="checkbox"/> OXIDATION	<input type="checkbox"/> CENTERLINE CREASE	<input type="checkbox"/> INCOMPLETE PENETRATION	<input type="checkbox"/> LINEAR DISPOSED	
53. DEFECT LOCATION(S) AND EXTENT <input type="checkbox"/> SEE SKETCH IN REMARKS			54. INSPECTOR (SIGNATURE/DATE)	
<b>DEFECT REPAIR</b>				
55. TYPE OF REPAIR <input type="checkbox"/> GRIND ONLY <input type="checkbox"/> GRIND AND WELD <input type="checkbox"/> WELD ONLY <input type="checkbox"/> OTHER (SEE REMARKS)	56. REPAIR LOCATION(S) AND EXTENT <input type="checkbox"/> SEE SKETCH IN REMARKS	57. WELD PROC AND REV/CH <input type="checkbox"/> NA <input type="checkbox"/> SAME AS ORIGINAL	58. EXCAV NDT REQUIRED <input type="checkbox"/> Y (MARK REQD INSP BLK 65/66) <input type="checkbox"/> N	59. ROOT PASS INSP REQUIRED <input type="checkbox"/> Y (MARK REQD INSP BLK 65/66) <input type="checkbox"/> N
60. LAYER T/R/I/F	61. FILLER TYPE	62. FILLER SERIAL NO. (MIC NO.)	63. PREHEAT/ INTERPASS TEMP <input type="checkbox"/> SAT	64. WELDER (SIGNATURE/DATE)
			<input type="checkbox"/> SAT	
			<input type="checkbox"/> SAT	
			<input type="checkbox"/> SAT	
<b>REPAIR INSPECTIONS</b>				
REPAIR WELD REQUIRES THE SAME INSPECTIONS AS THE ORIGINAL WELD. CARRY OVER ALL REJECTED OR VOIDED INSPECTIONS FROM PAGE 1.				
65. INSPECTION	66. INSPECTION TYPE	67. PROCEDURE USED	68. INSPECTOR (SIGNATURE/DATE)	
<input type="checkbox"/> EXCAV <input type="checkbox"/> NA	<input type="checkbox"/> 5X <input type="checkbox"/> PT TYPE IIC <input type="checkbox"/> MT/EQUIP NO.:		<input type="checkbox"/> SAT <input type="checkbox"/> REJ	
<input type="checkbox"/> ROOT <input type="checkbox"/> NA	<input type="checkbox"/> VT <input type="checkbox"/> 5X <input type="checkbox"/> PT TYPE IIC <input type="checkbox"/> MT/EQUIP NO.:		<input type="checkbox"/> SAT <input type="checkbox"/> REJ	
<input type="checkbox"/> BACKGOUGE <input type="checkbox"/> NA	<input type="checkbox"/> 5X <input type="checkbox"/> PT TYPE IIC <input type="checkbox"/> MT/EQUIP NO.:		<input type="checkbox"/> SAT <input type="checkbox"/> REJ	
<input type="checkbox"/> PT/MT (I) <input type="checkbox"/> NA	<input type="checkbox"/> PT TYPE IIC <input type="checkbox"/> MT/EQUIP NO.:		<input type="checkbox"/> SAT <input type="checkbox"/> REJ	
<input type="checkbox"/> VT (F) <input type="checkbox"/> NA	<input type="checkbox"/> OUTSIDE (ALL VTs) <input type="checkbox"/> INSIDE INACCESSIBLE <input type="checkbox"/> INSIDE <input type="checkbox"/> PARTIAL INSIDE INSP		<input type="checkbox"/> SAT <input type="checkbox"/> REJ	
<input type="checkbox"/> PT/MT(F) <input type="checkbox"/> NA	<input type="checkbox"/> PT TYPE IIC <input type="checkbox"/> 24 HOUR MT/EQUIP NO.:		<input type="checkbox"/> SAT <input type="checkbox"/> REJ	
<input type="checkbox"/> PT/MT – ID(F) <input type="checkbox"/> NA	<input type="checkbox"/> PT TYPE IIC <input type="checkbox"/> MT/EQUIP NO.: <input type="checkbox"/> INACCESSIBLE <input type="checkbox"/> PARTIAL INSP DONE		<input type="checkbox"/> SAT <input type="checkbox"/> REJ	
<input type="checkbox"/> RT (F) <input type="checkbox"/> NA	<input type="checkbox"/> 8 HOUR <input type="checkbox"/> 60 <input type="checkbox"/> 360 <input type="checkbox"/> 100%		<input type="checkbox"/> SAT <input type="checkbox"/> REJ	
69. REMARKS				

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QA FORM 20C INSTRUCTIONSPIPE, MACHINERY AND PRESSURE VESSEL WELD RECORD/WELD DEFECT REPAIR SHEET

PURPOSE: This instruction provides a form to document in process controls for welding and NDT of piping, machinery, pressure vessels, shafting and propellers including base metal repair and repair of castings in accordance with NAVSEA S9074-AR-GIB-010/278 (NSTP-278), MILSTD-2191, DOD-STD-2185 or in accordance with NAVSEA 250-1500-1. This Form does not contain all required data for accomplishment of Titanium Welds. Additional data is required as specified in local documents.

NOTES:

1. WHEN ADDITIONAL NDT AND OPERATIONAL TESTING (IN LIEU OF HYDROSTATIC STRENGTH TESTING) OF WELDED PIPE JOINTS IS SPECIFIED PER CHAPTER 505 OF NAVSEA S9086-RK-STM-010/CH505, PIPING SYSTEMS FOR NSTP-278 CLASS P-1 JOINTS, THE CWP/TGI SHALL CLEARLY SPECIFY THAT ADDITIONAL NDT IN LIEU OF HYDROSTATIC TESTING IS REQUIRED. ROOT LAYER SHALL BE PT OR MT INSPECTED. THE 5X VISUAL INSPECTION SUBSTITUTION ALLOWED BY NSTP-278 IS NOT PERMITTED. THE FINAL LAYER SHALL BE PT INSPECTED; MT IS NOT PERMITTED.
2. PLANNER SHALL COMPLETE THE BLOCKS IDENTIFIED BY A RED DIAMOND PRIOR TO ISSUING.
3. PER NAVSEA S9074-AR-GIB-010-278, WHEN A SPECIFIC ITEM ON A RECORD IS NOT APPLICABLE THE LETTERS "NA" SHALL BE ENTERED. IF A LINE ITEM HAS A "NA" BLOCK, CHECKING THE BLOCK MEETS THE INTENT OF ENTERING "NA" FOR THE REMAINDER OF THE BLOCKS FOR THAT LINE.

SCOPE: This weld record is required for NSTP-278 A-F, A-1, A-2, A-3, A-LT, P-1, P-LT, M-1, and T-1 welds, SUBSAFE welds, SOC welds, welding per MIL-STD-2191 (Main Shafts) and DOD-STD-2185 (Propellers) and other welds as required by the local Engineering authority.

PROCEDURE: Production and QA personnel make entries in QA form 20C as required below. Signatures verify that all entries in the associated line item are correct. When adding Continuation or Repair Sheets, enter the Ship (from Block 1), Map Drawing Number (from Block 9) or JCN (from Block 2) if there is no Map Drawing and the Joint Number (from Block 10). Enter the page number, starting with page 2, for each supplemental sheet (Continuation Sheet or Defect Repair Sheet) associated with the joint.

**PIPE, MACHINERY AND PRESSURE VESSELS WELDING DETAIL/NDT RECORD IDENTIFICATION SECTION**

BLOCK 1 - SHIP HULL

Enter ship's name and hull number.

BLOCK 2 - JCN

Enter Job Control Number.

BLOCK 3 - LWC/SHOP

Enter LWC.

BLOCK 4 - CWP/REC SER NO.

Enter REC serial number or NA as applicable. Do not list the REC Rev.

BLOCK 5 - SYSTEM/COMPONENT

Enter system and/or component to be welded, (e.g., Main Sea Water, 1MS-V23, HP Air flask, or #2 propulsion shaft).

BLOCK 6 - FABRICATION STD.

Mark the governing fabrication standard, NSTP-278 or NAVSEA 250-1500-1. For other Fabrication standards (MIL-STD 2191, DOD-STD-2185) enter an asterisk or other identifying mark and record procedure in the Remarks block.

BLOCK 7 - WELD CLASS

Enter applicable weld class from NSTP-278 fabrication standard (e.g., P-1, A-2). Enter classification for NAVSEA 250-1500-1 welds.

BLOCK 8 - JT DESIGN

Enter joint design. This can be a MIL-STD-22D or NAVSEA 250-1500-1 joint number, a joint design from a drawing or technical manual or a description such as "Build-up" or "Seal Weld". More than one joint design may be entered if allowed by drawing, NSTP-278, the Weld Procedure and local policy. If necessary, enter "RMKS" and list allowed joint design(s) in the Remarks section.

BLOCK 9 - SSMAP/JT ID DWG & REV

Enter map drawing or joint identification drawing. Enter NA if there is no map or joint identification drawing. Note that most submarine work requires that P-1 joints are mapped to a drawing that is included in the Ship's Drawing Index. See Deep Diving General Overhaul Specifications (DDGOS) 9480-0-I.

BLOCK 10 - JOINT NO.

Enter joint number, including type (WB, WS etc.) if listed, from joint map drawing. Check the "Mark JT" block if the weld is not mapped. NSTP-278 requires weld joint marking of class A-F, A-1, A-2, A-3, A-LT, P-1, P-LT, M-1 and T-1 welds if not mapped. Fabrication/repair/cladding welds within components do not require marking if the weld location is clearly defined on the record such that the record is clearly applicable to only that location.

If there is no joint number/map drawing or other traceability from joint to record:

Check the "MARK JT" block if required by TWD and/or local instruction. This box identifies to the fitter that the joint shall be marked, usually by vibra-tool, scribe or etch.

Example: Enter the Level I Certifying Activity Designator (CAD) letter(s) followed by a five digit date number and a joint number. The date number is the two-digit year plus the Julian day when the record is created. A job at Norfolk Naval Shipyard that installs one elbow would need two joint numbers for records created on May 14 1999, N-99134-1 and N-99134-2. (The joint number is unique to the applicable job (JCN). Each job starts a new series so there is no need for joint number logs or pre-allocation of joint numbers).

BLOCK 11 - PART DESCRIPTION

- a. Enter information for each part to be joined or repaired.
- b. Enter description of piece (e.g., pipe, valve, clevis, plate, etc.).

- c. Enter NPS pipe size and schedule or class (pipe welds only, NA others including pipe fittings).
- d. Enter arrangement drawing (preferred) or diagram and applicable revision.
- e. Enter piece number from drawing just entered (enter NA if there is no pc no.).
- f. Enter the base material type (normally from drawing) and the S-Group Number (e.g., ASTM A 178, Grade A (S-1), CUNI-70:30 (S-34), CRES 316 (S-8), 1-1/4Cr 1/2Mo (S-4)). S-group numbers are obtained from Table (1) of NSTP 278. Specify CRES by grade, Aluminum by grade and temper and Inconel (S-43) as either 600 or 625. In addition, for carbon steels (Group S-1) with carbon content greater than 0.30%, make a note of the maximum carbon content in the Remarks block. Include material spec if known (e.g., QQ-N-281, ASTM A182 F11). For new material, P&E verifies that information in Block 11, especially for material type, matches material ordering information in TWD. Use the Remarks block if additional space is needed.

NOTE: FOR BASE METAL REPAIRS, NORMALLY ONLY INFORMATION FOR PART 1 IS COMPLETED. ENTER "NA" IN PART 2 BLOCKS. FOR BASE METAL REPAIRS INVOLVING MORE THAN ONE MATERIAL TYPE, SUCH AS A REPAIR TO CU-NI BASE MATERIAL THAT TIES INTO AN ADJACENT NI-CU CLADDING, INFORMATION FOR BOTH MATERIALS SHALL BE COMPLETED AS PART 1 AND PART 2.

### **INSTALLATION SECTION**

NOTE: THE PURPOSE OF BLOCK 12 IS TO CONFIRM THE MATERIAL OF EACH PART IS THE SAME AS LISTED IN BLOCK 11.

#### **BLOCK 12** - **PART NO.1 AND PART NO.2**

(Welder) Check New or Existing for each part. If the part is new, no further action is required. If existing, check the method used to verify the material and annotate the existing material markings found or the results of the generic material test in the results section. For base metal repairs, Part 2 will be left blank if Part 2 of Block 11 is blank as only one part exists.

#### **BLOCK 13** - **PART NO.**

(Welder) Enter part number from Block 11 for each new part. Enter "NA" for backing rings or consumable inserts which are not included in Block 11.

#### **BLOCK 14** - **DESCRIPTION**

(Welder) Enter piece description either from Block 11 or for additional pieces, such as backing rings or consumable inserts which do not have a part number.

#### **BLOCK 15** - **LEVEL I NO./OTHER TRACE NO./MATERIAL/SPECIFICATION MARKINGS**

(Welder) For all new material, enter the material type (e.g., 316L, Inconel 625, ASTM A106 Grade B, etc.) when this information is on the piece or its accompanying tag or documentation. In addition, the following information is required:

- a. For new material in applications requiring traceability markings (e.g., Level I, SOC, etc.), enter the traceability marking.
- b. For new material not requiring traceability marking and not having a material type evident, enter the information required by Table 1 below (this would normally be the stock number).

TABLE 1- DOCUMENTATION REQUIREMENTS	
Material Control Level	Required Information
Level I Material Other Than Fasteners	MIC Number and any other traceability number, including any local traceability number (e.g., PNSY MLN – examples Z142, AB12)
Level I Fasteners	Either the MIC number or Material Marking, Color Code, Heat/Lot Number, and Manufacturers Symbol (Note: For nuts containing a self-locking insert, the color of the insert is the Manufacturer's symbol)
Controlled Structural Material And SOC Control Division "A" Material	Traceability Number
SOC Control Division "B" Material	Markings providing identification to material type or specification
AERP And Other Rotatable Pool Material (688 Class, TRIPER, Etc.)	Enter the appropriate rotatable pool serial number (e.g., RP-148A, 4810-013-5812-A3-0113, TIN -292-11893, etc.)
Transferred And Cannibalized Material	Enter the Equipment Removal List No. or other material History/ Traceability number (ERL# XXXX, SSBN-600 EHF #24, etc.)
Other Material Within The LEVEL I/SUBSAFE Boundary And SOC Control Division "C" Material	1. Enter at least one of the following documentation attributes: a. Stock Number (from package/container) b. Part Number (from package/piece) c. Part Number and associated Manufacturing Work Procedure (for manufactured items) d. Local Traceability Number (from piece/tag) e. Drawing and Piece Number (from piece/tag) f. Generic, MIL-SPEC, or Material Specification Marking (from piece) g. NDT record numbers or test results for items verified by generic material testing 2. For SOC components only: Enter the stock number of the "O"-ring lubricant or any sealant used during assembly

- c. If an alternate material is authorized enter an asterisk or other identifying symbol and provide authorization (e.g., DFS #) in Block 39 (Remarks).
- d. For consumable inserts, enter the type (e.g., MIL-67) marked on the insert, the insert size and the Level I or certified material number from the tag.

BLOCK 16 - FITTER/INSPECTOR

Sign to verify that Block 15 entries match the markings on the piece or tag and to verify that the material matches that required by Block 11. Where material type is not annotated on the piece or its accompanying tag/documentation, material verification is accomplished by matching the identifying marking on the tag/documentation against the ordering information specified in the TWD.

BLOCK 17 - PART

No entry. Part numbers correspond to Block 11.

BLOCK 18 - WALL THICKNESS REQUIRED

Enter nominal wall thickness for piping and piping fittings.

NA may be entered for non-piping applications which are greater than ½ inch thick, or pipe socket fittings, valves, piping drilled after boss installation or piping passing through sleeves.

Nominal wall thickness is the nominal wall thickness for the associated system piping. Minimum allowable piping installation wall thickness is that provided by the installation drawing or can be calculated by subtracting 10% from the nominal wall thickness. Tubing specifications generally specify a minimum wall thickness only. For NAVSEA 250-1500-1 welds and if required by local direction for NSTP-278 welds, the nominal wall thickness for tubing should be calculated by adding 10% to the tubing minimum wall thickness. If the basis for minimum wall thickness is different from above, document the special basis in the Remarks.

Enter minimum allowable installation thickness.

**BLOCK 19** - **WALL THICKNESS ACTUAL**

(Welder) Enter minimum measured thickness after end preparation. "NA" may be entered for non-piping applications which are greater than ½ inch thick, or pipe socket fittings, valves, piping drilled after boss installation or piping passing through sleeves.

For casting repairs, record the wall thickness adjacent to the defect (excavation area). A sketch showing the size (length, width, and depth) and location of all nominal and special repair will be entered per the directions for the REMARKS section (Block 39).

**BLOCK 20** - **FITUP**

Planner mark PREWELD NDT and FITUP AFTER TACK blocks "NA" when not applicable. Fitter check other appropriate blocks or make entry for:

- a. Completion of any required pre-weld NDT - See Block 35 and 36 and the TWD.
- b. Installed joint design - Annotate the joint design installed. The installed joint design shall be as specified in Block 8. If an alternate joint design is authorized enter an asterisk or other identifying symbol and provide authorization (e.g., DFS #) in Block 39 (Remarks). For base metal repair, sketch excavation in Remarks section. Sketches should include location, dimensioned from a reference surface or line, and length width and depth of excavation.
- c. Satisfactory fit-up - This means that the fit-up meets the procedure requirements for the joint design, and that any scribe line or joint number marking (required if "MARK JT" in Block 10 is checked) is complete.
- d. Satisfactory fit-up after tacking - If NA is not checked in advance by P&E, the SAT block will be checked after satisfactory fit-up after tacks by the NDT Inspector.

**BLOCK 21** - **VERIFICATION**

(Fitter/NDT Inspector) Sign verification of proper fit-up.

**WELDING SECTION****BLOCK 22** - **WELD PROC/REV/CH & TECH DATA SHEET**

(Welder) Enter weld procedure (including revision and change), tech data sheet or other welding instruction.

**BLOCK 23** - **POSITION**

(Welder) Circle HFP (Horizontal Fixed Pipe), VFP (Vertical Fixed Pipe) or OOP (Out Of Position pipe) as applicable by local instruction.

**BLOCK 24** - **MIN PREHEAT**

PREHEAT - (Welder) Enter minimum preheat temperature just prior to welding.

INTERPASS - (Welder) Enter maximum interpass temperature as measured during the process.

**BLOCK 25** - **FABRICATION LOCATION**

(Welder) Enter location where work is performed. Compartment can be the damage control number or the common name such as UL MMR1, or Aux Machinery Space. Circle Port (P), Centerline (C), or Starboard (S).

BLOCK 26 - LAYER(S)

(Welder) Enter type of weld layer(s) (e.g., Tack (T), Root (R), Intermediate (I), or Final (F)). Record one line for each different welder/filler metal combination. (If a complete weld is done by the same welder, on the same day, using filler metal with the same traceability numbers, the layer may be indicated as T, R, I, F using only one line). However, the welder's signature is required prior to each specified inspection, (e.g., If a root PT or 5X is required, the R and I layers can not be on the same line). Intermediate layers shall be numbered (I1, I2, I3...) if needed, to record more than one filler metal lot or welder. Use continuation sheet if needed.

BLOCK 27 - FILLER TYPE

(Welder) Enter type of filler material used, (e.g., RN60, 9N10, etc.).

BLOCK 28 - FILLER SERIAL NO.

(Welder) Enter filler serial number (Level I numbers, traceability numbers) from filler or tag. Enter, "Non level I", for Non-level filler material.

BLOCK 29 - WELDER

(Welder) Sign, enter badge number and Date to verify that the entries made are correct and the weld is per the required procedure. For HY or HSLA welds enter the time and date that the weld reached ambient temperature in the remarks.

BLOCK 30 - STRESS RELIEF REQUIRED

Planner mark "Yes" if stress relief is desired for distortion control or is required by tech manual or drawing, otherwise mark "NO" block. If Block 30 is marked "NO", "NA" Blocks 31 and 32.

BLOCK 31 - PROCEDURE

Welder enter stress relief procedure used, temperature range and duration. Planner mark "NA" if Block 30 is marked "NO".

BLOCK 32 - HEAT TREATER

Heat Treater, sign to verify that the heat treatment was accomplished per the required procedure, temperature range and duration. Planner, mark "NA" if Block 30 is marked "NO".

BLOCK 33 - WELDER/FITTER

(Welder) (Fitter includes other trades as applicable). For welds that are machined or ground flush, include a sketch in the Remarks section including weld location from a reference surface or line, and the length and width of the weld prior to requesting NDT. Sign that all welding and surface preparation is correctly completed, reference line(s) and joint number (if checked in Block 10) are marked and weld is ready for NDT. The welder shall sign this block for weld workmanship if welding is performed and should be co-signed by the shop performing the final action on the joint (if other than the welder) prior to inspection as specified by local direction.

**WELD INSPECTIONS SECTION**

BLOCK 34 - ACCEPTANCE STANDARD/CLASS

Planner enter NDT acceptance standard (e.g., MIL-STD-2035 or NAVSEA 250-1500-1) and acceptance standard class (if applicable). (NDT acceptance standard classes for NSTP-278 welds are found in NSTP-278 Table XI).

**BLOCK 35** - **INSPECTION**

Planner mark inspection(s) required. Mark NA for inspections that are not required. Note that first line allows writing in inspections, especially pre-weld inspections like excavations or end-preps. Mark MT/PT-ID for joints which require MT/PT and have an inside accessible surface (e.g., non-backing ring butt welds).

**BLOCK 36** - **INSPECTION TYPE**

Planner mark the types of NDT (VT, 5X, PT, MT or RT). Mark "Inside" when required for welds that allow for inside inspections. For welding of HY/HSLA and STS materials indicate when 8 hour RT or 24 hour MT are required by marking appropriate box.

(Inspector) Record equipment numbers as appropriate. Line out Type II [Method] C if that type penetrant dye and method are not used and record substitute PT types and methods in the Procedure or Remarks block. If a yoke is used for MT write "Yoke" in place of the unique equipment identification. Mark "inaccessible" or "partial inspection done", as appropriate, if full inspection of inside surface cannot be accomplished.

**BLOCK 37** - **PROCEDURE USED**

(Inspector) Record inspection procedure used.

**BLOCK 38** - **INSPECTOR**

(Inspector) Mark "SAT" for satisfactory or "REJ" for rejection of required inspections. Do not mark either for inaccessible inspections. Sign verification for inspections required by Blocks 35 and 36. Rejection is required if an inspection shows rejectable conditions that have not been satisfactorily repaired by polishing or light grinding and reinspected. If an inspection is rejected add a Weld Defect Repair Sheet and complete Blocks 52-54. Carry rejected, voided, and incomplete inspections to Block 65 and 66. See Header instructions above for adding a Repair Sheet. If PT/MT-ID (F) in Block 36 is marked "inaccessible", the Inspector will enter signature and leave "SAT" and "REJ" check box blank.

**BLOCK 39** - **REMARKS**

(All) Record additional relevant information as directed in this instruction, by work document or identified in-process. Appropriate remarks entries or sketches include: defect size and location, special weld joint designs, records of material weldability tests for casting repairs, or the additional records required for Titanium welding. Use a continuation sheet for additional space or reference a separate record. Each entry shall contain a signature, printed name and date except where the entry is pre-printed on the form by P&E.

**FINAL DISPOSITION****BLOCK 40** - **SUPERVISOR**

The NDT Supervisor will enter printed name, signature, badge number and date signifying all information on the record (including any rejects and repairs) is technically acceptable and administratively correct. Enter total pages in the Heading.

**BLOCK 41** - **LOCAL GOVERNMENT INSP./QAS**

For shipyard use only.

QA FORM 20C - CONTINUATION SHEET INSTRUCTIONS

**WELD HISTORY**

BLOCKS 42 - 46 -            LAYER, FILLER TYPE, FILLER SERIAL NO., PREHEAT/INTERPASS TEMP, WELDER

(Welder) See instructions for Blocks 24 and 26-29. Note any changes in Remarks on continuation sheet.

**WELD INSPECTION**

BLOCKS 47 - 50 -            INSP, INSPECTION TYPE, PROCEDURE USED, INSPECTOR

(Engineering/Planning/Inspector) See instructions for Blocks 35-38. Write out inspection type in Block 48. General instruction may be written in the Remarks section.

BLOCK 51            -            REMARKS

(All) See Block 39 instructions for remarks. Each entry shall contain signature, badge number and date except where the entry is pre-printed on the form by P&E. Initials may be entered in lieu if an employee's signature appears elsewhere on the same page.

QA FORM 20C - WELD DEFECT REPAIR SHEET

**DEFECT DESCRIPTION**

BLOCK 52            -            DEFECT DESCRIPTION

(Inspector) Place an "X" in the applicable defect description block that describes the defect.

BLOCK 53            -            DEFECT LOCATION(S) AND EXTENT

(Inspector) Describe or sketch in remarks (Block 69) the defect location(s) and size(s). Defect location in reference to a permanent landmark is recommended.

BLOCK 54            -            INSPECTOR

(Inspector) Verify that rejected inspections from page 1, continuation sheet or previous repair sheet are marked in Block 65 and 66 to be redone. Verify defect identification by signature.

**DEFECT REPAIR**

BLOCK 55            -            TYPE OF REPAIR

(Welder) Mark type(s) of repair. Identify repair type (grind only, grind and weld, etc.). More than one repair type may be marked.

BLOCK 56            -            REPAIR LOCATION(S) AND EXTENT

(Welder) Describe or sketch in Remarks section the repair locations and size (length, width and depth). Descriptions shall include distances and/or degrees from "0" reference points or lines to locate repairs. Note that generally the repair extends beyond the defect and this must be recorded.

**BLOCK 57** - **WELD PROC & REV/CH**

(Welder) Mark "NA" if only grinding is needed for repair. Enter the weld procedure, revision and data sheet or mark "Same as original weld" if welding is required.

**BLOCK 58** - **EXCAVATION NDT REQUIRED**

(Welder) Check if MT, PT or 5X VT is required for the excavation area. Also mark Blocks 65 and 66. Any weld repair which originally required final MT or PT requires MT, PT or 5X VT of repair excavations. Consult P&E or local facility engineering if there is any uncertainty about the repair inspection requirements.

**BLOCK 59** - **ROOT PASS INSPECTION REQUIRED**

(Welder) Mark if a new root pass inspection is required (when all or part of the root is replaced), also mark Blocks 65 and 66 root pass inspections. Repaired root welds which originally required inspections shall require the same inspections when replaced or repaired. Consult P&E or local facility engineering if there is any uncertainty about the repair inspection requirements.

**BLOCKS 60 - 64** - **LAYER, FILLER TYPE, FILLER SERIAL NO., PREHEAT/INTERPASS, WELDER**

See instructions for Blocks 24 and 26-29.

**REPAIR INSPECTIONS****BLOCKS 65 - 68** - **INSP, INSPECTION TYPE, PROCEDURE USED, INSPECTOR**

(As Appropriate) In-process repairs of weld rejects generally require the same inspections as the original weld with the addition of inspection of the excavation needed to remove the defect.

The inspector is responsible to carry forward all inspections, from page 1, a Continuation Sheet or a previous Repair Sheet, which were rejected (see Block 38).

The welder will mark any additional inspections required due to the extent of the repair.

Excavations must be 5X VT, MT or PT inspected if MT or PT is a requirement of the finished weld. Root inspections must be accomplished if all or part of the root is redone. Also mark any intermediate layer inspections for repeat if these layers are removed by repair. These inspections must be done prior to covering by the repair. Blocks 58 and 59 serve to remind welders of this before the welding phase of the repair.

Previously accepted inspections shall be redone if a subsequent inspection requires rework that could affect the previous inspection result. Voided inspections shall be marked to be redone in the repair area. Any weld material removal for repair voids the completed finished surface inspections (F), VT, PT, MT, or RT inspections in Block 35.

Consult P&E, NDT Supervisor, or local facility engineering for repair inspection details. Note that your local activity may require that a discrepancy be clarified by a Liaison Action Request for formal direction or approved by a Departure from Specification prior to proceeding with in-process repair of welding defects.

**BLOCK 69** - **REMARKS**

(All) Record additional details here, especially sketches of defect areas and repairs. Each entry shall contain signature, printed name and date except where the entry is preprinted on the form by P&E. Initials may be entered if a corresponding employee's signature appears elsewhere on the same page. Use a continuation sheet for additional space. See Block 39.

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**HYDROSTATIC/PNEUMATIC TEST RECORD**

QA FORM 26 (9/05) Planning shall fill in blocks identified by a ♦ prior to issuing

♦1. SHIP	HULL NO.	♦2. JCN	♦3. LWC/SHOP	♦4. CWP/REC SER NO.	♦5. SYSTEM/COMPONENT
♦6. REFERENCES (TEST PRESSURE DRAWINGS, REFERENCE MANUALS OR OTHER APPLICABLE REFERENCES)					
A.		B.		C.	
♦7. REQUIRED TEST AND INSPECTION – SPECIFY TEST REQUIREMENTS [i.e., TYPE OF TEST, TEST FLUID, SPECIAL VALVE POSITIONS, DURATION, ACCEPTANCE CRITERIA, JOINTS TO BE TESTED (IF ENTIRE COMPONENT/SYSTEM IS TESTED, SO STATE)].					
♦8. DIAGRAM OF TEST AREA INCLUDING GAGS AND BLANKS INSTALLED, VALVE POSITIONS, AND TEST GAGES/INSTR USED (DOCUMENT BELOW).					
9. GAGE DATA	RANGE (PSIG)	SERIAL #	CAL DUE DATE		
PRIMARY					
BACKUP					
♦10. REQUIRED TEST PRESSURE (PSIG) AND TEST DURATION:			11. ACTUAL TEST PRESSURE (PSIG) AND TEST DURATION:		
12. TEST RESULTS (CHECK ONE):		<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT			
13. REMARKS:					
14. CERTIFICATION					
PERFORMED BY			INSPECTED BY		
CRAFTSMAN SIGNATURE/BADGE NO.	DATE	QA INSPECTOR/SHIPYARD REP SIGNATURE/BADGE NO.		DATE	

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QA FORM 26 INSTRUCTIONS  
HYDROSTATIC/PNEUMATIC TEST RECORD

PURPOSE: To document hydrostatic/pneumatic tests accomplished on piping systems or portions of a system to recertify the system after maintenance. It also provides a method for the FMA to specify the required retests for work they performed.

PROCEDURE: The numbered blocks on QA form 26 correspond with the instructions listed below. Any block not used will be marked NA. The planning organization shall fill in blocks identified with the diamond symbol prior to issuing the CWP.

BLOCK 1 - SHIP HULL NO.

Enter the ship's name and hull number.

BLOCK 2 - JCN

Enter the JCN.

BLOCK 3 - LWC

Enter the shop number of the LWC.

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 - 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: (FOR SUBMARINES ONLY) 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, test fluid, special valve positions, 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 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.

BLOCK 10 - REQ'D TEST PRESSURE (PSIG) AND TEST DURATION

Enter the required test pressure and test duration. If listing the test pressure would classify the CWP enter "J", "H", Item 1 of Ref (a), etc. as appropriate from the applicable reference instead of classifying the document.

BLOCK 11 - ACTUAL TEST PRESSURE (PSIG) AND TEST DURATION

Enter the actual test pressure and the duration the test pressure was applied. Test duration will include the required test period and the time required to complete the inspection. If listing the test pressure would classify the CWP enter "J", "H", Item 1 of Ref (a), etc. as appropriate from the applicable reference instead of classifying the document.

BLOCK 12 - TEST 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.

NOTE: IF A SATISFACTORY TEST CANNOT BE ACHIEVED, A DFS FOR NON-NUCLEAR TESTS OR LAR FOR NUCLEAR TESTS MUST BE PROCESSED IN ACCORDANCE WITH PART 1 CHAPTER 8 OF THIS VOLUME OR THE TASK MUST BE REWORKED AND RETESTED.

BLOCK 13 - REMARKS

Remarks pertinent to this test will be entered in this block.

BLOCK 14 - CERTIFICATION

PERFORMED BY

Person performing the test print name, enter signature, badge number and date signifying accuracy of data recorded.

INSPECTED BY

QAI/Shipyard Representative print name, enter signature, badge number and date verifying the accuracy of test results recorded and inspection performed satisfactory.

**DROP TEST RECORD**

QA FORM 27 (9/05)

Planning shall fill in blocks identified by a ♦ prior to issuing

♦1. SHIP	HULL NO.	♦2. JCN	♦3. LWC/SHOP	♦4. CWP/REC SER NO.	♦5. SYSTEM/COMPONENT
♦6. REFERENCES (TEST REFERENCE MANUAL(S) AND/OR OTHER APPLICABLE REFERENCES)					
A.		B.		C.	
♦7. REQUIRED TEST AND INSPECTION – SPECIFY TEST REQUIREMENTS [i.e. TYPE OF TEST, SPECIAL VALVE POSITIONS, DURATION, ACCEPTANCE CRITERIA, JOINTS TO BE TESTED (IF ENTIRE COMPONENT/SYSTEM IS TESTED, SO STATE)].					
♦8. DIAGRAM OF TEST AREA INCLUDING GAGES AND BLANKS INSTALLED, VALVE POSITIONS, INITIAL & FINAL TEMPERATURE (IF APPLICABLE) AND TEST GAGES/INSTR USED (DOCUMENT BELOW).					
9. GAGE DATA	RANGE (PSIG)	SERIAL #	CAL DUE DATE		
PRIMARY					
BACKUP					
10. a. REQUIRED TEST PRESSURE (PSIG):		a.	b.	11. a. FINAL PRESSURE AT END OF TEST:	
b. ACTUAL TEST PRESSURE:				b. ACTUAL DURATION:	
				a.	b.
12. ALLOWABLE PRESSURE DROP% IN MINUTES/HOURS			13. FINAL PRESSURE DROP CORRECTED FOR TEMPERATURE CHANGE		
14. TEST RESULTS (CHECK ONE):				<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT	
15. REMARKS:					
16. CERTIFICATION					
PERFORMED BY:			INSPECTED BY:		
CRAFTSMAN SIGNATURE		DATE	QA INSPECTOR/SHIPYARD REP SIGNATURE/BADGE NO.		DATE

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QA FORM 27 INSTRUCTIONSDROP TEST RECORD

PURPOSE: To document drop tests accomplished on piping systems or portions of a system to recertify the system after maintenance actions have been accomplished.

PROCEDURE: The numbered blocks on QA form 27 correspond with the instructions listed below. Any block not used will be marked NA. The planning organization shall fill in blocks identified with the diamond symbol, the Required Initial Test Pressure of Block 10 and the maximum allowable pressure drop in Block 12 prior to issuing the CWP.

BLOCK 1 - SHIP HULL NO.

Enter ship's name and hull number.

BLOCK 2 - JCN

Enter the JCN.

BLOCK 3 - LWC

Enter the shop number for the LWC.

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 - SYSTEM/COMPONENT

Enter the name of the system and/or component (i.e., FWD ESCAPE TRUNK) to be tested.

BLOCK 6 - 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, including inspection points, necessary to recertify the work. FMAs will fill in this block and then provide the QA form 27 to Ship's Force so they can prepare the test procedure to retest FMA work.

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, valve positions, initial and final temperature (if applicable), etc. The 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.

BLOCK 10a - REQUIRED TEST PRESSURE

Enter the required test pressure (psig).

BLOCK 10b - ACTUAL TEST PRESSURE

Enter the actual test pressure.

BLOCK 11a - FINAL PRESSURE AT END OF TEST

Record final pressure reading when the required test time is completed.

BLOCK 11b - ACTUAL DURATION

Enter the actual duration of the test.

BLOCK 12 - ALLOWABLE PRESSURE DROP % IN MINUTES/HOURS

Enter the allowable pressure drop as a percentage of the test pressure in minutes or hours. Cross out time measure not used.

BLOCK 13 - FINAL PRESSURE DROP CORRECTED FOR TEMPERATURE CHANGE

Record final pressure drop calculated with corrections for temperature change in the same units as Blocks 11 and 12.

BLOCK 14 - TEST RESULTS

Check "SAT" block, if all inspections specified by Block 7 are complete and satisfactory.

Check "UNSAT" block, if test results are unsatisfactory. Identify the specific inspection and reason for failure in the remarks section.

NOTE: IF A SATISFACTORY TEST CANNOT BE ACHIEVED, A DFS FOR NON-NUCLEAR TESTS OR LAR FOR NUCLEAR TESTS MUST BE PROCESSED IN ACCORDANCE WITH PART I CHAPTER 7 OF THIS VOLUME OR THE TASK MUST BE REWORKED AND RETESTED.

BLOCK 15 - REMARKS

Enter any comments pertinent to the test.

BLOCK 16 - CERTIFICATION

PERFORMED BY

Person performing the test print name, enter signature and date signifying accuracy of data recorded.

INSPECTED BY

QAI/Shipyard Representative print name, enter signature, badge number and date verifying the accuracy of test results recorded and inspection performed satisfactory.

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QA FORM 28 INSTRUCTIONSSHOP TEST RECORD

PURPOSE: To document the OQE required when performing in-shop testing.

PROCEDURE: The numbered blocks on QA form 28, SHOP TEST RECORD, correspond with the instructions listed below. The form will become part of the TWD, and the responsibilities for filling out the form are as follows:

- a. Planning shall fill in blocks identified by a ♦ prior to issuing QA form 28.
- b. QAI will complete Block 11 (when required by this manual).
- c. QAS shall complete Block 12 for SUBSAFE/SOC Testing.
- d. Shop Supervisor shall complete Block 12 for other testing.

BLOCK 1 - SHIP/HULL

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/Job Order & Key-Op

Enter the Job Control Number (e.g., 20884-EM01-2947, 3872556103/R01). Naval Shipyards enter Job Order and KeyOp.

BLOCK 3 - LWC/SHOP

Enter the shop number of the Lead Work Center/or the Assigned Key Shop.

BLOCK 4 - CWP/REC SERIAL NO.

Enter the CWP/REC serial number if applicable, otherwise NA. 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, or the name of the component being tested (e.g., ASW-80/81). If the record is for testing rotatable pool material, Planner or Craftsman enter the serial number of the material when available or known.

BLOCK 6 - TEST REFERENCES

Enter the document number that provides the test requirements other than those test requirements listed in the Task Group Instruction, JCN or Job Order listed in Block 2: (e.g., SUBMEPP Maintenance Standard or Technical Repair Standard (SMS/TRS) Revision and Change, Task Group Instruction, Technical Manual and Section No., Assembly Drawing Number & Revision, etc.).

BLOCK 7 - TEST GAGE RANGE/TEST INSTRUMENT USED, SERIAL NO. & CALIBRATION DUE DATE

Enter each test gage and each instrument (normally enter the gage or instrument range) used for testing any item or component. Enter the serial number of the gage or instrument, and Calibration Due Date. If the items are part of a computerized test stand, indicate the serial number of the test stand.

BLOCK 8 - RELIEF VALVE SET POINT

Enter the relief valve set point and verification signature of person setting the relief. The signature(s) in Block 8 include that the test was accomplished with the proper calibrated test equipment. Use Block 10 for additional space. If listing the test pressure would classify the CWP enter "J", "H", Item 1 of Ref (a), etc. as appropriate from the applicable reference instead of classifying the document.

BLOCK 9 - TEST REQUIREMENTS & RESULTS

Planner enter all test requirements Test Procedure/Type of Test/Paragraph, required valve position and entry point (if not described by Test procedure, SUBMEPP Maintenance Standard or Technical Repair Standard, that is invoked in the Technical Work Document), Required Medium, Required Pressure, Minimum Duration, Allowable Leakage and any other test requirements. NA blocks if not applicable. Enter other test requirements, if applicable, in Block 9 or the Remarks Block 10. If listing the test pressure would classify the CWP enter "J", "H", Item 1 of Ref (a), etc. as appropriate from the applicable reference instead of classifying the document.

NOTES:

1. For Scope of Certification Tests requiring Divers Air Clean Requirements, Planning add a SOC Cleanliness Maintained Test Requirement (annotate to verify that system cleanliness has been maintained) with signature, badge number and date for the craftsman.
2. For hydraulic actuators with relief valves which must be removed for the hydrostatic or tightness tests, relief valve reinstallation shall be documented in one of the following manners:
  - a. On a QA form 34A
  - b. On a QA form 17C
  - c. Planning: Enter "Relief valve removed for test and reinstalled after test" in the QA Form 28 Remarks block and provide an area for the mechanic to record the following attributes for all new material installed:
    - Piece number
    - Drawing number or reference letter
    - Part description
    - Quantity
    - LOE

Mechanic: Record the data for each attribute listed above for all new material installed. Provide signature, badge number and date for Objective Quality Evidence that the relief valve and o-ring were reinstalled after the test; all new material meets specified requirements, is installed and listed below; and after verifying existing material is acceptable for re-use and is installed.

3. For hydraulic 2 position valve orientation, enter a requirement in the Remarks block for the operation of the valve ("PRESSURIZE C1 TO OPEN, PRESSURIZE C2 TO CLOSE"), signature, badge number and date for Objective Quality Evidence of the proper operation if not already identified in the Maintenance Standard Test requirements.

Test or Production personnel enter the results of testing (Actual Medium Used, Actual Pressure, Actual Duration (including inspection time), Actual Leakage, and the results of testing (SAT or UNSAT) and enter signature, badge number and date. Signature also verifies that test instrumentation was calibrated, the correct test configuration was used to perform the test and any sequencing (e.g., valve cycling) listed in Block 9 or 10 was accomplished. If the

results are unsatisfactory, enter the deficiency report number or DL serial number which documents the test deficiency and/or work accomplished to correct the deficiency. If unsat, the craftsman will report the condition on a Deficiency Form or document the re-work on the applicable QA Form. Further testing of the component should not continue until the unsat condition is resolved. NA blocks if not applicable.

NOTES:

1. For Test Procedure steps that require testing from both directions, annotate/record Actual Pressure, Duration, Leakage, and Results for each direction.
2. For SOC work, valves that act as a boundary closure between two distinct operating pressure systems or subsystems shall have the test pressure of each port identified by a temporary tag when testing is performed in a shop or on a test bench, when the valve configuration is such that it could be installed two ways into the system, and the ports are not otherwise marked or identified. The temporary tags can be removed after the valves have been installed. The purpose of the tag is to alert personnel of the correct orientation of the valve into the system. (P9290 Appendix J, Paragraph J8 refers).

Enter any remarks in Block 10. Remarks shall be accompanied by a signature, badge number and date, if not part of the original technical direction.

BLOCK 10 - REMARKS

Enter any remarks. Identify which test the remarks apply to. Remarks shall have a signature, badge number and date except where the entry is pre-printed on the form by Planning, unless the pre-printed entry requires signature for OQE. Initials may be entered in lieu of an employee's signature and badge number, if a corresponding employee's signature and badge number appears elsewhere on the same page.

BLOCK 11 - QA INSPECTOR/SHOP SUPERVISOR SIGNATURE/BADGE NO

Quality Assurance Inspector or Shipyard Representative enter signature, badge number and date verifying the completeness of the data recorded in Blocks 7 through 9 and that the data agrees with the listed requirements (as implemented by local Shipyard instruction).

BLOCK 12 - QAS SIGNATURE/BADGE NO.

For SUBSAFE or SOC components only, QAS or cognizant QA representative as defined by local instructions, will sign, enter badge number and date in this block to indicate the completeness of the entries.

For other components, the Production Shop Supervisor shall sign that the records have been reviewed for completeness.

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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 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.

**BLOCK 7** - **NEW MATERIAL**

Craftsman

PC NO: Enter the piece numbers of parts. List only the new parts being installed. New body bound studs documented on a QA form 17SI should not be documented on a QA form 34.

REF: Enter the letter corresponding to the reference listed in Block 6 that provides the material specification or assembly information for the piece listed in the "PC NO." block.

JOINT BLK ID: Enter the alphanumeric designator corresponding with the particular Block 9 or Block 14 entry (9A, 9B, 14A, 14B, etc.) that identifies the joint where the material is installed.

DESCRIPTION: Describe all new parts associated with the assembly or joint. For fasteners and nuts, include diameter and thread (e.g., bolt, ½"-13; stud, ½"-12; SHCS, ½"-13, etc.). Record shim thickness when shims are installed (not required for shims installed as a part of an epoxy repair).

**NOTE:** IF A PORTION OF A NEW VALVE OR COMPONENT IS USED TO REPLACE PARTS (E.G., BONNET AND DISC ASSEMBLY), ENTER A DESCRIPTION OF THE PART OR ASSEMBLY OF PARTS AND DOCUMENT THE LEVEL I NUMBER OF THE NEW VALVE OR COMPONENT IN THE IDENT SECTION. LIST THE PARTS THAT THE ASSEMBLY CONSISTS OF IN THE REMARKS BLOCK (A SINGLE COMPONENT MAY BE LISTED IN BLOCK 7) WITH A NOTE THAT THE PART(S) WERE TAKEN FROM THE NEW VALVE OR COMPONENT.

QTY: Record quantity of new material installed. Each quantity must be unique to one Block 9 joint.

LOE: Identify the Level of Essentiality (MIC Level). The material control level shall be as identified by craftsman. Example: SS, LI, NA. For SOC material, enter the appropriate Material Control Division (A, B, or C).

IDENT: Enter the marking on the part or on the packaging/container/tag (when the part is not marked) as shown in Table 1.

CRAFT INT: Craftsman: Installing craftsman enter initials for material installed. The initials shall correspond to the related Block 9 craftsman's signature unless otherwise noted with a corresponding signature elsewhere on the form (e.g., Remarks block entry and signature).

**NOTE:** IF THE CRAFTSMAN INSTALLING THE MATERIAL IS OTHER THAN THE CRAFTSMAN SIGNING FOR JOINT DATA IN BLOCK 9 OR BLOCK 14, A CORRESPONDING SIGNATURE, PRINTED NAME AND DATE SHALL BE ENTERED IN THE REMARKS BLOCK.

**BLOCK 8** - **BLUE/CHALK CHECK AND/OR VALVE BALL COMPRESSION DATA**

**NOTE:** A QA-34 FORM IS NOT REQUIRED TO BE GENERATED SOLELY FOR CAPTURING BLOCK 8 DATA IF THE REMAINDER OF THE COMPONENT IS TO BE ASSEMBLED USING A QA-34A FORM. USE A QA-17 OR OTHER APPROPRIATE METHOD.

(PLANNING) A documented blue/chalk check or valve ball compression check is required for all controlled assemblies and is allowed by the DDGOS in lieu of a seat tightness test for welded in-line valves and components where a seat tightness test is not practical. Enter an X in the applicable NA box when Blue/Chalk Check or Valve Ball Compression is not applicable. When a Valve Ball Compression check is required, enter the required stack height and ball cavity dimensions. These dimensions should include maximum and minimum requirements.

(CRAFTSMAN) Record actual ball/seat stack heights and cavity dimensions when Planning has provided the required dimensions. If more than one blue check is required, enter additional checks in Remarks. For hull and back up valves where more than one ball/seat stack height dimension is required, enter in the following manner: (3.213/3.567) where the first dimension is for one ball/seat combination and the second dimension is for the other one. Identify each dimension to its associated valve. Sign, date and print name after satisfactory accomplishment of a Blue/Chalk Check or Valve Ball Compression check.

TABLE 1- DOCUMENTATION REQUIREMENTS	
Material Control Level	Required Information
Level I Material Other Than Fasteners	MIC Number and any other traceability number, including any local traceability number (e.g., PNSY MLN – examples Z142, AB12).
Level I Fasteners	NOTE: THE INFORMATION ENTERED FOR FASTENERS MAY NEED TO INCLUDE INFORMATION FROM BLOCKS 3 AND 8 FROM QA FORM 1. DO NOT ENTER THE PNSY TRACE NUMBER FROM BLOCK 3 OF THE QA FORM 1.  Document the markings from the fastener to include either: (1) The color code and the heat/lot number, material type, and manufacturer's symbol (for nuts containing a self-locking insert, the color of the insert is the manufacturer's symbol). (2) The MIC number (when MIC number is on the fastener or on the individual tag for some fasteners).
Controlled Structural Material And SOC Control Division "A" Material	Traceability Number
SOC Control Division "B" Material	Markings providing identification to material type or specification
AERP And Other Rotatable Pool Material (688 Class, TRIPER, Etc.)	Enter the appropriate rotatable pool serial number (e.g. RP-148A, 4810-013-5812-A3-0113, TIN -292-11893, etc.)
Transferred And Cannibalized Material	Enter the Equipment Removal List No. or other material History/ Traceability number (ERL# XXXX, SSBN-600 EHF #24, etc.)
Other Material Within The LEVEL I/SUBSAFE Boundary And SOC Control Division "C" Material	1. Enter at least one of the following documentation attributes: a. Stock Number (from package/container) b. Part Number (from package/piece) c. Part Number and associated Manufacturing Work Procedure (for manufactured items) d. Local Traceability Number (from piece/tag) e. Drawing and Piece Number (from piece/tag) f. Generic, MIL-SPEC, or Material Specification Marking (from piece) g. NDT record numbers or test results for items verified by generic material testing. 2. For SOC components only: Enter the stock number of the "O-ring lubricant or any sealant used during assembly.

**BLOCK 9 - JOINT DATA FOR JOINTS REQUIRING TORQUE DOCUMENTATION**

Torque documentation is required for the following joints:

- (1) Sea connected/seawater bolted pressure boundary joints where failure of the joint would result in flooding into or out of the system through a hole greater than or equal to 0.28 square inches (0.6 inches diameter), within piping systems ½ NPS 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 for systems 4 inch NPS and larger inboard of the inboard joint of the backup valve.
- (3) All bolted pressure boundary piping and component joints in submarine/vehicle Scope of Certification (SOC) boundary per reference (b).
- (4) All pressure boundary joints assembled using controlled assembly procedures when torque is required by Planning.

NOTE: WHEN MULTIPLE JOINTS ARE DOCUMENTED ON ONE QA 34 FORM, ENTER A SUCCESSIVE LETTER FOR EACH BLOCK 9\_ USED (E.G., 9B, 9C, ETC.).

NOTE: THIS BLOCK MAY BE USED FOR SPECIFIC ATTRIBUTES THAT ARE NOT COVERED BY THE STANDARD ATTRIBUTES ON THE FORM.

JOINT ID/JOINT TYPE: Planner enter the joint identification number including joint type (e.g., ASW-5744 F). For joint types, use "F" for flanged bolted joints, "U" for union joints, and "S" for screw joints. When a joint identification number is not available, a joint description (e.g., Tailpiece-to-Body (F)) shall be used. Locally assigned joint numbers may be used when a joint description is not practicable and clarity is required. When additional attribute(s) applies to a component (e.g., hatches, etc.) that are not covered by the attributes already on the form, list the attribute and location (applicable reference) for the acceptance criteria (e.g., TWD, technical manual, etc.). For hatches, at a minimum list the "Seat Clearance Measurement".

JOINT REF: Planner enter the letter corresponding to the reference listed in Block 6 that identifies where the joint number or description information is found (e.g., Mapping Diagram, Drawing, Tech Manual, Work Procedure, etc.).

REQ THREAD LUBE: Planner enter the type(s) of thread lubricant(s) that are authorized (e.g., MOLYKOTE P37, Fel-Pro C5A, etc. or options (e.g., MOLYKOTE P37 or Fel-Pro C5A)). Enter "None" if no lubricant is required.

APPLIED THREAD Craftsman enter the thread lubricant actually used during assembly.

LUBE: Enter "None" if no lubricant was used.

HI FSTNR: Planner indicate (Yes/No) whether the joint contains Hull Integrity Male Fasteners. When "NO" is checked, enter "NA" in the "EXISTING HI MALE FASTENER MARKING" block.

EXISTING HI MALE FASTENER MARKING: (Craftsman) When the "HI FSTNER" block is marked "Yes", record the quantity of reused/existing male fasteners and the symbols of recognizable significance, as required by Part I, Chapter 5, paragraph 5.8.3.b(2) of this volume (e.g., 6 ea. .K., 2 ea. unmarked).

NOTE: (CRAFTSMAN) IF HULL INTEGRITY MALE FASTENERS (DRIVEN STUDS) ARE UNMARKED, ILLEGIBLE, OR THE SYMBOLS ARE NOT RECOGNIZABLE PER CRITICAL INSPECTION REQUIREMENTS OF PART I, CHAPTER 5, PARAGRAPH 5.8.3.b(2) OF THIS VOLUME, AND THEY WERE NOT REMOVED FROM THE HULL INSERT OR COMPONENT BODY:

- a. DOCUMENT THE QUANTITY
- b. ENTER THE WORDS "STUDS NOT REMOVED" IN THE REMARKS BLOCK
- c. REQUEST QAI PERFORM A GENERIC MATERIAL IDENTIFICATION TEST (E.G., ACID SPOT TEST).

NOTE: (QUALITY ASSURANCE INSPECTOR) PERFORM A GENERIC MATERIAL IDENTIFICATION TEST ON HULL INTEGRITY MALE FASTENERS (DRIVEN STUDS) THAT ARE UNMARKED, ILLEGIBLY MARKED, OR MARKED WITH SYMBOLS THAT ARE NOT RECOGNIZABLE PER CRITICAL INSPECTION REQUIREMENTS OF PART I, CHAPTER 5, PARAGRAPH 5.8.3.b(2) OF THIS VOLUME AND FOR WHICH THE CRAFTSMAN HAS ANNOTATED "STUDS NOT REMOVED". MARK STUDS THAT ARE IDENTIFIED AS HAVING THE CORRECT MATERIAL

(I.E., .K. OR KM). IF THE STUDS CANNOT BE MARKED DUE TO SIZE/CONFIGURATION, ETC., ENTER THE RESULTS OF THE GENERIC MATERIAL IDENTIFICATION TEST IN THE REMARKS BLOCK.

Planner enter "NA" if not an HI joint or if no existing pressure boundary male fasteners are to be reused.

STUD ROTATION: Planner enter an X in the NA box of the Stud Rotation block when not applicable (e.g., when joint does not contain studs).

Craftsman record SAT after verifying all set studs to be tight during nut installation and torquing in accordance with Part I, Chapter 5, paragraph 5.8.7 of this volume.

- a. Anaerobic Stud Bonding Inspection - Newly Installed Studs. The following test procedures shall be performed to ensure proper bonding after curing has been completed:
  - (1) Mark the end of the studs using a felt tip marker, paint pen or other appropriate marking pen by making a line in the direction of the center of the bolt circle.
  - (2) All newly installed studs shall be tested using one of the following methods. Either method may be used unless otherwise specified. Both methods utilize the same lubricant as required for final assembly of the joint. Studs shall not be restrained from turning during the test by any method other than the locking compound in the set end of the stud.
  - (3) Torque Method. Apply the minimum breakaway torque on each newly installed stud per TABLE 2. Double nuts or a stud extractor (Colette) shall be used to apply the required torque. Acceptance criteria is per paragraph b.
  - (4) Self Locking Nut Method. Apply torque to each newly installed stud by installing and removing an unused self-locking nut per NASM 25027 or commercial spec IFI-100/107 with plastic elements. Install the nut to a point of stud thread protrusion that is at least 3 threads beyond the self-locking insert. Acceptance criteria is per paragraph b.
- b. The assembly is considered acceptable if there is no turning of the stud during the Breakaway Torque or Self-Locking Nut check. The assembly may also be considered acceptable if a slight initial turning motion (up to 1/4 turn) of the stud is observed, and no further turning motion is observed during torquing or nut installation/removal. (A small turning of the set stud represents a breaking or powdering of the locking compound which actually increases resistance to further turning motion.) Report any failures to Engineering.
- c. In some cases, work authorizing TWDs may specify that studs set with an anaerobic locking compound in submarine hull integrity applications be subjected to an ultraviolet light inspection. Engineering requests for this test will be based on accessibility and ability to view the stud hole. When ultraviolet light inspection is specified, properly installed anaerobic compounds should appear as a red dye and should fully encircle the stud. This is considered to be an extra line of defense above and beyond performance proof testing of paragraphs a.(1) through b. above. Under no circumstances should ultraviolet light inspection be used as a substitute for performance proof testing.

- d. In-Service Anaerobic Stud Rotation. Rotation of in-service Class 3 studs with anaerobic locking compound on subsequent tightening to the required torque is permissible, as long as the following check is performed:
- (1) If the stud does rotate up to 1/4 turn during in-service nut tightening, then back off the nut 1/4 turn before continuing to torque it.
  - (2) If the stud does not rotate while backing off the nut or when torquing the nut afterwards, the stud is acceptable as long as the stud does not violate the stand-off requirement for that application. In this case, the stud rotation represents further breaking or powdering of the locking compound which increases resistance to any further turning motion.
  - (3) If the stud rotates while backing off the nut, rotates when torquing the nut afterwards or violates the stand-off requirement for that application, the stud must be removed and replaced. In this case, the stud rotation represents locking compound failure.

NOTE: IF ANY STUD ROTATION CAUSES THE STUD STAND-OFF TO VIOLATE THE STAND-OFF REQUIREMENTS FOR THAT APPLICATION, THEN THE STUD MUST BE REMOVED. THE STUD MAY BE CLEANED AND REINSTALLED IF IN ACCEPTABLE CONDITION OR REPLACED BY A NEW STUD.

TABLE 2 - Resistance Test Breakaway Torque Values for Anaerobic Locking Compounds

STUD SIZE	MIN TORQUE (FT-LBS.)	STUD SIZE	MIN TORQUE (FT-LBS.)	STUD SIZE	MIN TORQUE (FT-LBS.)
1/4	2.5	5/8	25	1-3/8	100
5/16	5	3/4	33	1-1/2	115
3/8	6.7	7/8	50	1 3/4-5	150
7/16	8.3	1	67	1 3/4-8	160
1/2	12.5	1-1/8	75	2	180
9/16	17	1-1/4	83	2-1/4	215

FASTENER SIZE/TYPE: Planner enter the type, size and thread of the male fastener (e.g., 1-1/4"-7 Stud, 9/16"-18 SHCS, 3/4"-10 bolt, etc.).

REQUIRED TORQUE AND TOLERANCE: Planner enter the torque and tolerance required for the component or fastener. Mark the appropriate block (in-lbs or ft-lbs). When special tightening/assembly instructions apply in lieu of torque, enter tightening/assembly instructions and reference document/drawing; use Remarks if additional space is required.

TORQUE REF: Planner enter the letter of the reference listed in Block 6 that identifies where the torque value was obtained, including paragraph or table when applicable.

AVERAGE RUNNING TORQUE: Craftsman enter the average running torque as measured. Mark the appropriate block (in-lbs or ft-lbs).

(Planning/Craftsman) Enter "N/A" in the block when self-locking fasteners are not being used.

NOTE: RUNNING TORQUE DOES NOT NEED TO BE TAKEN INTO ACCOUNT FOR FASTENERS GREATER THAN 5/8 INCH DIAMETER UNLESS SPECIFIED IN THE TWD. THE INTENT IS TO ENSURE PROPER TORQUE IS APPLIED, TAKING RUNNING TORQUE INTO CONSIDERATION WHEN IT IS A SIGNIFICANT FACTOR WITH REGARD TO THE FINAL TORQUE. IF RUNNING TORQUE DOCUMENTATION IS NOT REQUIRED BY THE TWD FOR FASTENERS GREATER THAN 5/8", PLANNING SHOULD ANNOTATE THE BLOCK "NR" FOR NOT REQUIRED.

NOTE: CLICKER STYLE TORQUE WRENCHES AND HYTORC DEVICES ARE NOT TO BE USED TO MEASURE RUNNING TORQUE.

NOTE: THE AVERAGE RUNNING TORQUE MAY BE OBTAINED BY USING THE SAME DIAL TYPE TORQUE WRENCH THAT WILL BE USED FOR MEASURING THE FINAL TORQUE. A LOW RANGE DEVICE IS NOT REQUIRED AND RUNNING TORQUE DOES NOT HAVE TO FALL WITHIN THE 20% TO 90% SCALE REQUIREMENT. IF RUNNING TORQUE IS NOT MEASURABLE USING THIS DEVICE, ENTER "0" (ZERO) FOR THE AVERAGE RUNNING TORQUE.

NOTE: DOCUMENTATION OF THE TORQUE WRENCH USED FOR DETERMINING THE AVERAGE RUNNING TORQUE IS NOT REQUIRED. IF A DIFFERENT WRENCH IS USED TO TAKE THE RUNNING TORQUE BECAUSE THE FINAL TORQUE IS MEASURED WITH A CLICKER STYLE OR HYTORC DEVICE, THEN THE TORQUE WRENCH DATA MUST BE RECORDED.

FINAL TORQUE: Craftsman record the final torque observed on the torque device. The final torque observed shall be the average running torque, as required, plus the required torque. Mark the appropriate block (in.-lbs or ft-lbs). Request QAI to verify final torque by direct observation for all Controlled Assemblies and hull integrity pressure boundary joints which contain Hull Integrity fasteners (as required in Table 3). In the event that a multiplier or HYTORC machine is used, place an asterisk or other symbol in this block and refer to the remarks block. In the remarks block add a statement such as "Torque multiplier was used, actual torque reading was XXX PSI. This converts to a torque value of XXX Ft-lbs." When a combination of torquing methods (e.g., torque wrench, turn-of-the-nut method, etc.) is used for a single joint, record the final torque applied, and document the alternate torquing process. Record the quantity of fasteners that were tightened using the alternate method. When special tightening/assembly instructions apply in lieu of torque, as identified in the required torque block, document the actual special tightening/assembly applied to the joint (tightened, wrench tight, cap installed, etc.).

TORQUE DEVICE/  
INSTRUMENT USED: Craftsman enter the range, serial number and calibration due date of the torque device used during assembly for the final increment. For HYTORC machine, enter "HYTORC", the HYTORC's head data (i.e., serial number), serial number of the pressure gauge used to read actual pressure applied for final torque and the calibration due date of that pressure gauge. If other calibrated instruments (e.g., torque multiplier, torque meter) are used, also enter data for these instruments.

CRAFTSMAN SIGNATURE/BADGE: Craftsman sign and date after satisfactory assembly of the joint.

QAI SIGNATURE/BADGE: When required, QAI shall sign and date after the satisfactory completion of assembly in accordance with the requirements. Planner enter NA when QAI is not required.

Table 3 - QAI Inspection Requirements				
Location	Software Installation	Material Installations	Torque	Sealing Surface & Fasteners
Nuclear Level I piping system mechanical joints	Note 1	Yes - Existing and New L/I	Yes (when a torque is specified)	No
Controlled Assemblies	Yes	Yes - New L/I Only	Yes	Yes
SUBSAFE Hull Integrity Joints	Yes	Yes - New L/I Only	Yes	Yes
SUBSAFE Bolted Pressure Boundary Joints	No	Yes - New L/I Only	No	No
EHF Installations	Yes	Yes - New L/I Only	Yes	Yes
SOC Bolted Pressure Boundary Joints	No	Yes - New L/I Yes - MCD-A Yes - MCD-B Yes - MCD-C	Yes	Yes
SOC Unions	No	Yes - New L/I Yes - MCD-A Yes - MCD-B Yes - MCD-C	Yes (When source is specified)	Yes

NOTE 1: YES - IF A FLEXATALLIC GASKET IS USED AND THE MATING SURFACES ARE NOT IN CONTACT. THE QAI IS NOT REQUIRED TO WITNESS INSTALLATION OF THE GASKET BUT MUST INSPECT THE MATING SURFACE GAP AND PARALLELISM AFTER SOFTWARE INSTALLATION AND FINAL TORQUE.

NOTE 2: QAI IS REQUIRED FOR THE FOLLOWING:

- a. HF JOINTS
- b. EHF JOINTS
- c. CONTROLLED ASSEMBLIES FOR ALL SUBMARINES
- d. SCOPE OF CERTIFICATION JOINTS

FOR JOINTS: CRAFTSMAN/QAI signature(s) certifies that the joint meets the requirements for the following:

- a. The applied lubricant is acceptable per the technical direction.
- b. All existing Hull Integrity Male Fasteners have been examined for markings of significance or have been verified by a generic material identification test to insure they are of proper material. All markings have been recorded and if required, the results of any material identification testing are recorded in the Remarks block.
- c. All set studs have been verified to be tight during assembly in accordance with Part I, Chapter 5, paragraph 5.8.7 of this volume.
- d. The final required pre-load torque has been applied in accordance with specified requirements.
- e. Sealing surfaces meet the acceptance criteria of the applicable Maintenance Standard.
- f. Alignment, gap and parallelism meet the specified requirements for the joint.
- g. Male fasteners type and size agree with entries in the "FASTENER SIZE/TYPE" block and the specified criteria.
- h. Existing fasteners are reinstalled in the same joint and are not obviously incorrect based on markings, color, corrosion or other visual indication.

- i. Thread protrusion is satisfactory. Thread protrusion is the number of threads protruding above the nut. Minimum thread protrusion is one thread on non-self-locking fasteners or flush for self-locking fasteners. Maximum thread protrusion is ten threads unless authorized by drawing or technical manual.
- j. All new material associated with the joint meets specified requirements and is listed in Block 7. Existing material associated with the joint is acceptable and is correctly installed.
- k. The Craftsman will perform a visual check of new Level I material at the time of installation to verify the material meets the requirements of the TWD used to install the new material.

FOR OTHER THAN JOINTS: CRAFTSMAN/QAI signature(s) indicates compliance with the attribute(s) listed and the corresponding listed acceptance criteria. All new material associated with the joint meets specified requirements and is listed in Block 7. Existing material associated with the joint is acceptable and is correctly installed.

If UNSAT, the craftsman/QAI will initiate action to resolve the UNSAT condition (e.g., submit a DF) and indicate the action taken in the Remarks block. Do not sign unless a satisfactory repair is completed or the UNSAT condition is accepted.

BLOCK 10 - LOCKWIRE/LOCKING CABLE/DEVICE INSTALLED OR REQD ACTION

(Only required for SUBSAFE/DSS SOC joints)

NOTE: THIS BLOCK APPLIES TO LOCKING DEVICES THAT ARE INSTALLED AFTER JOINT MAKE-UP OR FOR CASES WHEN AN ACTION MUST BE TAKEN AFTER JOINT MAKE-UP TO ENGAGE THE LOCKING DEVICE (E.G., FLIPPING OF A LOCKTAB, STAKING A FASTENER, ETC.) TO ALLOW JOINT MAKE-UP AND TESTING PRIOR TO INSTALLING OR ENGAGING THE LOCKING DEVICE. THIS DOES NOT INCLUDE SELF LOCKING NUTS, SELF LOCKING BOLTS/CAP SCREWS, LOCKWASHERS, ETC. THAT ARE PART OF THE JOINT MAKE-UP AND ARE LISTED IN BLOCK 7.

Planner enter an X in the NA box when not applicable. When an action is required to engage the locking device, enter a description of the required action.

Craftsman sign, date and check SAT when lockwire, locking cable or required locking device (e.g., locking ring for EHF's, barrel nut locking device, etc.) has been properly installed, or the required action has been accomplished. Enter description (e.g., lockwire, locking cable, locktab) and ident (e.g., stock number, MIL-SPEC, or piece number) of the lockwire/locking cable/locking device. Enter description and "Existing" for existing locking devices. If more than one locking device type (e.g., lockwire and locktab washers) exists on the assembly, record additional information in the Remarks block. When the installation of more than one of the same type of locking device is being documented in Block 10 (e.g., 2 setscrews), record the quantity in addition to the description (Block 11 may be used if additional space is needed). Recording the quantity is not required for lockwire/locking cable, nor when the locking device quantity is documented in Block 7.

BLOCK 11 - REMARKS

(Craftsman/QAI/QAS/Planning) Enter any pertinent remarks or additional information related to the repair/assembly of the component. Each entry shall contain signature, badge number and date except where the entry is pre-printed on the form by Planning.

BLOCK 12 - LWC SUPERVISOR/SHOP SUPERVISOR SIGNATURE/BADGE NO.

LWC Supervisor will enter signature, date and badge number for final review, signifying the accuracy of the completed form. If any entry is UNSAT, initiate action to resolve the unsat condition and indicate the action taken in the "Remarks" block. Do not sign unless a satisfactory repair is completed or the UNSAT condition is accepted.

**BLOCK 13 - QAS/QAO SIGNATURE/BADGE NO.**

QAS/QAO sign, date and enter badge number for final review, signifying entries are complete and that the data agrees with the listed requirements.

**BLOCK 14 - JOINT DATA FOR JOINTS NOT REQUIRING TORQUE DOCUMENTATION**

NOTE: THIS BLOCK MAY BE USED FOR SPECIFIC ATTRIBUTES THAT ARE NOT COVERED BY THE STANDARD ATTRIBUTES ON THE FORM.

JOINT ID/JOINT TYPE OR ATTRIBUTE DESCRIPTION: Planner enter the joint identification number including joint type (e.g., ASW-5744 F). For joint types, use "F" for flanged bolted joints, "U" for union joints, and "S" for screw joints. When a joint identification number is not available, a joint description (e.g., Bonnet-to-Body (S)) shall be used. Locally assigned joint numbers may be used when a joint description is not practicable and clarity is required. When additional attribute(s) applies to a component (e.g., hatches, etc.) that are not covered by the attributes already on the form, list the attribute and location (applicable reference) for the acceptance criteria (e.g., TWD, technical manual, etc.). For hatches, at a minimum list the "Seat Clearance Measurement".

JT. REF: Planner enter the corresponding reference listed in Block 6 that identifies where the joint number or description information is found (e.g., Mapping Diagram, Drawing, Tech Manual, Work Procedure, etc.).

(C) FOR CRAFTSMAN OR (I) FOR INSPECTOR: Planner enter "C" on one line for each joint or attribute. Enter "I" on the remaining line for each joint or attribute that requires an inspector signature; leave blank if inspector signature is not required.

CRAFTSMAN SIGNATURE/BADGE/DATE: Craftsman sign and enter badge number and date on the line associated with the "C" after satisfactory assembly of the joint. If UNSAT, the craftsman will initiate action to resolve the UNSAT condition and indicate the action taken in the Remarks block. Do not sign unless a satisfactory repair is completed or the UNSAT condition is accepted.

FOR JOINTS: This signature provides certification that the joint meets the requirements for the following:

- a. All driven studs have been verified to be tight during assembly. Stud rotation during torquing (and break away) is limited to 1/4 turn, but no more turning during installation or removal of the nut for newly installed Class 3 studs installed with locking compound.
- b. The joint has been tightened using an approved method. Recording of torque value is not required.
- c. Sealing surfaces meet the acceptance criteria of the applicable Maintenance Standard.
- d. Alignment, gap and parallelism meet the specified requirements for the joint.
- e. All new material associated with the joint meets specified requirements and is listed in Block 7. Existing material associated with the joint is acceptable and is correctly installed.
- f. The Craftsman will perform a visual check of new Level I material at the time of installation to verify the material meets the requirements of the TWD used to install the new material.

FOR OTHER THAN JOINTS: This signature indicates compliance with the attribute(s) listed and the corresponding listed acceptance criteria. All new material associated with the joint meets specified requirements and is listed in Block 7. Existing material associated with the joint is acceptable and is correctly installed.

INSPECTOR SIGNATURE/BADGE/DATE: (Inspector) When required, Inspector sign and enter badge number and date on the line associated with the "(I)" for verification that all new material associated with the joint meets specified requirements and is listed in Block 7. Existing material associated with the joint is acceptable and is correctly installed.



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QA FORM 34A INSTRUCTIONSJOINT/COMPONENT ASSEMBLY RECORDFOR ASSEMBLIES NOT REQUIRING TORQUE DOCUMENTATION

PURPOSE: To provide a standard form to document the assembly of joints that do not require torque documentation. Planning shall fill in blocks identified by a ♦ prior to issuing.

REQUIREMENTS:

NOTE: NUCLEAR LEVEL I SYSTEM PIPING JOINTS (I.E., FLANGES) REQUIRE TORQUE DOCUMENTATION AND MUST BE DOCUMENTED ON A QA FORM 34.

1. A QA form 34A is required for:
  - a. All Level I (nuclear and non-nuclear) pressure boundary joints (e.g., "F", "S", and "U" type joints) unless specifically excluded by Part I, Chapter 2, paragraphs 2.2.4.a. and 2.2.4.b. of this volume.
  - b. The following submarine applications:
    - (1) (Pre-688 Class) Submarine SUBSAFE Bolted Pressure Boundary Joints including in-line pipe joints as well as component (bonnet to body) joints less than 4 inch NPS inboard of the inboard joint of the backup valve.
    - (2) Other SUBSAFE joints:
      - (a) Non-Seawater/Non-Sea Connected piping and component joints (e.g., EMBT Blow, Artic Blow, Emergency Flood Control, Stern Diving).
      - (b) Non-bolted pressure boundary piping and component joints within the hull integrity boundary (e.g., Union ("U") Bonnet Joints on Hull and Backup Valves, Hull and backup valve stem retainers ("S"), Boiler type Manhole Covers ("BTMC") on Impulse Tanks).
      - (c) Non-bolted pressure boundary piping and components (e.g., "U" and "S" joints) not within the hull integrity boundary.
      - (d) Linkage or mechanical interlock joints.
      - (e) SUBSAFE/Non-SUBSAFE interface piping joints (e.g., "F" and "U" joints).

PLANNING THE SCOPE OF A QA 34A FORM: In order to support the execution process, it is necessary to properly limit the scope of Assembly Records.

- a. Each joint shall have a unique joint record consisting of separate Block 8 entries.
- b. All Level I material (nuclear and non-nuclear) 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 8A, 8B, 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 34A 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). Naval shipyards enter Job Order and KeyOp.

BLOCK 3 - LWC/SHOP

Planner - Enter the LWC lead shop assigned to assemble the joint (e.g., X31, X38, X56).

BLOCK 4 - CWP/REC SER. NO.

Planner - 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 - SYSTEM/COMPONENT/ROTATABLE POOL NO.

Planner - Enter the noun name of the system and component (if applicable), (e.g., MSW-25). For Rubber Insert Sound Isolation Coupling enter the Selected Record Drawing Line Item No.

NOTE: ROTATABLE POOL SERIAL NUMBERS MAY BE ENTERED BY THE PLANNER, IF KNOWN, OR THE SHOP AS SPECIFIED BY LOCAL INSTRUCTIONS.

BLOCK 6 - REFERENCES

Planner - Enter all references used to identify component parts, joint, material and assembly information. Both the assembly drawing and electrical holes assignment drawing shall be listed for Electrical Hull Fittings (EHF). Include revision letter and, if applicable, the assembly number (e.g., Assy D, Assy RA etc.).

BLOCK 7 - NEW MATERIAL

PC NO: Craftsman - Enter the piece number of parts. List only the new parts being installed.

REF: Craftsman - Record the reference letter of the drawing or document listed in Block 6 which provides the material specification or assembly information for the piece listed in the "PC NO." block.

JOINT ID: Craftsman - Enter the alphanumeric designator corresponding with the particular Block 8 entry (8A, 8B, 8C, etc.) that identifies the joint where the material is installed.

DESCRIPTION: Craftsman - Describe all new parts associated with the assembly or joint. For fasteners and nuts, include diameter and thread (e.g., bolt, 1/2"-13; stud, 1/2"-12; SHCS, 1/2"-13; etc.). Record shim thickness when shims are installed unless the installation is already documented on another QA form.

**NOTE:** IF A PORTION OF A NEW VALVE OR COMPONENT IS USED TO REPLACE PARTS (E.G., BONNET AND DISC ASSEMBLY), ENTER A DESCRIPTION OF THE PART OR ASSEMBLY OF PARTS AND DOCUMENT THE LEVEL I NUMBER OF THE NEW VALVE OR COMPONENT IN THE IDENT SECTION. LIST THE PARTS THAT THE ASSEMBLY CONSISTS OF IN THE REMARKS BLOCK (A SINGLE COMPONENT MAY BE LISTED IN BLOCK 7) WITH A NOTE THAT THE PART(S) WERE TAKEN FROM THE NEW VALVE OR COMPONENT.

**QTY:** Craftsman - Record quantity of new material installed.

**LOE:** Craftsman - Identify the Level of Essentiality (MIC Level) as "I" or "NA". The material control level shall be as identified by Planning in the TWD.

**IDENT:** Craftsman - Enter the marking on the part or on the packaging/container/tag (when the part is not marked) as shown in Table 1.

**CRAFT INT:** Craftsman - Installing craftsman enter initials for material installed. The initials shall correspond to the related Block 8 craftsman's signature unless otherwise noted with a corresponding signature elsewhere on the form (e.g., Remarks block entry and signature).

**NOTE:** IF THE CRAFTSMAN INSTALLING THE MATERIAL IS OTHER THAN THE CRAFTSMAN SIGNING FOR JOINT DATA IN BLOCK 8, A CORRESPONDING SIGNATURE, BADGE NUMBER AND DATE SHALL BE ENTERED IN THE REMARKS BLOCK.

TABLE 1- DOCUMENTATION REQUIREMENTS	
Material Control Level	Required Information
Level I Material Other Than Fasteners	MIC Number and any other traceability number, including any local traceability number (e.g., PNSY MLN – examples Z142, AB12).
Level I Fasteners	NOTE: THE INFORMATION ENTERED FOR FASTENERS MAY NEED TO INCLUDE INFORMATION FROM BLOCKS 3 AND 8 FROM QA FORM 1. DO NOT ENTER THE PNSY TRACE NUMBER FROM BLOCK 3 OF THE QA FORM 1. Document the markings from the fastener to include either: (1) The color code and the heat/lot number, material type, and manufacturer's symbol (for nuts containing a self-locking insert, the color of the insert is the manufacturer's symbol). (2) The MIC number (when MIC number is on the fastener or on the individual tag for some fasteners).
Controlled Structural Material	Traceability Number
AERP And Other Rotatable Pool Material (688 Class, TRIPER, Etc.)	Enter the appropriate rotatable pool serial number (e.g. RP-148A, 4810-013-5812-A3-0113, TIN -292-11893, etc.)
Transferred And Cannibalized Material	Enter the Equipment Removal List No. or other material History/ Traceability number (ERL# XXXX, SSBN-600 EHF #24, etc.)
Other Material Within The LEVEL I/SUBSAFE Boundary	1. Enter at least one of the following documentation attributes: a. Stock Number (from package/container) b. Part Number (from package/piece) c. Part Number and associated Manufacturing Work Procedure (for manufactured items) d. Local Traceability Number (from piece/tag) e. Drawing and Piece Number (from piece/tag) f. Generic, MIL-SPEC, or Material Specification Marking (from piece) g. NDT record numbers or test results for items verified by generic material testing.

**BLOCK 8 - JOINT DATA**

**NOTES:**

- (1) THIS BLOCK MAY BE USED FOR SPECIFIC ATTRIBUTES THAT ARE NOT COVERED BY THE STANDARD ATTRIBUTES ON THE FORM.

- (2) FOR OVERHAUL OF HYDRAULIC ACTUATORS AND HYDRAULIC CONTROL VALVE ASSEMBLIES, ONLY ONE ENTRY IS REQUIRED FOR THE ENTIRE ASSEMBLY IN LIEU OF LISTING INDIVIDUAL JOINTS AS LONG AS A CLEAR DEFINITION OF WORK BOUNDARIES HAS BEEN IDENTIFIED IN THE WORK PROCEDURE. FOR THESE CASES, LIST “ACTUATOR ASSEMBLY” OR “CONTROL VALVE ASSEMBLY” IN THIS BLOCK.

JOINT ID & JOINT TYPE OR ATTRIBUTE DESCRIPTION: Planner - Enter the joint identification number including joint type (e.g., ASW-5744 F). For joint types, use “F” for flanged bolted joints, “U” for union joints, and “S” for screw joints. When a joint identification number is not available, a joint description (e.g., Bonnet-to-Body (S)) shall be used. Locally assigned joint numbers may be used when a joint description is not practicable and clarity is required. When an additional attribute(s) applies to a component (e.g., hatches, etc.) that are not covered by the attributes already on the form, list the attribute and location (applicable reference) for the acceptance criteria, (e.g., TWD, technical manual, etc.). For hatches, at a minimum list the “Seat Clearance Measurement”.

JT. REF: Planner - Enter the corresponding reference listed in Block 6 that identifies where the joint number or description information is found (e.g., Mapping Diagram, Drawing, Tech Manual, Work Procedure, etc.).

(C) FOR CRAFTSMAN OR (I) FOR INSPECTOR: Planner - Enter “C” on one line for each joint. Enter “I” on the remaining line for each joint requiring an inspector signature.

CRAFTSMAN SIGNATURE/BADGE/DATE: Craftsman sign and enter badge number and date on the line associated with the “C” after satisfactory assembly of the joint.

For joints, this signature provides certification that the joint meets the requirements for the following:

- a. All set studs to be tight during nut installation and torquing in accordance with Part I, Chapter 5, paragraph 5.8.7 of this volume.
- b. The joint has been tightened using an approved method. Recording of torque value is not required.
- c. Sealing surfaces meet the acceptance criteria of the applicable Maintenance Standard or drawing.
- d. Alignment, Gap and Parallelism meet the specified requirements for the joint.
- e. All new material associated with the joint meets specified requirements and is listed in Block 7. Existing material associated with the joint is acceptable and is correctly installed.

For other than joints, the signature indicates compliance with the attribute(s) listed and the corresponding listed acceptance criteria. All new material associated with the joint meets specified requirements and is listed in Block 7. Existing fasteners are installed in the same joint and are not obviously incorrect based on markings, color, corrosion or other visual inspection.

INSPECTOR SIGNATURE/BADGE/DATE: (QAI) When required, Inspector sign, print and enter badge number and date on the line associated with the “(I)” for verification of the following:

- a. Controlled assemblies: All controlled assemblies shall be documented on a QA Form 34.
- b. Non-Controlled assemblies: Inspector signature is for new Level I material only and meets the specified requirements and is properly documented in Block 7.
- c. Nuclear Level I Non-Controlled assemblies: Inspector signature is for new Level I material, gasket compression and parallelism. (Gap measurement is only required when mating surfaces are not in contact).

If UNSAT, the craftsman/QAI will initiate action to resolve the UNSAT condition (e.g., initiate a DFS) and indicate the action taken in the Remarks block. Do not sign unless a satisfactory repair is completed or the UNSAT condition is accepted.

BLOCK 9 - LOCKING DEVICE INSTALLED OR REQD ACTION

NOTE: THIS BLOCK APPLIES TO LOCKING DEVICES ON SUBSAFE COMPONENTS THAT ARE INSTALLED AFTER JOINT MAKE-UP OR FOR CASES WHEN AN ACTION MUST BE TAKEN AFTER JOINT MAKE-UP TO ENGAGE THE LOCKING DEVICE (E.G., FLIPPING OF A LOCKTAB, STAKING A FASTENER, ETC.) TO ALLOW JOINT MAKE-UP AND TESTING PRIOR TO INSTALLING OR ENGAGING THE LOCKING DEVICE. THIS DOES NOT INCLUDE SELF LOCKING NUTS, SELF LOCKING BOLTS/CAP SCREWS, LOCKWASHERS, ETC. THAT ARE PART OF THE JOINT MAKE-UP, AND ARE LISTED IN BLOCK 7.

Planner - Mark the NA box when not applicable. When an action is required to engage the locking device, enter a description of the required action.

(CRAFTSMAN) Enter the Block 8 joint identifier (e.g., 8A) in the JT ID block, check the "SAT" box and sign, enter badge number and date when lockwire or required locking device (e.g., locking ring for EHF's, barrel nut locking device, etc.) has been properly installed, or the required action has been accomplished. Enter description (e.g., lockwire, locktab) and identification (e.g., stock number, MIL-SPEC or piece number) of the lockwire/locking device. Enter description and "Existing" for existing locking devices. If more than one locking device type (e.g., lockwire and locktab washers) exists on the assembly, record additional information in the REMARKS block. When the installation of more than one of the same type of locking device is being documented in Block 9 (e.g., 2 setscrews), record the quantity in addition to the description (Block 10 may be used if additional space is needed). Recording the quantity is not required for lockwire/locking cable, nor when the locking device quantity is documented in Block 7.

BLOCK 10 - REMARKS

(CRAFTSMAN/QAI/QAS) Enter any pertinent remarks or additional information related to the repair/assembly of the component. Each entry shall contain signature and date except where the entry is pre-printed on the form by Planning.

BLOCK 11 - LWC SUPERVISOR/SHOP SUPERVISOR SIGNATURE/BADGE NO.

LWC/shop LWC Supervisor will enter signature, badge number and date for final review, signifying the accuracy of the completed form. If any entry is UNSAT, initiate action to resolve the unsat condition and indicate the action taken in the "Remarks" block. Do not sign unless a satisfactory repair is completed or the UNSAT condition is accepted.

BLOCK 12 - QAS SIGNATURE/BADGE NO.

QAS or QAO will print name, enter signature, badge number and date for final review, signifying the accuracy of the completed form. If any entry is UNSAT, the QAS will initiate action to resolve the unsat condition and indicate actions taken in the "Remarks" block. Do not sign unless a satisfactory repair is completed or the UNSAT condition is accepted.

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**THICKNESS MEASUREMENT RECORD**  
**QA FORM 35**

1. SHIP		HULL NO.		2. JCN		3. LWC/SHOP		4. CWP/REC SER NO		5. SYSTEM/COMPONENT					
6. REFERENCES															
A				B				C							
7. ITEM(S) TO BE INSPECTED															
PC NO.	REF	TYPE MAT	MIL-SPEC	MATERIAL PP - PIPE C - CASTING PL - PLATE O - OTHER	INSPECTION PROCEDURE	ACCEPTANCE CRITERIA	DESIGN THICKNESS	MIN/MAX ACCEPT THICKNESS	ACTUAL THICKNESS	ACCEPT REJECT					
										<input type="checkbox"/> ACCEPT <input type="checkbox"/> REJECT					
										<input type="checkbox"/> ACCEPT <input type="checkbox"/> REJECT					
										<input type="checkbox"/> ACCEPT <input type="checkbox"/> REJECT					
										<input type="checkbox"/> ACCEPT <input type="checkbox"/> REJECT					
8. ULTRASONIC EQUIPMENT															
INSTR (MOD/SER#)				TYPE TRANSDUCER		SIZE	FREQ	CAL STANDARD		COUPLANT					
				DELAY <input type="checkbox"/>											
				CONTACT <input type="checkbox"/>											
CAL DUE DATE:				DUAL ELEMENT <input type="checkbox"/>											
12. SURFACE FINISH IS ACCEPTABLE IN ACCORDANCE WITH DRAWING: PC NO___ <input type="checkbox"/> SAT <input type="checkbox"/> UNSAT      PC NO___ <input type="checkbox"/> SAT <input type="checkbox"/> UNSAT      PC NO___ <input type="checkbox"/> SAT <input type="checkbox"/> UNSAT      PC NO___ <input type="checkbox"/> SAT <input type="checkbox"/> UNSAT															
10. INSPECTION AREA SKETCH/REMARKS															
11. INSPECTOR				DATE				11. INSPECTOR				DATE			
12. NDT SUPERVISOR						DATE NO.									

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QA FORM 35 INSTRUCTIONSTHICKNESS MEASUREMENT RECORD

PURPOSE: To document UT thickness measurements and acceptability of material measured based on design material thickness.

PROCEDURE: The numbered blocks in QA form 35 correspond with the instructions below.

BLOCK 1 - SHIP HULL NO.

Enter the ship's name and hull number.

BLOCK 2 - JCN

Enter the JCN.

BLOCK 3 - LWC

Enter the LWC.

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 - SYSTEM/COMPONENT

Enter nomenclature and NPS (if applicable) for component being measured and if known, the end use (e.g., Valve body for ASW-352).

BLOCK 6 - REFERENCES

Enter the drawing number(s) or other references that show the material and design specifications for the component being measured (e.g., 845-4385050), the NDT inspection procedure number, and the drawing number and revision, material specification, or Military Standard used for acceptance criteria.

BLOCK 7 - MATERIAL

PC NO: Enter piece number of the part or component to be checked.

REF: Record the reference letter of the drawing or document listed in Block 6 which provides the assembly information for the piece listed in the "PC NO." block.

TYPE MATERIAL: Enter the material type (e.g., CRES-304, 7030 CUNI, 9010 CUNI).

MIL-SPEC: Enter the material MIL-SPEC or equivalent (e.g., ASTM, ASME/SPEC).

MATERIAL: Enter the abbreviation for the material being checked. If other than pipe, casting, or plate, write it in the block (e.g., forged) in the blank provided.

INSPECTION PROCEDURE: Enter the reference letter indicating the NDT inspection procedure number.

ACCEPTANCE CRITERIA: Enter the reference letter indicating the drawing, material specification, or Military Standard used for acceptance.

DESIGN MATL THICKNESS: Enter the design material thickness specified on the drawing, specification or standard.

MIN/MAX ACCEPT THK: Enter the drawing minimum acceptable thickness and if applicable the maximum drawing acceptable thickness with a MAX subscript.

ACTUAL THK: Enter the actual thickness as measured.

ACCEPT/REJECT: Check the appropriate box to indicate the results of the inspection.

BLOCK 8 - ULTRASONIC EQUIPMENT

INSTR (MOD/SER. NO): Enter the equipment model and serial number.

CAL DUE DATE: Enter the calibration due date of the equipment used during the measurement.

TYPE TRANSDUCER: Enter the type transducer used during the measurement. Check the appropriate block.

SIZE: Enter the transducer size used during the measurement.

FREQ: Enter the transducer frequency used during the measurement.

CAL STANDARD: Enter the serial no. of the calibration standard used.

COUPLANT: Enter the couplant used during the measurement.

BLOCK 9 - SURFACE FINISH ACCEPTABILITY

Enter the piece number being inspected and check the appropriate block (SAT/UNSAT) indicating the result of the surface finish inspection.

BLOCK 10 - INSPECTION AREA SKETCH/REMARKS

Enter a sketch of the area measured. In addition to the sketch, enter a list of any other references to determine acceptability of material thickness. Enter grid spacing if applicable. Enter a list of any other references to determine acceptability of material thickness. This block may also be used to record the results of multiple thickness readings on the same component. Enter remarks or comments pertinent to the inspection. Sign and date each entry.

BLOCK 11 - INSPECTOR/DATE

NDT Inspector(s) print name, enter signature and date signifying accuracy of the data recorded.

BLOCK 12 - NDT SUPERVISOR ID NO./DATE

NDT examiner/supervisor print name, enter signature, and date signifying the report as technically and administratively complete and accurate.

SHIP TO SHOP TAG MAT-1 (GENERAL USE)  
(Tag color is blue)

MAT-1		
<b>SHIP TO SHOP TAG (GENERAL USE) TAG ___ OF ___</b>		
<b>(PART 1)</b>		
SHIP _____		JCN _____
EIC/APL _____		SER. NO. _____
JOB BRIEF/EQUIP NOMENCLATURE _____ _____		
LEAD W/C _____	DATE DELV'D _____	DELIVERED BY _____
<b>(PART 2)</b>		
<b>READY FOR PICK UP TAG</b>		
SHIP* _____		JCN* _____
JOB BRIEF-WORK PERFORMED _____ _____		
REPAIR ACTIVITY REP. _____	DATE _____	
<b>(PART 3)</b>		
<b>CUSTOMER MATERIAL RECEIPT</b>		
SHIP* _____		JCN* _____
JOB BRIEF/EQUIP NOMENCLATURE* _____ _____		
RECEIVED BY _____	DATE _____	
DELIVERED BY _____	DATE _____	
SHIP'S FORCE REMOVE AND RETAIN PART 3 AS RECEIPT FOR MATERIAL DELIVERED TO THE REPAIR ACTIVITY		

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**MAT-1 INSTRUCTIONS**

**SHIP TO SHOP TAG MAT-1 (GENERAL USE)**

S/N 0103-LF-984-3400

NOTE 1: NOT TO BE USED FOR CONTROLLED MATERIAL.

NOTE 2: THE MAINTENANCE PROVIDER WILL ESTABLISH A PROCESS FOR CONTROLLING MATERIAL BEING TRANSPORTED FROM SHIP TO SHOP. IF A PROCESS IS USED OTHER THAN DESCRIBED BELOW, ISIC APPROVAL IS REQUIRED.

1. PURPOSE: To maintain positive identification and control of ship to shop transfer of equipment and components.

2. PROCEDURE:

- a. Ship's Force personnel will fill out all blocks in Part 1 and those marked with an asterisk (\*) in Parts 2 and 3, attach the tag to the equipment/component and deliver to the Repair Activity. Verify correct EIC/APL is provided. Ensure accurate description of desired work is included in Job Brief/Equip Nomenclature Block. Example: No. 2 Main Lube Oil Pump Discharge Relief Valve Pop Test to 45 psi and attach test tag.
- b. When the component is delivered to the Repair Activity, ship's representative will sign and date Part 1 and 3 in the applicable blocks. The Repair Activity representative will sign and date Part 3 to acknowledge receipt of the equipment/component. Part 3 will be detached from the tag and given to the ship's representative.
- c. Upon completion of repairs, the Repair Activity will record work performed, sign and date Part 2 and forward Part 2 to the ship as notice that the equipment/component is ready to be picked up.
- d. The ship's representative will present Part 3 to the Repair Activity Shop when picking up the equipment/component. Ship's Force should sign the Work Request for job completion when the item is picked up. If desired, part 3 may be attached to the completed work request.

3. BLOCK DESCRIPTION:

a. Part 1.

Ship	Ship's name and hull number
JCN	Job Control Number (UIC, Work Center and JSN)
EIC/APL	Equipment Identification Code/Allowance Parts
	List of item worked
Ser. No.	Equipment/Component Serial Number
Job Brief/Equip Nomenclature	Job Description and name of equipment or component
Lead W/C	Work center responsible for equipment/component
Date Delv'd	Date delivered to Repair Activity
Delivered By	Signature of person delivering item

b. Part 2.

Ship	Ship's name and hull number
JCN	Job Control Number (UIC, Work Center and JSN)
Job Brief/Work Performed	Job Description and brief explanation of work performed
By Repair Activity	Signature of person verifying work complete
Repair Activity Rep.	Date of signature above
Date	

c. Part 3.

Ship	Ship's name and hull number
JCN	Job Control Number (UIC, Work Center and JSN)
Job Brief/Equip Nomenclature	Job Description and name of equipment or component
Received By	Signature of Repair Activity person accepting item for work
Date	Date of signature above
Delivered By	Signature of person delivering item to Repair Activity
Date	Date of signature above

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

REFERENCES.

- (a) NAVSEA SS800-AG-MAN-010/P-9290 - System Certification Procedures and Criteria Manual for Deep Submergence Systems
- (b) NAVSEAINST 4790.8 - Ship's Maintenance and Material Management (3M) Manual
- (c) MIL-STD-1330 - Standard Practice for Precision Cleaning and Testing of Shipboard Oxygen, Helium, Helium-Oxygen, Nitrogen and Hydrogen Systems
- (d) NAVSEA S9086-CM-STM-010 - NSTM Chapter 078 (Gaskets, Packing and Seals)
- (e) NAVSEAINST 4720.23 - Deep Submergence Systems Temporary Modifications

LISTING OF APPENDICES.

- A Message Format for Certification Continuity for DSS
- B Letter Format for Certification Report to Tended DSS
- C **Message** Format for DDS Transfer of Custody **Certificate of Continuity** for Off-loads
- D **Message** Format for DDS Transfer of Custody **Certificate of Continuity** for On-loads
- E Message Format for DDS Acceptance of Custody

5.1 PURPOSE. To provide the requirements or direct the user to the appropriate references to ensure that maintenance performed during the Deep Submergence System's (DSS) life cycle supports certification at all times. Sections 5.5 through 5.8 of this chapter provide explicit inspection and acceptance criteria. Sustaining Activities, User Activities and Maintenance Activities should review specific system requirements for additional or superseding requirements. All material used within any DSS shall be as authorized for the specific DSS as required by reference (a).

5.2 EXCEPTIONS TO RE-ENTRY CONTROL. Exceptions to Re-Entry Control (REC) shall be listed in the applicable DSS Scope of Certification (SOC) Notebook.

5.3 PLANNED MAINTENANCE. Completion of Planned Maintenance System (PMS) is mandatory for continued certification of DSS units. Each DSS unit's PMS program will be administered per reference (a), reference (b) and the applicable SOC Notebook. Inability to comply with SOC PMS periodicities may require submission of a major Departure From Specification (DFS). The Program Manager will determine SOC-REC implementation based on the maintenance task complexity, system boundary and material control requirements. It is critically important to realize that even though a particular maintenance procedure does not require a REC, any repair or replacement of SOC components necessary to correct a deficient condition identified during that maintenance may require a REC. There are two documentation categories for SOC PMS:

- a. SOC - REC Required. Each SOC-REC PMS item requires the issuance of a REC Form and associated Controlled Work Package (CWP).
  - (1) Each SOC PMS Maintenance Requirement Card (MRC) card will utilize the following note or an equivalent note that has been approved by the System Certification Authority (SCA): "This maintenance involves equipment within the DSS SOC as defined by the SOC Notebook or applicable document. Performance of this maintenance requires that REC be utilized."
  - (2) This maintenance will be documented and audited using the REC as Objective Quality Evidence.

- b. SOC - NO REC Required. PMS items exempted from re-entry controls:
- (1) Each SOC PMS Maintenance Requirement Card (MRC) will utilize the following note or an equivalent note that has been approved by the SCA: "This maintenance involves equipment within the DSS SOC as defined by the SOC Notebook or applicable document. Performance of this maintenance does not require REC. However, if repair or replacement of any component is necessary, compliance with system certification requirements must be documented."
  - (2) The Sustaining Activity shall, depending on the frequency and complexity of the maintenance action, determine the methodology of documenting the accomplishment and completion of SOC PMS in a form suitable for audit. The maintenance requirements shall identify that documentation is required.

5.4 TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT. Follow the requirements specified in Part I, Chapter 5, Section 5.2 of this volume regarding Test, Measuring and Diagnostic Equipment for in-process work.

5.5 TORQUE. Follow the requirements specified in system drawings and Part I, Chapter 5, Section 5.3 of this volume for torque applied to components.

5.6 THREADED FASTENERS. Follow the requirements in Part I, Chapter 5, Section 5.4 of this volume for inspection and installation of threaded fasteners. Lubricants, anti-seize, locking compounds must comply with the certification requirements for the system as specified in reference (a) and the system drawings.

5.7 FLANGED AND UNION JOINTS. Follow the requirements in Part I, Chapter 5, Section 5.5 of this volume for flanged joints and union joints. Lubricants, anti-seize, locking compounds must comply with the certification requirements for the system as specified in reference (a) and the system drawings.

5.8 O-RING SEALS. Follow the requirements in Part I, Chapter 5, Section 5.6 for O-Ring seals. Lubricants, anti-seize, locking compounds must comply with the certification requirements for the system as specified in reference (a) and the system drawings.

#### 5.9 INSPECTIONS.

5.9.1 General Requirements. This section provides the minimum requirements and guidance for the performance of inspections. Inspections during the performance of maintenance form one of the fundamental elements essential in assuring that the task is completed properly and in compliance with all specifications. Inspections occur during the in-process phase of repair/maintenance (disassembly, repair, and re-assembly) and the re-certification phase (testing). Inspections serve to provide a careful and critical examination of the areas being inspected and form one of the cornerstones of a successful Quality Assurance (QA) Program. Use of inspections have and will continue to establish the Objective Quality Evidence (OQE) necessary for ensuring compliance to technical requirements.

5.9.2 Inspection Records. Inspection records provide a lasting record that the inspection was performed and completed according to the applicable specifications. Inspection records will be maintained when required for OQE and will be documented on appropriate QA forms contained in this volume or as Certification Signature Blocks in the Formal Work Package (FWP).

5.9.3 Critical Inspections. An inspection on any system or component, which by its nature is so critical to the successful completion of the task, that the inspection requires verification by a separate individual, other than the craftsman, qualified as an inspector. These inspections will be annotated in the written work procedure by the presence of an (I) or circle I, or in the case of Cleanliness Inspections (CI) or circle CI in the margin next to the applicable paragraph requiring the inspection and will be documented as a signature in the FWP or on the appropriate QA form. Critical Inspections applicable to all DSS Systems or components are as follows:

- (18) Ship's Force is responsible for providing "Buddy" SOC REC serial numbers to outside repair activities performing SOC work on the DSS systems. The Buddy REC number is issued from ship's QA form 11 log and will be documented on repair activities SOC/REC FORM.

5.11.4 Using a Departure from Specification to Close a Maintenance Certification Record/Re-Entry Control. If an MCR/REC is closed by transferring accountability for testing to an at-sea testing DFS, the DSS will be restricted as follows:

- a. The unit shall dive to the maximum depth at which it is to be certified or recertified to operate. The affected joints shall be inspected for joint tightness during initial submergence and subsequently at 200 foot intervals. Operations are restricted to that depth at which satisfactory joint tightness has been certified. Inspections shall be conducted at 200 foot intervals down to the maximum depth at which it is to be certified or recertified to operate. The test dive may be a single dive or a series of dives to accomplish the same purpose. The DSS 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.

NOTE: THE DSS MAY BE MANNED OR UNMANNED WHILE THE UNIT IS PROGRESSING TO EACH DEPTH INCREMENT. IF THE UNIT IS UNMANNED, BILGE ALARMS OR OTHER MEANS OF DETECTING FAILURES MUST BE PROVIDED TO ALERT OPERATORS OF ANY DSS SYSTEM FAILURE. SUFFICIENT TIME MUST BE ALLOTTED AT EACH 200 FOOT DEPTH INCREMENT FOR A POTENTIAL LEAK TO REGISTER AN ALARM BEFORE PROCEEDING TO THE NEXT DEPTH. IF THE BILGE ALARM (OR OTHER MEANS) INDICATES A FAILURE, THE PROHIBITION AGAINST MANNED OPERATIONS AND DEPTH LIMITATIONS OF 5.11.4C. BELOW APPLY. FINAL INSPECTIONS OF AFFECTED JOINTS DURING UNMANNED TESTING WILL BE MADE AT 200 FEET OR SHALLOWER PROVIDING NO OTHER INDICATIONS OF POTENTIAL FAILURE WERE NOTED AT THE DEEPER DEPTHS.

- b. If inspections of the system/component during the controlled dive are satisfactory, the DSS is released for operations with no immediate report required. Clearance of the DFS will be reported as required by Part III, Chapter 8 of this volume.
- c. If inspections of the system/component during the initial submergence or subsequent deeper depths are unsatisfactory:
- (1) The DSS is not authorized manned operations at any depth.
  - (2) The DSS is restricted to a depth of 200 feet unless specific authorization is received from the Type Commander (TYCOM) approving unmanned operations at depths deeper than 200 feet.
  - (3) An immediate report of unsatisfactory inspections will be made to the ISIC.
- d. If unmanned operations at depths greater than 200 feet are required, the Commanding Officer/Officer-in-Charge shall provide justification and request approval from the TYCOM (info ISIC, NAVSEA, 07Q and applicable Program Executive Officer) to conduct unmanned operations at depths deeper than 200 feet.
- e. Deficiencies discovered that are not joints specified for inspection in the MCR/REC and DFS shall be dispositioned as required by Part III, Chapter 8 of this volume and are not cause for depth restrictions unless the Commanding Officer/Officer-in-Charge deem necessary.

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

5.11.6 Exceptions to Re-Entry Control. Certain systems and equipment within the certified SOC boundary require frequent entry into the certified boundary for routine operations or maintenance actions in order to enable the ship to carry out its mission. These systems and components are listed in the DSS SOC Notebook. The operational requirements for these systems and equipment have been reviewed. Inherent operational controls in the present system are considered adequate and the 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 specified in the DSS SOC Notebook 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 Material Control Division A, B or C material and/or certification testing for new material.**

NOTE: MCR/REC EXCEPTIONS ARE FOR USER ACTIVITY'S 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 UNLESS SPECIFICALLY AUTHORIZED BY THE USER ACTIVITY'S SOC NOTEBOOK.

5.11.6.1 Controlled Assembly Requirements for SOC REC Exceptions.

- a. 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.
- b. Controlled Assembly requirements are:
  - (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 QA form 34 or 34B as applicable.
  - (5) Inspected by a Quality Assurance Inspector or Quality Assurance Supervisor.
  - (6) For piping systems, the re-certification test is an operational test to system operating pressure. The SOC Notebook, system drawings, technical manuals and other applicable specifications should be consulted to determine if a retest is required for REC Exempt maintenance on other components or systems.

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

- a. Prior to each manned operation, except as discussed in reference (a), paragraph 3.7.4, the User Activity will submit to the ISIC (deployed ISIC, if deployed), a written certification continuity report, which addresses the status of the DSS SOC RECs, testing of SOC RECs, HIPs completed and RECs closed by transferring actions to a DFS. Submarines shall submit this report to the ISIC prior to manned operations and/or each underway for submerged operations. Appendix A provides the minimum requirements for the letter or message. If no SOC controlled work, testing or HIPs were accomplished, no report is required.

- b. Prior to the DSS submerged operations after an FMA availability, refit or inport period when SOC work was performed, the FMA Commanding Officer will issue a letter report to each tended DSS, with a copy to the Sustaining Activity and parent ISIC, which addresses the status of SOC CWPs, testing of SOC systems, HIP maintenance requirements completed and SOC non-conformances (i.e., DFS and LAR). Appendix B provides the minimum requirements for the letter or message. Voyage repair periods and availability planning periods are not considered FMA availabilities.
- c. Prior to the DSS underway, activities other than FMAs which perform SOC maintenance on a DSS will issue a report to the DSS with a copy to the Sustaining Activity and parent ISIC, certifying that the maintenance performed meets the requirements of applicable specifications invoked by the governing document and the Memorandum of Agreement.
- d. In order to ensure continued certification of those DSSs that frequently change custody between activities such as the Dry Deck Shelters, off-loads and on-loads will use the format of Appendix C and D respectively to transfer custody of the vehicle. The receiving activity will conduct a review of the items identified in the transfer of custody letter/message and then report acceptance of custody using the format of Appendix E.

## 5.12 MATERIAL CONDITION MONITORING (SUBMARINES ONLY).

### 5.12.1 Hull Integrity Procedures Program.

- a. The HIP Program is applicable to specific DSS. The program provides the minimum material condition requirements to Sustain Certification, with an established periodicity to accomplish. It is one of the programs required to maintain SOC certification. Accomplishment of the HIP will identify changes within the SOC or hull integrity boundaries of the ship, which result from the degradation caused by the service environment.
- b. Administration, scheduling and reporting of the HIP program will be in accordance with the requirements of Volume VI, Chapter 38 of this manual. A summary of HIP status will be reported by the DSS User Activity in accordance with paragraph 5.11.7 of this chapter.
- c. When performing corrective maintenance the following guidance is provided with regard to HIPs:
  - (1) When performing corrective maintenance, associated HIP should be reviewed to determine if the HIP should be accomplished concurrently ahead of scheduled periodicity to preclude having to disassemble equipment again to accomplish the HIP. The DSS schedule or FMA resources may preclude concurrent, early accomplishment of HIPs.
  - (2) If HIP 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 III, Chapter 8 of this volume, even though the periodicity of the HIP MRC has not expired.
  - (3) When performing corrective maintenance that does affect a HIP measured parameter, perform that portion of the applicable HIP.
- d. Following installation of an alteration (Field Change, Temporary Modification) that modifies the structure of the DSS, such that access to vital equipment is or may be impacted, the Sustaining Activity shall evaluate the need to perform the Access to Vital Equipment DSS HIP. If access to vital equipment could be restricted, the Sustaining Activity shall perform the applicable DSS HIP. Partial accomplishment of the DSS HIP is acceptable if appropriate for the alteration. If partial accomplishment is performed, provide a copy to the installing activity and the ISIC. If the complete DSS HIP is accomplished, provide a copy to normal distribution.

5.13 TEMPORARY MODIFICATIONS. The User Activity/Sustaining Activity shall obtain formal approval from the Program Manager for any use of special equipment or modification of a DSS unit on a temporary basis.

5.13.1 Temporary Modification Program. NAVSEA PMS 399 and 07 have established a Temporary Modification Program. Each User Activity/Sustaining Activity shall manage Temporary Modifications to DSS as directed in reference (e).

NOTE: TEMPORARY MODIFICATIONS APPROVED FOR USE ON ONE DSS UNIT WILL NOT BE INSTALLED ON ANOTHER DSS UNIT WITHOUT PRIOR APPROVAL OF THE PROGRAM MANAGER WITH SCA CONCURRENCE.

5.13.2 Configuration Control. Installation of a previously approved temporary modification on the same unit is authorized only when the approval documentation is available and contains approval for re-installation for continuing use.

## APPENDIX C

**MESSAGE FORMAT FOR DDS TRANSFER OF CUSTODY  
CERTIFICATE OF CONTINUITY FOR OFF-LOADS**

FM (HOST SHIP)//  
 TO (DDS UNIT)//  
 INFO ISIC// (NOTE 1)//  
 TYCOM// (NOTE 2)//  
 (ADDITIONAL ADDEES)//  
 BT  
 (CLASSIFICATION)//  
 SUBJ/TRANSFER OF CUSTODY OF DDS-\_\_\_//  
 MSGID/GENADMIN/(HOST SHIP)//  
 REF/A/DOC/COMNAVSPECWARCOM/DATE OF LATEST CHANGE//  
 REF/B/DOC/NAVSEA/DATE OF LATEST CHANGE//  
 REF/C/DOC/NAVSEA/DATE OF LATEST CHANGE//  
 REF/D/DOC/NAVSEA/DATE OF LATEST CHANGE//  
 AMPN/REF A IS MOA BETWEEN COMNAVSPECWARCOM, COMSUBLANT, AND COMSUBPAC, REF B IS P-9290 SYSTEM CERTIFICATION PROCEDURES AND CRITERIA MANUAL FOR DEEP SUBMERGENCE SYSTEMS, REF C IS DDS SCOPE OF CERTIFICATION NOTEBOOK, REF D IS DDS (SSGN/688CL/VA CL) OPS AND EPS FOR DDS OPERATIONS.//  
 POC/\_\_\_/RANK/UNIT/LOCATION/EMAIL/  
 RMKS/1. IAW REF (A), REQUEST (DDS UNIT) ACCEPT CUSTODY OF DDS-( ).  
 2. DDS CERTIFICATION AND CLEANLINESS OF THE DIVERS AIR SYSTEM OF DDS-( ) HAVE BEEN MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF REFS (B) AND (C). ALL MAINTENANCE AND REPAIRS PERFORMED WHILE IN CUSTODY OF (HOST SHIP) HAVE BEEN COMPLETED IN ACCORDANCE WITH APPROVED SPECIFICATIONS AND TEST PROCEDURES.  
 3. (HOST SHIP) WILL TURN OVER CUSTODY OF REC, DFS, EQUIPMENT STATUS AND TEMPMOD LOGS; REC EXCEPTION RECORDS; PMS SCHEDULES AND MRCS; CALIBRATION RECORDS; HIP RECORDS AND MRCS FOR DDS-( ) TO (DDS UNIT). CURRENT STATUS OF REC AND DFS AS FOLLOWS:  
 A. IDENTIFY EACH OPEN REC INCLUDING A BRIEF DESCRIPTION OF THE WORK INVOLVED. IF NO RECs ARE OPEN AT THE TIME OF CUSTODY TRANSFER, STATE THIS FACT.  
 B. IDENTIFY ALL ACTIVE DFSs INCLUDING A BRIEF DESCRIPTION, CRITERIA FOR CLEARANCE, ANY OPERATING RESTRICTIONS, APPROVAL AUTHORITY ASSOCIATED WITH EACH DFS. IF NO DFSs ARE ACTIVE AT THE TIME OF CUSTODY TRANSFER, STATE THIS FACT.  
 4. CERTIFICATION REQUIREMENTS PERFORMED DURING HOST CUSTODY INCLUDE:  
 A. IDENTIFY EACH DDS INTERNAL AUDIT AND SCA SURVEY DUE DURING THE CUSTODY PERIOD.  
 B. IDENTIFY EACH HIP PERFORMED DURING THE CUSTODY PERIOD.  
 C. IDENTIFY EACH OUTSTANDING SCA CAT IA, IB, AND IC SURVEY CARDS.  
 5. GAS PODS (WILL/WILL NOT) BE INCLUDED IN THE TRANSFER.  
 6. STATE THAT EITHER ALL PMS FOR DDS-( ) IS CURRENT AT THE TIME OF CUSTODY, OR IDENTIFY ANY REQUIRED PMS THAT HAS BEEN DEFERRED OR RESCHEDULED.  
 7. DDS-( ) SHALL BE REMOVED IN ACCORDANCE WITH THE APPROPRIATE STANDARD OPERATING PROCEDURE OF REF (D). (DDS UNIT) IS RESPONSIBLE FOR ENSURING THAT ALL DDS PORTABLE EQUIPMENT IS INSTALLED, ALL PIPING INTERFACES AND ELECTRICAL HULL FITTINGS ARE PROPERLY HANDLED, AND ALL THREAD SAVERS AND PORTABLE FAIRING ARE PROPERLY REINSTALLED.//  
 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; COMREGSUPPGRU GROTON CT N40. Include NSW ISIC, Host Submarine home ISIC, and deployed ISIC (if applicable).
  2. Office codes for TYCOMs are: COMNAVSPECWARCOM CORONADO CA N844; COMSUBLANT 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 transfer 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.

## APPENDIX D

**MESSAGE FORMAT FOR DDS TRANSFER OF CUSTODY  
CERTIFICATE OF CONTINUITY FOR ON-LOADS**

FM (DDS UNIT)//  
 TO (HOST SHIP)//  
 INFO ISIC// (NOTE 1)//  
 TYCOM// (NOTE 2)//  
 (ADDITIONAL ADDEES)//  
 BT  
 (CLASSIFICATION)//  
 SUBJ/TRANSFER OF CUSTODY OF DDS-\_\_\_//  
 MSGID/GENADMIN/(DDS UNIT)//  
 REF/A/DOC/COMNAVSPECWARCOM/DATE OF LATEST CHANGE//  
 REF/B/DOC/NAVSEA/DATE OF LATEST CHANGE//  
 REF/C/DOC/NAVSEA/DATE OF LATEST CHANGE//  
 REF/D/DOC/NAVSEA/DATE OF LATEST CHANGE//  
 AMPN/REF A IS MOA BETWEEN COMNAVSPECWARCOM, COMSUBLANT, AND COMSUBPAC, REF B IS P-9290 SYSTEM CERTIFICATION PROCEDURES AND CRITERIA MANUAL FOR DEEP SUBMERGENCE SYSTEMS, REF C IS DDS SCOPE OF CERTIFICATION NOTEBOOK, REF D IS DDS (SSGN/688CL/VA CL) OPS AND EPS FOR DDS OPERATIONS.//  
 POC/\_\_\_/RANK/UNIT/LOCATION/EMAIL/  
 RMKS/1. DDS-( ) IS SCHEDULED TO BE ON-LOADED TO (HOST SHIP) ON (ON-LOAD DATE). UPON INSTALLATION OF THE DDS ONTO (HOST SHIP) REQUEST (HOST SHIP) ACCEPT CUSTODY FROM (DDS UNIT) PER REF (A).  
 2. DDS CERTIFICATION AND CLEANLINESS OF THE DIVERS AIR SYSTEM OF DDS-( ) HAVE BEEN MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF REFS (B) AND (C). ALL MAINTENANCE AND REPAIRS PERFORMED WHILE IN CUSTODY OF (DDS UNIT) HAVE BEEN COMPLETED IN ACCORDANCE WITH APPROVED SPECIFICATIONS AND TEST PROCEDURES.  
 3. (DDS UNIT) WILL TURN OVER CUSTODY OF REC, DFS, EQUIPMENT STATUS AND TEMPMOD LOGS; REC EXCEPTION RECORDS; PMS SCHEDULES AND MRCS; CALIBRATION RECORDS; HIP RECORDS AND MRCS FOR DDS-( ) TO (HOST SHIP). CURRENT STATUS OF REC AND DFS AS FOLLOWS:  
 A. IDENTIFY EACH OPEN REC INCLUDING A BRIEF DESCRIPTION OF THE WORK INVOLVED. IF NO RECs ARE OPEN AT THE TIME OF CUSTODY TRANSFER, STATE THIS FACT.  
 B. IDENTIFY ALL ACTIVE DFSs INCLUDING A BRIEF DESCRIPTION, CRITERIA FOR CLEARANCE, ANY OPERATING RESTRICTIONS, APPROVAL AUTHORITY ASSOCIATED WITH EACH DFS. IF NO DFSs ARE ACTIVE AT THE TIME OF CUSTODY TRANSFER, STATE THIS FACT.  
 4. CERTIFICATION REQUIREMENTS DUE DURING HOST CUSTODY INCLUDE:  
 A. IDENTIFY EACH DDS INTERNAL AUDIT AND SCA SURVEY DUE DURING THIS PERIOD.  
 B. IDENTIFY EACH HIP DUE DURING THIS PERIOD.  
 C. IDENTIFY EACH OUTSTANDING SCA CAT IA, IB, AND IC SURVEY CARDS.  
 5. GAS PODS (WILL/WILL NOT) BE INCLUDED IN THE TRANSFER.  
 6. STATE THAT EITHER ALL PMS FOR DDS-( ) IS CURRENT AT THE TIME OF CUSTODY, OR IDENTIFY ANY REQUIRED PMS THAT HAS BEEN DEFERRED OR RESCHEDULED.  
 7. DDS-( ) IS BEING INSTALLED IN ACCORDANCE WITH THE APPROPRIATE STANDARD OPERATING PROCEDURE OF REF (D). (DDS UNIT) IS RESPONSIBLE FOR ENSURING THAT ALL DDS PORTABLE EQUIPMENT IS INSTALLED, ALL PIPING INTERFACES AND ELECTRICAL HULL FITTINGS ARE PROPERLY HANDLED, AND ALL THREAD SAVERS AND PORTABLE FAIRING ARE PROPERLY CONTROLLED.//  
 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; COMREGSUPPGRU GROTON CT N40. Include NSW ISIC, Host Submarine home ISIC, and deployed ISIC (if applicable).
  2. Office codes for TYCOMs are: COMNAVSPECWARCOM CORONADO CA N844; COMSUBLANT 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 transfer 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.

- (4) End use installation is consistent with the previous service parameters such as the design pressure rating, design temperature rating or system applicability of the component.
- f. Receiving activity shall update applicable software to document information and records (e.g., DSS or Ship's Drawing Index for drawing revision) date of last MRC periodicity accomplishment and documentation of outstanding DFS into installing DSS or ship's Current Ship's Maintenance Project.

6.5.1.1 Non-Conforming Material. Material that is received from a DSS/operating ship to be installed in a SOC application that does not meet all the requirements of paragraph 6.4.1 of this Chapter may be acceptable under the specific instances listed below.

- a. Material received which is not current with respect to the applicable MRC inspection or any other required maintenance actions that are not current for the intended use shall have the applicable maintenance actions completed. Any inspection or maintenance action not completed must be departed using the process of Part I, Chapter 8 of this volume.
- b. Material which has an end use that is not consistent with the previous service parameters shall be subject to and satisfy the testing requirements for a new component installed in the receiving DSS or ship, provided the design is consistent with the intended end use.

6.5.2 Reuse of Scope of Certification Material. Reuse of SOC material from a ship whose certification has lapsed by virtue of inactivation availability is acceptable under the following conditions:

- a. Prior to commencement of system disassembly, material identified for transfer must be included in an identification and transfer system designated for this application. This system must provide a means for tagging components to be transferred to preclude compromise of material control integrity through unauthorized re-entry. NAVSEA considers existing tag-out systems as an adequate template for this identification system, however, identification system tags must be durable and clearly discernible from existing "tag-out" system tags.
- b. The identification tags must include as a minimum:
  - (1) The statement that the component is SOC material and that the component is not to be removed until the tag is uniquely marked by the facility conducting the inactivation.
  - (2) The DSS/Ship hull number (e.g., SSN 752).
  - (3) System and item identification (e.g., MIC number, ASW-1, etc.).
  - (4) Activity unique identifier (e.g., PHNSY-657-001).
- c. The following shall be supplied by the supplying activity/ship to the receiving ship:
  - (1) All outstanding DFS on the component.
  - (2) Any applicable technical variance documentation.
  - (3) The last accomplishment date and category of all applicable MRC inspections.
  - (4) All legible component markings shall be documented.
  - (5) A copy of the supplying ship's REC.
- d. All work completed on the material/component after removal from the supplying DSS/ship shall be documented and controlled by a REC.

- e. Those fasteners removed which connect a transferred item to equipment or components remaining on board, such as valve flange fasteners, shall not be shipped with the item, since to do so needlessly complicates the certification process.
- f. The receiving activity shall conduct material receipt inspection to verify the following:
  - (1) Attached material identification tag and material marking on the material matches the documentation provided from the facility conducting the inactivation.
  - (2) End use installation is consistent with the previous service parameters such as the design pressure rating, design temperature rating or system applicability of the component.
- g. The receiving activity must complete any maintenance due or overdue for the material. Any inspection not performed or other maintenance action not completed must be departed.
- h. The receiving activity must maintain documentation of receipt, inspection, installation and testing of the provided material.
- i. The material will be installed using a REC.

6.5.3 Material Recertification Required.

- a. Material which does not satisfy the requirements of paragraphs 6.5.1 or 6.5.2 of this chapter shall require full component certification to all DSS program requirements prior to use. Documentation of this certification shall be traceable from the installing activity's REC.
- b. If the SOC material to be transferred is designated for non-SOC end use, and if the removal is to be accomplished subsequent to the Inactivation Availability start date, applicable non-SOC transfer requirements are in effect. These requirements for Submarine Safety components are in reference (c) and the requirements for Level I components are in reference (a).

6.5.4 Material Re-certification Following Transfer to Outside Agency. Material transferred to and received from an outside maintenance organization which is not under Joint Fleet Maintenance Manual controls will be handled in the following manner:

<u>Procedure</u>	<u>Responsibility</u>
Remove existing attached QA form 2 and retain in Controlled Work Package for OQE.	Sustaining/User Activity
Transfer existing material using DD 1149 to and from the Outside Agency.	Sustaining/User Activity Department Head
Upon receipt, review vendor data, COC and test data as required by applicable specifications.	Sustaining/User Activity CMPO/CMH/QAI/QAO
Fill out QA form 2 in accordance with Part III, Chapter 11 of this volume and attach to the item. Turn over material to craftsman or stow in approved storage area.	Sustaining/User Activity CMPO/CMH/QAI
Place COC in respective REC for material control documentation.	Sustaining/User Activity QAI/Quality Assurance Supervisor
If material fails any of above steps, reject the material and attach QA form 3.	Sustaining/User Activity CMPO/CMH

QA FORM 2 INSTRUCTIONSMATERIAL IDENTIFICATION (ID)/CONTROL TAG

LANTFLT 4790/2 (8-01) S/N 0103-LF-981-0300

PURPOSE: Used for receipt inspection, certification and traceability of existing controlled material received from an outside vendor not under Joint Fleet Maintenance Manual controls.

PROCEDURE: The numbered blocks on QA form 2 correspond with the instructions listed below.

BLOCK 1 - TAG (A) OF (B)

- a. Block A - Enter "1". For additional tags used during the fabrication/transfer/installation process, number the tags in sequential order as used (2, 3, 4, etc.).
- b. Block B - The last number reflects the total number of tags used for this item during this maintenance action. This block is filled in by the QAI at the time Block 21 is signed on the last tag (e.g., 3 of 3).

BLOCK 2 - MIC NO./SERIAL NO.

NOTE: THE INFORMATION ENTERED FOR FASTENERS MAY NEED TO INCLUDE INFORMATION FROM BLOCKS 3 AND 8 FROM QA-1. DO NOT ENTER THE PNSY TRACE NUMBER FROM BLOCK 3 OF THE QA-1.

- a. New Material: Enter the Material Identification and Control (MIC) etched on the material. If the component has no MIC or a shortened MIC marking, ensure the full MIC marking from the shipping documents, tags, and/or packaging is entered.
- b. Fasteners: Document the markings from the fastener to include either:
  - (1) The color code and the heat/lot number, material type, and manufacturer's symbol (for nuts containing a self-locking insert, the color of the insert is the manufacturer's symbol).
  - (2) The MIC number (when MIC number is on the fastener or on the individual tag for some small fasteners).
- c. **If the material is Material Control Division B, enter Markings on the material or documented on the shipping papers providing identification to material type or military specification.**

BLOCK 3 - MAT LEVEL

Check the Existing block and the SOC block.

BLOCK 4 - MATL DESCRIPTION

Enter the quantity, size and noun name of the material (e.g., (6 each) 5/8" - 11 NICU studs, 10" O.D. CUNI barstock 6" long).

BLOCK 5 - NSN/SMIC

Enter "NA".

BLOCK 6 - RECEIPT INSPECTION COMMENTS

Enter receipt inspection results (i.e., SAT or UNSAT). If inspection results are UNSAT in Block 6, initiate a QA form 3. For UNSAT results in Block 6, the CMPO will only sign Block 7 of the QA form 2 if the QAO dispositions the item suitable for use on Block 12 of the QA form 3. For SAT receipt inspection, enter the following statement:

"Material Receipt Inspected SAT and is certified for re-use."

This entry will be signed by the QAO.

BLOCK 7 - CMPO/CMH

CMPO/CMH certifying the entries in Blocks 1-7 print name, enter signature and date.

NOTE 1: THE CMPO WILL VERIFY THAT THE ITEM IS WHAT IS REQUIRED FOR INTENDED USE PRIOR TO TURNING THE MATERIAL OVER TO CRAFTSMAN FOR FABRICATION AND/OR INSTALLATION AND FILL IN BLOCKS 8 THROUGH 12 AT THE TIME THE MATERIAL IS ISSUED.

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

At the time of issue, enter the Job Control Number (JCN) [UIC, WC and Job Sequence Number (JSN)] and CWP serial number.

BLOCK 9 - WC NO.

Enter the number of the WC receiving material (e.g., EM01, 10C, 38A).

BLOCK 10 - DATE

Enter date the WC received the material.

BLOCK 11 - REMARKS

Enter the reason for issue (e.g., issued to 31A for manufacture of fitting, issued to EM01 for installation).

BLOCK 12 - CRAFTSMAN/CMPO/CMH/QAI

For Initial Material Issue: Print name, enter signature signifying issue of material by CMPO/CMH. For Fabrication/Transfer (Additional QA form(s) 2 required). Print name, enter signature signifying receipt of material.

NOTE: THE REMAINING SECTIONS OF THE TAG ARE COMPLETED BY THE COGNIZANT CRAFTSMAN/CMPO/CMH/QAI DURING THE FABRICATION/INSTALLATION PROCESSES.

NOTE: SATISFACTORY CONDITION OF MATERIAL EXCHANGED BETWEEN WCs IS ASSUMED, UNLESS AN ENTRY IS MADE IN REMARKS INDICATING MATERIAL IS REJECTED.

BLOCK 13 - WC NO.

Enter the number of the WC receiving material (e.g., 56A or EA01).