

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

Page Numbers	Change in Effect	Page Numbers	Change in Effect
i thru iv	Change 5	V-I-1-1	Change 5
v thru vi	Change 1	V-I-1-2	Change 3
vii thru viii	Change 3	V-I-1-3	Change 5
ix	Change 4	V-I-1-4 thru V-I-1-6	Change 4
x thru xvi	Change 5	V-I-1-7 thru V-I-1-25	Change 5
xvii thru xviii	Change 4	V-I-1-26	Change 3
xix	Change 5	V-I-1A-1 thru V-I-1A-2	Change 3
xx thru xxii	Change 4	V-I-2-1 thru V-I-2-20	Change 5
V-I-FWD-1	REV C	V-I-2A-1 thru V-I-2A-2	REV C
V-I-FWD-2 thru V-I-FWD-3	Change 1	V-I-2B-1 thru V-I-2B-2	REV C
V-I-FWD-4	REV C	V-I-2C-1 thru V-I-2C-4	Change 5
V-I-FWD-A-1 thru V-I-FWD-A-4	Change 5	V-I-2D-1 thru V-I-2D-2	Change 5
V-I-FWD-B-1 thru V-I-FWD-B-2	REV C	V-I-2E-1 thru V-I-2E-2	Change 5
V-I-FWD-B-3 thru V-I-FWD-B-5	Change 1	V-I-3-1 thru V-I-3-5	Change 5
V-I-FWD-B-6 thru V-I-FWD-B-8	REV C	V-I-3-6	REV C
V-I-FWD-B-9	Change 1	V-I-3A-1 thru V-I-3A-2	Change 2
V-I-FWD-B-10 thru V-I-FWD-B-13	REV C	V-I-3B-1 thru V-I-3B-4	Change 2
V-I-FWD-B-14 thru V-I-FWD-B-15	Change 1	V-I-3B-5 thru V-I-3B-6	Change 5
V-I-FWD-B-16	REV C	V-I-3C-1	Change 2
V-I-FWD-B-17 thru V-I-FWD-B-18	Change 3	V-I-3C-2 thru V-I-3C-4	Change 5
V-I-FWD-B-19 thru V-I-FWD-B-20	Change 4	V-I-4-1	Change 4

Page Numbers	Change in Effect	Page Numbers	Change in Effect
V-I-4-2 thru V-I-4-6	REV C	V-I-7A-1	REV C
V-I-4-7	Change 4	V-I-7A-2	Change 2
V-I-4-8	REV C	V-I-7A-3	Change 1
V-I-5-1	Change 3	V-I-7A-4	REV C
V-I-5-2	Change 4	V-I-7B-1	Change 2
V-I-5-3 thru V-I-5-5	Change 3	V-I-7B-2	Change 4
V-I-5-6	Change 4	V-I-7B-3 thru V-I-7B-4	Change 3
V-I-5-7 thru V-I-5-34	Change 5	V-I-7B-5 thru V-I-7B-10	Change 4
V-I-5A-1 thru V-I-5A-2	Change 3	V-I-7C-1 thru V-I-7C-2	REV C
V-I-5A-3	REV C	V-I-8-1	Change 4
V-I-5A-4	Change 3	V-I-8-2 thru V-I-8-5	Change 3
V-I-5B-1	Change 1	V-I-8-6 thru V-I-8-10	Change 5
V-I-5B-2	REV C	V-I-8-11 thru V-I-8-14	Change 3
V-I-5C-1	Change 1	V-I-8A-1 thru V-I-8A-2	REV C
V-I-5C-2	REV C	V-I-8A-3 thru V-I-8A-4	Change 2
V-I-5D-1 thru V-I-5D-2	REV C	V-I-8B-1 thru V-I-8B-2	REV C
V-I-5E-1 thru V-I-5E-2	Change 3	V-I-9-1 thru V-I-9-4	Change 2
V-I-5F-1	Change 5	V-I-9-5 thru V-I-9-7	Change 5
V-I-5F-2	Change 3	V-I-9-8	Change 4
V-I-5G-1 thru V-I-5G-2	Change 3	V-I-9-9	Change 5
V-I-6-1 thru V-I-6-31	Change 4	V-I-9-10	Change 4
V-I-6-32 thru V-I-6-39	Change 5	V-I-9A-1	Change 1
V-I-6-40	Change 4	V-I-9A-2	REV C
V-I-7-1	Change 2	V-I-9B-1	Change 1
V-I-7-2 thru V-I-7-5	Change 3	V-I-9B-2	REV C
V-I-7-6 thru V-I-7-8	Change 2	V-I-9C-1 thru V-I-9C-2	REV C
V-I-7-9	Change 3	V-I-9D-1 thru V-I-9D-3	Change 1
V-I-7-10	Change 2	V-I-9D-4	Change 4
V-I-7-11 thru V-I-7-12	Change 3	V-I-9D-5 thru V-I-9D-6	Change 1

Page Numbers	Change in Effect	Page Numbers	Change in Effect
V-I-9E-1	Change 2	V-I-13A-1 thru V-I-13A-2	REV C
V-I-9E-2	Change 1	V-I-13B-1 thru V-I-13B-2	Change 5
V-I-10-1 thru V-I-10-4	Change 2	V-III-FWD-1 thru V-III-FWD-2	REV C
V-I-10-5 thru V-I-10-8	Change 3	V-III-FWD-A-1 thru V-III-FWD-A-2	Change 5
V-I-11-1 thru V-I-11-2	Change 5	V-III-FWD-B-1 thru V-III-FWD-B-3	Change 1
V-I-11-3	Change 1	V-III-FWD-B-4 thru V-III-FWD-B-5	REV C
V-I-11-4	REV C	V-III-FWD-B-6 thru V-III-FWD-B-7	Change 4
V-I-11-5	Change 5	V-III-FWD-B-8	Change 3
V-I-11-6	REV C	V-III-1-1 thru V-III-1-6	Change 5
V-I-11-7	Change 5	V-III-2-1	Change 1
V-I-11-8	REV C	V-III-2-2	REV C
V-I-11-9	Change 1	V-III-3-1	Change 5
V-I-11-10	REV C	V-III-3-2	REV C
V-I-11-11	Change 1	V-III-4-1 thru V-III-4-2	REV C
V-I-11-12 thru V-I-11-16	Change 2	V-III-5-1	Change 5
V-I-11-17	Change 4	V-III-5-2 thru V-III-5-8	Change 2
V-I-11-18 thru V-I-11-22	REV C	V-III-5-9 thru V-III-5-10	Change 5
V-I-11-23	Change 3	V-III-5A-1	Change 1
V-I-11-24 thru V-I-11-25	Change 5	V-III-5A-2	REV C
V-I-11-26	Change 3	V-III-5B-1 thru V-III-5B-2	REV C
V-I-11-27	REV C	V-III-5C-1 thru V-III-5C-2	REV C
V-I-11-28	Change 5	V-III-5D-1 thru V-III-5D-2	REV C
V-I-11-29 thru V-I-11-36	REV C	V-III-5E-1 thru V-III-5E-2	REV C
V-I-11-37 thru V-I-11-190	Change 5	V-III-6-1	Change 2
V-I-12-1 thru V-I-12-4	REV C	V-III-6-2 thru V-III-6-4	REV C
V-I-13-1	Change 5	V-III-6-5	Change 2
V-I-13-2	REV C	V-III-6-6	Change 1

Page Numbers	Change in Effect	Page Numbers	Change in Effect
V-III-6-7 thru V-III-6-11	REV C		
V-III-6-12	Change 1		
V-III-6-13	REV C		
V-III-6-14 thru V-III-6-16	Change 4		
V-III-7-1 thru V-III-7-2	REV C		
V-III-8-1 thru V-III-8-2	REV C		
V-III-9-1 thru V-III-9-6	REV C		
V-III-10-1 thru V-III-10-2	REV C		
V-III-11-1 thru V-III-11-8	REV C		
V-III-11-9 thru V-III-11-10	Change 3		
V-III-11-11	Change 1		
V-III-11-12	REV C		
V-III-11-13 thru V-III-11-17	Change 5		
V-III-11-18	REV C		
V-III-11-19	Change 5		
V-III-11-20	REV C		
V-III-11-21 thru V-III-11-23	Change 5		
V-III-11-24	REV C		

JOINT FLEET MAINTENANCE MANUAL**VOLUME V****QUALITY MAINTENANCE****TABLE OF CONTENTS**

	Page No.
LIST OF EFFECTIVE PAGES	i
RECORD OF CHANGES	v
JOINT FLEET MAINTENANCE MANUAL CHANGE REQUEST FORM.....	vii
PART I	
FOREWORD - QUALITY MAINTENANCE	
1.1 Purpose	V-I-FWD-1
1.2 Scope	V-I-FWD-1
1.3 Manual Organization	V-I-FWD-1
1.3.1 Basic Maintenance Principles.....	V-I-FWD-1
1.3.2 Special Circumstances and Maintenance Support	V-I-FWD-1
1.3.3 Order of Precedence	V-I-FWD-2
1.3.3.1 Operations.....	V-I-FWD-2
1.3.3.2 Maintenance and Technical	V-I-FWD-2
1.3.4 Advisories	V-I-FWD-3
1.4 Need for Quality Maintenance Processes	V-I-FWD-3
1.5 Changes and Corrections	V-I-FWD-4
1.6 Request for Copies of the Manual	V-I-FWD-4
Appendices	
A List of Acronyms	V-I-FWD-A-1
B Glossary of Terms.....	V-I-FWD-B-1
CHAPTER 1 - ORGANIZATIONAL RESPONSIBILITIES	
1.1 Purpose	V-I-1-1
1.1.1 Quality Assurance Organization	V-I-1-1
1.2 Fleet Responsibilities.....	V-I-1-1
1.2.1 Fleet Commander (Fleet).....	V-I-1-1
1.3 Type Commander Responsibilities	V-I-1-2
1.3.1 Type Commander	V-I-1-2
1.4 Immediate Superior In Command Responsibilities	V-I-1-3
1.4.1 Immediate Superior In Command.....	V-I-1-3
1.5 Ship Responsibilities	V-I-1-6
1.5.1 Ship's Commanding Officer.....	V-I-1-7
1.5.2 Ship's Executive Officer.....	V-I-1-7
1.5.3 Ship's Department Head.....	V-I-1-7
1.5.4 Ship's Supply Officer	V-I-1-8
1.5.5 Ship's Engineer Officer (Submarines only).....	V-I-1-9
1.5.6 Availability Coordinator (Submarines only).....	V-I-1-9
1.5.7 Ship's Maintenance Manager (Aircraft Carriers only)	V-I-1-10
1.5.8 Ship's Principal Assistant	V-I-1-10
1.5.9 Ship's Division Officer	V-I-1-10
1.5.10 Ship's Work Center Supervisor	V-I-1-10

1.5.11	Ship's Craftsman	V-I-1-11
1.5.12	Ship's Quality Assurance Officer	V-I-1-11
1.5.13	Ship's Assistant Quality Assurance Officer.....	V-I-1-13
1.5.14	Ship's Quality Assurance Supervisor	V-I-1-13
1.5.15	Ship's Quality Assurance Inspectors	V-I-1-13
1.5.16	Ship's Controlled Material Petty Officer.....	V-I-1-14
1.5.17	Ship's Cleanliness Inspector/Certifier	V-I-1-15
1.5.18	Ship's Nondestructive Test Examiner	V-I-1-15
1.5.19	Ship's Nondestructive Test Inspector	V-I-1-16
1.5.20	Engineering Department Master Chief	V-I-1-16
1.5.21	Ship's Maintenance Planner (Submarines and Aircraft Carriers only).....	V-I-1-16
1.6	Regional Maintenance Center/Fleet Maintenance Activity Responsibilities	V-I-1-16
1.6.1	RMC Commander/FMA Commanding Officer	V-I-1-16
1.6.2	RMC Deputy Commander/FMA Executive Officer	V-I-1-17
1.6.3	RMC Production Officer/FMA Repair Officer.....	V-I-1-17
1.6.4	FMA Supply Officer.....	V-I-1-18
1.6.5	FMA Nuclear Repair Officer.....	V-I-1-19
1.6.6	RMC/FMA Planning and Estimating Officer	V-I-1-19
1.6.7	RMC/FMA Division Officer	V-I-1-20
1.6.8	RMC/FMA Work Center Supervisor.....	V-I-1-20
1.6.9	RMC/FMA Craftsman	V-I-1-20
1.6.10	RMC Quality Assurance Department Head (Code 130) or Industry Management Department (Code 400 at Puget Sound Naval Shipyard and Intermediate Maintenance Facility).....	V-I-1-21
1.6.11	RMC Code 133 Division Head/FMA Quality Assurance Officer	V-I-1-21
1.6.12	RMC/FMA Assistant Quality Assurance Officer	V-I-1-23
1.6.13	RMC/FMA Quality Assurance Supervisor	V-I-1-23
1.6.14	RMC/FMA Quality Assurance Inspector	V-I-1-23
1.6.15	RMC/FMA Controlled Material Petty Officer/Controlled Material Handler	V-I-1-23
1.6.16	RMC/FMA Cleanliness Inspector/Certifier	V-I-1-24
1.6.17	RMC/FMA Command Examiner.....	V-I-1-24
1.6.18	Nondestructive Test Division Officer	V-I-1-24
1.6.19	RMC/FMA Nondestructive Test Inspector.....	V-I-1-25
1.7	Other Activity Responsibilities.....	V-I-1-25
Appendices		
A	Format for Submarine QA Pre-Underway Checklist.....	V-I-1A-1

CHAPTER 2 - QUALITY MAINTENANCE PROCESSES

2.1	Purpose	V-I-2-2
2.2	Technical Work Documents	V-I-2-2
2.2.1	Minimum Requirements for using Technical Work Documents	V-I-2-2
2.2.2	Maintenance Procedure.....	V-I-2-3
2.2.3	Formal Work Package	V-I-2-4
2.2.4	Controlled Work Package.....	V-I-2-4
2.2.5	Maintenance Certification Record/Controlled Work Package (Non-SUBSAFE).....	V-I-2-6
2.2.6	Sequencing Document	V-I-2-7
2.3	Formal Work Package Development.....	V-I-2-7
2.3.1	Responsibility for Preparation of Formal Work Packages/Controlled Work Packages.....	V-I-2-7
2.3.2	Security Classification	V-I-2-7
2.3.3	Formal Work Package Format	V-I-2-8
2.3.3.1	Formal Work Package Elements Defined	V-I-2-8
2.3.3.2	Use and Transcribing of Source Documents.....	V-I-2-12
2.3.4	Formal Work Package Approval	V-I-2-12
2.3.5	Controlled Work Package Approval.....	V-I-2-13
2.3.6	Formal Work Package In Process Use.....	V-I-2-13

2.3.7	Formal Work Package Changes.....	V-I-2-13
2.3.7.1	Pen and Ink Changes.....	V-I-2-13
2.3.7.2	Rework Addendum.....	V-I-2-14
2.3.7.3	Revisions.....	V-I-2-14
2.3.7.4	Attachment.....	V-I-2-15
2.3.7.5	Supplement.....	V-I-2-16
2.3.7.6	Voiding.....	V-I-2-16
2.3.7.7	Formal Work Package Closeout.....	V-I-2-16
2.3.7.7.1	Completed Formal Work Packages.....	V-I-2-16
2.3.7.8	Controlled Work Package Closeout.....	V-I-2-16
2.3.7.9	Emergent Controlled Work.....	V-I-2-18
2.3.7.10	Standardized Formal Work Package.....	V-I-2-18
2.3.7.11	Lost Controlled Work Packages Following Controlled Work Package Approval.....	V-I-2-18
2.4	Troubleshooting.....	V-I-2-18
Appendices		
A	Technical Work Document Illustration.....	V-I-2A-1
B	Work Package Decision Process.....	V-I-2B-1
C	Certification Signature Requirements for Reactor Plant/Nuclear Support Facility/ Controlled Industrial Facility Work.....	V-I-2C-1
D	Formal Work Package Approval/Revision Sheet.....	V-I-2D-1
E	Technical Work Document Review and Approval Matrix.....	V-I-2E-1

CHAPTER 3 - PERSONNEL QUALIFICATION AND TRAINING

3.1	Purpose.....	V-I-3-1
3.2	General.....	V-I-3-1
3.2.1	Discussion.....	V-I-3-1
3.3	Qualification.....	V-I-3-1
3.3.1	Re-qualification.....	V-I-3-2
3.3.2	Required Service Record Entries.....	V-I-3-2
3.4	Qualification Requirements.....	V-I-3-2
3.4.1	Ship's Quality Assurance Officer.....	V-I-3-2
3.4.2	Ship's Assistant Quality Assurance Officer.....	V-I-3-2
3.4.3	Immediate Superior In Command.....	V-I-3-2
3.4.4	Regional Maintenance Center/Fleet Maintenance Activity Quality Assurance Officer.....	V-I-3-3
3.4.5	Regional Maintenance Center/Fleet Maintenance Activity Assistant Quality Assurance Officer.....	V-I-3-3
3.4.6	Quality Assurance Supervisor.....	V-I-3-3
3.4.7	Quality Assurance Inspector.....	V-I-3-3
3.4.8	Controlled Material Petty Officer/Controlled Material Handler.....	V-I-3-3
3.4.9	Steam Plant Cleanliness Inspector/Certifier.....	V-I-3-3
3.4.9.1	Qualification Requirements for Reactor Plant Cleanliness Inspector/ Certifier.....	V-I-3-3
3.4.10	Gas Systems Cleanliness Inspector/Certifier.....	V-I-3-4
3.4.11	Oxygen Clean Instructors.....	V-I-3-4
3.4.12	Ship's and Fleet Maintenance Activity Oxygen Clean Workers.....	V-I-3-4
3.4.13	Oxygen Calibration Technicians.....	V-I-3-4
3.4.14	Work Center Supervisors and Planners.....	V-I-3-4
3.4.15	Qualification Requirements for Submarine Nuclear Propulsion Plant Operator Welders (Navy Enlisted Classification Code 3351 and Supervisor Welders 3361).....	V-I-3-4
3.4.16	Qualification Requirements for Submarine Fly-By-Wire Ship Control System Maintenance Technician.....	V-I-3-4
3.5	Training.....	V-I-3-4
3.5.1	Maintenance Personnel Training.....	V-I-3-4
3.5.2	Requirements.....	V-I-3-5

3.5.3	Submarine Safety Awareness Training (Submarines and Submarine Repair Facilities only).....	V-I-3-5
-------	--	---------

Appendices

A	NAVEDTRA 43523 Qualification Matrix.....	V-I-3A-1
B	Outlines of Typically Effective Training Topics	V-I-3B-1
C	Recommended Training Topics for Selected Positions	V-I-3C-1

CHAPTER 4 - WELDER, BRAZER AND NONDESTRUCTIVE TESTING QUALIFICATIONS

4.1	Purpose	V-I-4-1
4.1.1	General Requirements.....	V-I-4-1
4.1.2	Training	V-I-4-1
4.2	General Requirements for Brazers and Welders.....	V-I-4-1
4.2.1	Eye Examination.....	V-I-4-2
4.2.2	Brazing and Welding Procedures.....	V-I-4-2
4.2.3	Brazing and Welding Personnel Knowledge	V-I-4-2
4.2.4	Brazer and Welder Identification Numbers	V-I-4-2
4.2.4.1	Brazer and Welder Identification Number Log.....	V-I-4-2
4.2.5	Validation of Qualification	V-I-4-2
4.2.6	Qualification Records	V-I-4-3
4.2.6.1	Individual Brazer/Welder Qualification File.....	V-I-4-3
4.2.6.1.1	Maintenance of Qualification	V-I-4-3
4.2.6.2	Method of Qualification Maintenance	V-I-4-3
4.2.6.3	Renewal of Qualification	V-I-4-3
4.2.7	Effective Date of Qualification.....	V-I-4-3
4.2.7.1	Qualification Results.....	V-I-4-4
4.3	Brazer Qualifications	V-I-4-4
4.3.1	Prerequisite	V-I-4-4
4.3.1.1	Qualification Test.....	V-I-4-4
4.3.2	Limitations.....	V-I-4-4
4.3.3	Test Assembly Evaluation	V-I-4-4
4.3.4	Maintenance of Qualification	V-I-4-4
4.3.5	Qualification Renewal	V-I-4-4
4.3.6	Transfer of Qualification	V-I-4-4
4.4	Qualification Requirements for Navy Enlisted Classification CODE 4955 Welders	V-I-4-4
4.4.1	Qualification Prerequisites.....	V-I-4-4
4.4.1.1	Navy Enlisted Classification Code Achievement	V-I-4-4
4.4.1.2	Specific Qualifications.....	V-I-4-4
4.4.2	Maintenance of Qualification	V-I-4-4
4.4.3	Qualification Renewal	V-I-4-4
4.4.4	Transfer of Qualification	V-I-4-4
4.4.5	Waiver of Qualification Tests.....	V-I-4-4
4.5	Non-Coded Hull Technicians	V-I-4-5
4.5.1	Authorization	V-I-4-5
4.5.2	Minor Structure Components.....	V-I-4-5
4.6	Qualification Requirements for Nondestructive Test Personnel.....	V-I-4-6
4.6.1	Purpose	V-I-4-6
4.6.2	Levels of Certification	V-I-4-6
4.6.3	Certification of Nondestructive Test Personnel	V-I-4-6
4.6.4	Renewal of Certification.....	V-I-4-6
4.6.5	Maintenance of Qualification	V-I-4-6
4.6.6	Qualification Administration	V-I-4-6
4.6.7	Approval of Nondestructive Testing Qualification Examinations.....	V-I-4-7
4.6.8	Transfer of Qualification	V-I-4-7
4.6.9	Nondestructive Testing Personnel Records	V-I-4-7
4.6.10	Nondestructive Testing Qualification Log.....	V-I-4-7

4.6.11 Qualification of Generic Material Identity Testing Personnel V-I-4-7
 4.6.12 Qualification Administration V-I-4-7
 4.6.12.1 Transfer of Qualification..... V-I-4-7

CHAPTER 5 - IN-PROCESS CONTROL

5.1 Purpose V-I-5-2
 5.2 Test, Measurement and Diagnostic Equipment V-I-5-2
 5.2.1 General Requirements..... V-I-5-2
 5.2.2 Torque Wrenches..... V-I-5-2
 5.2.3 Gauges V-I-5-4
 5.3 Torque..... V-I-5-5
 5.3.1 General Requirements..... V-I-5-5
 5.4 Inspections V-I-5-5
 5.4.1 General Requirements..... V-I-5-5
 5.4.2 Inspection Records..... V-I-5-5
 5.4.3 Critical Inspections V-I-5-5
 5.4.4 Cleanliness Inspections..... V-I-5-7
 5.4.5 Nuclear Propulsion Plant and Nuclear Support Facility General Cleanliness Requirements..... V-I-5-8
 5.4.5.1 Reactor Plant..... V-I-5-8
 5.4.5.2 Steam Plant V-I-5-8
 5.4.5.3 Nuclear Support Facility V-I-5-8
 5.4.5.4 Standard Lubricants and Penetrating Fluid V-I-5-8
 5.4.6 General Shipboard Steam Plant Systems Cleanliness Requirements V-I-5-8
 5.4.6.1 Purpose V-I-5-8
 5.4.6.2 Applicability V-I-5-8
 5.4.6.3 Discussion..... V-I-5-9
 5.4.6.4 Requirements V-I-5-9
 5.4.7 Set Stud Inspection V-I-5-10
 5.5 Software..... V-I-5-10
 5.5.1 Determination of Acceptability and Use of Piping System Software V-I-5-10
 5.6 Submarine Safety Maintenance Certification/Re-Entry Control Nuclear and Non-Nuclear..... V-I-5-12
 5.6.1 Purpose V-I-5-12
 5.6.1.1 General..... V-I-5-12
 5.6.2 Re-Entry Control Program..... V-I-5-12
 5.6.3 Nuclear Submarine Safety System Re-Entry V-I-5-13
 5.6.3.1 Reactor Plant Planning Yard Liaison Action Requests..... V-I-5-13
 5.6.4 Re-Entry Control Administrative Procedures V-I-5-13
 5.6.5 Using a Controlled Dive Departure from Specification to Close a Maintenance Certification Record/Re-Entry Control..... V-I-5-16
 5.6.6 Voyage or At Sea Repairs..... V-I-5-16
 5.6.7 Exceptions to Re-Entry Control..... V-I-5-17
 5.6.8 Certification Continuity Report V-I-5-18
 5.7 Reactor Plant Work Accomplishment Report (Submarines Only) V-I-5-19
 5.7.1 Purpose V-I-5-19
 5.7.2 Specific Instructions for Completing Reactor Plant Work Accomplishment Report Cover Sheet..... V-I-5-19
 5.7.3 Specific Instructions for Completing Reactor Plant Certification When New or Previously Uncertified Material is Installed in a Submarine Safety Application V-I-5-20
 5.7.4 Specific Instructions for Completing Reactor Plant Certification When Previously Certified Material is Reinstalled V-I-5-20
 5.8 Material Condition Monitoring (Submarines Only) V-I-5-20
 5.8.1 Unrestricted Operations Maintenance Requirement Card Program..... V-I-5-20
 5.9 Submarine Fly-By-Wire Maintenance Certification..... V-I-5-21

5.9.1	Purpose	V-I-5-21
5.9.1.1	General.....	V-I-5-21
5.9.1.2	Applicability	V-I-5-22
5.9.1.3	Submarine Flight Critical Component Boundary.....	V-I-5-22
5.9.2	Submarine Flight Critical Component Boundary Work Control Procedures.....	V-I-5-22
5.9.3	Submarine Flight Critical Component Boundary Work Control Closeout	V-I-5-22
5.9.4	Objective Quality Evidence to Support Controlled Work on Fly-By-Wire Ship Control System Submarine Flight Critical Component	V-I-5-23
5.10	Aircraft Carrier Maintenance Documents.....	V-I-5-23
5.10.1	Purpose	V-I-5-23
5.10.2	Non-Nuclear Deviations, Waivers and Departure from Specifications	V-I-5-23
5.10.2.1	During a Maintenance Action.....	V-I-5-23
5.10.2.2	During Operations.....	V-I-5-24
5.10.3	Liaison Action Requests - Nuclear Cognizant Areas	V-I-5-24
5.10.3.1	Technical Responsibilities	V-I-5-24
5.10.3.2	Technical Resolution	V-I-5-24
5.10.4	Nuclear Liaison Inquiry - Nuclear Cognizant Areas.....	V-I-5-25
5.10.5	Steam Plant Action Request - Non-Nuclear Cognizant Areas	V-I-5-25
5.10.5.1	Usage	V-I-5-25
5.10.5.2	Validation.....	V-I-5-26
5.10.5.3	Categories	V-I-5-26
5.10.5.4	Coordination	V-I-5-26
5.10.5.5	Routing	V-I-5-26
5.10.5.6	Status.....	V-I-5-26
5.10.5.7	Software	V-I-5-27
5.10.5.8	Process Map.....	V-I-5-27
5.10.6	Steam Plant Liaison Inquiry - Non-Nuclear Cognizant Areas	V-I-5-27
5.10.6.1	Process Manager	V-I-5-27
5.10.6.2	Amplifying Information.....	V-I-5-27
5.10.7	Reactor Plant Configuration Change Report.....	V-I-5-27
5.10.8	Technical Manual Deficiencies and Manual Change Requests	V-I-5-30
5.10.8.1	Technical Manual Maintenance	V-I-5-30
5.10.8.2	Technical Manual Deficiency/Evaluation Report	V-I-5-30
5.10.8.3	URGENT Deficiencies	V-I-5-30
5.10.8.4	Routine Deficiencies.....	V-I-5-30
5.10.8.5	Technical Manual Deficiency/Evaluation Report Process.....	V-I-5-30
5.10.9	Fleet COSAL Feedback Report	V-I-5-31
5.10.9.1	Usage	V-I-5-31
5.10.9.2	Misuse.....	V-I-5-31
5.10.9.3	Form Location.....	V-I-5-32

Appendices

A	Determining Software Usability	V-I-5A-1
B	Format for Submarine Certification Continuity Report	V-I-5B-1
C	Format for Fleet Maintenance Activity Certification Report to Tended Submarine.....	V-I-5C-1
D	Format for Non-Fleet Maintenance Activity Certification Report to Tended Submarine	V-I-5D-1
E	RPCCR Cover Letter for SHIPALTs (Sample)	V-I-5E-1
F	Technical Manual Deficiency Report (TMDER).....	V-I-5F-1
G	Fleet COSAL Feedback Report	V-I-5G-1

CHAPTER 6 - MATERIAL CONTROL

6.1	Purpose	V-I-6-1
6.1.1	Discussion.....	V-I-6-1
6.2	Nuclear.....	V-I-6-1
6.2.1	Controlled Material Determination.....	V-I-6-2
6.2.1.1	General Requirements.....	V-I-6-2
6.2.1.2	Determination of Required Repair Parts	V-I-6-2

6.2.1.3	Determination of Level of Control.....	V-I-6-2
6.2.1.4	Nuclear Material Level Determination	V-I-6-2
6.2.2	Controlled Material Procurement	V-I-6-2
6.2.2.1	General Requirements.....	V-I-6-3
6.2.2.2	Controlled Material Procurement.....	V-I-6-3
6.2.3	Receipt Inspection of Nuclear Controlled Material	V-I-6-3
6.2.3.1	General Requirements.....	V-I-6-3
6.2.3.2	Quality Assurance Forms for Receipt Inspections.....	V-I-6-4
6.2.3.3	Nuclear Receipt Inspection	V-I-6-4
6.2.3.3.1	Receipt Inspection of Nuclear Material	V-I-6-4
6.2.3.4	General Requirements for Nuclear Material	V-I-6-4
6.2.3.5	Nuclear Material Receipt Inspection Procedures	V-I-6-5
6.2.4	Marking of Nuclear Repair Parts	V-I-6-7
6.2.4.1	General Requirements.....	V-I-6-7
6.2.4.2	Marking Requirements for Nuclear Repair Parts	V-I-6-8
6.2.4.3	Assignment of Material Identification and Control Numbers for Items Manufactured from Certified Raw Materials	V-I-6-9
6.2.5	Nuclear Repair Parts Downgrading	V-I-6-9
6.2.5.1	Nuclear Controlled Material Downgrading.....	V-I-6-9
6.2.6	Storage, Issue and Handling of Nuclear Repair Parts	V-I-6-10
6.2.6.1	Storage Requirements	V-I-6-10
6.2.6.2	Staging Requirements	V-I-6-11
6.2.6.3	Issue of Nuclear Controlled Material.....	V-I-6-11
6.2.6.4	Handling of Nuclear Controlled Material	V-I-6-11
6.3	Non-Nuclear	V-I-6-16
6.3.1	Controlled Material Determination	V-I-6-16
6.3.1.1	General Requirements.....	V-I-6-17
6.3.1.1.1	Determination of Required Repair Parts.....	V-I-6-17
6.3.1.1.2	Determination of Level of Control	V-I-6-17
6.3.1.2	Non-Nuclear Material Level Determination	V-I-6-17
6.3.1.2.1	Systems and Components	V-I-6-17
6.3.1.2.2	Emergent Situation Upgrading	V-I-6-18
6.3.1.3	Non-Nuclear Level I Systems and Boundaries	V-I-6-18
6.3.1.4	Level I Components.....	V-I-6-19
6.3.2	Quality Assurance List (Submarines only)	V-I-6-21
6.3.3	Controlled Material Procurement	V-I-6-21
6.3.3.1	General Requirements.....	V-I-6-21
6.3.3.2	Controlled Material Procurement.....	V-I-6-22
6.3.4	Receipt Inspection of Controlled Material.....	V-I-6-23
6.3.4.1	General Requirements.....	V-I-6-23
6.3.4.2	Quality Assurance Forms for Receipt Inspections.....	V-I-6-24
6.3.4.3	Receipt Inspection and Certification of Valve Balls.....	V-I-6-24
6.3.4.4	Level I and Submarine Flight Critical Component Receipt Inspection.....	V-I-6-24
6.3.4.5	General Requirements for Level I and Submarine Flight Critical Component Material	V-I-6-24
6.3.5	Receipt Inspection of Open Purchase (Non-Supply System) or Locally Manufactured Material or Upgrading Supply System Material to Level I (Fleet Maintenance Activity only).....	V-I-6-29
6.3.5.1	Uncertified Material Required for Level I Applications	V-I-6-29
6.3.5.2	Uncertified Material Required for SUBSAFE Applications.....	V-I-6-30
6.3.5.3	Uncertified Material Required for Submarine Flight Critical Component Applications	V-I-6-30
6.3.6	Authorized Material Certification Activities	V-I-6-30
6.3.6.1	Currently or Previously Authorized Material Certification Activities	V-I-6-30
6.3.7	Marking of Level I Stock Program Material and Controlled Material.....	V-I-6-32
6.3.7.1	General Requirements.....	V-I-6-32
6.3.7.2	Level I Material.....	V-I-6-33

6.3.7.3	Assignment of Material Identification and Control Numbers for Items Manufactured from Certified Raw Materials	V-I-6-34
6.3.8	Level I Submarine Flight Critical Component Stock Program Material Downgrading	V-I-6-35
6.3.8.1	Material Downgrading	V-I-6-35
6.3.9	Storage, Issue and Handling of Level I/Scope of Certification/Submarine Flight Critical Component Stock Program Material	V-I-6-35
6.3.9.1	Storage Requirements	V-I-6-35
6.3.9.2	Staging Requirements	V-I-6-37
6.3.9.3	Issue of Level I/Scope of Certification/Submarine Flight Critical Component Controlled Material	V-I-6-37
6.3.9.4	Handling of Material	V-I-6-37
6.3.9.5	Maintaining Accountability	V-I-6-38

CHAPTER 7 - TESTING REQUIREMENTS

7.1	General.....	V-I-7-1
7.1.1	Testing Requirements for Systems, Portions of Systems and Components.....	V-I-7-2
7.2	Testing	V-I-7-3
7.2.1	Test Procedures.....	V-I-7-3
7.2.2	Test Requirements	V-I-7-4
7.2.3	Test Pressure Source References	V-I-7-5
7.2.4	Non-Nuclear Pressure Drop Tests	V-I-7-5
7.2.4.1	General Instructions	V-I-7-5
7.2.4.2	Calculations	V-I-7-6
7.2.4.3	Example	V-I-7-6
7.3	Weight Handling Equipment	V-I-7-7
7.3.1	Weight Handling Equipment	V-I-7-7
7.4	Exemptions/Alternative Test Requirements (Non-Nuclear)	V-I-7-8
7.4.1	General.....	V-I-7-8
7.4.2	Exemptions/Alternatives to Test Requirements (Non-Nuclear unless Specifically Addressed in Nuclear Technical Documents).....	V-I-7-9
7.5	Reactor Plant and Nuclear Support Facility Testing	V-I-7-11
7.5.1	Hydrostatic/Pneumatic Tests or Drop Tests.....	V-I-7-11
7.5.2	Mechanical Joint Fasteners	V-I-7-11
7.5.3	Valve Seat Leak Tests.....	V-I-7-12
7.6	Supplemental Test Criteria (Non-Nuclear)	V-I-7-12
7.6.1	Purpose	V-I-7-12
Appendices		
A	Testing Requirements for Surface Ship Systems.....	V-I-7A-1
B	Testing Requirements for Submarine Systems	V-I-7B-1
C	SUBMEPP Product Feedback	V-I-7C-1

CHAPTER 8 - DEPARTURE FROM SPECIFICATION (DFS/WAIVERS/NUCLEAR LIAISON ACTION REQUEST/STEAM PLANT ACTION REQUESTS)

8.1	Purpose	V-I-8-1
8.1.1	Background.....	V-I-8-1
8.1.2	Terminology	V-I-8-1
8.1.3	Specification	V-I-8-1
8.2	Departure From Specification.....	V-I-8-2
8.2.1	Reporting Departures from Specification	V-I-8-3
8.2.2	Types of Departures from Specification	V-I-8-3
8.2.3	Permanent and Temporary Approval of Departure from Specification	V-I-8-3
8.2.4	Major Departure from Specification.....	V-I-8-4
8.2.5	Minor Departure from Specification.....	V-I-8-6

12.1 Purpose V-I-12-1
 12.1.1 Scope V-I-12-1

12.2 General Preservation Requirements..... V-I-12-1

12.3 Submarine Preservation Maintenance Processes V-I-12-1
 12.3.1 Maintenance Processes V-I-12-1
 12.3.2 Coating System Maintenance Authorization V-I-12-1

12.4 Quality Assurance for Critical Coated Areas..... V-I-12-2
 12.4.1 Critical Coated Areas..... V-I-12-2
 12.4.2 Requirements for Critical Coated Areas V-I-12-2
 12.4.3 Test and Inspection Records V-I-12-2
 12.4.4 Blaster and Painter Certification..... V-I-12-2
 12.4.5 Coating Inspector Certification..... V-I-12-2
 12.4.6 Coating Inspector Responsibilities V-I-12-3
 12.4.6.1 Inspection of Storage and Receipt Inspection Facilities V-I-12-3
 12.4.6.2 In-Process Inspections V-I-12-3
 12.4.7 Inspection of Final Coating System..... V-I-12-3
 12.4.8 Review of Records for Final Coating Evaluation V-I-12-3
 12.4.9 Acceptance/Rejection of Final Coating Systems V-I-12-4

CHAPTER 13 - WIRE REMOVAL AND REPLACEMENT

13.1 Purpose V-I-13-1
 13.1.1 Discussion..... V-I-13-1

13.2 Action V-I-13-1

Appendices

A Wire Removal/Replacement Form MAT-2 V-I-13A-1
 B Submarine Wire Removal/Replacement Form MAT-3 V-I-13B-1

PART III

FOREWORD - SCOPE OF CERTIFICATION

1 Purpose V-III-FWD-1

2 Scope V-III-FWD-1

3 Need For Scope of Certification Quality Maintenance Processes V-III-FWD-1

Appendices

A List of Acronyms V-III-FWD-A-1
 B Glossary of Terms..... V-III-FWD-B-1

CHAPTER 1 - ORGANIZATIONAL RESPONSIBILITIES

1.1 Purpose V-III-1-1
 1.1.1 Scope of Certification Organization V-III-1-1

1.2 Responsibilities..... V-III-1-1
 1.2.1 Type Commander V-III-1-1
 1.2.2 Immediate Superior In Command..... V-III-1-2
 1.2.3 Sustaining Activity/User Activity..... V-III-1-4

CHAPTER 2 - QUALITY MAINTENANCE PROCESSES

2.1 Applicability V-III-2-1

2.2 Controlled Work Package..... V-III-2-1

CHAPTER 3 - PERSONNEL QUALIFICATION AND TRAINING

3.1	Applicability	V-III-3-1
3.2	General.....	V-III-3-1
3.3	Discussion.....	V-III-3-1
3.4	Qualification Requirements	V-III-3-1
3.4.1	Qualifications.....	V-III-3-1
3.4.2	Scope of Certification Quality Maintenance Qualifications	V-III-3-1
3.5	Training	V-III-3-1
3.5.1	Scope of Certification Awareness Training (Submarines and Submarine Repair Facilities Only).....	V-III-3-1

CHAPTER 4 - WELDER, BRAZER AND NONDESTRUCTIVE TESTING QUALIFICATIONS

4.1	Applicability	V-III-4-1
-----	---------------------	-----------

CHAPTER 5 - IN PROCESS CONTROL

5.1	Purpose	V-III-5-1
5.2	Exceptions to Re-Entry Control.....	V-III-5-1
5.3	Planned Maintenance.....	V-III-5-1
5.4	Test, Measurement and Diagnostic Equipment	V-III-5-2
5.5	Torque.....	V-III-5-2
5.6	Inspections	V-III-5-2
5.6.1	General Requirements.....	V-III-5-2
5.6.2	Inspection Records.....	V-III-5-2
5.6.3	Critical Inspections	V-III-5-2
5.6.4	Cleanliness Inspections.....	V-III-5-3
5.7	Software.....	V-III-5-4
5.7.1	Determination of Acceptability and Use of Piping System Software	V-III-5-4
5.8	Scope of Certification Maintenance Certification/Re-Entry Control	V-III-5-4
5.8.1	Purpose	V-III-5-4
5.8.1.1	General	V-III-5-4
5.8.2	Re-Entry Control Program.....	V-III-5-4
5.8.3	Re-Entry Control Administrative Procedures.....	V-III-5-5
5.8.4	Using a Departure from Specification to Close a Maintenance Certification Record/Re-Entry Control.....	V-III-5-7
5.8.5	Voyage or At Sea Repairs.....	V-III-5-8
5.8.6	Exceptions to Re-Entry Control.....	V-III-5-8
5.8.6.1	Controlled Assembly Requirements for SOC REC Exceptions	V-III-5-9
5.8.7	Certification Continuity Report	V-III-5-9
5.9	Material Condition Monitoring (Submarines only)	V-III-5-9
5.9.1	Hull Integrity Procedures Program	V-III-5-9
5.10	Temporary Modifications	V-III-5-10
5.10.1	Temporary Modification Program	V-III-5-10
5.10.2	Configuration Control.....	V-III-5-10

Appendices

A	Message Format for Certification Continuity for DSS	V-III-5A-1
B	Letter Format for Certification Report to Tended DSS	V-III-5B-1
C	Message Format for DDS Transfer of Custody Certificate of Continuity for Off-loads	V-III-5C-1
D	Message Format for DDS Transfer of Custody Certificate of Continuity for On-loads	V-III-5D-1
E	Message Format for DDS Acceptance of Custody	V-III-5E-1

APPENDIX A
LIST OF ACRONYMS

ACCOMP	Aircraft Carrier Class Maintenance Plan
AEL	Allowance Equipage 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
DMAC	Diagnostic and Maintenance Computers
DMP	Depot Modernization Period
DPMA	Docking Phased Maintenance Availability
DSS	Deep Submergence System
DSW	Diesel Sea Water
ECD	Estimated Completion Date
eDFS	Electronic Departure from Specification
EDSRA	Extended Docking Selected Restricted Availability
EHF	Electrical Hull Fitting
EMBT	Emergency Main Ballast Tank
EOH	Engineered Overhaul
ERO	Engineered Refueling Overhaul
ET	Eddy Current Testing
FBR	Feedback Report
FBW SCS	Fly-By-Wire Ship Control System
FMA	Fleet Maintenance Activity
FRC	Federal Records Center
FWP	Formal Work Package
GSO	General Specifications for Overhaul of Surface Ships
HFP	Horizontal Fixed Pipe
ICAR	Immediate Corrective Action Report
ID	Identification
ISEA	In-Service Engineering Activity

ISIC	Immediate Superior in Command
JCN	Job Control Number
JFMM	Joint Fleet Maintenance Manual
JID	Joint Identification Number
JSN	Job Sequence Number
LAR	Liaison Action Request
LI	Level I
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
NA or N/A	Not Applicable
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
NAVSUP WSS	Naval Supply Weapon Systems Support
NDT	Nondestructive Test
NEC	Navy Enlisted Classification
NIIN	National Item Identification Number
NNPI	Naval Nuclear Propulsion Information
NPS	Nominal Pipe Size
NRO	Nuclear Repair Officer
NRP	Nuclear Repair Part
NSDSA	Naval Systems Data Support Activity
NSF	Nuclear Support Facility
NSN	National Stock Number
NSTM	Naval Ships' Technical Manual
OOP	Out Of Position
OPNAV	Naval Operations
OQE	Objective Quality Evidence
OSIC	On Site Installation Coordinator
P&E	Planning and Estimating
PLAD	Plain Language Address Directory

PMS	Planned Maintenance System
POC	Point Of Contact
PPEA	Propulsion Plant Engineering Activity
PQS	Personnel Qualification Standard
PSA	Post Shakedown Availability
PT	Liquid Penetrant Testing
PTS	Pressure Test Station
Q Point	Critical Quality Control Point
QA	Quality Assurance
QAI	Quality Assurance Inspector
QAL	Quality Assurance Lists
QAO	Quality Assurance Officer
QAS	Quality Assurance Supervisor
QC	Quality Control
QM	Quality Maintenance
Ra	Roughness Average
RADCON	Radiological Control
RCI	Reactor Plant Cleanliness Inspector/Certifier
REC	Re-Entry Control
RFI	Ready for Issue
RFOH	Refueling Overhaul
RISIC	Rubber Insert Sound Isolation Coupling
ROH	Regular or Refueling Overhaul
RPM	Reactor Plant Manual
RPPY	Reactor Plant Planning Yard
RPWAR	Reactor Plant Work Accomplishment Report
RT	Radiographic Testing
SAED	Submarine Antenna Engineering Directorate
SAQAM	Submarine Antenna Quality Assured Material
SCI	Steam Plant Cleanliness Inspector
SCS	Ship Control System
SEOC	Submarine Engineered Operating Cycle
SFCC	Submarine Flight Critical Component
SHCS	Socket Head Cap Screw
SHIPALT	Ship Alteration
SMIC	Special Material Identification Code
SOC	Scope of Certification
SPAR	Steam Plant Action Request
SPLI	Steam Plant Liaison Inquiries
SRA	Selected Restricted Availability
SUBSAFE	Submarine Safety
SUBMEPP	Submarine Maintenance Engineering Planning and Procurement Activity
SUPSHIP	Supervisor of Shipbuilding
SW	SEAWOLF Class Component
TDMIS	Technical Data Management Information System
TDU	Trash Disposal Unit
TFBR	Technical Feedback Report
TGI	Task Group Instruction
TM	Technical Manual
TMDE	Test, Measuring and Diagnostic Equipment
TMDER	Technical Manual Deficiency/Evaluation Report
TMMA	Technical Manual Maintenance Activity

TPD	Test Pressure Drawing
TPS	Test Pressure Station
TRF	Trident Refit Facility
TRS	Technical Repair Standard
TWD	Technical Work Document
TYCOM	Type Commander
UIC	Unit Identification Code
URO	Unrestricted Operations
UT	Ultrasonic Testing
VDD	Version Description Document
VFP	Vertical Fixed Pipe
VT	Visual Testing
VU	VIRGINIA Class Component
WC	Work Center
WCS	Work Center Supervisor

VOLUME V
PART I
CHAPTER 1
ORGANIZATIONAL RESPONSIBILITIES

REFERENCES.

- (a) NAVSEA T9044-AD-MAN-010 - Requirements Manual for Submarine Fly-By-Wire Ship Control Systems
- (b) COMSUBLANT/COMSUBPACINST 3502.1 - Submarine Force Internal Monitoring and Critiques
- (c) NAVSEA SS800-AG-MAN-010/P-9290 - System Certification Procedures and Criteria Manual for Deep Submergence Systems
- (d) NAVEDTRA 43523 - Personnel Qualification Standard for Quality Maintenance Program
- (e) NAVSEAINST 4790.23 - Baseline Project Management Plan (BPMP)
- (f) COMSUBFORINST C5400.30 - Engineering Department Organization Manual
- (g) NAVSEA 0948-LP-045-7010 - Material Control Standard
- (h) NAVSEA S9086-CH-STM-020 - NSTM Chapter 074 V2 (Nondestructive Testing of Metals Qualification and Certification Requirements for Naval Personnel (Non-nuclear))
- (i) NAVSEA T9074-AS-GIB-010/271 - Requirements for Nondestructive Testing Methods
- (j) SECNAVINST 4855.3 - Product Data Reporting and Evaluation Program (PDREP)
- (k) NAVSEA S9074-AQ-GIB-010/248 - Welding and Brazing Procedures and Performance Qualification
- (l) NAVSEA 0924-062-0010 - Submarine Safety (SUBSAFE) Requirements Manual
- (m) NAVSEANOTE 5000 - Activities Authorized to Perform SUBSAFE, FBW-SCS and DSS-SOC Work
- (n) CNRMCIINST 4700.3 - Unplanned Events, Critiques and Trouble Reports
- (o) OPNAVINST 4790.15 - Aircraft Launch and Recovery Equipment Maintenance Program (ALREMP)

LISTING OF APPENDICES.

- A Format for Submarine QA Pre-Underway Checklist

1.1 **PURPOSE.** To provide a list of responsibilities and duties of key personnel within the organizations that are involved in the Fleet Quality Assurance (QA) Program. Responsibilities and/or duties listed in this section are further amplified in other sections of this volume.

1.1.1 **Quality Assurance Organization.** The QA Program for the Fleet is organized into five levels of responsibility:

- a. Fleet.
- b. Type Commander (TYCOM).
- c. Immediate Superior in Command (ISIC).
- d. Ship Commanding Officer/Officer in Charge.
- e. Regional Maintenance Center (RMC) Commander/Fleet Maintenance Activity (FMA) Commanding Officer.

1.2 **FLEET RESPONSIBILITIES.**

1.2.1 **Fleet Commander (Fleet).** The Fleet is responsible to provide policy and direction for the implementation and operation of the QA program as follows:

- a. Promulgate the QA program through the guidelines and procedures of Volume V (Quality Maintenance) of the Joint Fleet Maintenance Manual.
- b. Promote effective and consistent use of Volume V (Quality Maintenance) of the Joint Fleet Maintenance Manual by TYCOMs.

- c. Ensure the scope of training through fleet schools provides the necessary skills for maintenance and management personnel to successfully support the QA program.
- d. Jointly authorize changes to this volume after evaluation and analysis of proposed changes by each TYCOM.
- e. Review TYCOM QA program by sponsoring an annual Quality Assurance Officer (QAO) Conference/Symposium, inviting TYCOM QAO and Naval Sea Systems Command (NAVSEA) technical authorities. The stated purpose should be to establish common trends, discussions of various QA concerns, improvements, and required actions.
- f. Ensure assessments of FMAs and RMCs occur in accordance with Volume IV, Chapter 2, paragraph 2.1.1 of this manual.

1.3 TYPE COMMANDER RESPONSIBILITIES.

1.3.1 Type Commander. TYCOMs are responsible for the following:

- a. (Submarines only) Obtain NAVSEA approval for exception to Re-Entry Control (REC) requirements.
- b. Administer a Departure from Specification (DFS) system to:
 - (1) Establish and maintain an auditable method of processing requests for approval of DFS.
 - (2) Review and evaluate DFS requests and obtain clarification of technical specifications from NAVSEA where appropriate.
 - (3) Approve or disapprove DFS requests.
 - (4) Obtain NAVSEA approval of DFS when required by the appropriate NAVSEA technical specification or manual.
 - (5) Keep NAVSEA informed of all major DFS requests.
 - (6) Provide a periodic status report of all outstanding major DFS to ISIC Material Officers for their action to ensure their records agree with TYCOMs and to pursue DFS clearance.
 - (7) Conduct liaison with NAVSEA on outstanding major DFS requiring NAVSEA action. Provide a periodic status report to NAVSEA of those DFS for which NAVSEA action is overdue.
 - (8) Ensure outstanding DFS for deploying/returning ships are passed between parent and deployed ISICs as required by paragraph 1.4.1.g.(6) of this chapter.
 - (9) (Surface Force Ships/Aircraft Carriers only) Maintain a file of all outstanding DFSs.
- c. Perform assessments of nuclear FMAs annually, not to exceed 18 months.
- d. (Submarines only) Perform assessments of ISICs annually not to exceed 18 months.
- e. Perform assessments of FMAs non-nuclear programs annually not to exceed 18 months.
- f. At the discretion of the TYCOM perform random, unannounced ISIC, FMA and ship QA assessments and monitor visits.
- g. Review and evaluate FMA and ISIC reports of corrective action taken on QA assessments to ensure compliance with this program.
- h. (Submarines only) Maintain a system to provide Submarine Safety (SUBSAFE) certification for submarines.
- i. Perform an annual self evaluation of the QA program and provide a copy to the Fleet QAO. For Submarine TYCOMs, the self assessment will also include SUBSAFE, Submarine Fly-By-Wire Ship Control System (FBW SCS) and Deep Submergence Systems programs and a copy of the assessment should be forwarded to NAVSEA.
- j. Evaluate and analyze proposed changes to this volume.

- k. (Submarines Only) Perform annual SUBSAFE/Scope of Certification (SOC)/FBW SCS awareness training for staff members that routinely review SUBSAFE/SOC/FBW SCS Objective Quality Evidence, make determinations on SUBSAFE/SOC/FBW SCS DFSs and perform other SUBSAFE/SOC/FBW SCS work oversight functions.
- l. (Submarines only) For FBW SCS, develop and implement the necessary instructions and procedures to meet the requirements of reference (a) and to ensure these requirements are adhered to during the life cycle of the ship.
- m. (Submarines only) Maintain FBW SCS certification in accordance with reference (a). In relation to the planning and performance of post Upgrade/Alteration or Major Repair Work Sea Trials for maintaining FBW SCS certification of previously certified submarine FBW SCS, TYCOM shall:
 - (1) Approve at-sea testing developed by the In-Service Engineering Activity (ISEA) following Upgrade/Alteration or Major Repair Work and apply appropriate restrictions and in each message state that ship's speed is restricted to 20 knots or less when an FBW SCS fault condition results in a major nonconformance affecting control of ship's pitch, heading, depth and control surfaces. The ship's speed is restricted to 20 knots or less until satisfactory resolution of the major non-conformance and TYCOM approval to operate the FBW SCS to previously authorized conditions is granted, unless specifically addressed in the Sea Trial agenda or as stated in Departure From Specifications/Deviations/Waivers.
 - (2) Following verification from the ISIC of satisfactory completion of all at-sea testing, correction of all mandatory deficiencies, receipt of certification that the FBW SCS material condition of those parts of the ship installed, repaired and/or tested by the ISEA/activity performing the work is satisfactory, and upon confirmation that FBW SCS certification was not affected for those portions of ship FBW SCS not affected by the ISEA/activity performing the work, issue a message to the ship, with copies to Chief of Naval Operations (CNO), ISIC and NAVSEA, certifying the FBW SCS and authorizing FBW SCS unrestricted use in support of submarine unrestricted operations or specifically identify any operating restrictions of the ship and/or system.
- n. (Submarines only) For assigned activities, provide NAVSEA 07Q informational copies of critiques, trouble reports and incident reports for SUBSAFE/FBW SCS/Deep Submergence System (DSS)/SOC issues that result in a problem severity level of Level 1 (critical) as defined in reference (b).

1.4 IMMEDIATE SUPERIOR IN COMMAND RESPONSIBILITIES.

NOTE: (SUBMARINES ONLY) WHEN ISIC FUNCTIONS ARE DELEGATED OUTSIDE OF THE SQUADRON (NAVAL SUBMARINE SUPPORT COMMAND, SUBMARINE SQUADRON SUPPORT CENTER, ETC.) THERE MUST BE A FORMAL TRANSFER OF RESPONSIBILITY VIA A MEMORANDUM OF AGREEMENT (MOA) OR OTHER FORMAL METHOD.

1.4.1 Immediate Superior in Command. ISICs are responsible to the TYCOM for the following:

- a. Organize and implement a QA program to carry out the provisions of this volume.
- b. (Submarines only) Organize and implement a program to verify performance of required maintenance to sustain the material condition necessary to support Unrestricted Operations (URO) to authorized operating depth in accordance with the applicable class URO Maintenance Requirement Card (MRC) manual, and this volume.
- c. (Submarines, Aircraft Carriers, Readiness Support Groups and RMCs only) Organize and implement a work request screening process such that those jobs requiring special controls are recognized and the supporting technical documentation is provided to the maintenance activity as required by this volume.
- d. (Submarines only) Review Ship's Force Controlled Work Packages (CWP) for FMA accomplished nuclear work as required by Part I, Chapter 2, Appendix E, Technical Work Document (TWD) Review and Approval matrix, of this volume.

- e. (Submarines only) Ensure ship's certification continuity report, when required by this volume, is received before the ship is underway. Review the ship's underway certification continuity report to ensure that it is in the proper format and includes all reports required. In particular, the ISIC will ensure all URO planned maintenance is up to date. Discrepancies noted must be resolved prior to underway.
- f. Review and sign the MOA required by Volume II, Part I, Chapters 3 and 4, of this manual. This agreement will list the responsibilities and actions of each party before start of any availability (e.g., unscheduled availabilities, Tiger Team repairs, technical assist visits) that involves work within SUBSAFE, FBW SCS, nuclear or Level I certification boundaries to ensure responsibilities for recertification of work performed is not split between maintenance activities and that each activity is responsible to certify the work they performed.
- g. (Submarines only) Administer a DFS system to:
 - (1) Establish and maintain system of processing requests for DFSs.
 - (2) Review and evaluate DFS requests and obtain clarification of technical specifications from TYCOM/NAVSEA where appropriate.
 - (3) Approve or disapprove DFS requests.
 - (4) Obtain TYCOM/NAVSEA approval of DFS when required by the appropriate TYCOM/NAVSEA directive, technical specification or manual.
 - (5) Ensure the deployed ISIC directing the supporting FMA will act as the cognizant ISIC for those actions required to approve, review and track DFSs for ships deployed. The parent ISIC, with concurrence from the deployed ISIC, may, on a case by case basis, perform these functions. In such cases, the parent ISIC will inform the deployed ISIC when such action(s) concurred upon is/are complete.
 - (6) The parent ISIC will provide a complete file of all outstanding DFSs to the deployed ISIC, prior to any ship deployment. The deployed ISIC will provide a complete file of all outstanding DFSs to the parent ISIC at the end of deployment.
 - (7) Specify procedures for:
 - (a) Submission of OPNAV form 4790/2K for DFS that require a future maintenance action to clear the departed condition.
 - (b) Submission of OPNAV form 4790/CK for permanent repair DFS which result in new Allowance Parts List and Coordinated Shipboard Allowance List support requirements.
 - (8) Keep parent ISIC apprised on the status of DFSs for deployed units.
 - (9) Maintain files of outstanding DFSs.
 - (10) Aggressively pursue clearing of DFSs.
- h. Monitor the QA program and procedures of assigned FMA periodically and monitor corrective actions on discrepancies noted during the last TYCOM audit. (Submarines only) Naval Submarine Support Command New London will monitor Naval Submarine Support Facility New London.
- i. Schedule and conduct a QA Program assessment in conjunction with the Fleet Readiness Training Plan (or as determined by each TYCOM) of all assigned ships to ensure the repair actions undertaken by Ship's Force conform to the provisions of the QA Program as well as pertinent technical requirements.
- j. Review and endorse TYCOM audit report of assigned FMA(s).
- k. Conduct periodic monitoring of Ship's Force work and QA program on all assigned ships during maintenance periods.
 - (1) Perform at least one surveillance during each refit/upkeep/FMA availability.

- (2) Conduct monitoring during industrial availabilities (e.g., Selected Restricted Availability, Drydocking Selected Restricted Availability, Extended Refit Period, Post Shakedown Availability, Phased Maintenance Availability, Docking Phased Maintenance Availability, Depot Modernization Period, Engineered Refueling Overhaul and Regular or Refueling Overhaul).
- l. (Submarines only) Perform annual SUBSAFE/SOC/FBW SCS awareness training for staff members (Submarine Squadrons and associated Naval Submarine Support Centers and Performance Monitoring Teams to include Weapons, Combat Systems and Material Departments with the associated Chain of Command) that routinely review SUBSAFE/SOC/FBW SCS objective quality evidence, make determinations on SUBSAFE/SOC/FBW SCS DFSs, perform other SUBSAFE/SOC/FBW SCS work oversight functions.
- m. (Submarines only) Conduct an oral interview of relieving Ship's Force QAO which covers the following topics as a minimum:
 - (1) URO Program Management including a review of the ship's current URO Schedules and Inventories and completion procedures.
 - (2) DFS Program Management including a review of all outstanding departures.
 - (3) QA Training and Qualification Program.
 - (4) QA Surveillance and Assessment Program including a review of the ship's last ISIC QA Assessment and corrective actions.
 - (5) CWP opening and closing review processes.
- n. Ensure fact-finding critiques are held to establish underlying causes and pursue corrective actions when necessary. When major errors or problems occur during maintenance that affect Nuclear, Level I, FBW SCS/Submarine Flight Critical Components (SFCC), DSS/SOC or SUBSAFE work, a critique may be necessary. Examples include when significant problems or trends occur or those that did result or could result in incidents, significant unplanned rework, serious equipment damage, malfunction or personnel injury. Minor problems are isolated deficiencies with minimal overall impact and no significant consequences; these should normally be corrected on the spot and without expending much time and effort.
 - (1) (Submarines only) Contact the **ISIC** immediately for issues which will result in a SUBSAFE/FBW SCS/DSS/SOC critique, SUBSAFE/FBW SCS/DSS/SOC trouble report, and/or SUBSAFE/FBW SCS/DSS/SOC fact-finding.
 - (2) (Submarines only) Additional guidance and direction for critiques is contained in reference (b).
 - (3) (Submarines only) Copies of critiques and incident reports for SUBSAFE/FBW SCS/DSS/SOC issues that result in a problem severity level of Level 1 (critical) will be sent to the TYCOM electronically.

NOTE: THE ISIC IS ONLY RESPONSIBLE TO AUDIT FBW WORK PERFORMED BY FORCES AFLOAT/TYCOM MANAGED ACTIVITIES.

- o. (Submarines only) ISIC responsibilities. Maintain FBW SCS certification in accordance with reference (a). In relation to the planning and performance of post Upgrade/Alteration or Major Repair Work Sea Trials, for maintaining FBW SCS certification of previously certified submarine FBW SCS, the ISIC shall:
 - (1) Provide sufficient time for crew training during the Upgrade/Alteration or Major Repair Work period to permit Ship's Force to attain a level of knowledge and proficiency of the FBW SCS adequate to ensure proper operation and safety of the ship and its personnel during Sea Trials. ISIC shall also ensure crew has proper number of trained operators.

- (2) Conduct FBW SCS Certification Audits of Upgrade/Alterations or Major Repair Work and issue report to the activity. Audits shall be conducted using the TYCOM provided FBW Certification Audit Checklist at a minimum. Provide a copy of the FBW SCS Certification Audit Report to the Supervising Authority, ship's Commanding Officer, TYCOMs, Fleet Commanders and NAVSEA.
 - (3) Following Upgrade/Alteration or Major Repair Work report, by message, crew readiness and prior to each underway until certified, verification from the ISEA/activity performing the work that all work performed by the ISEA/activity performing the work necessary for at-sea testing or Sea Trials has been completed, including resolution of ISIC FBW SCS Certification Audit Deficiencies recommendations and status of incomplete ISIC FBW SCS Certification Audit Category Deficiencies, and that the material condition of those parts of the ship installed, repaired, and/or tested by the ISEA/activity performing the work is satisfactory, certify to the TYCOM, with information copies to the CNO, the appropriate Fleet Commander and NAVSEA, that the FBW SCS material condition of those parts of the ship installed, repaired and/or tested by the ISEA/activity performing the work is satisfactory for Sea Trials in accordance with approved at-sea tests or Sea Trial agenda.
 - (4) Following verification from the ISEA/activity performing the work of satisfactory completion of all at-sea testing or trials, completion of controlled dives, correction of all mandatory Sea Trial deficiencies, and resolution of all ISIC FBW SCS Certification Audit Category IA recommendations, certify to the TYCOM, with information copies to CNO, the appropriate Fleet Commander and NAVSEA, the FBW SCS material condition of those parts of the ship installed, repaired, and/or tested by the ISEA/activity performing the work is satisfactory, and recommend authorization for FBW SCS unrestricted use in support of submarine unrestricted operations, subject to ISIC verification that FBW SCS certification of areas outside ISEA/activity performing the work tasking has been sustained, or specifically identify any operating restrictions of the ship and/or system.
- p. (Submarines only) The ISIC will transmit a Submarine Material Transfer Message to the gaining ISIC for deploying/deployed submarines when the unit out chops to include the following:
- (1) Status of outstanding Casualty Reports.
 - (2) Status of outstanding ZOZZ.
 - (3) Status of outstanding (SUBS).
 - (4) Status of active DFS actions.
 - (5) Status of Periodic Maintenance Requirements (Integrated Maintenance and Modernization Plans and UROs) for accomplishment.
 - (6) Status of Alterations for accomplishment.
 - (7) Status of Pre-Overhaul Tests/Pre-Availability Testing for ships within 12 months of a scheduled CNO availability.
 - (8) Current Operational Interval/Operational Cycle expiration dates.
 - (9) Status of Material Condition Assessment if in progress.
- q. (Submarines only) At the end of every scheduled FMA upkeep, verify all SUBSAFE deficiencies documented in the ship's Current Ship's Maintenance Project have been corrected or have an appropriate DFS.
- r. (Submarines only) Prior to submerged underway operations when submarines are in a port with an ISIC, or when a submarine is in an availability such as Continuous Maintenance Availability, Interim Drydocking, Emergent Availability or CNO Availability, the ISIC QAO shall complete a QA Pre-Underway Checklist. Appendix A of this chapter provides the minimum requirements for the QA Pre-Underway Checklist.

1.5 SHIP RESPONSIBILITIES.

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

- a. Designate a QAO in writing who will have sufficient time on board to maintain program continuity.
- b. Approve Technical Work Document (TWD) as required in Part I, Chapter 2, Appendix E, TWD Review and Approval matrix, of this volume.
- c. (Submarines only) Provide the ISIC a written report of ship's certification continuity prior to underway, as specified in Part I, Chapter 5, paragraph 5.6.8 of this volume.
- d. (Submarines only) Organize and implement a program to ensure performance of required maintenance to sustain the material condition necessary to support URO to authorized operating depth in accordance with the applicable class URO MRC manual and Volume VI of this manual.
- e. (Submarines only) Organize and implement a program to ensure performance of required maintenance to sustain the material condition necessary to support FBW unrestricted operations in accordance with reference (a).
- f. (Submarines only) Organize and implement a program to ensure performance of required maintenance to sustain the material condition necessary to support DSS-SOC certification (if required) in accordance with reference (c).
- g. (Submarines only) Approve and sign all recertification Reactor Plant Work Accomplishment Reports (RPWAR) and ensure these documents are forwarded to the Reactor Plant Planning Yard with copy to NAVSEA Nuclear Propulsion Directorate (08), TYCOM and ISIC.
- h. Certify all QA personnel qualifications (respective Department Head on Aircraft Carriers).
- i. Review and sign with the shipyard or other industrial activity, RMC/FMA and ISIC, an MOA on responsibilities and action of each party with respect to work accomplishment prior to start of SUBSAFE, nuclear, FBW SCS or Level I work in accordance with this manual.
- j. Approve DFSs in accordance with Part I, Chapter 8 of this volume.

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

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

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

- a. Ensure area(s) in or adjacent to their work centers/divisions/spaces are designated for the stowage of controlled material in accordance with Part I, Chapter 6 of this volume.
- b. Review or approve Formal Work Package (FWP) and TWD as required in Part I, Chapter 2, Appendix E, TWD Review and Approval matrix, of this volume.
- c. Ensure personnel in their departments involved in performing, planning, approving or supervising shipboard maintenance on SUBSAFE, nuclear, FBW SCS and Level I systems participate in QA training.
- d. Verify the department maintains sufficient numbers of qualified Quality Assurance Inspectors (QAI) and Controlled Material Petty Officers (CMPO).
- e. Participate in oral examination of shipboard QAI and Quality Assurance Supervisor (QAS) assigned to their departments.
- f. Ensure personnel within their departments perform QA surveillance, qualification, training, etc. as defined in this volume.

- g. Review and approve information submitted to the FMA for identification of controlled work. This information must include a TWD serial number when required by Part I, Chapter 2 of this volume. This review will also ensure that the work request identifies specific categories applicable in each of the following situations as required by this volume:
 - (1) SUBSAFE.
 - (2) Level I.
 - (3) Submarine Antenna Engineering Directorate (SAED).
 - (4) Nuclear.
 - (5) Special cleanliness requirements.
 - (6) Special testing requirements.
 - (7) Special fabrication requirements.
 - (8) DFS.
 - (9) SOC.
 - (10) SFCC.
- h. Ensure fact-finding critiques are held to establish underlying causes and pursue corrective actions when necessary. When major errors or problems occur during maintenance that affect Nuclear, Level I, FBW SCS/SFCC, DSS/SOC or SUBSAFE work, a critique may be necessary. Examples include when significant problems or trends occur or those that did result or could result in incidents, significant unplanned rework, serious equipment damage, malfunction or personnel injury. Minor problems are isolated deficiencies with minimal overall impact and no significant consequences; these should normally be corrected on the spot and without expending much time and effort.
 - (1) (Submarines only) Contact the ISIC immediately for issues which will result in a SUBSAFE/FBW SCS/DSS/SOC critique, SUBSAFE/FBW SCS/DSS/SOC trouble report, and/or SUBSAFE/FBW SCS/DSS/SOC fact-finding.
 - (2) (Submarines only) Additional guidance and direction for critiques is contained in reference (b).
 - (3) (Submarines only) Copies of critiques and incident reports for SUBSAFE/FBW SCS/DSS/SOC issues that result in a problem severity level of Level 1 (critical) will be sent to the TYCOM electronically.
- i. Review DFS for technical accuracy and sign.
- j. Spot check performance of QA training by attending/monitoring training at least quarterly.
- k. (Aircraft Carriers only) Certify QA qualifications for personnel assigned to their department by signing the applicable Personnel Qualification Standard cover sheet of reference (d).

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

- a. Ensure procurement, receipt and stowage of Nuclear, SOC, SFCC, SAED - Submarine Antenna Quality Assured Material and Level I materials are in compliance with this volume, applicable material control standards and instructions.
- b. Designate and maintain areas for stowage of Level I (LI) and SOC stock program material, SFCC and Nuclear Repair Parts (NRP) in the custody of the supply department.
- c. File the Supervisor of Shipbuilding letter of certification for Level I, SFCC and NRP which are in the custody of the supply department.

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

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

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

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

- a. Become a knowledgeable member of the availability project team.
- b. To support these requirements, the Availability Coordinator will be assigned as early as possible during the pre-availability test and inspection period, nominally 15 months before the availability starts. Prior to reporting to the submarine, the Availability Coordinator will be trained in shipyard processes and Availability Work Package requirements in accordance with reference (e), Appendix H. After reporting to the submarine, the Availability Coordinator should spend a significant portion of his time working with the shipyard project team prior to the start of the availability. This may require that he remain ashore during key pre-availability planning phases while the submarine is at sea. Finally, to prevent interference with his responsibilities for availability planning and execution, the Availability Coordinator should not be assigned routine watch standing duties. He should maintain proficiency

requirements (about two watches per month), but his watch standing duties should not interfere with daily project management routine or the increased pace of coordination associated with major key events (e.g., undocking).

- c. Educate/train Ship's Force on shipyard tools and processes to be used during the availability. This responsibility does not circumvent the requirements placed on the industrial activity to train Ship's Force, but the Availability Coordinator will coordinate and complement the training provided by the industrial activity.
- d. Coordinate the integration and execution of Ship's Force responsibilities during the availability planning and execution.
- e. Act as the primary liaison between Ship's Force and the shipyard project team.

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

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

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

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

- a. Review TWD as required in Part I, Chapter 2 Appendix E, TWD Review and Approval matrix, of this volume.
- b. Review the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- c. Verify controlled work is accomplished in accordance with an approved CWP.
- d. Ensure personnel assigned to their divisions perform QA surveillance, qualification, training, etc. as defined in this instruction.
- e. Supervise QA training of division personnel.
- f. Provide timely response to QA 14, indicating root cause analysis and actions taken.
- g. Issue unique identification numbers for brazers and welders.
- h. Maintain a log of unique identification numbers assigned to brazers/welders.
- i. Ensure annual validation of qualification is performed for brazers/welders and entries are entered into the individual service records.
- j. Maintain an auditable file for each brazer/welder assigned.
- k. Maintain an auditable log of each brazer/welder for proper maintenance of qualification.

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

- a. Review the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- b. Have TWD prepared, when designated the Lead Work Center (LWC), and as required by Part I, Chapter 2, paragraph 2.2 of this volume:

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

1.5.11 Ship's Craftsman. Craftsman is responsible to:

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

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

- a. Administer the ship's QA program.
- b. Review TWD as required in Part I, Chapter 2, Appendix E, TWD Review and Approval matrix, of this volume.

- c. Review the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- d. Verify the FWP, in the CWP, specifies the correct OQE that is to be generated to prove recertification of the system or component.
- e. Verify the testing requirements for controlled work, called out in the FWP, are correct and in accordance with the latest applicable specifications as required by Part I, Chapter 2, paragraph 2.3 of this volume.
- f. Verify completed test results for controlled work fully satisfy test requirements, or corrective action is taken.
- g. Review and close out all TWDs for work on systems or components required for reactor plant startup, propulsion plant startup or ship's underway operations (e.g., if the work is on a spare component it may not be necessary to close the TWD) prior to startup or getting underway.
- h. Maintain the following record files in accordance with Part I, Chapter 10, paragraph 10.5 of this volume:
 - (1) Completed CWPs.
 - (2) QA Assessments, audits, surveillance and deficiency correction.
 - (3) Controlled material.
- i. Determine suitability for use of Level I, SOC, SFCC or Nuclear Level I material from another ship in own ship's system, when the transfer is directly from the donating ship.
- j. Provide disposition instructions for material rejected at receipt inspection.
- k. Obtain chemical analysis, NDT, destructive testing and generic materials identity testing results as required by Part I Chapter 6 of this volume to certify material for use in a certified (e.g., Level I, SUBSAFE, Nuclear, Scope of Certification) system.
- l. Provide technical services to the Supply Officer for determining material requirements.
- m. Authorize downgrading of LI stock program material, NRP or controlled material for non-level use.
- n. Review requests for DFS for accuracy and technical merit, and forward to Department Head.
- o. Maintain an auditable file of outstanding DFS and the record of DFS numbers assigned. Prior to each underway following any scheduled Fleet/CNO Maintenance Availability, the ship's QAO will audit active DFSs against associated Job Control Numbers to verify a current up to date entry in the Current Ship's Maintenance Project exists.
- p. Maintain a file of DFS which have been approved as permanent repairs and result in change in configuration until they are reflected in ship's drawings.
- q. Verify ship's mapping plans and selected records and drawings are updated (marked up) when approved DFS authorize a change in configuration as a permanent repair.
- r. Submit DFS clearance reports, using Departure Clearance Report (QA form 12A) to the approving authority when the work was done which corrects specific DFS. If unable to use a QA form 12A, use the message format of Part I, Chapter 8, Appendix B, of this volume.
- s. Manage the ship's internal QA Audit and Surveillance program as required by Part I Chapter 9 of this volume. Coordinate with the ship's Executive Officer to resolve surveillance scheduling and accomplishment problems.
- t. Ensure that QA training is conducted as required by Part I, Chapter 3 and Part III, Chapter 3 (as applicable) of this volume and reference (a) (as applicable). The QAO will coordinate with the Ship's Engineer and Engineering Department Master Chief to incorporate these requirements into the Engineering Departmental Training Plan. The QAO will attend QA training when practical.
- u. Assess QA training and provide input to Engineering Department Master Chief and Ship's Engineer for incorporation into the periodic Engineering Department Training assessment as required by reference (f).

- v. Implement a formal qualification program for QAIs, CMPOs, Cleanliness Inspector/Certifiers, QASs, Work Center Supervisors and Maintenance Planners (if assigned).
- w. Conduct oral qualification interviews for QAIs/QASs/CMPOs/Cleanliness Inspector/Certifiers, Work Center Supervisors and Maintenance Planners.
- x. Maintain a current master list of qualified CMPOs/Controlled Material Handlers (CMH), Cleanliness Inspectors, QAIs, QASs (if assigned), Oxygen Clean Workers, Oxygen Clean Instructors, Work Center Supervisors and Maintenance Planners as specified in Part I, Chapter 10 of this volume.
- y. (Submarines only) Verify all reactor plant hull integrity area maintenance is accomplished in accordance with appropriate directives.
- z. (Submarines only) Verify **the appropriate work control** is initiated for work within the SUBSAFE, **SOC and FBW** boundary.
- aa. (Submarines only) Maintain SUBSAFE **and SOC REC and FBW**/CWP records including the CWP log.
- ab. (Submarines only) Coordinate with the ISIC and the FMA to ensure the administration, scheduling and reporting of the URO MRC program is in accordance with the applicable class URO MRC manual, and this volume.
- ac. (Submarines only) Retain any QA form 34 generated in connection with controlled assembly performed as a REC exception in accordance with Part I, Chapter 5, paragraph 5.6.7, Note 3 of this volume.
- ad. Review in detail as many non-nuclear NDT weld records as possible (minimum of 10 percent per year) to ensure that all of the requirements of the applicable fabrication documents have been and are continuously being met.
- ae. Verify an active Job Control Number exists for all active temporary DFSs at the completion of all scheduled Fleet Maintenance Activity Availabilities, major or minor, CNO availabilities or at least quarterly and maintain an auditable record of the verification until superseded.
- af. (Submarines only) At the end of a scheduled FMA upkeep, verify all SUBSAFE deficiencies documented in the ship's Current Ship's Maintenance Project have been corrected or have an appropriate DFS.

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

1.5.14 Ship's Quality Assurance Supervisor. QAS, if assigned, will perform the duties as specified in paragraph 1.6.13 of this chapter.

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

- a. Develop a thorough understanding of the QA program.
- b. After verifying work completed, enter initials or signature (as required by the form, tag or procedure), and the date on all applicable QA forms/tags and CWP steps.
- c. Verify QA form 2 is filled out correctly and attached to items removed from a controlled system for transfer to another Fleet activity and ensure items received from another ship have QA form 2 tags attached.
- d. As LWC QAI, review each CWP prepared which requires QAI CSBs to verify inspection requirements are adequately addressed before submission to QAO and/or Department Head as required by Part I, Chapter 2, Appendix **E**, of this volume.
- e. Verify all work inspected meets the minimum requirements set forth in latest applicable plans, specifications and directives of higher authority as stated in the FWP.
- f. Perform QA inspections of certification attributes as required by Part I, Chapter 5, of this volume.
- g. Ensure all inspections beyond the capability of the QAI are performed by FMA inspectors prior to final acceptance/installation of the product by the ship.

- h. Ensure only TMDE (i.e., measuring devices, instruments, inspection tools, gauges, jigs or fixtures), which have current calibration stickers/records attached or available, are used for production, acceptance and testing. Uncalibrated/untested TMDE will be tagged and removed from service immediately.
- i. Ensure items removed from controlled systems are tagged with QA form 2 when required by Part I, Chapter 6 of this volume. Tags are not required if material is nuclear non-Level (Level N/A) or non-nuclear non-level.
- j. Ensure controlled material (Level I, Nuclear Level I, **Material Control Division A & B, SFCCs**) delivered to a RMC/FMA work center for work is tagged with a QA form 2.
- k. Report all work and testing discrepancies/deficiencies to the department head and the QAO via chain of command. Ensure the deficiency is resolved before work continues.
- l. Sign QA form 2 when controlled material is installed for SUBSAFE and nuclear systems.
- m. As LWC QAI, review all completed QA forms and data sheets for accuracy, completeness and technical correctness.
- n. Reject untraceable, damaged, or unclean controlled material using a material reject tag (QA form 3).
- o. Witness controlled assemblies, as a second party not involved in the actual work.
- p. (Submarines only) Complete the necessary recertification information for maintenance performed by Ship's Force; for material changes/replacement, material generic identification (if not previously documented) or fastener torque on the applicable blank RPWAR pages and submit to the Engineer Officer for review prior to approval by the Commanding Officer. The general notes for report preparation and use, supplied with each RPWAR, will be used in completing the recertification form.
- q. Review certification testing as part of CWP preparation.
- r. Witness and document results of tests (hydrostatic, drop, joint tightness). Work center tests of components conducted by the FMA need not be witnessed, unless directed by the Department Head or FMA CWP. Promptly inform supervisors of unsatisfactory test results. Ensure test documentation is complete and accurate.
- s. Review DFS/LAR prepared by the work center for accuracy and technical merit, and forward to the Division Officer and QAO.

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

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

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

1.5.17 Ship's Cleanliness Inspector/Certifier. Cleanliness Inspectors/Certifiers are responsible to perform initial, in process and final cleanliness inspections during maintenance/repairs for those systems requiring cleanliness controls per Part I, Chapter 5, paragraph 5.4, of this volume.

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

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

- r. Prepare and execute the training and qualification program for each NDT method that leads to inspector certification in each method and maintains inspector competency in each method.

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

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

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

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

- a. Prepare the FWP/CWP as required in Part I, Chapter 2, paragraph 2.3.1.b of this volume.
- b. Perform ship check/job check to verify equipment configuration supports work package development.
- c. Develop FWPs/CWPs with the correct written instructions both in sequence and requirements to satisfactorily accomplish the work.
- d. Develop FWPs/CWPs with the correct technical specifications or requirements (e.g., torque values, dimensions, NDT inspection, special cleanliness, recertification test) for certification attributes to be documented on the appropriate QA form. Fill in all preplaced data required by QA form instructions prior to routing CWP.
- e. Ensure signatures for repair work attributes are annotated as requiring CSB or signature, as applicable, on the QA form and in the FWP as discussed in Part I, Chapter 2 of this volume by use of (R), (S), (C), (I), (Q) and (V) in the margin by the appropriate step.
- f. Ensure correct materials, spare parts and special test equipment to be used during maintenance and testing are called out in the materials section of the FWP.
- g. Initiate revisions to FWPs/CWPs when requirements of Part I, Chapter 2, paragraph 2.3.7.3.b(2)(b) and (d) of this volume are met.
- h. Maintain file of Standardized FWPs in accordance with Part I, Chapter 2, paragraph 2.3.7.10.e. of this volume, for their respective divisions. Submit Standardized FWPs to LWC Supervisor for approval prior to use.
- i. Initiate procurement of material specified by the applicable drawings, standards or specifications to complete the designated repairs.
- j. Prepare and route a DFS for non-nuclear or LAR for nuclear tests, inspections, material or other requirements of any maintenance action in which the requirements were not met.

1.6 REGIONAL MAINTENANCE CENTER/FLEET MAINTENANCE ACTIVITY RESPONSIBILITIES.

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

- a. Designate the RMC/FMA QAO in writing.

- b. (Submarines only) Provide a written report of certification to the tended ship, at the conclusion of a maintenance period and prior to a tended ship's next underway.
- c. Certify the qualifications of QA personnel.
- d. Ensure the RMC/FMA has an effective audit and surveillance program capable of assessing work performance and identifying areas of poor performance.
- e. Initiate a semi-annual evaluation of the RMC/FMA QA Program by the QAO.
- f. (Submarines only) Implements all aspects of the SUBSAFE and FBW-SCS programs as delineated by references (a), (c), (I) and (m).

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

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

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

- NOTES:
- 1. AT TRIDENT REFIT FACILITIES SOME OF THESE RESPONSIBILITIES MAY BE UNDER THE COGNIZANCE OF THE PLANNING OFFICER. HOWEVER, THEY WILL NOT BE DELEGATED TO A LEVEL LESS THAN A DEPARTMENT HEAD.
 - 2. WHERE NOTED, SOME OF THESE RESPONSIBILITIES MAY BE UNDER THE COGNIZANCE OF THE ENGINEERING DEPARTMENT HEAD AT AN RMC.
- a. Implement a work request screening process such that jobs requiring special controls are recognized.
 - b. Implement a QA Program that ensures all work accomplished by the Production/Repair Department meets the material and workmanship requirements of approved plans and specifications.
 - c. Provide liaison with other department heads when their functions are directly or indirectly related to the QA requirements of the Production/Repair Department.
 - d. Review and approve TWD as required in Part I, Chapter 2, Appendix E, TWD Review and Approval matrix, of this volume.
 - e. Review and approve the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
 - f. (Submarines only) Approve and sign all recertification RPWAR and ensure these documents are forwarded to the Reactor Plant Planning Yard with copy to NAVSEA 08, TYCOM and tended ship's parent ISIC.
 - g. Review all DFS initiated by the RMC/FMA.
 - h. (Submarines only) Review and approve all LARs initiated by the FMA.
 - i. Maintain a sufficient number of qualified personnel to adequately staff the QA Division. At RMCs this may be performed by the Quality Assurance Department Head.
 - j. Implement a formal training and qualification program for all personnel assigned to the Production/Repair Department who perform, plan, and/or supervise controlled work, covering QA requirements and practices.
 - k. Designate nuclear/non-nuclear Metallographic Test Method Examiner and Generic Material Alloy Identification Examiners (as applicable). At RMCs this may be performed by the Quality Assurance Department Head.

- l. Verify the RMC/FMA has an effective audit and surveillance program capable of assessing work performance and identifying areas of poor performance. At RMCs this may be performed by the Quality Assurance Department Head.
- m. Ensure fact-finding critiques are held to establish underlying causes and pursue corrective actions when necessary. When major errors or problems occur during maintenance that affect Nuclear, Level I, FBW SCS/SFCC, DSS/SOC or SUBSAFE work, a critique may be necessary. Examples include when significant problems or trends occur or those that did result or could result in incidents, significant unplanned rework, serious equipment damage, malfunction or personnel injury. Minor problems are isolated deficiencies with minimal overall impact and no significant consequences; these should normally be corrected on the spot and without expending much time and effort. At RMCs this may be performed by the Engineering or Quality Assurance Department Head.
 - (1) (Submarines only) Contact the ISIC immediately for issues which will result in a SUBSAFE/FBW SCS/DSS/SOC critique, SUBSAFE/FBW SCS/DSS/SOC trouble report, and/or SUBSAFE/FBW SCS/DSS/SOC fact-finding.
 - (2) (Submarines only) Additional guidance and direction for critiques is contained in reference (b).
 - (3) (Submarines only) Copies of critiques and incident reports for SUBSAFE/FBW SCS/DSS/SOC issues that result in a problem severity level of Level 1 (critical) will be sent to the TYCOM electronically.
- n. Ensure that each work request/job order is screened for Quality Control/QA requirements and marked up or stamped as to specific category applicable in each of the following situations as required by this manual:
 - (1) SUBSAFE.
 - (2) Level I.
 - (3) SAED.
 - (4) Nuclear.
 - (5) Special cleanliness requirements.
 - (6) Special testing requirements.
 - (7) Special fabrication requirements.
 - (8) SOC.
 - (9) SFCC.
- o. (Submarine Repair Facilities) Oversees the implementation of the SUBSAFE, DSS-SOC and FBW-SCS programs as directed by references (a), (c), (l) and (m).

1.6.4 FMA Supply Officer. Supply Officer is responsible to:

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

- f. Ensure appropriate supply personnel receive training on nuclear and non-nuclear material covering material certification, material procurement, receipt inspection, and LI/SOC stock program material, SW, VU and NRP stowage requirements.
- g. Ensure semiannual inventories of supply's LI/SOC stock program material, SW, VU and NRP are conducted.

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

- a. Determine and specify the material requirements and the certification requirements for the NRP to be used in nuclear controlled work.
- b. Initiate procurement action for NRP required for accomplishment of nuclear tasks.
- c. Review and approve the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- d. Prepare and promulgate the CWP, when OQE is required at the conclusion of the nuclear work and as required by Part I, Chapter 2 of this volume.
 - (1) Verify the FWP is the correct procedure both in sequence and requirements to satisfactorily accomplish the controlled work.
 - (2) Verify the CWP contains/lists the correct technical specifications or requirements (e.g., torque values, dimensions, NDT inspections, special cleanliness, test) for certification attributes to be documented on the appropriate QA form.
 - (3) Ensure test requirements for controlled work comply with the latest applicable specifications.
 - (4) Ensure signatures for repair work attributes are annotated as requiring CSB or signature, as applicable, on the QA form and in the FWP as discussed in Part I, Chapter 2 of this volume by use of (R), (S), (CI), (G), (C), (I), (Q) and (V) in the margin by the appropriate step.
- e. (Submarines only) Review and sign the necessary recertification RPWAR pages, as required by Part I, Chapter 5, paragraph 5.11, of this volume for repair/maintenance actions performed in Reactor Plant SUBSAFE/Hull Integrity areas by the FMA and forward to the QAO for review.
- f. (Submarines only) Maintain copies of approved RPWAR forwarded to the Reactor Plant Planning Yard in an auditable fashion.
- g. Provide the tended ship the test requirements and joints/components to be tested for recertification of FMA work prior to commencing work on the tended ship.
- h. Conduct oral examinations for qualification of personnel as reactor plant Cleanliness Inspector/Certifier.
- i. Ensure only appropriately trained and/or qualified personnel perform nuclear work.

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

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

- (4) Ensure signatures for repair work attributes are annotated as requiring CSB or signature, as applicable, on the QA form and in the FWP as discussed in Part I, Chapter 2, paragraph 2.3 of this volume by use of (R), (S), (CI), (G), (C), (I), (Q) and (V) in the margin by the appropriate step.
- e. Provide the tended ship the test requirements and joints/components to be tested for recertification of FMA work prior to commencing work on the tended ship.

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

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

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

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

1.6.9 RMC/FMA Craftsman. Craftsman is responsible to:

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

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

1.6.10 RMC Quality Assurance Department Head (Code 130) or Industry Management Department (Code 400 at Puget Sound Naval Shipyard and Intermediate Maintenance Facility). (For NAVSEA managed RMCs) These departments are responsible to:

- a. Implement a QA program in accordance with this volume that ensures all work accomplished by the Production/Repair Department meets the material and workmanship requirements of approved plans and specifications.
- b. Provides liaison with other department heads when their functions are directly or indirectly related to the QA requirements of the Production/Repair Department.
- c. Provide the Commander/Commanding Officer with a semi-annual evaluation of the overall adequacy and effectiveness of the RMC's QA program.
- d. Verify the RMC/FMA has an effective audit and surveillance program capable of assessing work performance and identifying areas of poor performance.
- e. Maintain sufficient number of qualified personnel to adequately staff the QA Department.
- f. Designate nuclear/non-nuclear Metallographic Test Method Examiner and Generic Material Alloy Identification Examiners (as applicable) (Code 130 responsibility at Puget Sound Naval Shipyard and Intermediate Maintenance Facility).
- g. Ensure fact-finding/critiques (as applicable) are held to establish underlying causes and pursue corrective actions when major errors, mistakes or problems occur during maintenance, or result in serious damage to equipment or injury to personnel. Notify Commander Navy Regional Maintenance Center of critiques and trouble reports in accordance with reference (n).
- h. Assign a qualified Quality Assurance Officer to the Code 133 division (RMC) or Code 450 (Puget Sound Naval Shipyard and Intermediate Maintenance Facility).

1.6.11 RMC Code 133 Division Head/FMA Quality Assurance Officer. Code 133/QAO is responsible to:

- a. Organize and implement a QA program within the RMC/FMA to carry out provisions of this volume.
- b. Provide guidance and evaluate efforts to produce work of acceptable standards.
- c. Prepare QA procedures, where necessary, to implement the provisions of this volume.
- d. Assist the TYCOM/ISIC as requested in performing QA audits on tended ships.
- e. Assist the TYCOM/ISIC as requested in providing indoctrination training on the QA program to the Engineer Officers and QAOs of assigned ships. Provide QA training for tended ship's personnel qualifying as CMPO/CMH, QAS and QAI.
- f. Approve downgrading of controlled material.
- g. Determine suitability for use of controlled material received from one ship, for use on another ship, when the transfer is via an RMC/FMA work center.
- h. Provide disposition instructions for rejected material.
- i. Institute a formal qualification program for QA personnel.
- j. Train and qualify work center CMPOs/CMHs. Inform the appropriate Division Officer and the Production/Repair Officer in writing of those qualified and any changes.
- k. QAO will review FMA generated DFS for accuracy and technical merit, sign and forward to the Repair Officer. At an RMC, this function will be the responsibility of the NAVSEA Technical Authority Warrant Holder in Engineering Department.

- l. Obtain chemical analysis, NDT and destructive testing required to upgrade or certify material for nuclear and non-nuclear applications for both the RMC/FMA and tended ships.
- m. Establish and coordinate RMC/FMA procedures for material control as delineated in this volume.
- n. Review, open and close out TWDs as required in Part I, Chapter 2, Appendix E, TWD Review and Approval matrix of this volume. Establish positive controls to ensure that repairs which are not in conformance with specification are not accepted without an approved DFS for non-nuclear systems or LAR for nuclear systems.
- o. Review the FWP as required in Part I, Chapter 2, paragraph 2.3.4 of this volume.
- p. (Submarines only) Review and sign RPWAR.
- q. Develop a QA training program, in conjunction with the Training Officer, which includes training for personnel who perform, plan and/or supervise controlled work.
 - (1) Supervise training and qualification of:
 - (a) QAS.
 - (b) QAIs.
 - (c) CMPOs/CMHs.
 - (d) Cleanliness Inspectors/Certifiers.
 - (2) Review and evaluate training of all personnel performing controlled work. Ensure that the continuing training is in sufficient detail and depth to provide effective training in all topics and areas specified in Part I, Chapter 3 of this volume.
- r. Maintain a current master list of qualified QASs (if assigned), QAIs, CMPOs/CMHs, Cleanliness Inspectors, Oxygen Clean Workers and Oxygen Clean Instructors as specified in Part I, Chapter 10 of this volume.
- s. Establish and administer a comprehensive RMC/FMA QA audit and surveillance program capable of assessing the work performance, training and qualifications and identifying areas of poor performance. Enlist the assistance of other repair department officers and senior enlisted personnel for audits and surveillance in the repair and supply departments.
 - (1) Prepare and update a written surveillance and annual audit schedule.
 - (2) Provide the Quality Assurance Department Head (for RMC) and Commander/Commanding Officer (for FMA) with a semi-annual evaluation of the overall adequacy and effectiveness of the RMC's/FMA's QA program.
- t. Ensure record files are maintained for CWP, controlled material, audits, surveillance, audit deficiency corrections, qualifications and training.
- u. Ensure all testing required for completion of TWD is complete and reviewed prior to the tended ship reactor plant startup, propulsion plant startup, or getting underway or a DFS for non-nuclear systems or LAR for nuclear systems has been submitted and approved.
- v. Perform opening reviews of CWP as assigned to assure OQE generated will support work recertification. Perform closing reviews of CWP as assigned to assure technical accuracy and satisfactory OQE exists for record history.
- w. Supervise QASs, QAIs, Cleanliness Inspectors/Certifiers, CMPOs/CMHs and other personnel, involved in controlled work, in the performance of their QA duties.
- x. Conduct QA audits, surveillance and coordinate corrective actions to ensure compliance with specifications.
- y. Maintain QA records and files, which includes completed CWPs including radiography film (if radiography used for acceptance of work), controlled material records (e.g., QA form 1, certification papers received with the material), training and qualification, etc.

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

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

- a. Ensure all testing required for completion of CWP is complete and reviewed prior to the tended ship reactor plant startup, propulsion plant startup, or getting underway or a DFS for non-nuclear systems or LAR for nuclear systems has been submitted and approved.
- b. Perform opening reviews of CWP as assigned to assure OQE generated will support work recertification. Perform closing reviews of CWP as assigned to assure technical accuracy and satisfactory OQE exists for record history.
- c. Train and supervise QAIs, Cleanliness Inspectors/Certifiers, CMPOs/CMHs and other personnel, involved in controlled work, in the performance of their QA duties.
- d. Conduct QA audits, surveillance and coordinate corrective actions to ensure compliance with specifications.
- e. Maintain QA records and files including completed CWPs (including radiography film if radiography used for acceptance of work), controlled material records (e.g., QA form 1, certification papers received with the material), training and qualification, etc.
- f. Review DFS for accuracy and technical merit and forward to QAO (FMA only).

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

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

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

- a. Receipt inspect all controlled material received by their work center/division.
- b. Ensure all material under their cognizance is stored and controlled to the governing material control requirements.
- c. Inspect controlled material storage areas of their work center semi-annually, as a minimum, in accordance with Part I, Chapter 6 of this volume.
- d. Ensure controlled material is properly stowed and handled so the identification of the subject material and its certification are always maintained.
- e. Reject unsatisfactory material. Fill out and attach QA form 3 and request disposition instructions.

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

1.6.16 RMC/FMA Cleanliness Inspector/Certifier. Cleanliness Inspectors/Certifiers are responsible to perform initial, in process and final cleanliness inspections during maintenance/repairs for those systems requiring cleanliness controls per Part I, Chapter 5, paragraph 5.4 of this volume.

NOTE: THE FOLLOWING DUTIES WILL BE ACCOMPLISHED BY THE COMMAND EXAMINER OR THE DIVISION OFFICER. WHEN ACCOMPLISHED BY THE DIVISION OFFICER, A COMMAND EXAMINER IS NOT REQUIRED.

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

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

1.6.18 Nondestructive Test Division Officer. RMC/FMA NDT Examiner is responsible to:

- a. Approve examination material for all NDT methods utilized at the activity for which they are certified. Ensure examination material reflects changes made to applicable fabrication documents.
- b. Approve and qualify NDT procedures for each method utilized at the activity. Revise and approve procedures as necessary when changes are made to applicable fabrication documents.
- c. Schedule and perform NDT Inspector surveillance. Maintain records of surveillance in order to perform trend analysis of inspector abilities and program effectiveness.
- d. Schedule and administer NDT examinations. Maintain records of examinations sufficient to trace inspector qualifications to original examination material. Maintain a matrix of high miss questions in order to assess inspector knowledge and program effectiveness.
- e. Train, certify and monitor NDT Inspectors as required by applicable specifications and Part I, Chapter 3 paragraph 3.2.2 of this volume.

- f. Schedule eye examinations for NDT Inspectors.
- g. Ensure each NDT Inspector's service record is kept updated with qualification status.
- h. Maintain individual records of qualification for NDT inspectors.
- i. Monitor the welder/brazer qualification and training per reference (k).
- j. Review all welder/brazer records for completeness semi-annually. This review may be performed by the welding engineers at Trident Refit Facilities (TRF).
- k. Review completed NDT inspection reports for technical completeness and accuracy and sign, where indicated on the report on completion of work.
- l. Review, approve and monitor the commands' welder/brazer training and qualification program as required by reference (k).
- m. Prepare and execute the training and qualification program for each NDT method that leads to inspector certification in each method and maintains inspector competency in each method.
- n. Ensure submittal of required reports of certification or recertification to higher authority as required by reference (h).

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

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

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

- a. Ship's Force is ultimately responsible for all work accomplished on board their ship.
- b. Ship's Force is responsible for the development of TWDs for use in technical assist visits.
- c. In some cases, technical assists may provide troubleshooting services or complete equipment changes. Technical representatives are expected to utilize approved QA procedures or observe the requirements of this manual. The contractor or representative shall be able to explain what controls he/she will place on a given job, including testing and documentation to be provided for OQE.
- d. Technical support agencies and contracted organizations may not perform work inside the SUBSAFE boundary. Only activities that are listed in reference (m) are authorized to perform SUBSAFE work. In cases where RMCs or other activities are assisting on maintenance inside the SUBSAFE, DSS-SOC and FBW boundary, paragraph 1.7.a and 1.7.b of this chapter will be strictly adhered to.
- e. Product Quality Deficiency Reporting shall be in accordance with reference (j), with the exception of Aircraft Launch and Recovery Equipment. Quality Deficiency Reporting associated with Aircraft Launch and Recovery Equipment is addressed in reference (o).

(This Page Intentionally Left Blank)

VOLUME V
PART I
CHAPTER 2
QUALITY MAINTENANCE PROCESSES

REFERENCES.

- (a) OPNAVINST C9210.2 - Engineering Department Manual for Naval Nuclear Propulsion Plants
- (b) NAVSEA 389-0153 - Radiological Controls
- (c) NAVSEA S9213-33-MMA-000 - Radiological Controls for Ships
- (d) NAVAIR AD-700A1-MDB-000 - Recovery Assistance Traversing (RAST) System
- (e) NAVSEA T9044-AD-MAN-010 - Requirements Manual for Submarine Fly-By-Wire Ship Control Systems
- (f) NAVSEA S0300-B2-MAN-010 - Supervisor of Shipbuilding, Conversion and Repair Operations Manual
- (g) NAVSEA 389-0317 - Procedures for Maintenance and Repairs to Naval Reactor Plants
- (h) NAVSEA 0387-LP-046-8000 - System Hydrostatic Test Requirements
- (i) NAVSEA 0924-062-0010 - Submarine Safety (SUBSAFE) Requirements Manual
- (j) NAVSEA S9074-AR-GIB-010/278 - Requirements for Fabrication Welding and Inspection, and Casting Inspection and Repair for Machinery, Piping and Pressure Vessels
- (k) NAVSEA 0900-LP-001-7000 - Fabrication and Inspection of Brazed Piping Systems
- (l) NAVSEA S9086-CH-STM-010 - NSTM Chapter 074 V1 (Welding and Allied Processes)
- (m) NAVSEA S9AA0-AB-GOS-010 - General Specifications for Overhaul of Surface Ships (GSO) 1983 Edition
- (n) NAVSEA T9074-AD-GIB-010/1688 - Requirements for Fabrication, Welding and Inspection of Submarine Structure
- (o) NAVSEA S9086-T4-STM-010 - NSTM Chapter 589 (Cranes)
- (p) NAVSEA SS800-AG-MAN-010/P-9290 - System Certification Procedures and Criteria Manual for Deep Submergence Systems
- (q) NAVSEA SS521-AA-MAN-010 - U.S. Navy Diving and Manned Hyperbaric Systems Safety Certification Manual
- (r) COMSUBLANT/COMSUBPACINST 6470.5 - Submarine Radiation Health Manual
- (s) NAVSEAINST 9210.23 - Naval Nuclear Work at Naval Activities and Private Shipyards - Certification of Work Accomplishment and Data Retention of Associated Records and Retention of Design Records - Requirements for
- (t) NAVSEA 0989-LP-058-1000 - Tender Nuclear Support Facilities Preventive Maintenance Index
- (u) NAVSEA 0989-064-3000 - Cleanliness Requirements for Naval Nuclear Plant Maintenance and Construction
- (v) MIL-STD-2041 - Control of Detrimental Materials
- (w) NAVSEA 250-1500-1 - Welding Standard
- (x) NAVSEA 392-0755 - Seal Weld Manual (Nuclear)
- (y) NAVSEA 389-0288 - Radiological Controls
- (z) MIL-STD-1627 - Bending of Pipe or Tube for Ship Piping Systems
- (aa) NAVSEA 0348-LP-159-0000 - Freeze Sealing Manual (Nuclear)
- (ab) NAVSEA 0989-LP-037-2000 - Commissioned Submarine General Reactor Plant Overhaul and Repair Specification
- (ac) NAVSEA 0989-LP-043-0000 - Commissioned Surface Ship General Reactor Plant Overhaul and Repair Specification
- (ad) NAVSEA 0989-LP-040-6000 - Air Flask Inspection and Maintenance Requirements (Nuclear)
- (ae) NAVSEA T9074-AS-GIB-010/271 - Requirements for Nondestructive Testing Methods
- (af) MIL-STD-2132 - Nondestructive Testing Examination Requirements

LISTING OF APPENDICES.

- A Technical Work Document Illustration
- B Work Package Decision Process
- C Certification Signature Requirements for Reactor Plant/Nuclear Support Facility/Controlled Industrial Facility Work
- D Formal Work Package Approval/Revision Sheet
- E Technical Work Document Review and Approval Matrix

2.1 PURPOSE. To provide the requirements for generating work procedures that will provide the craftsman with clear, concise, and technically correct instructions to complete the maintenance task while conforming to technical specifications. The work instructions will vary in complexity depending on the type of work to be performed, the amount of existing guidance available, the extent of preparation and system restoration required, and the technical ability of the craftsman.

2.2 TECHNICAL WORK DOCUMENTS. Technical Work Documents (TWD) consist of three general types: Maintenance Procedures (MP), Formal Work Packages (FWP) and Controlled Work Packages (CWP). Refer to Appendices A and B to determine which type of TWD is required.

2.2.1 Minimum Requirements for using Technical Work Documents.

- a. Nuclear Propulsion plant maintenance as defined in reference (a).
- b. Repair or troubleshooting to Fleet Maintenance Activity (FMA) Nuclear Support Facility systems or components.
- c. Radioactive repair work as discussed in references (b) and (c). Major work accomplished in reactor compartments or high radiation areas as required by references (b) and (c).
- d. Manufacture and corrective maintenance of electrical/electronic nuclear support and test equipment (e.g., switchgear test equipment, scram breaker time response equipment).
- e. Propeller/propulsor replacement or repair.
- f. Any Freon systems including self-contained units when the gas path is penetrated.
- g. FMA work on tended ship's systems.
- h. Level I/Submarine Safety (SUBSAFE) system work.
- i. Tests for FMA non-nuclear controlled work, which requires hydrostatic testing for recertification.
- j. All flammable liquid shipboard systems.
- k. Electric motor rewind.
- l. (Submarines only) Repair of Masts and Antennas.
- m. Other Ship's Force repair or troubleshooting as determined by the Department Head.
- n. Troubleshoot and repair of Gas Turbines when:
 - (1) Repairs affect the gas path.
 - (2) Removal, repair and/or replacement of accessory gearbox and components.
 - (3) Repairs to bleed air piping.
- o. Troubleshoot and repair of Main Propulsion Turbines/Generator Turbines.
- p. Troubleshoot and repair of Propulsion and Generator Lube Oil systems.
- q. Troubleshoot and repair of Propulsion and Generator Reduction Gearing/Drive Train Assemblies.
- r. Troubleshoot and repair of Auxiliary Turbines and pumps in which disassembly is required.
- s. Troubleshoot and repair of Boilers, Diesel Engines and their support systems.
- t. Any work within the Scope of Certification boundary.

- u. Troubleshoot and repair to submarine towed array handling systems.
- v. Welding and brazing requiring a CWP per paragraph 2.2.4 of this chapter.
- w. Maintenance on Weight Handling Equipment.
- x. Maintenance on Recovery Assist, Securing and Traversing systems, per reference (d).
- y. Maintenance performed which invokes MIL-STD 1330 or MIL-STD 1622 cleanliness standards.
- z. Maintenance on Fly-By-Wire Ship Control Systems, per reference (e).
- aa. Steering Gear Systems
- ab. (Submarines only) Special Valves
- ac. (SSBN only) Troubleshooting and repair of Missile Gas, Missile Hydraulic and Missile Tube systems that remove the ability to inert and jettison the tube contents.

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

Table 2-1 Types of PTS/TPS Fittings			
Style	Description	Ship/Class	Drawing/Specification
Style 1	Rectangular block assembly	SSN 688 Class	NGNN 2300-818
Style 2	Integral assembly or TRIDENT style fitting	SSBN 726 Class SSN 774 Class	NAVSEA 845-4687601
Style 3	Threaded boss assembly or Shroeder test fitting	SSN 21 Class SSN 774 Class	MIL-V-24695
Pressure Test Stations (PTS) and Test Pressure Stations (TPS) in the SUBSAFE boundary refer to components of different design that perform a similar function.			

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

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

- a. (Submarines only) If an approved NAVSEA Maintenance Standard (MS) is invoked to perform an emergent repair and there is no intention to reset the maintenance interval, then the MS can be used as a guide to the extent necessary to perform repair. Parts removed can be inspected in accordance with the MS. Inspection criteria for parts not addressed by the MS (e.g., those parts identified as mandatory

replacement parts) shall be inspected in accordance with general acceptance criteria or the system drawing or the component technical manual. Additionally, the torque, lubrication, and test criteria cited in the MS may provide revised values which differ from NAVSEA drawings and/or component technical manuals.

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

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

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

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

- (1) Manufacture, installation, and repair of nuclear Level I systems and components. The following actions may be controlled with TWDs other than CWP's provided all assembly procedures and inspections (Quality Assurance Inspector (QAI)) requirements specified in reference (g) are delineated in the procedure section of the FWP:
 - (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 (h) 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 requires hydrostatic testing or an external pressure source to perform the test or retest, including Pre-Overhaul Tests except a CWP is NOT required for routine gage or instrument calibrations.
- c. Work within SUBSAFE/hull integrity boundary.
- (1) Work within SUBSAFE/hull integrity boundary, identified in reference (i), including:
 - (a) Submarine pressure hull grinding, cutting and welding.
 - (b) Adjustments that affect valve timing associated within the flood control system components and/or Unrestricted Operations Maintenance Requirement Card affected components to include cap removal/reinstallation of hydraulic variable restrictors.
 - (c) Pressure testing salvage air valves via the external connection.
 - (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 (j) and reference (k). (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 (j).
 - (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 (l) and (m).
 - (4) Welding on submarine hull and structures in accordance with reference (n) 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 (o).
- 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. If repair or replacement of any component requires a record of OQE (pressure testing, new Level I (LI) or Scope of Certification (SOC) material, welding, etc.), a Re-Entry Control (REC) or CWP as appropriate is required. However, the following exceptions apply:
 - (1) 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 (i), reference (p) or reference (q).
 - (2) A REC or CWP is not required for maintenance performed in accordance with an approved Planned Maintenance System Maintenance Requirement Card by Ship’s Force personnel that states that performance of the maintenance does not require REC.
 - (3) A CWP is not required for inspections on systems defined as “critical” as specified in MIL-STD-1622 during maintenance of cleanliness when performed by Type Commander or Ship’s Force personnel and the maintenance of cleanliness is authorized to be performed as a REC Exception in the applicable Deep Submergence Systems SOC Notebook.
- k. Maintenance within the SFCC Boundary, per reference (e).

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

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

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

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

Submarine Seawater MCR EXCEPTION ITEM	OPERATIONAL CONTROL REQUIREMENT	RECERTIFICATION TESTING
Cleaning Shaft Seal Cooling Water strainers or filters	Controlled assembly (Notes 1 and 2)	None
Cleaning of Auxiliary Sea Water system strainers	Controlled assembly (Notes 1 and 2)	None

Table 2-2 Submarine Seawater MCR EXCEPTION ITEM (Non-SUBSAFE) (Cont'd)

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

Notes:

- (1) An FWP, in accordance with paragraph 2.2.3 of this chapter, will be used to control and document all work performed as a MCR exception.
- (2) Controlled assembly requirements are:
 - (a) Verification that surface finishes of gasket/o-ring sealing surfaces are in accordance with applicable specifications.
 - (b) Verification that fastener material and installation is in accordance with applicable specifications.
 - (c) Verification that gaskets/o-rings are properly installed and in accordance with applicable specifications.
 - (d) Assembly is documented on a QA form 34.
 - (e) Inspected by a QAI or Quality Assurance Supervisor (QAS).

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

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

2.3 FORMAL WORK PACKAGE DEVELOPMENT.

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

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

2.3.2 Security Classification. Attention must be paid to proper classification, handling, and marking of an FWP. As initially prepared, the FWP itself or as used in a CWP, is frequently unclassified and becomes classified as data is recorded. FWPs for nuclear propulsion plant systems are frequently CONFIDENTIAL, and almost always contain Naval Nuclear Propulsion Information and should be marked and controlled as required by the appropriate NAVSEA, Naval Operations (OPNAV), and Department of Energy Security instructions (e.g., NAVSEAINST 5510.45 Series, OPNAVINST N9210.3, OPNAVINST 5510.11 Series, CG-RN-1).

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

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

2.3.3.1 Formal Work Package Elements Defined.

- a. List of References. All references used shall be listed in a manner which will allow positive identification of the references and will state the current revision and advance change notice when the FWP was prepared.
- b. List of Enclosures. Enclosures are any technical documents which are not readily available to the craftsman and are used to provide information, direct or document work, or direct contingency work. Each enclosure page will contain, as a minimum, the FWP (file) number, enclosure number, and enclosure sheet number for traceability purposes. Enclosures are not required to be listed as references. Examples of enclosures are:
 - (1) Diagrams, prints or applicable portions of technical manuals.
 - (2) Necessary QA forms (CWP only).
 - (3) Contingency repair (predictable event).
- c. LOEP. The LOEP is an accounting of every page, including enclosures that make up the FWP. Each time a change/revision adds, modifies, or deletes a page of the FWP, the LOEP sheet must also be revised. Original pages will be marked "-". Subsequent changes/revisions will reflect latest change/revision number.
- d. General Information. This section is used to provide useful information, clarifying remarks, and sequencing allowances.

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

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

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

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

- f. Responsibilities. List the general responsibilities of all involved ship's divisions or FMA Work Centers and tended ship personnel. Examples are:
- (1) "38N will establish and maintain freeze seals as specified in the Freeze Seal Agreement."
 - (2) "51A will provide motor rewind and balancing services."
- g. Precautions. List precautions for personnel and equipment protection that are specific to the job. Three examples of precautions are:
- (1) Personnel: Hazards (e.g., toxic or explosive mixtures), stressors (e.g., high noise levels, high heat operations), and protective requirements needed to ensure personnel safety.
 - (2) Equipment: Safeguards, protective equipment, operating restrictions necessary to prevent equipment damage.
 - (3) Prevention of the loss of cleanliness: Specific precautions to prevent the loss of cleanliness for the task being performed.
- h. Budgeted Man-Rem. In this section, establish the Man-Rem estimate for accomplishment of the task. (See reference (r) for submarines.
- i. Initial Conditions (required element). This section contains those prerequisites and plant conditions that must be completed prior to commencing the MP. Examples are: material certification, job briefings and actions required for safety precautions listed in the Precautions Section.
- (1) Prerequisites must be completed prior to starting the MP and include actions necessary to certify the material, conduct briefings and state safeguards taken against hazards identified in the Precautions Section. Production work, other than shop work will not be performed as a prerequisite. Examples of prerequisites:
 - (a) "EM01 or 38A: Record name plate data from component to be worked. Verify the FWP is consistent with the name plate data."
 - (b) "Division Officer/Leading Petty Officer (LPO)/Nuclear Repair Officer (NRO)/Radiological Control (RADCON) Officer: Conduct a pre-work briefing. Complete attendance sheet provided as Enclosure ()."
 - (2) List the initial plant/system conditions required to properly and safely accomplish the work to be done. This should include work boundaries which will be specified by the Ship/FMA depending on the job. The isolation boundaries will be determined and established by the duty officer/tagout authorizing officer prior to authorizing commencement of the maintenance (this includes the isolation valve lineup, power isolation, etc.). The extent of this section will vary depending upon the type of job.
 - (a) For a Ship's Force job, this section should identify work boundaries and plant/system conditions (e.g., Pressure/Temperature Band, cold iron). The duty officer/tagout authorizing officer will determine and set the isolation boundaries.
 - (b) For an FMA ship to shop job, this element is not applicable.
 - (c) For an FMA job on a tended ship, the FMA must determine the work boundaries and identify to the ship any plant conditions that must be maintained during the work. The ship will determine and set the isolation boundaries.

j. Procedure (required element). This section contains the instructions on how to accomplish the work. Concentrate on putting the steps of the job in proper sequence. Don't describe technically how to do a step (unless past experience has shown some of this type of information is required). The following steps describe how to write this section of the FWP:

(1) Outline the various steps necessary to accomplish the work to be done. Whenever there is a need to provide information, or caution the reader, write the word (NOTE or CAUTION) in capital letters followed by a colon and the text of the note or caution in ALL CAPITAL LETTERS. The NOTE or CAUTION is to appear immediately before the step or section it is applicable to. NOTES and CAUTIONS do not perform work, but are used as the first sentence(s) in a work step. Where NOTES and CAUTIONS are used in the same work step, the CAUTION will be specified first.

(a) CAUTIONS should only be used whenever a specific danger to personnel, equipment, or the potential for loss of cleanliness exists.

1 CAUTION: THE ANTI-SEIZE COMPOUND USED IN THIS STEP IS A HAZARDOUS MATERIAL AND REQUIRES SPLASH PROOF GOGGLES AND RUBBER GLOVES TO BE WORN WHILE HANDLING OPEN CONTAINER OR USING THE MATERIAL.

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

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

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

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

(2) Work Center Designations. This is not mandatory for Ship's Force work if a single Work Center is performing all steps contained in the FWP. Otherwise, each work step of the procedure shall have a Work Center (i.e., 31A, EM01, etc.) designated responsible for performing that step. A specific designation (e.g., NRO, Engineering Officer of the Watch, Engineering Duty Officer, LPO/LWC Supervisor, LPO) may be substituted for Work Center designations where appropriate. More than one Work Center Designation may be used where dual responsibilities are needed. Examples of Work Center Designations:

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

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

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

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

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

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

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

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

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

- (g) (V) = Steps requiring verification by a craftsman.
 - (h) (G) = Government notification required.
- (4) Signature Requirements in FWPs and CWPs. Certain steps require positive assurance that the step was actually performed and/or completed in a prescribed manner. Signatures are also required for assurance of critical requirements, critical measurements, or requirements for OQE. If the step requires completion of a data form (e.g., inspection, NDT record, hydrostatic test data sheet), the signature block shall be on the data form, not the procedure step. The following is a list of typical steps/examples requiring signatures:
- (a) Steps which require performance of QA checks or NDT that are documented on a QA form in order to provide traceability of signatures. Personnel who sign QA forms or other OQE documents will print their name along with their signature, badge number (where applicable) and date. These types of steps must include a statement of satisfactory compliance adjacent to the signature block in the associated QA form.
 - (b) Completion of a strength test.
 - (c) Hull and backup valve blue checks of seat and disc and stack height measurements.
 - (d) Completion of Controlled Assembly steps.
- (5) For nuclear work, Certification Signature Blocks are required where specifically called out in NAVSEA technical documents **as defined in Appendix C**.

NOTE:

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

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

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

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

2.3.4 Formal Work Package Approval.

- a. FWP's developed for a job are routed and approved prior to the performance of the work. The appropriate work authorization and reference material, (including QA documents for CWP's), to conduct the FWP shall accompany this routing.
- b. Review of the FWP by the Chemical RADCON Assistant or Quality Assurance Officer (QAO) may be appropriate.
- c. For FMAs, the FWP is reviewed by the Planning Officer, LWC and Assist Work Centers. The FWP can be approved by the Repair Officer as the standard FWP for that work process.
- d. Approval signatures are made on the FWP approval sheet (see Appendix D). Signature blocks not required will be marked NA. Signature blocks that are signed will be accompanied by a legible printed name and date.

- e. For Ship's Force standardized FWP's the LPO/LWC supervisor shall verify that all references are current. For FMA Standardized FWP's the Planning Officer shall perform the verification. If changes are required, the FWP must be revised and routed for approval.
- f. For FWP's that are part of a CWP, see CWP approval matrix, Appendix E.
- g. QAO will review all FWP's for components or systems 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. REC/MCR exceptions will be tracked using the REC/MCR Exception Controlled Assembly Log QA form 11A located in Part I, Chapter 11 of this volume.

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/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 not 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 E.

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

2.3.7 Formal Work Package Changes.

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

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

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

- a. The craftsman doing the work must stop the work and notify the LPO/Work Center Supervisor (WCS) that rework is required.
- b. Clear directions on which steps are to be repeated must be provided. Reproducing QA forms may be required. All original and rework QA forms will be retained with the CWP. In addition to the page numbering format used in the TWD, documents and QA forms reproduced to perform rework will be annotated with the term "REWORK" and associated numbering or lettering used in the LOEP at the top of the documents/form(s) (for example - REWORK A, or REWORK 1.1).
- c. An updated LOEP is required when rework requires additional QA forms.
- d. A rework addendum is approved by the Division Officer (for CWPs, concurrence is obtained from the Production Officer/QA Officer).

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

- a. Reasons requiring a revision to a FWP/TWD:
 - (1) Scope of the work changes (e.g., replace software changed to machine the valve).
 - (2) Boundary of the work changes (e.g., change location of or additional disconnected joints).
 - (3) Change in test requirements unless authorized by a Departure from Specification.
 - (4) Any change in material requirements, which result in a change in testing requirements.
 - (a) The LWC Division Officer or LWC Planner may add materials after the FWP is open that do not change testing requirements.
 - (b) For FWPs executed as a part of the CWP, the QAO/QAS will concur with the addition of material. Concurrence will be by initialing the new line item.
 - (c) At job completion the material list must accurately reflect new materials installed in the system or component.
 - (5) If RADCON is insufficient for the work, based on actual conditions at the worksite, and to change the type of contamination enclosure specified for the work (e.g., to use a drape in lieu of glove bag as specified in the FWP).
 - (6) MCR/REC must be revised.
- b. Steps for making a revision to a CWP/FWP/TWD:
 - (1) Work must stop immediately and the LPO/WCS must be notified when the need for a revision is identified.
 - (2) The revision is then initiated.
 - (a) For Surface Force Ships, an FWP revision is initiated by the originating Work Center and reviewed by the Division Officer responsible for the work associated with the revision.
 - (b) For submarines and aircraft carriers, an FWP revision is initiated by the originating Work Center Maintenance Planner and reviewed by the Division Officer responsible for the work associated with the revision.
 - (c) For Surface Force Ships, a CWP revision is initiated by the LWC and approved per the requirements of Appendix E of this chapter.

- (d) For submarines and aircraft carriers, a CWP revision is initiated by the LWC Maintenance Planner and approved per the requirements of Appendix E of this chapter.
- (3) A revision is normally made by page substitution. Revisions shall be lettered consecutively starting with "A" with the revision letter entered on all affected sheets of the FWP. Revised portions of the FWP shall be marked with a vertical line and the revision letter in the margin. New or replacement sheets may be added by labeling the added sheet with the number of the preceding page and a sub-letter (e.g., Page 5A of 15). Superseded pages (without signatures or recorded data) shall be retained until the FWP is closed out.
- (4) A cover sheet for the revision is attached. The FWP revision sheets will be placed on top of the previous cover sheet with the most current cover sheet on top.
- (5) Routing and authorization of the FWP/TWD is performed.
 - (a) The revised FWP/TWD must be routed only to and reviewed by the divisions affected by the revision process.
 - (b) For an FWP concurrence with the revision is obtained from the Department Head prior to executing the revision. A revision, as a minimum, must be approved by the same level of personnel who approved the original FWP.
 - (c) CWP revisions must be approved by the QAO and officer(s) who approved the original (e.g., Repair Officer, Department Head and Commanding Officer).
- c. Other guidance on making revisions to an FWP/TWD.
 - (1) Revisions to issued FWPs may include non-technical modifications (e.g., line outs) discussed above. In addition, the following instructions are those permitted to be made in the Instructions for Entering Revisions area of Appendix D.
 - (a) Remove: Physically take out the page(s) as specified in the change instruction.
 - (b) Replace: Physically take out the page(s) specified in the change instruction. Put the replacement page(s) provided by the revision in place of the removed page(s) as specified.
 - (c) Insert: Physically insert the page(s) specified in the change instruction into the FWP as specified.
 - (2) A revision will not remove pages with or QA forms from the CWP/FWP/TWD with signatures or recorded data. The portion not yet complete on pages with signatures or data, including QA forms, will be lined out.
 - (3) Each activity affected will ensure that revisions are made and accounted for in an exact manner. The following intent will be adhered to regarding the revision process:
 - (a) All revisions will be entered into the body of the original FWP or will be added as an enclosure or attachment to the original FWP.
 - (b) Revisions shall be numbered such that accountability is maintained.
 - (c) The LOEP will be modified each time a change is made.

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

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

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

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

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

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

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

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

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

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

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

- a. CWPs required to support reactor plant or propulsion plant startup, equipment startup or ship's underway will normally be closed prior to the event.
- b. CWPs for spare equipment, equipment requiring reactor plant or propulsion plant operations to test, equipment requiring retest at sea or for equipment not required for reactor plant, propulsion plant or at sea operations may be left open with the Department Head and Commanding Officer's concurrence.
- c. All nuclear CWPs shall be reviewed for compliance with requirements and closed out prior to reactor plant or propulsion plant startup or ship's underway unless the Department Head and Commanding Officer's concurrence has been obtained to keep the CWP open to perform a critical heat up or critical operations to accomplish system/component retest. Prior to reactor plant or propulsion plant startup or

ship's underway, any activities performing controlled maintenance on the ship will provide the status of the maintenance to the ship (and the ISIC for submarines). When critical operations or at sea testing is required to complete the task the following procedures will be used:

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

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

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

- e. Departure from Specification will be processed in accordance with Part I, Chapter 8 of this volume for any specifications not met during the repair.

2.3.7.10 Standardized Formal Work Package.

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

2.3.7.11 Lost Controlled Work Packages Following Controlled Work Package Approval.

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

2.4 TROUBLESHOOTING.

- a. Troubleshooting a system which is being operated in accordance with the normal ship's operating procedures in normal operation in response to a request for on-site Fleet Technical Assistance does not require an FWP provided the troubleshooting is non-obtrusive (i.e., visual inspection/observations only) and intended to evaluate the nature of the reported problem. Any manipulation of the system outside normal operating conditions requires an FWP.
- b. Troubleshooting equipment normally controlled by using an FWP/TWD, whether done by Ship's Force or by an outside activity, can seldom be precisely defined at the start of corrective maintenance. An FWP for troubleshooting shall include well-defined initial conditions, boundaries and stop points within which troubleshooting can be accomplished. Detailed procedural steps are not required.

Troubleshooting procedure may require some form of trial and error process of elimination. In order to determine the proper tests following troubleshooting, a record of actions performed shall be kept. Once the problem is identified, the FWP shall be revised to properly repair and test the affected equipment.

(This Page Intentionally Left Blank)

APPENDIX C**CERTIFICATION SIGNATURE REQUIREMENTS FOR REACTOR PLANT/
NUCLEAR SUPPORT FACILITY/CONTROLLED INDUSTRIAL FACILITY WORK**

1. General Requirements. This appendix lists the instances when a signature is required to certify data or accomplishment of maintenance items. All attributes will be certified by verification or inspection. Appendix C is meant to be comprehensive. However, there could be a maintenance item performed by forces afloat and not listed in this appendix where a NAVSEA document requires a verification with a certification signature; in that event, the certification signature requirement should be met in accordance with the NAVSEA document.

- a. Certifications that record OQE shall be documented on QA forms and kept as required by references (s) and (t), as applicable.
- b. Items that require inspection or verification without an associated record will require a signature only and are not OQE. Therefore, they do not need to be kept after the maintenance is complete and accepted.
- c. Where it is convenient to use a locally generated form to accomplish specific certifications, the CWP shall refer to the form and the signatures will be on the form. These forms need not be kept unless a record is required.
- d. Indicate the individual responsible for performing the certification and the specific attributes being certified at the signature block.
- e. Certification signature statements shall be referenced on each page where a certification signature is required using references (s) and (t), as applicable, for reactor plant and Nuclear Support Facility maintenance respectively:
 - (1) "Direct report from watchstanders" may be deleted from the second (**) Certification Signature Block statement for work where such an option would not be applicable.
 - (2) Single asterisk (*) or double asterisk (**) shall be used at each Certification Signature Block to indicate the type of certification that is expected.

2. Specific Requirements.

- a. Cleanliness. Nuclear propulsion plant cleanliness, foreign material, and detrimental material control shall be according to Table 2.4-a of reference (u).
 - (1) Reactor Plant:
 - (a) Inspection following entry into clean hardware where dirt producing (e.g., machining or grinding) or potentially dirt producing operations (e.g., clean cuts of pipes) are used.
 - (b) Inspection prior to final closure of each opening in clean hardware where the closure will prevent visual access to surfaces which contact system fluid.
 - (c) Inspection during any operation in which a loss of cleanliness could occur that is not easily detected and corrected.
 - (d) Inspection for re-verification of hardware cleanliness per section 2.6 of reference (u).
 - (e) Final inspection following fabrication of hardware or dirt producing modification to hardware.
 - (f) After removal of a controlled product as defined in reference (v) for internal surfaces of installed hardware and internal surfaces of hardware that contains crevices and inaccessible areas. (Applicable to shipyards and Nuclear Regional Maintenance Departments only.)
 - (g) Following the cleaning of internal surfaces when crevices or inaccessible areas are exposed.

- (h) During assembly or disassembly of joints with thread sealant downstream of cleanliness filters to verify there is no visible thread sealant on internal surfaces following assembly.
- (i) Following dirt producing modification to hardware with crevices and inaccessible areas.
- (j) The following inspections must be performed by personnel qualified to perform the verifications but do not require an independent inspection or a certification signature:
 - 1 Verification of cleanliness following entry into clean hardware, except entry that is dirt producing (e.g., machining, grinding) or potentially dirt producing (e.g., clean cuts of pipe).
 - 2 Verification of cleanliness prior to and during assembly (including assembly that creates crevices).
 - 3 Verification of cleanliness prior to thermal treatment.
 - 4 Verification of cleanliness after any test that uses soft metal probes or tips; for example, alloy identity testing.
 - 5 Verification of cleanliness following cleaning except when performed for paragraphs (a) through (d) above or when crevices or inaccessible areas are exposed.
 - 6 Verification of cleanliness following tape removal.
 - 7 Verification of cleanliness prior to closure of support system openings and connection of a clean support system to clean hardware.
 - 8 Verification of final review of the accountability log.
 - 9 Verification of cleanliness prior to installation of support equipment to any vent and drain valve, other than a pressurized discharge.
 - 10 Verification of final cleanliness of cleanliness plugs provided the plugs are assembled from clean parts or sub-assemblies without crevices or inaccessible areas and if the assembly occurs in a clean room or clean area.
- (2) Steam Plant. Verification of cleanliness whenever cleanliness has been lost.
- b. Welding and Brazing. The following signature requirements apply:
 - (1) Inspections where records are required by reference (w) with the exception of in-process visual inspections, which may be verifications. These inspections will be documented on QA forms.
 - (2) Inspections where records are required by reference (x) with the exception of in-process visual inspections, which may be verifications. Inspection that gaskets, O-rings, or seals are either removed or scored as required before welding, so that they no longer function as a seal. These inspections will be documented on QA forms.
 - (3) Inspections for parameters/data where records are required by sections of reference (w) involving welding, with the exception of in-process visual inspections, which may be verifications. This information will be documented on QA forms.
 - (4) Inspections, where records are required, associated with reactor plant welds on piping systems and on components which are nuclear Level I or non-level piping system applications when welds are qualified, performed and inspected according to NAVSEA Nuclear Propulsion Directorate (08) documents other than those included in paragraphs 2.b.(1), (2) and (3) above, with the exception of in-process visual inspections, which may be verifications. These inspections will be documented on QA forms.
 - (5) Inspections required by reference (k) for class P-3a brazed joints in nuclear Level I piping systems, where records are required. These inspections will be documented on QA forms.

- (6) Verification that proper purge path is established before welding, both inlet and exit.
- c. Shielding. Inspections to verify the proper replacement of permanent shielding according to reference (y) or (c), as applicable.
- d. Mechanical Joint Assembly.
 - (1) Verification of the following applicable attributes is required if maintenance is accomplished using a FWP/CWP.
 - (a) Joint identification.
 - (b) Condition of flange faces, O-ring grooves, and other sealing surfaces.
 - (c) Joint alignment.
 - (d) Installation of O-rings or gaskets.
 - (e) Lubrication of fasteners.
 - (f) Thread engagement and stand-out.
 - (g) Final torque on fasteners.
 - (h) Gasket compression and flange parallelism.
 - (2) For joints in Nuclear Level I systems, inspection of the following applicable attributes is required whether the maintenance is accomplished by a CWP or FWP.
 - (a) Final torque on fasteners when a torque is specified.
 - (b) Gasket compression and flange parallelism. (Gap measurement is only required when mating surfaces are not in contact).
- e. Pipe Bending. For pipe bending according to reference (z), the following signature requirements apply:
 - (1) Inspection (NDT) of bent pipe. These inspections will be documented on QA forms.
 - (2) Visual inspections of bent pipe.
- f. Freeze Seal Operations. For freeze sealing according to reference (aa) the following signature requirements apply:
 - (1) Verification of dimensional measurements before and after freeze seal operations.
 - (2) Verification that the variation between before and after dimensional measurements does not exceed the allowed tolerance.
 - (3) Verification that the freeze seal is established.
- g. Hydrostatic Testing. The following signature requirements apply: Inspections required during hydrostatic testing according to reference (h) and the applicable reactor plant manual. The results of these inspections will be documented on QA forms.
- h. Locking devices. The following signature requirements apply:
 - (1) Internal locking devices. The proper installation of locking devices inside the pressure boundary of components containing primary coolant and all locking devices (internal and external) associated with reactor vessels, closure heads, and control rod drive mechanisms shall be confirmed by inspection. The results of such inspection, including dimensions and clearances measured to confirm proper installation, will be documented on QA forms.
 - (2) Verification of the proper installation of other reactor plant component locking devices. This verification is by the craftsman unless the component drawing requires an inspector to perform the check.
- i. Valve Repair. The following signature requirements apply:

- (1) Inspection of the final measurement of the bellows restraint gap “x-dimension” of pilot actuated relief valves where required by applicable technical manuals.
 - (2) Verification of the final blue check of the disc-to-seat.
- j. Valve Testing. The following signature requirements apply to inspection during post installation testing and periodic testing of primary, steam generator, and charging pump relief valves:
- (1) Proper blocking (gagging) and subsequent return to normal service.
 - (2) Locking devices, if required, on manual lift mechanism, locked.
 - (3) Manual lift mechanism removed, if so designed, after testing.
- k. Miscellaneous. The following signature requirements apply:
- (1) Inspections required before, during, or after repair to remove surface discontinuities according to reference (ab), (ac) or (t), as applicable. Document these inspections on QA forms.
 - (2) Inspections required on reactor plant air flasks according to reference (ad).
 - (3) Inspections required for determining reactor plant material acceptability according to the specifications requirements when the inspections specify reference (ae) or reference (af).
 - (4) Inspection of penetrations in tanks to ensure all temporary plugs have been removed and the penetrations are free from obstruction, if maintenance has been performed in the tank.
 - (5) Inspections required by Article 242 of reference (y) or Appendix D of reference (c), as applicable.
 - (6) Verification of removal of installed temporary reactor plant support equipment.
 - (7) Verification of satisfactory completion of reactor compartment closure tests including tests on individual penetrations.
 - (8) Verification of the Reactor Plant Work Accomplishment Report by designated officers.

APPENDIX D

FORMAL WORK PACKAGE APPROVAL/REVISION SHEET

FWP NUMBER _____ REVISION _____

TASK _____

LEAD DIVISION/WORK CENTER _____ ORIGINATOR _____

REVIEWED BY:

WORK CENTER PLANNER (REQUIRED IF ORIGINATOR IS NOT A QUALIFIED PLANNER) _____

AWC LPO/SUPERVISOR _____ AWC DIVISION OFFICER _____

AWC LPO/SUPERVISOR _____ AWC DIVISION OFFICER _____

AWC LPO/SUPERVISOR _____ AWC DIVISION OFFICER _____

NRO _____ P&E OFFICER _____

RADCON OFFICER/CRA _____ CHOP FOR FURTHER USE? ____ YES ____ NO

DIVISION LPO/LWC SUPERVISOR _____ LWC DIVISION OFFICER _____

APPROVED: _____

DEPT HEAD

DATE

THIS STANDARDIZED FWP HAS BEEN VERIFIED TO BE THE LATEST REVISION AND CONTAINS THE CURRENT REFERENCES. THE RADCON OFFICER/CRA HAS/HAS NOT (CIRCLE ONE) VERIFIED THIS FWP FOR CURRENT RADIOLOGICAL CONDITIONS.

LWC SUPERVISOR/LPO _____ DATE

PLANNING OFFICER (IF APPLICABLE) _____ DATE

REVISIONS/CHANGES AND SUMMARY: (APPROVAL SHEET) OR INSTRUCTIONS FOR ENTERING REVISION
LTR: _____ DESCRIPTION _____ DATE ENTERED _____

REVIEWED FOR SATISFACTORY COMPLETION AND CLOSEOUT

AWC LPO/SUPERVISOR _____ LWC LPO/SUPERVISOR _____

(This Page Intentionally Left Blank)

APPENDIX E

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)		R (11)	A				R (8)	A (8)	R (11)		
	FMA	R (2)	R	R			A				R (8)	A (8)			
SF Prepared CWP	Other		R	R		R	A				R	R	R	A (4)	
	LI		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) (10)	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)	
	LI	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 LI)
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.
11. QAO will review opening and closing of all FWPs for components or systems assembled and performed as a REC/MCR exception.

VOLUME V
PART I
CHAPTER 3
PERSONNEL QUALIFICATION AND TRAINING

REFERENCES.

- (a) NAVEDTRA 43523 - Personnel Qualification Standard for Quality Maintenance Program
- (b) MIL-STD-1330 - Standard Practice for Precision Cleaning and Testing of Shipboard Oxygen, Helium, Helium-Oxygen, Nitrogen and Hydrogen Systems
- (c) OPNAVINST N9210.3 - Safeguarding Naval Nuclear Propulsion Information
- (d) NAVSEAINST 9210.39 - Submarine Nuclear Propulsion Plant Operator Welders: Procedures for Maintenance of Qualification
- (e) NAVSEA 389-0317 - Procedures for Maintenance and Repair of Naval Reactor Plants (Nuclear)
- (f) COMSUBFORINST C5400.30 - Engineering Department Organization Manual
- (g) NAVSEA T9044-AD-MAN-010 - Requirements Manual for Submarine Fly-By-Wire Ship Control Systems
- (h) NAVSEA SS800-AG-MAN-010/P-9290 - System Certification Procedures and Criteria Manual for Deep Submergence Systems
- (i) NAVSEA 0924-062-0010 - Submarine Safety (SUBSAFE) Requirements Manual
- (j) NAVSEANOTE 5000 - Activities Authorized to Perform SUBSAFE, FBW-SCS and DSS-SOC Work

LISTING OF APPENDICES.

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

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 Part I, Chapter 2, paragraph 2.2.1 of this volume.

3.2 **GENERAL.** Personnel who screen, plan, perform, inspect and supervise the maintenance performed to the following requirements shall be trained and qualified in accordance with this volume and reference (a).

- a. Maintenance requiring a Technical Work Document per Chapter 2, paragraph 2.2.1 of this volume.
- b. Maintenance listed as Material Certification Record (MCR) exceptions per Part I, Chapter 2, paragraph 2.2.5 of this volume.
- c. Maintenance listed as Re-Entry Control (REC) exceptions per Part I, Chapter 5, paragraph 5.6.7 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.

3.3 **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 A 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 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.
 - (2) A submarine QAO shall be a graduate of the Submarine Officers' and Supervisors' Quality Maintenance course, F-4H-0182. No other formal PQS qualification is required. With a formal waiver (Naval message or letter) endorsed by the Immediate Superior In Command (ISIC) and approved by the Type Commander (TYCOM), this requirement can be temporarily waived by the TYCOM but the waiver may not exceed 6 months. The waiver must list the interim QAO and qualifications, the perspective QAO and graduation date from F-4H-0182 and/or the report date.
 - (3) An aircraft carrier QAO shall be a graduate of the 5-week Quality Assurance Officer Course (S-4H-0001) for CVN officers. No other formal PQS qualification is required. With a formal waiver (Naval message or letter) endorsed by the ISIC and approved by the TYCOM, this requirement can be temporarily waived but the waiver may not exceed 6 months. The waiver must list the interim QAO and qualifications, the perspective QAO and graduation date from S-4H-0001 and/or the report date.
- e. (Submarines only) Complete an oral interview with the ISIC or submarine support component QAO.

3.4.2 Ship's Assistant Quality Assurance Officer.

- a. Normally E-6 or above with engineering/repair experience.
- b. Designated in writing by the Commanding Officer.
- c. (Submarines only) Complete an oral interview with the ISIC or Submarine Support Component QAO.

3.4.3 Immediate Superior In Command.

- a. Quality Assurance Officer.
 - (1) Should be a commissioned officer, but may be a civilian with engineering/repair experience.
 - (2) Should be a graduate of a QAO course. No other formal PQS qualification is required.
 - (3) Designated in writing by the ISIC.

- b. Assistant Quality Assurance Officer.
 - (1) Normally E-7 or above, but may be a senior civilian with engineering/repair experience.
 - (2) Should be a graduate of a QAO course.
 - (3) Qualified as QAS. QAS qualification is not required if he/she is a graduate of the Norfolk Naval Shipyard Fleet Maintenance Support Branch QAO course.
 - (4) Designated in writing by the Commanding Officer. The duties assigned, including signature authority, shall be clearly delineated.

3.4.4 Regional Maintenance Center/Fleet Maintenance Activity Quality Assurance Officer.

- a. Should be a commissioned officer, but may be a civilian with engineering/repair experience.
- b. Will not be assigned collateral duties or responsibilities that divert attention from primary duties of QM.
- c. Should be a graduate of a QAO course. No other formal PQS qualification is required.
- d. Designated in writing by the Commanding Officer.

3.4.5 Regional Maintenance Center/Fleet Maintenance Activity Assistant Quality Assurance Officer.

- a. Normally E-7 or above, but may be a senior civilian with engineering/repair experience.
- b. Qualified as QAS or a graduate of a QAO course.
- c. Designated in writing by the Commanding Officer.

3.4.6 Quality Assurance Supervisor.

- a. Normally E-6 or above, but may be a civilian.
- b. Complete PQS for QAS, and pass a written examination and oral board.
- c. QAS is a mandatory qualification for Fleet Maintenance Activities (FMA). Qualification of QAS for ships is at the TYCOM's discretion.

3.4.7 Quality Assurance Inspector.

- a. Normally a petty officer, but may be a civilian.
- b. Complete PQS for Quality Assurance Inspector (QAI) and pass a written exam and oral board.
- c. The qualification card may be split into separate nuclear and non-nuclear QAI qualifications. If this is done, the command must ensure QAIs do not inspect areas excluded from their qualifications.

3.4.8 Controlled Material Petty Officer/Controlled Material Handler.

- a. Normally a petty officer, but may be a civilian.
- b. Complete PQS for Controlled Material Petty Officer (CMPO)/Controlled Material Handler (CMH), and pass a written exam and oral board.
- c. Activities may modify the qualification card to allow CMPO/CMH qualification for specific materials only. If this is done, commands must have a method to ensure CMPOs/CMHs do not handle material excluded from their qualification.

3.4.9 Steam Plant Cleanliness Inspector/Certifier.

- a. Normally a petty officer, but may be a civilian.
- b. Complete PQS for Steam Plant Cleanliness Inspector and pass a written exam and oral board.

3.4.9.1 Qualification Requirements for Reactor Plant Cleanliness Inspector/Certifier.

- a. Normally a petty officer, but may be a civilian.
- b. Complete PQS, per reference (a), for Reactor Plant Cleanliness Inspector, pass written exam and oral board.

3.4.10 Gas Systems Cleanliness Inspector/Certifier.

- a. Normally a petty officer, but may be a civilian.
- b. Satisfactorily complete an Oxygen Clean Worker course of instruction in accordance with reference (b).

3.4.11 Oxygen Clean Instructors. An Oxygen Clean Instructor will be certified in accordance with reference (b). 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 (b). 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 **at the direction of the Naval Sea Systems Command (NAVSEA) Metrology and Calibration (METCAL) Quality Manager.** 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 maintenance tasks outlined in Part I, 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 fundamentals (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). **SPECIFIC PROGRAM REQUIREMENTS ARE IDENTIFIED IN REFERENCES (d) AND (e).**

3.4.16 Qualification Requirements for Submarine Fly-By-Wire Ship Control System Maintenance Technician. Shall be a graduate of the Ship Control System Maintenance Technician School (A-623-0118 for SSN 21 Class, A-623-0131 for SSN 774 Class).

3.5 TRAINING.

3.5.1 Maintenance Personnel Training. All personnel involved with planning, performing and supervising maintenance specified in Section 3.2 of this chapter will be trained using the following guidance:

- a. Appendices B and C of this chapter and Part II, Chapter 1, Appendix A of this volume (where applicable) provide information on program elements normally contained in effective maintenance training programs. Appendix B is applicable to Ship's Force whereas Appendix C is applicable to Fleet Maintenance Activities (e.g., mechanics, Nondestructive Test (NDT) technicians, welders and planners). All appendices identified in this paragraph are provided as information only and are not to be considered mandatory listings.
- b. 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.
- c. Include the training with existing topics where possible (i.e., CMPO training held with Repair Parts Petty Officer training or Steam Plant Cleanliness training held in conjunction with Machinery Divisions training on the Steam Plant). However, some areas may require separate training to be held.

- d. 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.
- e. 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 QA and welder training and qualification program audit required by reference (a), paragraph 9.3.1.

3.5.2 Requirements. The training topics of this chapter shall be fully integrated into the Engineering Department Training Plan in accordance with reference (f). The QAO shall provide a list of applicable training topics to the Engineer and Engineering Department Master Chief for all ship's departments for inclusion in the Engineering Department training plans.

- a. These topics shall be reviewed and updated annually or whenever a new long range training plan is generated.
- b. For maintenance personnel, the QAO shall provide a list of applicable training topics using Appendices B and C of this chapter as a guide.
- c. For personnel responsible for planning, approving, inspecting or supervising maintenance on systems/equipment included in the QM Program, the QAO shall submit a separate advanced training program. At a minimum, the following items shall be covered.
 - (1) Requirements and generation of a controlled work package and formal work package including objective quality evidence, required inspections and critical QM points.
 - (2) Material certification, control and stowage requirements.
 - (3) 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.
 - (4) Testing.
 - (5) 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. Personnel at Submarine Repair Facilities who supervise or manage SUBSAFE, Deep Submergence System-Scope of Certification or Fly-By-Wire-Ship Control System work will receive training on parent requirements to include (at a minimum) references (g), (h), (i) and (j). 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.

(This Page Intentionally Left Blank)

10. Nuclear Training Topics.

NOTE: WHERE THERE ARE SIMILAR LECTURE TOPICS, IT IS SUGGESTED THAT THE TRAINING PRESENTED TO NUCLEAR TRAINED PERSONNEL CONSIST OF BOTH THE INFORMATION FROM TOPICS 1-9 ABOVE AND THE NUCLEAR SPECIFIC INFORMATION CONTAINED BELOW.

- a. Material Certification.
 - (1) This lecture should include discussion of: Nuclear Level I requirements.
 - (2) The following references provide information on this topic:
 - (a) NAVSEA 0948-LP-045-7010; Material Control Standard.
 - (b) NAVSEAINST C9210.34; Material Identification and Control Requirements for Naval Nuclear Reactor Plant Piping Systems.
 - (c) SPCCINST 4440.376; Supply Policies and Procedures for Naval Reactor Plant Repair Parts and Materials.
 - (d) NAVSEA 0989-LP-037-2000; Commissioned Submarine General Reactor Plant Overhaul and Repair Specification.
 - (e) NAVSEA 0989-LP-043-0000; Commissioned Surface Ship General Reactor Plant Overhaul and Repair Specification.
 - (f) NAVSEA 0989-LP-058-1000; Destroyer Tender and Submarine Tender Nuclear Support Facilities Overhaul and Repair Specification.
 - (g) NAVSEA 0989-064-3000; Cleanliness Requirements for Naval Nuclear Plant Maintenance and Construction.
 - (h) NAVSEAINST 9210.23; Naval Nuclear Work at Naval Activities and Private Shipyards - Certification of Work Accomplishment and Data, Retention of Associated Records and Retention of Design Records, Requirements for.
- b. Material Procurement/Receipt Inspection. This lecture should include discussion of:
 - (1) Nuclear Material.
 - (2) Material Substitutions. Certifying material for use to Nuclear Level I.
 - (3) The list of references in paragraph 10.a (2) of this appendix provides information on the above topic.
- c. In-Process Control.
 - (1) This lecture should include discussion of:
 - (a) Cleanliness requirement for:
 - 1 Reactor Plant (nuclear powered ships only).
 - 2 Steam Plant (fossil and nuclear powered ships).
 - (b) Requirements for a work package.
 - (c) Generation of a work package.
 - (d) Use of QA forms and tags.
 - (e) Setting plant conditions.
 - (f) Certification signature requirements.
 - (g) Use of material control tags.

- (h) Reactor Plant Work Accomplishment Reports (RPWAR).
 - (2) The list of references in paragraph 10.a.(2) of this appendix provides information on the above topic.
- d. Testing.
 - (1) This lecture should include discussion of:
 - (a) Hydrostatic test rig requirements including calibration.
 - (b) Hydrostatic test forms.
 - (c) Conducting hydrostatic test.
 - (d) Setting plant conditions.
 - (e) Use of Reactor Plant Manual for test requirements.
 - (f) Weight Handling Equipment Testing.
 - (2) The following references provide information on this topic:
 - (a) Reactor Plant Manual.
 - (b) NAVSEA 0989-028-5000; Manual for the Control of Testing and Plant Conditions.
 - (c) NAVSEA 0387-LP-046-8000; System Hydrostatic Test Requirements.
 - (d) NAVSEA 0989-LP-058-0000; AS/AD Tender Nuclear Support Facilities Preventive Maintenance Index.
 - (e) NAVSEA 0989-LP-037-2000 - Commissioned Submarine General Reactor Plant Overhaul and Repair Specification.
 - (f) NAVSEA 0989-LP-043-0000 - Commissioned Surface Ship General Reactor Plant Overhaul and Repair Specification.
- e. Final work package documentation. This lecture should include discussion of:
 - (1) Record retention requirements.
 - (2) Mandatory documents.
- f. Reactor Plant Fundamentals. This should be slanted toward the worker so that he/she understands the possible consequences of faulty workmanship, loss of cleanliness, etc., in the Reactor Plant.
- g. FMA Nuclear Planning Yard Basic Trade Skills Lesson Plans (when available).

APPENDIX C**RECOMMENDED TRAINING TOPICS FOR SELECTED POSITIONS**

1. Experience has shown that effective training should be related to job skills required by the individual.
 - a. Mechanical craftsmen should cover areas like:
 - (1) Tools and their uses.
 - (2) Shop safety.
 - (3) Work authorization.
 - (4) Material identification.
 - (5) Rework and their causes.
 - (6) Valve construction and methods to perform:
 - (a) Stack height measurements.
 - (b) Blue checks.
 - (c) Lapping of a valve seat.
 - (7) Pump construction and methods to perform:
 - (a) Mechanical seal replacement.
 - (b) Alignments.
 - (8) Testing requirements.
 - (9) Cleanliness requirements.
 - (10) Technical manuals and their usage.
 - (11) Drawings and their usage.
 - (12) Work packaging administration.
 - b. NDT inspectors and welders should cover the following areas:
 - (1) NAVSEA S9074-AR-GIB-010/278; Requirements for Fabrication Welding and Inspection, and Casting Inspection and Repair for Machinery Piping and Pressure Vessels.
 - (2) NAVSEA T9074-AD-GIB-010/1688; Fabrication, Welding and Inspection of Submarine Structures.
 - (3) MIL-STD-1689 (for Surface Ships only); Fabrication, Welding and Inspection of Ship's Structures.
 - (4) NAVSEA 0900-LP-001-7000; Fabrication and Inspection of Brazed Piping Systems.
 - (5) NAVSEA T9074-AS-GIB-010/271; Requirements for Nondestructive Testing Methods.
 - (6) MIL-STD-2132; Nondestructive Examination Requirements for Special Applications.
 - (7) Material control.
 - (8) Cleanliness.
 - (9) Work package administration.
 - c. Planners should cover the following areas:
 - (1) SUBSAFE program.
 - (2) Level I program.

- (3) QA forms.
- (4) Welding requirements.
- (5) Manufacturing specifications.
- (6) Cleanliness requirements and specifications.
- (7) Hydrostatic testing.
- (8) Material control.
- (9) Manufactured fittings specifications.
- (10) Plant conditions.
- (11) System flushes.
- (12) NDT requirements.
- (13) Testing requirements.
- (14) Index of technical publications.
- (15) Military standards and specifications.
- (16) Selected record drawings/ship's drawing index.
- (17) Maintenance data systems.
- (18) Blue print reading.
- (19) For activities involved in Scope of Certification maintenance:
 - (a) NAVSEA SS800-AG-MAN-010/P-9290, System Certification Procedures and Criteria Manual for Deep Submergence System.
 - (b) Scope of Certification material control classification.
 - (c) Implodability.
- (20) Submarine Flight Critical Components.

2. Proven training methods include the use of mockups and training aids that show practical application of the lecture material. Hands on mockup training, performed by the workers is the most highly effective method followed by the demonstration of skills by the instructor.

3. Nuclear Training Topics.

NOTE: WHERE THERE ARE SIMILAR LECTURE TOPICS, IT IS SUGGESTED THAT THE TRAINING PRESENTED TO NUCLEAR TRAINED PERSONNEL CONSIST OF BOTH THE INFORMATION FROM TOPICS 1-2 ABOVE AND THE NUCLEAR SPECIFIC INFORMATION CONTAINED BELOW.

- a. Job Skill Training. Each work center should determine the skill requirements and incorporate their own training requirements. Examples are:
 - (1) Nuclear planners should cover areas like:
 - (a) RPWAR.
 - (b) Manufactured fittings specifications.
 - (c) Freeze seal requirements.
 - (d) Plant conditions.
 - (e) Welding requirements.
 - (f) Radiological Controls.

- (g) System flushes.
 - (h) Nondestructive Testing (NDT) requirements.
 - (i) Hydrostatic testing requirements.
- (2) The following references provide information on the above topics:
- (a) NAVSEA 0387-LP-046-8000; System Hydrostatic Test Requirements.
 - (b) NAVSEA 0348-LP-159-1000; Freeze Sealing Manual.
 - (c) NAVSEA 0989-064-3000; Cleanliness Requirements for Naval Nuclear Plant Maintenance and Construction.
 - (d) Valve Manuals.
 - (e) NAVSEA 0989-LP-037-2000; Commissioned Submarine General Reactor Plant Overhaul and Repair Specification.
 - (f) Reactor Plant Manual.
 - (g) NAVSEA 0989-028-5000; Manual for the Control of Testing and Plant Conditions.
 - (h) NAVSEA 389-0317; Procedures for Maintenance and Repair of Naval Reactor Plants.
 - (i) NAVSEA 0989-LP-043-0000; Commissioned Surface Ship General Reactor Plant Overhaul and Repair Specification.
 - (j) NAVSEA 0989-LP-058-1000; Destroyer Tender and Submarine Tender Nuclear Support Facilities Overhaul and Repair Specification.

(This Page Intentionally Left Blank)

- (2) Any normally wetted, previously obscured areas (i.e., areas not visible during normal operations) of the submarine pressure hull, non-pressure hull, tanks and/or supporting structure (interior or exterior) in way of any components, hull insulation, or damping or acoustic material which is removed for other reasons shall receive a visual examination by personnel qualified per reference (j) for any evidence of preservation systems breakdown, corrosion, thickness reduction, and/or deformation and cracking. Any evidence of the above shall be evaluated and corrected in accordance with the requirements of references (j) and (k). Results of examinations shall be submitted in accordance with the reporting format required by references (j) and (k). Any unusual, unexpected, or potentially dangerous conditions such as, but not limited to, large 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.

5.4.4 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 (h).
 - (2) Naval Nuclear Propulsion systems **as required by reference (l)**.
- c. Results of cleanliness acceptance inspections required by paragraph 5.4.4.b of this chapter shall be documented in the Technical Work Document and certified by a signature **for those inspections requiring independent inspection**.
- 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 (l) apply. For steam plant (fossil fuel) or general shipboard systems listed in paragraph 5.4.6 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.

5.4.5 Nuclear Propulsion Plant and Nuclear Support Facility General Cleanliness Requirements.

5.4.5.1 Reactor Plant. For work involving the cleanliness requirements of Chapters 1, 2 and 3 of reference (1), inspector presence is required for initial opening of a reactor plant system when the opening is accomplished using a dirt producing procedure such as a butt weld cut or pipe cut. For non-dirt producing methods, such as socket weld cuts, cuts on canopy seals and the opening of a flange, the worker may verify cleanliness without the presence of a Cleanliness Inspector. For either case, the worker will first establish a clean area and then open the system. The system will then be inspected for cleanliness by the worker or inspector depending on the method used for opening the system. The worker will then install cleanliness plugs, disestablish the clean area and perform the required repair. Upon completion of the repair, the worker will clean the area and inspector presence is again required for system inspection prior to closure of the opening.

- a. Maintenance personnel and appropriate supervisors shall be briefed by a QAI on applicable requirements before starting work. The brief shall include at least the following:
 - (1) Inspection requirements.
 - (2) Acceptance criteria.
 - (3) Methods to maintain cleanliness.
 - (4) Required actions for a loss of cleanliness.
- b. Cleanliness plugs that are locally manufactured or procured through the Navy supply system shall meet the requirements of reference (1). A logbook shall be kept by the appropriate work center or work center supervisor recording all cleanliness plugs by serial number. Additionally, a QAI shall document that the requirements of Chapter 1 of reference (1) for Temporary Seals and Plugs have been met regardless of procurement method or each plug recorded in the logbook.
- c. If a loss of cleanliness occurs as explained in reference (1), then cleanliness shall be re-established according to the requirements and procedures of reference (1). Upon a loss of cleanliness, the Lead Work Center Division Officer, QAO and appropriate Department Head(s) will approve the recovery procedures.
- d. Use a Tool and Material Accountability Log to document the required accountability whenever foreign material exclusion controls are established. A formal written record shall be maintained for all material (e.g., tools, equipment, temporary plugs and seals and tape) taken inside the physical boundary that are small enough to fit inside the material openings in the hardware and do not have lanyards attached. The record shall describe the material, where it was introduced and when it was removed. Except for eyeglasses and goggles, accountability is required for all clear plastic material regardless of size.
- e. Control of tools shall be as specified in reference (1) and this volume. Work center supervisors will be responsible for control of handling equipment and metal removal and finishing tools. Additionally, the following requirements consistent with reference (1) apply for metal removal and finishing tools: Except for cutting tools (drills, bits, taps, etc.), metal removal and finishing tools (files, wire brushes, grinding wheels, etc.) used on corrosion-resistant or carbon steel materials will be segregated from general work center metal removal and finishing tools and fasteners.

5.4.5.2 Steam Plant. Reference (1) 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 (1) shall be assigned only to activities that have reference (1) 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 (1), then cleanliness shall be reestablished according to the requirements and procedures of reference (1). 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 (1).

- e. Reference (l) 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.

5.4.5.3 Nuclear Support Facility.

- a. Reference (m) provides specific cases that invoke reference (l) and reference (n).
- b. Where the above references do not address a specific Nuclear Support Facility system or component, reference (l) 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.

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

5.4.6 General Shipboard Steam Plant Systems Cleanliness Requirements.

5.4.6.1 Purpose. To define the general requirements for cleanliness controls during maintenance/repair of steam plant systems on Surface Force ships.

5.4.6.2 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. Steam drains.

5.4.6.3 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.

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

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

- (1) New or repaired components should be cleaned to the maximum extent practical without disassembly prior to installation into the system to ensure preservatives, desiccants, etc. are removed.
 - (2) Assembly and maintenance may require the use of lubricants, sealants, and other compounds. Those compounds should be used only as authorized and only applied in the flow path, if authorized by the process instruction.
 - (3) During all maintenance, ensure action is taken to ensure all foreign materials are removed following the maintenance and prior to system operations.
 - (4) Water used for cleaning or flushing steam plant systems must meet the criteria for steam plant makeup/feedwater.
- c. Verification of cleanliness. When verification of cleanliness is required, verification should be accomplished by visual inspection. If configuration of the system or component precludes visual inspection, and cleanliness has not been maintained, then flushing may be used to verify cleanliness.
- (1) Visual inspections will be conducted using normal reading level lighting. Mirrors and borescopes may be used provided resolution is sufficient to verify cleanliness.
 - (2) Components should not be disassembled just to conduct visual cleanliness verification. Instead a flush may be used to verify cleanliness. Valves may have the visual inspection performed on the accessible portions of the flow area.
 - (3) Flushes will be conducted for period of not less than five minutes.
 - (4) Visual inspection acceptance criteria.
 - (a) No grease, oil, or other foreign material.
 - (b) For uncoated surfaces, tightly adherent corrosion products typical for the type of material (e.g., carbon steel) are acceptable. No loose corrosion products may be present.
 - (c) For coated surfaces, the coating must be acceptable to the process instruction used to apply the coating. No loose corrosion products may be present.
 - (5) Flush acceptance criteria (Visual).
 - (a) For water flushing, the water sample must be free of foreign material.
 - (b) For steam flushing, a sample of condensate downstream of the area being flushed must be free of foreign material.
 - (c) For lines flushed with compressed gas, place a white filter cloth at the outlet to collect debris. After flushing, the cloth must contain only light speckling and/or staining due to rust and dirt and must contain no readily apparent quantities of foreign materials (e.g., metal shavings, abrasive grit, oil).
 - (d) For piping where direct sampling of the flush effluent is not possible, the following requirements apply:
 - 1 For lines that cannot be directly sampled during flushing (e.g., lines that discharge into a tank or condenser without drains or sample taps between the area being flushed and the tank), flush for five minutes. Sample the collected discharge from the tank, the water sample must be free of foreign material.
 - 2 Dead-ended piping in a line being flushed by opening a mechanical connection, will have water, steam, or gas (as applicable) flushed past the dead end connection to the main stream for a minimum of five minutes at the maximum practical flow rate. When cleanliness is verified for the main stream, it is also verified for the dead-ended piping.

- 3 For piping which cannot be sampled because it discharges overboard, flush for at least five minutes. No acceptance criteria are applicable.

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

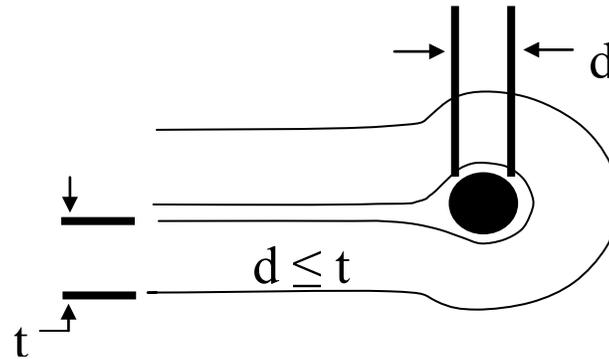
5.4.7 Set Stud Inspection. During disassembly or reassembly, inspect set studs to ensure no rotation is exhibited during nut loosening and tightening. Where direct visual inspection is not possible, marking the top of the stud (e.g., felt tip marker) to a reference point on the assembly may be used.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

5.5 SOFTWARE

5.5.1 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 (p) and are provided in Appendix A. In case of question or conflict the requirements of reference (p) apply. Additional guidance regarding non-metallic seals is provided in the following paragraphs.

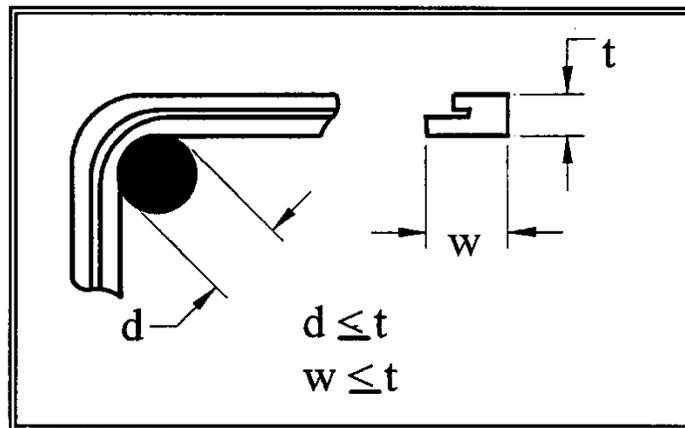
- a. It is Fleet policy that software (e.g., O-Rings, gaskets) will be reused only as a last resort. If new software is not available, software may be used after satisfactory inspection for damage, resiliency, discoloration, or cracking in accordance with reference (p).
- b. In all cases, the guidance provided in applicable NAVSEA technical documents (e.g., drawings, component technical manuals, references (p) and (q) 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 5-2 below:

Figure 5-2 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 5-3 below.

Figure 5-3 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.

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

5.6.1 **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.

5.6.1.1 **General.**

- a. Reference (r) 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 (s) or (t).

- 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.

5.6.2 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 (r), 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 5.6.4 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 5.6.7 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.

5.6.3 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 5.7 of this chapter. Nuclear SUBSAFE RECs shall be marked in Block 2 of the QA-9 as SUBSAFE and NUCLEAR. Approval to open and close the Nuclear REC will be in accordance with Part I, Chapter 2, Appendix E of this volume using the "NUC" review and approval matrix.

5.6.3.1 Reactor Plant Planning Yard Liaison Action Requests.

NOTE: INFORMATION ON THIS SUBJECT IS SAFEGUARDED IN ACCORDANCE WITHOPNAVINST N9210.3.

5.6.4 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 5.6.4.b.(2) above.
 - (5) The MCR/REC and records of MCR/REC will contain all of the OQE necessary to comply with paragraph 5.6.2.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 5.6.4.b.(14) (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 16 prior to the signing of Block 17 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 20 and 21 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 5.6.8 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, FBW-SCS or DSS-SOC REC serial numbers to outside repair activities performing SUBSAFE, FBW-SCS or DSS-SOC work on shipboard SUBSAFE, FBW-SCS or DSS-SOC systems. The Buddy REC number is issued from ship’s QA-11 log and will be documented on repair activities 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, FBW-SCS or DSS-SOC certified activities performing SUBSAFE Work.

5.6.5 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 (r), 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 5.6.5a. above, unless specific authorization is received from TYCOM approving URO or changing the depth restriction. The DFS approved to perform the controlled deep dive shall be cancelled and a new major DFS for the failed testing shall be initiated by the ship. 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 preclude a component requiring deep dive testing from seeing submergence pressure, the requirements of paragraph 5.6.5a. of this chapter shall apply upon removal of the Dry Deck Shelter and shall be so annotated in the approval comments of the deep dive DFS.

5.6.6 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.

5.6.7 Exceptions to Re-Entry Control. Table 5-1 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 5-1 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 operation 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

REC EXCEPTION ITEM	OPERATIONAL CONTROL REQUIREMENT	RECERTIFICATION TESTING
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/Reinstallation of MS plugs (9/16" and smaller) including test fittings for gauge test or hydrostatic test	FWP/Controlled assembly (Notes 2 and 3)	Note 4
Removal/Reinstallation external salvage pipe cap	FWP/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 or RMC periscope repair personnel	None
Cleaning Sea Water Injection Strainers	FWP/Controlled assembly (Notes 2 and 3)	None
Main closure regreasing on MOD 25 MSW pumps, SSN 21 and SSN 774 Class Sea Water Pumps	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/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 of Main or Auxiliary Sea Water Pump 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, paragraph 2.2.3 of this volume, will be used to control and document all work performed as a REC exception.
- (3) Controlled assembly requirements are:
 - (a) Verification that surface finishes of gasket/o-ring sealing surfaces are in accordance with applicable specifications.
 - (b) Verification that fastener material and installation is in accordance with applicable specifications.
 - (c) Verification that gaskets/o-rings are properly installed and in accordance with applicable specifications.
 - (d) Assembly is documented on a QA form 34.
 - (e) Inspected by a QAI or Quality Assurance Supervisor.
- (4) The re-certification test is an operational test to system operating pressure.

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

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

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

5.7 REACTOR PLANT WORK ACCOMPLISHMENT REPORT (SUBMARINES ONLY).

5.7.1 Purpose.

- a. The RPWAR form is a listing of those pipe and components of the reactor plant which are SUBSAFE. It is specific for each ship and is provided by the Reactor Plant Planning Yard via the TYCOM. The RPWAR consists of:
 - (1) Status sheet.
 - (2) Cover sheet.
 - (3) RPWAR Master Pages.
 - (4) Addendum Sheet.
 - (5) RPWAR general notes.
- b. The reactor plant hull integrity area is comprised of those items on the RPWAR. Each ship must maintain the RPWAR current. Each completed RPWAR will be filed in an auditable manner along with the latest revision for the ship of the NAVSEA RPWAR status drawing. The reproducible blank RPWAR will be maintained in the same file. The ship will reproduce blanks as necessary to support reactor plant work.
- c. To properly complete the RPWAR, the preparer must review the general notes of the applicable RPWAR and the instructions in reference (e).
- d. To certify (or recertify) a nuclear SUBSAFE item, a RPWAR must be completed by the activity performing the maintenance (ship, FMA or shipyard) in accordance with reference (e) and forwarded as soon as possible to the Reactor Plant Planning Yard with copies to NAVSEA 08, TYCOM, ISIC and the ship. The RPWAR is to be signed in ink and the signed in ink copy should be forwarded to the Reactor Plant Planning Yard. Initials or typed signatures are not permitted. When work is complete, submit only those pages of the RPWAR line items that certify the work accomplished.
- e. The RPWAR does not, in any way, relieve the FMA or ship of its responsibility to comply with all applicable requirements specified in technical manuals, plans, and other NAVSEA documents.

- f. When the FMA works in an area covered by the RPWAR, the ship's Engineer Officer will provide the FMA with a reproduced RPWAR with the number filled in, notes, applicable certification forms and addenda sheet.
- g. Instructions contained in this section are in amplification of those included in reference (e) and the RPWAR drawing itself.

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

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

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

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

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

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

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

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

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

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

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

5.8 MATERIAL CONDITION MONITORING (SUBMARINES ONLY).

5.8.1 Unrestricted Operations Maintenance Requirement Card Program.

- a. The URO MRC program provides the minimum material condition requirements for URO to design test depth, with an established periodicity to accomplish. It is one of the programs required to maintain SUBSAFE certification. Accomplishment of the URO MRC will identify changes within the SUBSAFE or hull integrity boundaries of the ship, which result from the degradation caused by the service environment.
- b. Administration, scheduling and reporting of the URO MRC program will be in accordance with the requirements of Chapter 25, Volume VI of this manual. A summary of URO MRC status will be reported by the submarine Commanding Officer in accordance with paragraph 5.6.8 of this chapter.
- c. When performing corrective maintenance the following guidance is provided with regard to URO MRC:
 - (1) When performing corrective maintenance, associated URO MRCs should be reviewed to determine if the URO MRCs should be accomplished concurrently ahead of scheduled periodicity to preclude having to disassemble equipment again to accomplish the URO MRCs. Ship's schedule or FMA resources may preclude concurrent, early accomplishment of URO MRCs.
 - (2) If URO MRC criteria are used, in total or in part, during corrective maintenance, and a measured parameter is found out of tolerance and not restored, a major DFS must be submitted, in accordance with Part I, Chapter 8 of this volume, even though the periodicity of the URO MRC has not expired.
 - (3) When performing corrective maintenance that does affect a URO MRC measured parameter, perform that portion of the applicable URO MRC. A URO MRC measured parameter is any parameter that is documented on the Data Report Form during the performance of the URO MRC. The following are examples of corrective maintenance that may affect a URO MRC measured parameter:
 - (a) When the retest of the corrective maintenance is a documented URO MRC measured parameter (i.e., Emergency Flood Control Accumulator Tightness Test - URO MRC 026).
 - (b) When maintenance (such as opening mechanical joints or replacing hardware, adjustments, tests) affects the operation of a system inspected/tested by a URO MRC (i.e., Emergency Flood Control - URO MRC 025).
- d. Following installation of an alteration (Ship Alteration (SHIPALT), Alteration and Improvement, Temporary Alteration) that modifies the structure of the Ship, such that access to vital equipment is or may be impacted, the Ship shall evaluate the need to perform URO MRC 029. If access to vital equipment could be restricted, the Ship shall perform URO MRC 029 and provide a copy to the

installing activity and the ISIC. Partial accomplishment of URO MRC 029 is acceptable if appropriate for the alteration. If partial accomplishment of the URO MRC is performed, provide a copy to the installing activity and the ISIC. If the complete URO MRC is accomplished, provide a copy to normal distribution.

5.9 SUBMARINE FLY-BY-WIRE MAINTENANCE CERTIFICATION.

5.9.1 Purpose. To promulgate the policy and procedure for:

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

5.9.1.1 General.

- a. Reference (u) 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 (u).
- 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.

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

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

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

5.9.2 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.

5.9.3 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.

5.9.4 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. Reference (u) provides OQE requirements including additional attributes to be included as part of the SFCC Boundary work control process. This information should be used as follows:

NOTE: THE ISIC IS ONLY RESPONSIBLE TO AUDIT FBW WORK PERFORMED BY FORCES AFLOAT/TYCOM MANAGED ACTIVITIES.

- 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.

5.10 AIRCRAFT CARRIER MAINTENANCE DOCUMENTS.

5.10.1 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).

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

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

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

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

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

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

5.10.3 Liaison Action Requests – Nuclear Cognizant Areas.

5.10.3.1 Technical Responsibilities. A memorandum of agreement exists between NAVSEA Nuclear Propulsion Directorate (08) and NAVSEA PMS 312/335 that details the division of responsibilities within the propulsion plants of nuclear powered ships. If a nuclear powered ship is unable to comply with specifications for reactor plant

systems or components and also those systems identified as nuclear by the appropriate nuclear/non-nuclear interface diagram, then a review of NAVSEA 08 requirements shall be requested via a LAR. A formal resolution of all LARs is generally required prior to reactor plant or propulsion plant startup.

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

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

5.10.4 Nuclear Liaison Inquiry – Nuclear Cognizant Areas.

NOTE: INFORMATION ON THIS SUBJECT IS SAFEGUARDED IN ACCORDANCE WITH OPNAVINST N9210.3.

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

- a. The Steam Plant Action Request (SPAR) is designed to allow the fleet and maintenance activities to submit requests for technical assistance on non-Ship Alteration related issues. The Carrier Engineering Team (CET) will assist in providing solutions which satisfy specification requirements, supply a technical evaluation or the basis for concurrence or non-concurrence with a deviation or proposed change. Where sufficient information is not available to resolve the problem, the CET may request additional information in a reply. Each SPAR will be categorized based on the type of action taken in the proposed reply.
- b. As with a LAR, if a ship or FMA has a question or technical problem or is unable to comply with a non-nuclear specification, technical assistance is available from the In-Service CET. CET Liaison services are requested using the SPAR discussed in detail in Appendix 4 of reference (d).

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

- a. SPAR should be submitted by the ship or FMA to the PPEA to address technical, logistical and/or operational problems with the steam and electric plant systems. It is the intent of these requirements to ensure consistency between fleet units and overhaul and repair activities in the content, format and completeness of SPAR submissions. The SPAR is not intended to replace Ship's Force and Overhaul/Repair Yard communication with the CVN68 class Engineering Configuration Manager for drawing and Ship Change Document/ShipAlt installation and configuration control issues using LARs prepared in accordance with reference (w).

- b. Examples of when generation of a SPAR is appropriate are:
 - (1) Receipt of spurious De-Aerating Feed Tank level alarms during maneuvering transients that the performance of available preventive maintenance and technical manual troubleshooting does not correct.
 - (2) Failure of the Emergency Diesel Generator to parallel across the Emergency Diesel Generator output breaker during a normal Emergency Diesel Generator feedback in accordance with the Steam Plant Manual and troubleshooting do not correct or identify the cause of the failure.
 - (3) Failure of a normal seeking Automatic Bus Transfer to transfer to its normal source upon a return of the normal power supply and Ship's Force is unable to identify the cause through available troubleshooting methods.
- c. The SPAR is not intended to replace:
 - (1) The CSMP for work requests/candidates.
 - (2) TFBRS for discrepancies with the PMS System.
 - (3) Technical Manual Deficiency/Evaluation Reports (TMDER) or Manual Change Requests for identifying discrepancies in technical manuals.
 - (4) Reporting changes to ship's configuration as a result of the Navy Modernization Program.
- d. A SPAR is also never used for removing or reprogramming work to or from an AWP.
- e. AWP's for Chief of Naval Operations availabilities are developed in accordance with Section 5.1.1 and Appendix D or F of the ACCMP. The ACCMP can be found on the Carrier Team One website under the "Resources/Library" tab.

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

- a. The request concerns a PPEA cognizant system or component as defined in Enclosure (1) to PPEA-1.
- b. The request does not change:
 - (1) Engineering System Diagrams.
 - (2) System diagram attributes, such as system design or performance characteristics, material, pipe size, etc.
 - (3) Steam Plant Manual.
 - (4) Component Procurement Specifications.
 - (5) Component Technical Requirement documents.
 - (6) Component technical manuals.
 - (7) System testing requirements.
 - (8) GSO requirements.
- c. The request has no impact on Reactor Plant systems or components.

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

- a. Routine – within 20 business days.
- b. Urgent – within 5 business days.

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

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

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

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

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

5.10.5.8 Process Map. The PPEA SPAR Process Map is shown in detail in Figure 5-4 of this chapter.

5.10.6 Steam Plant Liaison Inquiry – Non-Nuclear Cognizant Areas. SPLIs are the Steam Plant equivalent of an NLI. SPLIs are used by the CET to request information, disseminate technical information associated with the Steam Plant, or direct work that does not require a drawing change or affect system configuration control, to the Fleet and overhaul activities. This document is intended to be a data collection tool only, and in general will not direct Forces Afloat to accomplish any repair, modification, or alteration to systems or components. Following NAVSEA approval, a SPLI is issued to the applicable TYCOM(s), who will forward the request to the appropriate ships via official letter. Each activity shall maintain an auditable file, containing all information associated with each incoming and outgoing (answered) inquiry. A SPLI may be necessary to obtain specific data and other information from Forces Afloat during development of SPAR responses and other CET products.

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

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

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

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

- a. Formal instructions for completion of RPCCRs is found in Appendix 11 of reference (d). Blocks 1 - 30 (31 if needed) must be filled out in accordance with the instructions found in Appendix 11.

- b. Commanding Officers are directed to forward RPCCR(s) to NAVSEA 08 by official letter, similar to the sample in Appendix E of this chapter, using ship's letterhead with copies to the TYCOM, ANSTR Pittsburgh and A4W/A1G RPPY.

Figure 5-4 - PPEA SPAR Process Map

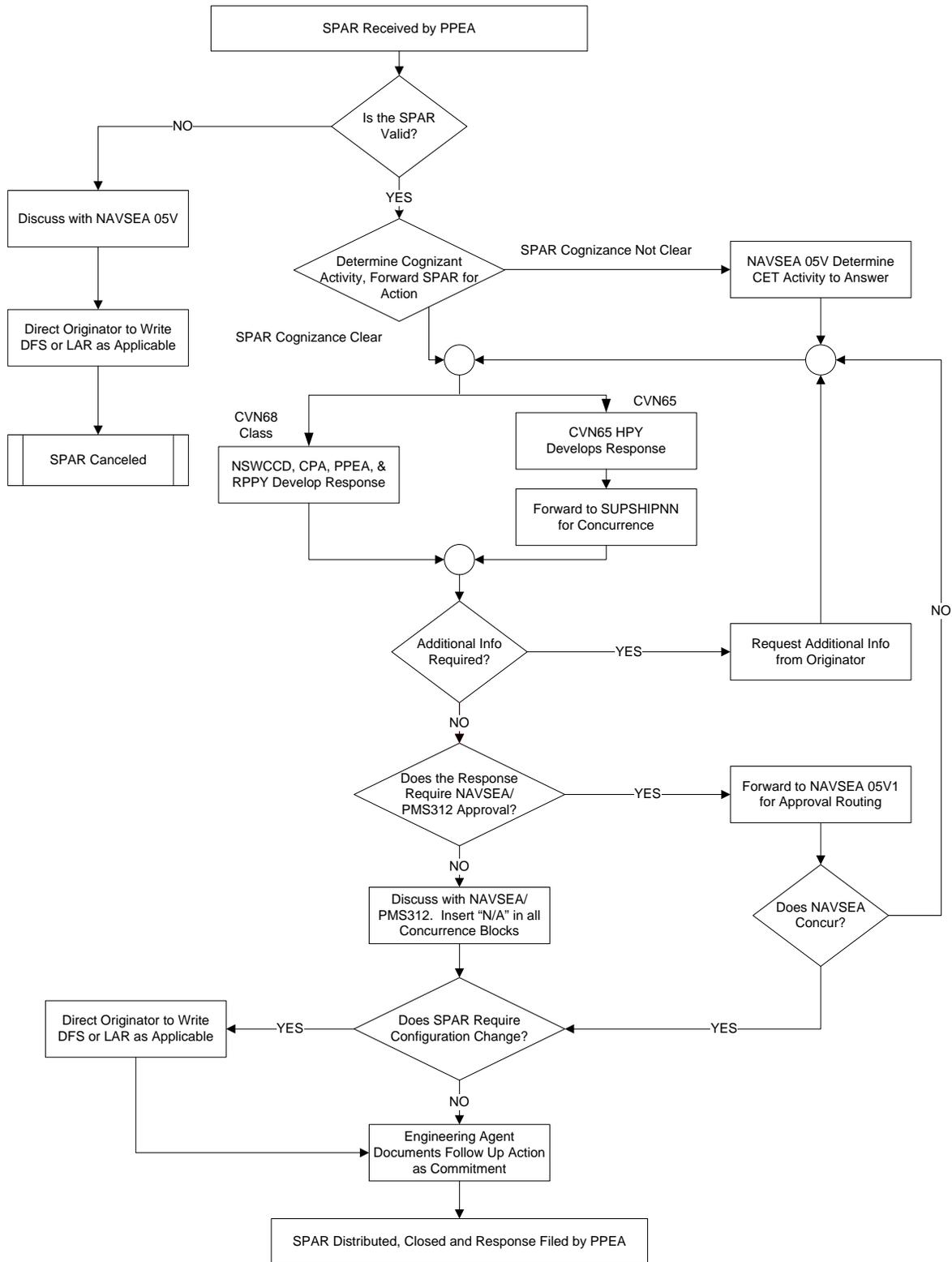
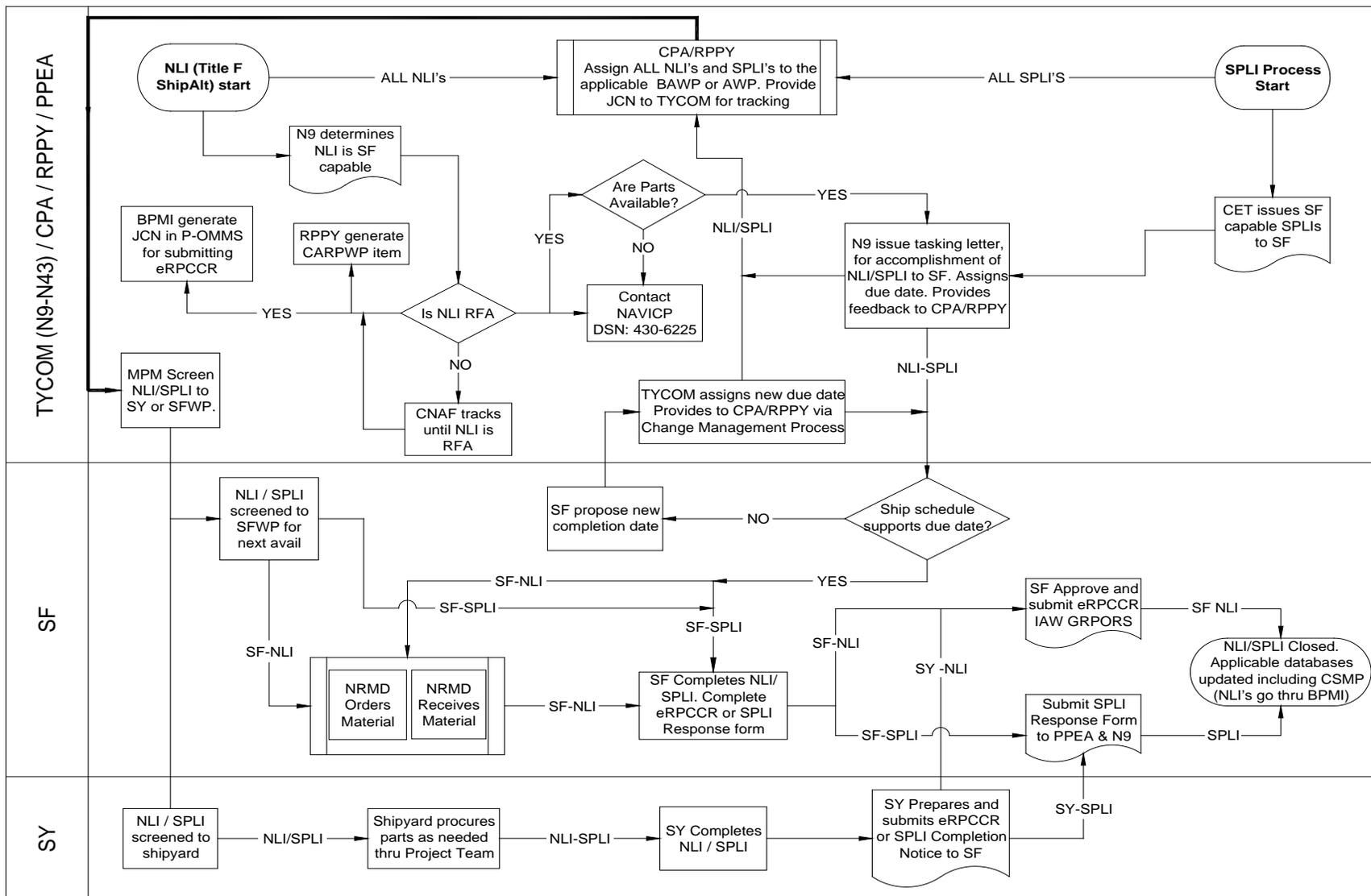


Figure 5-5 Overall NLI/SPLI Process Map



V-1-5-30

5.10.8 Technical Manual Deficiencies and Manual Change Requests.

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

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

5.10.8.3 URGENT Deficiencies.

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

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

5.10.8.4 Routine Deficiencies.

- a. Routine TM documentation deficiencies and concerns are reported via the web or using a paper TMDER. The paper form should be available in the back of any ship or NAVSEA/SPAWAR system tech manual. If not, a copy should be requisitioned.
- b. Attach a copy of the TM title page and the marked-up pages (if available) to the TMDER and mail to Commander, Naval Surface Warfare Center, Port Hueneme Division at the address above or via the web at <https://nsdsa.nmci.navy.mil/tmder/tmdp.aspx>.
- c. Again, TDMIS users may submit routine TMDERs via the “deficiency module” of TDMIS. Attachments may be uploaded in TDMIS.

5.10.8.5 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.

5.10.9 Fleet COSAL Feedback Report.

5.10.9.1 Usage. This report is used specifically to call attention to and seek correction of any technical deficiencies found on Allowance Parts Lists (APL)/Allowance Equipage 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.

5.10.9.2 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 (x) for further details concerning this form.

5.10.9.3 Form Location. The Fleet COSAL Feedback Report form (Appendix G of this chapter) can be found at 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.

(This Page Intentionally Left Blank)

**APPENDIX F
TECHNICAL MANUAL DEFICIENCY REPORT (TMDER)**

Ref: NAVSEAINST 4160.3A NAVSEA S0005-AG-GYD-010/TMMP			
NAVSEA/SPAWAR TECHNICAL MANUAL DEFICIENCY/EVALUATION REPORT (TMDER)			
<p>INSTRUCTIONS: Continue on 8 ½" x 11" page if additional space is needed.</p> <p>1. Use this report to indicate deficiencies, problems and recommendations relating to publications.</p> <p>2. For CLASSIFIED TMDERs see OPNAVINST 5510H for mailing requirements.</p> <p>3. For TMDERs that affect more than one publication, submit a separate TMDER for each.</p> <p>4. Submit TMDERs at web site https://nsdsa2.phdnswc.navy.mil or mail to: COMMANDER, CODE 310 TMDER BLDG 1389, NAVSURFWARCENDIV NSDSA, 4363 MISSILE WAY, PORT HUENEME CA 93043-4307</p>			
1. PUBLICATION NUMBER	2. VOL/PART	3. REV/DATE OR CHG/DATE	4. SYSTEM/EQUIPMENT ID
5. TITLE OF PUBLICATION			6. REPORT CONTROL NUMBER (6 digit UIC-YY-any four: xxxxxx-03-xxxx)
7. RECOMMEND CHANGES TO PUBLICATION			
7a. Page #	7b. Para #	7c. RECOMMENDED CHANGES AND REASONS	
8. ORIGINATOR'S NAME AND WORK CENTER	9. DATE	10. ORIGINATOR'S E-MAIL ADDRESS	11. TMMA of Manual (NSDSA will complete)
12. SHIP OR ACTIVITY Name and Address (Include UIC/CAGE/HULL)		13. Phone Numbers: Commercial (___) ___-___	

(This Page Intentionally Left Blank)

<u>Activity</u>	<u>Identification Code</u>
Newport News Shipbuilding	NN
Naval Undersea Warfare Systems Center - Newport (NUWC)	NUSC
Norfolk Naval Shipyard	N
Charleston Naval Shipyard	C
Puget Sound Naval Shipyard	S
Pearl Harbor Naval Shipyard	P

- c. Listed below are some of the LI activity designators assigned by NAVSEA to various activities.

<u>Activity</u>	<u>Identification Code</u>
<u>Naval Shipyard</u>	
Charleston	C
Long Beach	L
Mare Island	MS
Norfolk	N
Pearl Harbor	P
Philadelphia	H
Portsmouth	A
Puget Sound	S

Supervisor of Shipbuilding

Groton	SSG
--------	-----

<u>Activity</u>	<u>Identification Code</u>
-----------------	----------------------------

Naval Weapons Station

Naval Surface Warfare Center Division, Crane	WQC
Naval Surface Warfare Center Ordnance Station, Louisville	NSL
Naval Weapons Station, Yorktown	YT

Other NAVSEA Activities

Other	JCR
SRF, Guam	SRFG
SRF, Yokosuka	SRFY
Naval Undersea Warfare Center Detachment, New London	NUWC
Naval Inventory Control Point (formerly Navy Ships Parts Control Center)	X
Naval Submarine Support Facility, NLON	SFNL
Submarine Base, Pearl Harbor	SBPH

<u>Activity</u>	<u>Identification Code</u>
TRIDENT Refit Facility, Kings Bay	TRFK
TRIDENT Refit Facility, Bangor	TRFB
SIMAs/Tenders	AS-32, 33, 34, 36, 37, 39, 40, 41, etc.

- d. For Submarine Flight Critical Components, see reference (k) for the activities authorized for testing and certification.

6.3.7 Marking of Level I Stock Program Material and Controlled Material.

6.3.7.1 General Requirements. LI Stock Program Material passes from the manufacturers into the Navy supply system by way of Navy receipt inspection activities, which examine the material and subject it to a number of tests. LI material which meets acceptance criteria is marked with a permanent MIC number. SUBSAFE material supplied by the shipyard as onboard repair parts during new construction is required to be MIC marked. On older ships, the SUBSAFE material supplied as onboard repair parts during new construction may not have been MIC marked, but will be listed on the Supervisor of Shipbuilding's letter of certified material.

- a. The purpose of MIC marking is four-fold:
 - (1) To denote that the marked material has been inspected, verified and accepted.
 - (2) To verify the material in hand by comparing it to the applicable drawings, plans, ordering requirements, and installing documents.
 - (3) To provide traceability from the installed material to OQE.
 - (4) To preclude complete re-inspection of material accepted by an approved activity.
- b. Two problems arise in application that can defeat the purpose of the MIC marking:
 - (1) Internal components of an assembly which is MIC marked on the exterior, are usually not marked individually, and can lose their identity as LI material, if separated during disassembly. Strict adherence to "bag and tag" requirements, using fleet QA forms, overcomes this problem. Any part that becomes separated from its QA form (a loss of traceability) must be treated as uncontrolled material.
 - (2) Reference (a) permits the use of shortened MIC numbers in cases where the entire marking cannot be applied due to space limitations. It is possible that some LI material will lack the traceability number providing the critical link to the OQE, which in turn serves as the basis for the designation "LI material or controlled material". This problem is circumvented by a tag affixed by the receipt inspection activity directly to the material or to its container, which lists the complete MIC number. The complete MIC marking is recorded during receipt inspection. Although the complete MIC marking would not be visible once the item was installed, traceability is maintained through the retained QA paperwork and tags associated with the job, which will list the full MIC number.
- c. SUBSAFE castings and aluminum bronze components receive a permanent LI marking.
- d. The MIC and SUBSAFE markings are in addition to the required manufacturer's marking.
- e. Altering of a MIC marking is prohibited except to make documented corrections.
- f. Method of marking controlled material. Physical marking methods are described in references (a) and (j).
- g. Items not physically capable of being marked. Items such as small parts are packaged in homogeneous lots (i.e., same heat, batch or melt; and same vendor traceability) and the package is marked. If the package is opened, the individual items removed must be tagged with QA form 2. The remaining items in the package will be controlled by the use of a single QA form 2 attached to the package.

6.3.7.2 Level I Material. LI material has a MIC marking affixed to it by the activities which certify the material for the Navy supply system. The activities are listed in paragraph 6.3.6 of this chapter. Authorized FMAs may apply a MIC marking to a component prior to installation in a ship. MIC markings will be applied in accordance with reference (a). The following paragraphs provide general guidance regarding MIC marks and marking:

- a. Elements of the MIC Marking. The normal MIC marking consists of three elements:
 - (1) Material designator. The material designation comes from Volume II of reference (a) with the two or three letter code (e.g., KMA).

NOTE: MIC MARKINGS ON OLDER STOCK PIPING MATERIAL, VALVES, FITTINGS, ETC., RECEIVED FROM THE SUPPLY SYSTEM MAY CONTAIN FOUR LETTER MATERIAL DESIGNATORS. FOUR LETTER MIC MARKING MATERIAL DEFINITIONS ARE CONTAINED IN VOLUME II OF REFERENCE (a).

- (2) Traceability number. The traceability number is used by the marking activity to relate the piece to inspection records and consists of the last two digits of the year, Julian date when the material was inspected, a hyphen and lot number (e.g., 89364-043).
 - (3) Certifying Activity Designator (CAD). The CAD denotes the activity that performed the certification testing and marking. The CAD indicates acceptance of the material. Only the government activities and private shipyards which are authorized by NAVSEA to certify inspect and mark LI material are assigned CADs. NAVSEA periodically issues a letter containing the list and identity code of government activities and private shipyards authorized to certify LI material. A listing of those activities authorized to certify LI material is provided in paragraph 6.3.6 of this chapter.
- b. If all the markings cannot be affixed because of space limitations, then they are affixed in accordance with reference (a).
- c. Sample MIC Markings. Three marking systems are in effect. Samples of MIC marks affixed to non-nuclear LI material from each of the marking systems follow:

- (1) CNB-91301-123 TRFB (LI material, new marking system)

CNB	91301	123	TRFB
Material code.	Julian date	Inspection	Inspection
70/30 copper	of inspection	lot number	Activity
nickel (from		(3 digits	(TRIDENT Refit
the Material		maximum)	Facility, Bangor)
Designator			
Catalog)			

- (2) KMD-90204-123 A (LI material, new marking system)

KMD	90204	123	A
Material code.	Julian date	Inspection	Inspection
K monel (from	of inspection	lot number	Activity
the Material		(3 digits	(Portsmouth
Designator		maximum)	Naval Shipyard)
Catalog)			

- (3) 7150 001 A VBA (LI material, old marking system)

7150	001	A	VBA
Julian Date	Inspection	Inspection	Material code.
of inspection	lot number	activity	Valve bronze
		(Portsmouth	alloy
		Naval Shipyard)	

- (4) 7100 005 CNB (LI material, old marking system)

7100	005	CNB
Julian date of inspection	Inspection lot number	Material code. Copper nickel alloy

- (5) SER 1991-921A LI (Marked by Portsmouth Naval Shipyard)

SER 1991-921A-061 LI (Marked by Naval Surface Warfare Center, Carderock Division (Submarine Antenna Engineering Directorate) (previously NAVSSES, Philadelphia))

- d. Examples of LI MIC marks for periscope and antenna parts marked prior to 31 July 1979:

- (1) NCD 8249-584 QQ LI

NCD	8249	584	QQ
Material code	Julian date of inspection	Inspection lot number (3 digits maximum)	Inspection Activity (Naval Surface Warfare Center, Carderock Division)
Nickel copper alloy			

- (2) SER 1991-921A-AS18

FMA marking applied to previously unmarked antenna, mast or periscope parts within the SUBSAFE boundary documented by receipt inspection record (QA form 1) as being received prior to 31 July 1979 or are parts removed from an antenna, mast or periscope from an in-service SUBSAFE certified submarine.

- (3) Fasteners are identified and color coded in accordance with Appendix C of reference (a).

6.3.7.3 Assignment of Material Identification and Control Numbers for Items Manufactured from Certified Raw Materials.

NOTE: HEADED FASTENERS (CAPSCREWS, BOLTS, MACHINE SCREWS, ETC.) MANUFACTURED FROM LI MATERIAL REQUIRE ADDITIONAL TESTING (i.e., WEDGE TENSILE OR AXIAL TENSILE TESTING AND HARDNESS TESTING).

- a. LI items manufactured using certified LI raw material (e.g., barstock, plate, forged shape) except fasteners with heads may be assigned the same MIC markings as the raw stock provided no work is done on the base material that would alter its chemical, physical or mechanical properties (machining and welding may be done).
- b. Headed fasteners will be assigned a unique MIC marking following local manufacture from existing LI material and satisfactory completion of certification testing. A DFS is required if certification testing is not completed.

NOTE: A NEW MIC MARKING SHALL BE ADDED WHENEVER LI MATERIAL IS HEAT TREATED OR WORKED IN SUCH A WAY AS TO ALTER CHEMICAL, PHYSICAL OR MECHANICAL PROPERTIES. THE NEW MIC NUMBER SHALL PROVIDE TRACEABILITY TO THE ORIGINAL MIC NUMBER AND RECERTIFICATION TEST REPORTS FOR CHEMICAL, PHYSICAL OR MECHANICAL PROPERTIES.

- c. The following procedures will be used by a FMA authorized to certify and assign MIC markings, in accordance with reference (a), to items manufactured from certified raw material that have had their chemical, physical or mechanical properties altered:
 - (1) Prepare a new QA form 1 for each new item.
 - (a) Complete Blocks 1, 2, 5, and 6 of QA form 1.
 - (b) Blocks 7 and 8 of QA form 1 will be marked "NA".

- (c) In Block 9 of QA form 1, check “no”, then print name, sign and date.
 - (d) Enter the appropriate codes for the required tests and inspections in Block 10 of QA form 1.
 - (e) Enter signed and dated statements in Block 11 of the QA form 1 that provides:
 - 1 The MIC number of the raw material and Controlled Work Package serial number used in manufacture, inspection and test of the item.
 - 2 The results of the tests and inspections designated in Block 10 of QA form 1
 - (f) Check the appropriate boxes in Blocks 12, 13 and 14, print name and sign Block 15 of QA form 1.
 - (g) If the item was found to be acceptable and certified to the appropriate Level of Essentiality, assign a new MIC number in the format shown in paragraphs 6.3.7.2.c.(1) or (2) of this chapter for non-nuclear material.
 - 1 Volume II of reference (a) should be consulted for the material designator since the fabrication processes may have altered the material.
 - 2 The date will be the date that the MIC number is assigned.
 - 3 Each item manufactured will be assigned a lot number and the appropriate test and inspection records for that item will be annotated with the lot number to ensure traceability.
- (2) Complete the new QA form 2 using the new MIC number.
- (a) Mark the certified material with the new MIC markings in accordance with paragraph 6.3.7.2 of this chapter. Block 5 of QA form 2 will be N/A.
 - (b) Remove the original QA form 2 with the raw stock MIC number. Enter a statement in the installation block that the item has been certified and the new MIC number that was assigned. The tag should then be filed with the new QA form 1.

6.3.8 Level I Submarine Flight Critical Component Stock Program Material Downgrading.

NOTE: MATERIAL CODED AS SS DOES NOT REQUIRE DOWNGRADING FOR USE IN LI APPLICATIONS.

6.3.8.1 Material Downgrading. Occasionally LI/SFCC Stock Program controlled material must be downgraded in order to support training or production work due to the non-availability of uncertified material. In order to maintain accountability of the end use of LI/SFCC Stock Program controlled material, the following procedure is required:

<u>Procedure</u>	<u>Responsibility</u>
For LI/SFCC, obtain written authorization to downgrade the material from the QAO.	Leading Petty Officer/Work Center Supervisor
Remove all MIC markings from the LI material and SMIC markings from SFCC as well as controlled material tags and forms. The QA forms will be forwarded to the QAO (ship) or QA office (FMA) with the approved authorization.	CMPO/CMH

6.3.9 Storage, Issue, and Handling of Level I/Scope of Certification/Submarine Flight Critical Component Stock Program Material.

6.3.9.1 Storage Requirements.

- a. The supply department onboard the FMA or a ship will stow, handle and issue LI/SOC/SFCC stock program material as required by the governing NAVSEA, NAVICP, or NAVSUP instruction.

NOTE: LI/SOC/SFCC STOCK PROGRAM MATERIAL BECOMES CONTROLLED MATERIAL, FOR THE PURPOSES OF THIS MANUAL, WHEN THE MATERIAL HAS BEEN RECEIVED BY THE CMPO OF THE WORK CENTER OR DIVISION.

- b. Controlled material in the custody of customers (ship or FMA work centers) will be segregated by a physical barrier, in clearly marked, dry, secure, clean stowage and handling areas.
 - (1) Use of separate boxes, shelves, roped off or marked (e.g., painted lines) areas are acceptable methods of segregation/stowage, provided they are clearly marked, allowing separation of the following materials:
 - (a) Material within the SUBSAFE boundary.
 - (b) LI.
 - (c) SFCC.
 - (d) SOC MCD-A, MCD-B and MCD-C.
 - (e) Material undergoing receipt inspection.
 - (f) Rejected materials.
 - (g) Material staged for a specific job or process. Controlled materials of different Levels of Essentiality and non-controlled material may be co-located when staging materials for a specific job as long as all identification tags attached to the material are annotated with the same Job Control Number.
 - (2) These materials must be segregated from each other and from other materials. Segregation will be maintained from receipt through staging. Unidentified material or rejected material will be segregated from acceptable controlled material. Access to controlled material will be positively controlled.
 - (3) LI materials of different material types, grades or condition shall be segregated through physical separation unless readily differentiated by other attributes, such as size or physical appearance. When physical segregation cannot be accomplished, an alternative positive system of control shall be used. The method used shall assure that different materials that appear to be similar are not mixed (unless the materials are approved alternates for each other as indicated by part or stock number).
- c. Controlled material will be handled and stored in a manner to prevent damage and be sealed for cleanliness when applicable (e.g., Oxygen Clean).
- d. Material received, or modified after receipt, not meeting the receipt inspection requirements of paragraph 6.3.4 of this chapter will be rejected, tagged with QA form 3, and placed in segregated controlled stowage to await disposition. Disposition examples:
 - (1) Disposal.
 - (2) Repair.
 - (3) Retention of components for future use.
- e. Material awaiting receipt inspection will be segregated from material accepted or material rejected.
- f. CMPOs will inspect controlled material storage areas of their work center, semi-annually as a minimum to ensure:
 - (1) Material is in designated area.
 - (2) Material is properly identified.
 - (3) Material is properly marked and tagged.

- (4) Material is protected from damage.
- (5) Material is kept clean.
- (6) Material is segregated as required.

6.3.9.2 Staging Requirements. Controlled materials of different Levels of Essentiality and non-controlled material may be co-located when staging material for a specific job provided that:

- a. All QA forms or identification tags attached to the material are annotated with the same Job Control Number.
- b. Material is segregated from material staged for other jobs or processes.

6.3.9.3 Issue of Level I/Scope of Certification/Submarine Flight Critical Component Controlled Material. LI/SOC controlled material issue will be restricted to those specific applications that have controlled material requirements. SFCC controlled material may be issued for non-Flight Critical applications without written authorization but must not be subsequently installed into components within the SFCC Certification Boundary.

6.3.9.4 Handling of Material. All controlled material received by a work center, whether received from the supply department as onboard stock, work center stores or from a tended ship must be controlled as required by reference (a) for LI, reference (b) for SOC or reference (k) for SFCC.

- a. Controlled material must at all times be in physical custody of either the work center CMPO, QAI, a craftsman or stowed in a work center controlled material stowage area.
- b. Lots of material (e.g., box of bolts) broken down for end use, will maintain the same identification and control as the parent controlled item using QA form 2 as appropriate.
- c. The QA form 2, and/or any other identification must stay with the material at all times until it is installed or reinstalled in the system or returned to the custody of Ship's Force.
- d. Transfer of a MIC marking during issue of barstock or pipe will be accomplished by transferring the MIC to a new location on the piece to be sectioned, and be verified by the work center CMPO/CMH or a QAI before the original marking is lost.
- e. If, during fabrication, the original piece must be broken down (such as cutting off a piece of barstock) or the MIC marking will be lost by machining, welding, etc., the proper material identification markings will be transferred to the piece(s) prior to cutting or to the container, in case of small parts, and QA form 2 will be attached to each new piece.
- f. On completion of shop/ship fabrication or assembly stage, the QAI will check the finished product against the attached material identification tags for required material markings. The QAI will inspect the finished product for conformance to specifications. If satisfactory and if the required marking is present the QAI will print name and sign the QA form 2.
- g. If for any reason at any time the product fails inspection, the QAI will reject the material, attach QA form 3 and inform the QAO.
- h. The lead work center will be responsible for installation and the final acceptance block on all QA forms associated with a particular product. Assist work centers or divisions will be responsible for control of material that they use on a job.
- i. Material consumed (e.g., welding electrode, brazing alloy) or installed (e.g., studs, valve ball) in the repair process must have its identity (MIC number, type or grade of the material) recorded on the appropriate QA form (e.g., QA form 18, QA form 20, QA form 34).
- j. For previously installed material in a SUBSAFE, LI, SOC or SFCC system which is removed and is to be re-installed, positive control and identification of the material shall be maintained from removal through reinstallation by use of a QA form 2. Non-controlled material will be tagged with a QA form 2 or other positive means of traceability until reinstallation.

- k. Damaged existing material removed from a SUBSAFE, LI, SOC or SFCC system which will not be repaired or reused, and is immediately disposed of as trash, does not require a QA form 2 or QA form 3 to be attached. All MIC markings on damaged material that meets this criterion shall be removed prior to disposal to prevent inadvertent reuse. If there is any potential for repair or re-use of the removed material, then paragraph 6.3.9.4.j applies and QA form 2 must be attached. Do not remove MIC numbers from controlled material that is required to be turned-in. Damaged controlled material that is required to be turned-in, such as depot level repairable items, shall be rejected using the QA form 3 process.
- l. All material, parts or components from controlled systems which are removed from the ship by Ship's Force, to be worked by the FMA, must have a QA form 2 properly filled out and attached. If it is necessary for the FMA to disassemble such components, identification must be retained on each part which is controlled material using additional QA form 2. The original QA form 2 will remain with the part or component until it is re-installed in the ship.
- m. Material control tags (i.e., QA forms 2) shall be used to positively identify controlled material in transit to avoid unauthorized movement, co-mingling and improper use.
- n. Each controlled component removed from a ship's system in order to allow repair/maintenance will be tagged with QA form 2 to maintain identification and traceability. Controlled components (e.g., periscopes, valves and valve bonnets, pumps, etc.) disassembled and reassembled in a temporary controlled jobsite (established in a work space or at a jobsite) do not require individual QA tags to be filled out and attached to each controlled component (controlled components are defined in reference (a)), provided that:
 - (1) Access to the temporary controlled jobsite is controlled by a physical boundary and is marked with a posted sign stating "Temporary Controlled Jobsite".
 - (2) Rejected material must be identified, tagged with QA form 3 and removed from the area.
 - (3) Work must be actively in progress and not be longer than a shift or one normal working day on a job site vice in a FMA repair shop.

6.3.9.5 Maintaining Accountability. All controlled material received by a work center and stored in a controlled material locker shall have an attached QA form 2 and may have an associated QA form 1. The following process shall be used when issuing material:

<u>Procedure</u>	<u>Responsibility</u>
<p><u>Issuing a lot (single or multiple items) with no material remaining:</u> Update original existing QA form 2 to annotate the Name of the craftsman and workcenter or shop or organization the material is issued to.</p> <p>Update associated QA form 1 (if applicable) in accordance with QA form 1 instructions. Submit the associated QA form 1 with zero amount remaining to the QAO.</p>	<p><u>CMPO</u></p> <p><u>CMPO</u></p>
<p><u>Issuing a portion of a lot with material remaining:</u> Initiate a new QA form 2 for each quantity less than the entire lot of material to be issued specifically annotating the amount to be issued. Annotate the Name of the craftsman and workcenter or shop or organization the material is issued to. Do not modify the original QA form 2.</p>	<p><u>CMPO</u></p>

<u>Procedure</u>	<u>Responsibility</u>
<p>Issuing a portion of a lot with material remaining: Initiate a new QA form 2 for each quantity less than the entire lot of material to be issued specifically annotating the amount to be issued. Annotate the Name of the craftsman and workcenter or shop or organization the material is issued to. Do not modify the original QA form 2.</p>	<p>CMPO</p>
<p>Update associated QA form 1 to annotate amount issued and amount remaining in accordance with QA form 1 instructions.</p>	<p>CMPO</p>
<p>When the last material of a lot is issued, destroy the original QA form 2 with zero amount remaining. Submit the associated QA form 1 with zero amount remaining to the QAO.</p>	<p>CMPO</p>

(This Page Intentionally Left Blank)

- (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 5.6.5 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 a material deficiency discovered during a maintenance action **as follows:**
 - (1) **(For Aircraft Carriers and Surface Forces) For any material deficiency discovered during a maintenance action** that will not be corrected prior to the ship's underway, and is not categorized as a Major DFS in accordance with paragraph 8.2.4 of this chapter.

- (2) (For submarines only) For any material deficiency discovered during a maintenance action that will not be corrected prior to the ship's underway, and is not categorized as a Major DFS in accordance with paragraph 8.2.4 of this chapter except "K" Coded Maintenance Requirement Cards (KMRC) that are outside the SUBSAFE boundary which will be entered into and tracked in the Ship's CSMP as well as the Performance Monitoring Team Onsite Analysis Report.
- 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) A Major DFS is required to document missing or damaged Special Hull Treatment removed from external structure only when the coating system beneath the Special Hull Treatment is missing or delaminated resulting in bare metal that is not repaired. Missing or damaged Special Hull Treatment removed from external structure is to be tracked using the CSMP process as long as the remaining coating system is intact or repaired (i.e., no bare metal) when the following conditions are met:
- (1) The submarine is not currently in a Depot Level Availability.
 - (2) Temporary repairs are performed in accordance with the requirements of the class specific hull treatment repair and maintenance manual.
 - (3) The CSMP item is scheduled to be cleared no later than the next scheduled Depot Level Availability.

8.3 DEPARTURE FROM SPECIFICATION PROCEDURES.

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

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

- a. Requests for DFS will be submitted, approved and cleared in accordance with paragraph 8.3.7 or 8.3.8 of this chapter. The Web Based Electronic Departure from Specification (eDFS) program is 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 eDFS.

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 EDfs, 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 eDFS 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 eDFS program 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.
 - (1) (Carriers and Surface Force Ships) DFS serial numbers for Ship's Force initiated departures will be automatically supplied by eDFS (0000 series). For departures initiated by a depot level activity, the serial numbers will be automatically supplied by eDFS (1000 series). All outstanding departures must be submitted to the TYCOM for evaluation by a Local Technical Authority prior to a ship's underway. However, if the Local Technical Authority evaluation is not complete prior to the underway, the ship is responsible to ensure adequate temporary precautions and/or standing orders are in effect until the DFS evaluation is complete. For temporary departures expiring during an underway, as discussed in paragraph 8.3.9 of this chapter, the extension request shall be made sufficiently in advance to allow the evaluation process to be completed before the expiration date and preferably prior to the underway in which the DFS expires.
 - (2) (Submarines only) DFS serial numbers will be issued from the Ship's Force hand written log and entered into the ship's eDFS stand alone program (and delivered to ISIC in either electronic or hard copy format). DFS serial numbers for work performed by NAVSEA managed activities, to include Public and Private shipyards and/or activities directed by TYCOM, shall use 1000 series DFS numbers auto initiated by the eDFS software.
- 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. The activity submitting the DFS for permanent approval will inform the ship of the configuration change and provide sufficient data to support submission of Ship's Configuration Change Report (OPNAV 4790/CK) and a Fleet COSAL Feedback Report (NAVSUP 1371).
- c. For DFS approved as a permanent repair for material/component substitution resulting in a configuration change, the ship will submit a Ship's Configuration Change Report (OPNAV 4790/CK) and a Fleet COSAL Feedback Report (NAVSUP 1371) to ensure accurate configuration accounting and technical/supply support are maintained.
- d. 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 eDFS program 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 eDFS program. 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 eDFS, WHEN IT IS DIRECTED THAT THE QA FORM 12 IS SIGNED, AN ELECTRONIC SIGNATURE IS IMPLIED. ISIC AND UNITS ASSIGNED TO TYCOMs UTILIZING THE eDFS SYSTEM WILL SUBMIT DFSs TO THE TYCOM VIA THE eDFS PROGRAM. THIS PROGRAM REQUIRES A USER IDENTIFICATION AND PASSWORD SUPPLIED BY THE TYCOM. THE FOLLOWING PROCESSES WILL BE EXECUTED UNDER THE eDFS PROGRAM 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 eDFS program 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 eDFS 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, eDFS will automatically supply the next open DFS serial number. See paragraph 8.3.1g.(1) of this chapter for carriers and surface force ships and paragraph 8.3.1g.(2) of this chapter for submarines for a description of the current process for assigning DFS serial numbers.

- (1) ISICs shall schedule and conduct a QA Program assessment in conjunction with the Fleet Readiness Training Plan (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) Audits and surveillances (to include QA-14 Binder).
 - (e) Welder qualification and training.
 - (f) QA records and record retention.
 - (g) (Submarines only) SUBSAFE/REC, SOC and FBW program.
 - (h) (Submarines only) URO MRC Program.
 - (2) (Submarines only) Assessments will be evaluated using the criteria provided in Appendix D. Electronic copies of the assessment reports will be forwarded to the TYCOM. Submission of the assessment may be via email with appropriate cover letter.
 - (3) (Surface Force Ships) Copies of the assessment reports will be forwarded to the TYCOM noting completion of assessment as satisfactory with findings documenting corrective action taken or proposed corrective action or corrective action required to be taken by the TYCOM or higher authority.
- b. ISICs will conduct the following additional periodic audits and surveillance:
- (1) Conduct periodic monitoring of Ship's Force controlled work and QA program on all assigned ships during maintenance periods.
 - (a) Perform at least one surveillance during each refit/upkeep/FMA availability.
 - (b) Conduct monitoring during industrial availabilities.
 - (2) Conduct monitoring of assigned FMA's QA. This monitoring will include:
 - (a) Review of work procedures including opening and closing practices.
 - (b) Monitoring of in progress work both on tended ships and in FMA work centers.
- c. (Submarines only) Additional ISIC Requirements.
- (1) On completion of a Selected Restricted Availability (SRA), Pre-Inactivation Restricted Availability (PIRA), Major Maintenance Period (MMP), Extended Refit Period (ERP), **Docking Phased Maintenance Availability (DPMA)** 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 9.3.3 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), Extended Docking Selected Restricted Availability (EDSRA), 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) CWP's done since commencement of the PSA, DMP, EDSRA, EOH, ERO, RFOH or ROH prior to cold operations and prior to Fast Cruise. CWP's 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, EDSRA, 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, EDSRA, 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.

NOTE: THE ISIC IS ONLY RESPONSIBLE TO AUDIT FBW WORK PERFORMED BY FORCES AFLOAT/TYCOM MANAGED ACTIVITIES.

- (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., CWP's).
- 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.

NOTE: WHEN REPEAT FINDINGS ARE NOTED, THE AUDITOR SHALL DECIDE IF ROOT CAUSE ANALYSIS IS REQUIRED FOR THE SPECIFIC DEFICIENCY.

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 E. The TYCOM/ISIC cover letter forwarding the QA Audit/Assessment/Surveillance Discrepancy forms (Appendix E) 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. Specifically, the Ship's Force report shall:
 - (1) For individual findings that require immediate corrective action, include a root cause, causal analysis, immediate corrective action and permanent corrective action.
 - (2) For areas evaluated as weak (i.e., Below Standards) or areas where repeat findings indicate that previous corrective action was not effective include:
 - (a) A discussion of the fundamental root causes.
 - (b) A discussion of action taken to correct the causes and an evaluation of the effectiveness of this action.
 - (c) A discussion of the reasons why previous corrective action was not successful in improving any area where repeat findings indicate that previous corrective action was not effective.
 - (3) For all other individual findings requiring an official response, include, at a minimum, a permanent corrective action taken to correct the deficiency.
- 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 or within 15 days of receipt of the ISIC Official Audit/Assessment/Surveillance Report, whichever is sooner. 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 or within 15 days of receipt of the ISIC Official Audit/Assessment/Surveillance Report, whichever is sooner. 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 or within 15 days of receipt of the ISIC Official Audit/Assessment/Surveillance Report, whichever is sooner.
 - (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 or within 15 days of receipt of the ISIC Official Audit/Assessment/Surveillance Report, whichever is sooner. 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 ISIC and an informational copy to the respective TYCOM 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 ISIC and an informational copy to the respective TYCOM.
 - (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 OQE of certified (closed) CWPs 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.

(This Page Intentionally Left Blank)

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 NATIONAL ITEM IDENTIFICATION NUMBER. National Item Identification Number (NIIN) may be used whenever National Stock Number (NSN) is called for, including all QA forms. The NIIN uniquely identifies material in supply system and is adequate for Objective Quality Evidence (OQE) purposes.

11.3 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 11A. | - | REC/MCR Exception Controlled Assembly Log |
| h. | QA form 12. | - | Departure From Specification Request. |
| i. | QA form 12A. | - | Departure Clearance Report. |
| j. | QA form 14. | - | Surveillance/Monitoring/Audit Discrepancy Record. |
| k. | QA form 17. | - | Test and Inspection Record. |
| l. | QA form 17A. | - | Epoxy Repair Record. |
| m. | QA form 17B. | - | Electroplating Repair Record. |
| n. | QA form 17C. | - | Component Repair Record. |
| o. | QA form 17D. | - | Submarine Flight Critical Component (SFCC) Access, Removal and Installation Record. |
| p. | QA form 17SI. | - | Stud Installation Record. |
| q. | QA form 17W. | - | Handling Equipment Test Record. |
| r. | QA form 18. | - | Silver Braze Fabrication and Inspection Record. |
| s. | QA form 18A. | - | Ultrasonic Inspection Record. |

t.	QA form 20.	-	Welding In Process Control/Nondestructive Test Record.
u.	QA form 20A.	-	Radiographic Test Inspection Record.
v.	QA form 20B. (Part A)	-	Structural Primary Record.
w.	QA form 20B. (Part B)	-	Structural Weld History.
x.	QA form 20B. (Part C)	-	Structural Defect Record.
y.	QA form 20C.	-	Pipe, Machinery and Pressure Vessel Weld Record/Weld Defect Repair Sheet.
z.	QA form 26.	-	Hydrostatic/Pneumatic Test Record.
aa.	QA form 27.	-	Drop Test Record.
ab.	QA form 28.	-	Shop Test Record.
ac.	QA form 34.	-	Joint/Component Torque and Assembly Record.
ad.	QA form 34A.	-	Joint/Component Assembly Record.
ae.	QA form 35.	-	Thickness Measurement Record.
af.	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) Special Material Identification Code (SMIC) material with valid MIC markings.
 - (2) Submarine Antenna Engineering Directorate (SAED), (Submarine Antenna Quality Assurance Material) SMIC material.
 - (3) Open purchased and stock system non-level material required to meet SUBSAFE requirements.
- c. Level I:
 - (1) LI, 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 or MCD B: 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 or B) 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.

(This Page Intentionally Left Blank)

QA FORM 9 INSTRUCTIONSMAINTENANCE CERTIFICATION RECORD/RE-ENTRY CONTROLPURPOSE:

NOTE: "N/A" ALL UNUSED BLOCKS.

1. This form is used to authorize and certify maintenance within SUBSAFE, Nuclear Level I, Level I, SOC or SFCC boundaries and is used as a CWP cover sheet.
2. The instructions are broken down into two separate situations.

SITUATION 1. CONTROLLED WORK/SUBSAFE RE-ENTRY CONTROL BY SHIP'S FORCE ONLY.

- a. The following instructions contain the minimum information and controls necessary to maintain certified systems on board ship when work is performed by Ship's Force on a certified ship.
- b. Each block number on the Maintenance Certification Record (MCR)/Re-Entry Control (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. Each block 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 instruction.

BLOCK 1 - PAGE 1 OF

Enter the total number of pages (QA form 9 plus any QA form 10 used as a supplement, should normally be 1 of 2).

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

Check or "X" the appropriate block(s) 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.

Obtain the next CWP serial number from the ship's QAO and enter 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. Upon issuance of each REC revision, all prior revisions are canceled and superceded 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

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

BLOCK 10 - REPAIR/RE-ENTRY LOCATION

Enter the physical location of the work.

BLOCK 11 - COMPONENT(S)

Enter 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 Joint Identification (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.
- 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 E 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 E 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 E 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 as established by the CWP. For example, a typical entry would be: QA2(3), QA12(1), QA26(1), QA34(1), RFI Tag(1), LAR(2). List only QA form 2s for new material installed in the system or component. The cumulative documentation (OQE) shall be listed on the most current revision.

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. When rework is identified following signing blocks 17 and 18, new signature/date blocks for blocks 17 and 18 shall be documented on a QA form 10.

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. When rework is identified following signing blocks 17 and 18, new signature/date blocks for blocks 17 and 18 shall be documented on a QA form 10.

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 E 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(s) 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 as established by the CWP. For example, a typical entry would be: QA2(3), QA12(1), QA26(1), QA34(1), RFI Tag(1), LAR(2). List only QA form 2s for new material installed in the system or component. The cumulative documentation (OQE) shall be listed on the most current revision.
- 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 16 has been completed, reviewed and is correct. When rework is identified following signing blocks 17 and 18, new signature/date blocks for blocks 17 and 18 shall be documented on a QA form 10.

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. When rework is identified following signing blocks 17 and 18, new signature/date blocks for blocks 17 and 18 shall be documented on a QA form 10.

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 E 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.

| (This Page Intentionally Left Blank)

QA FORM 11A INSTRUCTIONS**REC/MCR EXCEPTION CONTROLLED ASSEMBLY LOG**

PURPOSE: To provide a record for the completion of maintenance on components or systems 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.

PROCEDURE: The numbered blocks on QA Form 11A correspond to the same number below. A REC/MCR Exception Controlled Assembly log will be maintained by each ship.

- a. The log is maintained by the QAO for ships.
- b. The REC/MCR Exception and Controlled Assembly Log will summarize the chronological record of REC/MCR exceptions and controlled assemblies until all maintenance on the log sheet has been superseded.

NOTE 1: EACH REC/MCR EXCEPTIONS LOG PAGE SHALL BE RETAINED IN THE FRONT OF THE REC EXCEPTION BINDER UNTIL ALL ITEMS LISTED ON THAT PAGE ARE SUPERSEDED.

BLOCK 1: - PAGE NO.

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

BLOCK 2: - SHIP

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

BLOCK 3: - TWD

QAO will identify the TWD used to perform the REC/MCR exception controlled assembly, (i.e. FWP serial number, PMS MRC, component technical manual, etc.).

BLOCK 4: - LEVEL OF WORK

The QAO will enter the level of work (e.g. SUBSAFE, Level I, SOC).

BLOCK 5: - SYSTEM OR COMPONENT

The QAO will enter the system or component for the maintenance (e.g. Salvage Air/SA-1 thru SA-8, RO Unit Wye Strainer).

BLOCK 6: - PRIME RESPONSIBILITY WORK CENTER OR GROUP

The QAO will enter the division/workcenter responsible for the work. This is the workcenter conducting the controlled assembly.

BLOCK 7: - DATE

QAO will enter the date reviewed in the "ISSUED" block. In the column "CLOSED", the QAO will enter the same date as the QA-34 block 13.

QAO will enter date QA-34 was filed in REC Exception binder.

BLOCK 8: - REMARKS

This column is to be used to summarize the work description and any other pertinent information (e.g., Salvage Air/SA-1 through 8, RO Unit Wye Strainer PMS, External Air Charging Conn). Enter "N/A" if block is not used.

| (This Page Intentionally Left Blank)

**DEPARTURE FROM SPECIFICATION REQUEST
QA FORM 12**

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

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

(This Page Intentionally Left Blank)

QA FORM 12 INSTRUCTIONSDEPARTURE FROM SPECIFICATION REQUEST

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

PROCEDURE:

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

BLOCK 1 - DEPARTURE NO.

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

BLOCK 2 - SHIP HULL NO.

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

BLOCK 3 - JCN

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

BLOCK 4 - CWP/REC SER. NO.

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

BLOCK 4A - TECHNICAL WORK DOCUMENT

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

BLOCK 5 - DATE

Enter the date the DFS request is filled out.

BLOCK 6 - ORIGINATOR

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

BLOCK 7 - DEPARTURE TYPE

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

BLOCK 7A - EXPECTED CLEARANCE DATE

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

BLOCK 7B - TEMPORARILY APPROVED UNTIL DATE

The Approval Activity will fill in the "TEMPORARILY APPROVED UNTIL DATE" for non-Electronic Departure from Specification departures. Electronic Departures from Specification will automatically populate with the TEMPORARILY APPROVED UNTIL DATE in conjunction with the approval authority signature.

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

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

BLOCK 9 - SYSTEM/COMPONENT/LOCATION

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

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

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

BLOCK 11 - **REFERENCES**

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

BLOCK 12 - **APPLICABLE SPECIFICATIONS**

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

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

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

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

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

BLOCK 15 - **DATE ANSWER REQUESTED BY**

Enter date.

BLOCK 16 - **SUBMITTING ACTIVITY**

Type or print name and enter signature.

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

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

BLOCK 18 - **APPROVAL ACTIVITY**

List the activity who will be the final approval.

BLOCK 19 - **COPY TO**

Enter activities to receive copy.

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

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.

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

TYCOM: Check the appropriate blocks. Type or print name, sign and date. ((Submarines only) See QA-12 Block 19 table below for approval guidance).

LOCAL TECHNICAL AUTHORITY: When appropriate, check the appropriate blocks and type or print name, sign and date. Check the FWD TO NAVSEA FOR ACTION BLOCK for any DFS requiring NAVSEA final approvals. **NAVSEA/NAVAL AIR SYSTEMS COMMAND (NAVAIR)** action: The appropriate blocks will be checked and signed by NAVSEA.

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

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

NOTE: WHEN ANY OF THE FOLLOWING BLOCKS IN SECTION 7 ARE CHECKED, THE TYCOM MAY APPROVE THE DFS AS DEFINED IN THE FOLLOWING TABLE:

QA-12 Block 19 Table (Submarines Only)	
MAJOR	TYCOM may approve MAJOR non-conformances on a temporary basis with concurrence from the appropriate NAVSEA technical authority.
MINOR	TYCOM may approve all MINOR non-conformances not also marked SUBSAFE, FBW, SFCC, or SOC.
SUBSAFE	<p>TYCOM may approve the following MINOR departures:</p> <ul style="list-style-type: none"> (1) Departures to which a NAVSEA approved PRECEDENT setting departure clearly applies. The NAVSEA approved departure cited as the PRECEDENT shall be referenced and retained with the approved departure. (2) Departures administered solely for the purpose of transferring accountability to an alternative accountability system in support of at-sea testing. <p>The TYCOM may approve all other MAJOR or MINOR non-conformances within the SUBSAFE Certification Boundary following discussion with the designated NAVSEA technical authority or regional Chief Engineer.</p>
URO	With the exception of at-sea portions of URO MRC 022, the TYCOM shall obtain NAVSEA technical approval of all URO MRC non-conformances.
FBW	<p>TYCOM may approve the following MINOR departures:</p> <ul style="list-style-type: none"> (1) Departures to which a NAVSEA approved PRECEDENT setting departure clearly applies. The NAVSEA approved departure cited as the PRECEDENT shall be referenced and retained with the approved departure. <p>The TYCOM may approve all other MAJOR or MINOR non-conformances within the FBW/SFCC Certification Boundary following discussion with NAVSEA 05U7T.</p>

<p>SFCC</p>	<p>TYCOM may approve the following MINOR departures:</p> <p>(1) Departures to which a NAVSEA approved PRECEDENT setting departure clearly applies. The NAVSEA approved departure cited as the PRECEDENT shall be referenced and retained with the approved departure.</p> <p>The TYCOM may approve all other MAJOR or MINOR non-conformances within the FBW/SFCC Certification Boundary following discussion with NAVSEA 05U7T.</p>
<p>SOC</p>	<p>MINOR non-conformances: Following agreement from NAVSEA that a condition is MINOR, may be approved by the TYCOM as a temporary SOC non-conformance provided that it does not affect the watertight integrity of the DDS and no DDS manned operations will be conducted.</p> <p>Non-conformances affecting any system, equipment or component within the SOC boundary, which are determined to be required by Part III, Chapter 8 of this volume, shall be categorized and processed as a MAJOR departure, unless otherwise directed by NAVSEA, will require NAVSEA approval.</p>

DEPARTURE CLEARANCE REPORT
QA FORM 12A

1. FROM:	2. DATE	
3. TO:		
4. SUBJECT DFS NUMBER _____ DATED _____ ON SYSTEM/COMPONENT _____ IN USS _____		
5. REFERENCE(s): (A) COMUSFLTFORCOMINST 4790.3 - JOINT FLEET MAINTENANCE MANUAL (B) (C) (D)		
6. JUSTIFICATION		
7. CLEAR / CANCEL SUBJECT DFS IN ACCORDANCE WITH REFERENCE (A). (CIRCLE ONE)		
8. SIGNATURE	TITLE	DATE

(This Page Intentionally Left Blank)

QA FORM 12A INSTRUCTIONS
DEPARTURE CLEARANCE REPORT

PURPOSE: Provide document for reporting the clearance of a DFS.

PROCEDURE: The numbered blocks on QA form 12A correspond with the instructions listed below. QA form 12A should be completed by the ship on which the DFS exists as soon as the discrepant condition has been corrected.

BLOCK 1 - FROM

Enter the ship's name and hull number.

BLOCK 2 - DATE

Enter date the DFS was cleared/cancelled.

BLOCK 3 - TO

Enter the appropriate ISIC or, if clearing ship approved DFS, enter "CO".

BLOCK 4 - SUBJECT

Enter the required data taken from the QA form 12.

BLOCK 5 - REFERENCE(s)

Enter all applicable references.

BLOCK 6 - JUSTIFICATION

Enter detailed justification for the clearance/cancellation listing all references, tests and inspections used for the DFS clearance.

BLOCK 7 - CLEAR/CANCEL

Circle the appropriate action.

BLOCK 8 - SIGNATURE

QAO print name, enter signature, title and date.

(This Page Intentionally Left Blank)

SURVEILLANCE/MONITORING/AUDIT DISCREPANCY RECORD
QA FORM 14

	1. DATE	2. SERIAL NUMBER	3. WC
4. PART 1 - DISCREPANCY DESCRIPTION			
5. ORIGINATOR SIGNATURE		6. QA OFFICER/QA SUPERVISOR REVIEW SIGNATURE	
QA RETAIN ORIGINAL AND FORWARD COPY TO DIVISION			
7. PART 2 – CORRECTIVE ACTION			
ROOT CAUSE(s):			
IMMEDIATE CORRECTIVE ACTION(s):			ECD
PERMANENT CORRECTIVE ACTION(s):			ECD
OBJECTIVE QUALITY EVIDENCE CORRECTIONS:			
8. DIVISION OFFICER (SIGNATURE)			DATE
DIVISION RETAIN COPY AND FORWARD COPY TO QA OFFICER			
9. QA OFFICER/QA SUPERVISOR (QAO/QAS) (SIGNATURE)			DATE
10. PART 3 - EFFECTIVENESS REINSPECTION/AUDIT		ECD	11. EFFECTIVENESS (YES/NO)
			QA FORM 14
12. EFFECTIVENESS REVIEW QA OFFICER/QA SUPERVISOR (QAO/QAS) (SIGNATURE)			DATE
COMPLETED ORIGINAL TO:		QA-14 BINDER	
COPY TO:		DIVISION RECORD FILE	
		CWP, QA FORM AND/OR REC (IF CORRECTING OQE OR PACKAGE)	

(This Page Intentionally Left Blank)

QA FORM 14 INSTRUCTIONSSURVEILLANCE/MONITORING/AUDIT DISCREPANCY RECORD

- PURPOSE:**
- a. To provide as a result of conducting audits and surveillances, a method or means of reporting a discrepancy and ensuing corrective actions are taken by the WC or division.
 - b. To provide a method of recording discrepancies, reworks and processing actions until final clearance.
 - c. To provide the only approved method to correct or add Objective Quality Evidence to a certified CWP or closed QA Form.
 - d. To provide, when maintained in an auditable fashion, a record of completed corrective actions.
 - e. To provide, when completed, an ability to conduct trend analysis to improve overall FMA and ship's maintenance quality.

NOTE: A COPY OF ALL ASSOCIATED QA FORMS 14 SHALL BE INCLUDED WITH THE CWP, QA FORM AND/OR REC. DEFICIENCIES FOUND IN A CLOSED CWP, QA FORM AND/OR REC THAT REQUIRE CORRECTION SHALL BE DOCUMENTED ON A QA FORM 14. NO CHANGE TO THE CLOSED CWP, QA FORM AND/OR REC IS PERMITTED EXCEPT AS CITED IN THIS NOTE. THE QA FORM 14 SERIAL NUMBER WILL BE ANNOTATED AT THE TOP OF THE QA FORM 9 OR QA FORM TO CLEARLY INDICATE A QA FORM 14 WAS WRITTEN AFTER THE CWP, QA FORM AND/OR REC WAS CLOSED/CERTIFIED AND THAT ADDITIONAL OQE IS ASSOCIATED WITH THE CLOSED CWP, QA FORM AND/OR REC PACKAGE.

PROCEDURE: The numbered blocks in QA form 14 correspond with the instructions listed below.

BLOCK 1 - **DATE**

The person discovering/documenting the discrepancy will enter the date the report was initiated.

BLOCK 2 - **SERIAL NUMBER**

The QAS/QAO will enter the next sequential number from the QA form 14 Log.

BLOCK 3 - **WC**

Person discovering/documenting the discrepancy will enter the WC responsible.

BLOCK 4 - **PART 1 - DISCREPANCY DESCRIPTION**

Person discovering the discrepancy will enter a description of the discrepancy and the associated reference. If associated with a CWP, enter the CWP serial number.

BLOCK 5 - **ORIGINATOR SIGNATURE**

The individual discovering/documenting the discrepancy will sign, and legibly print, type or stamp his/her name.

BLOCK 6 - **QA OFFICER/QA SUPERVISOR REVIEW SIGNATURE**

The QAO or a QAS will sign and legibly print, type or stamp his/her name signifying a review of and concurrence with the validity of the discrepancy.

NOTE: BLOCK 7, WHEN COMPLETE, WILL SIGNIFY A COMPREHENSIVE PROCESS BY WHICH THE BLOCK 4 DISCREPANCY'S CAUSE, CORRECTION AND PREVENTION ARE IDENTIFIED AND TRACKED TO COMPLETION.

BLOCK 7 - **PART 2 - CORRECTIVE ACTION**

- a. **ROOT CAUSE:** When required by the QAO, the Division Officer of the WC responsible (Block 3) for causing the discrepancy will enter the root cause and a brief supporting discussion.

- b. **IMMEDIATE CORRECTIVE ACTION:** The Division Officer of the WC responsible for causing the discrepancy will enter a description of the IMMEDIATE CORRECTIVE ACTIONS (if applicable) that have been taken or are planned and indicate their Estimated Completion Date (ECD).
- c. **PERMANENT CORRECTIVE ACTION:** The Division Officer of the WC responsible for causing the discrepancy will enter a description of the PERMANENT CORRECTIVE ACTIONS (to prevent recurrence) that have been taken or are planned and indicate their ECD. Examples include: process improvements and policy/procedural changes.
- d. **OBJECTIVE QUALITY EVIDENCE CORRECTIONS:** The Division Officer of the WC responsible for causing an Objective Quality Evidence discrepancy will enter all required information that adds and/or corrects existing discrepant OQE (described in Block 4) to a closed CWP, QA FORM and/or REC. In the event the deficiency identified in Block 4 is not related to OQE, this area shall be marked NA.

NOTE: UPON SIGNING BLOCK 8, THE DIVISION OFFICER SHALL RETAIN A COPY FOR TRACKING PURPOSES, UNTIL RESOLVED, AND PROVIDE A COPY OF THE QA FORM 14 TO THE QAO/QAS.

BLOCK 8 - **DIVISION OFFICER SIGNATURE**

The Division Officer of the WC responsible for causing the discrepancy will sign, date and legibly print, type or stamp his/her name signifying comment validity and accurate corrective action/OQE correction (if applicable) exists.

NOTE: UPON SIGNING BLOCK 9, THE QAO/QAS SHALL FILE A COPY OF THE SIGNED QA FORM 14 WITH THE DISCREPANT CLOSED CMP, QA FORM AND/OR REC (AS APPLICABLE) TO ALLOW IT TO STAND ALONE.

BLOCK 9 - **QA OFFICER/QA SUPERVISOR SIGNATURE**

The QAO or QAS will sign, date and legibly print, type or stamp his/her name indicating full acceptance of the Block 7 comments.

BLOCK 10 - **PART 3 - EFFECTIVENESS RE-INSPECTION/AUDIT**

When required by the QAO, the QAO or QAS will enter a description of the necessary QAO/QAS re-inspections/audits that will support determining effectiveness of each Block 7 Corrective Action and indicate an ECD for each re-inspection/audit action. Examples include but are not limited to: audits, surveillances, exams and level of knowledge interviews.

BLOCK 11 - **EFFECTIVENESS**

Upon completion of a Re-inspection/Audit (Block 10), the QAO or QAS will enter its effectiveness as "YES or NO". If the effectiveness has been determined to be "NO", the QAO/QAS shall transfer the issue to a new QA form 14 (for further root causal analysis and corrective actions) and enter that new QA FORM 14 serial number in the space provided.

NOTE: UPON CLOSURE, THE QAO/QAS SHALL FILE THE COMPLETED AND CLOSED QA FORM 14 IN THE QA FORM 14 BINDER WITH A COPY FILED WITH THE DISCREPANT CLOSED CWP, QA FORM AND/OR REC (AS APPLICABLE) TO ALLOW IT TO STAND ALONE.

BLOCK 12 - **EFFECTIVENESS REVIEW QA OFFICER/QA SUPERVISOR SIGNATURE**

Upon completion of all re-inspections/audits (Block 10), determination of effectiveness and deferral (by QA-14 for any corrective actions deemed NOT effective), the QAO or QAS shall enter signature and date, and legibly print, type or stamp his/her name indicating acceptance and closure of the QA form 14.

TEST AND INSPECTION RECORD

QA FORM 17 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. SYSTEM/COMPONENT
♦6. REFERENCES (COMPONENT DETAIL/ASSEMBLY DRAWING AND REV)					
A.		B.		C.	
D.		E.		F.	
♦7. PART DESCRIPTION/PIECE NO.:					
♦8. DESCRIPTION OF TEST AND/OR INSPECTION:					
9. RESULTS					
10. CRAFTSMAN SIGNATURE			11. QA INSPECTOR SIGNATURE		
DATE			DATE		
12. RECORD HAS BEEN REVIEWED FOR COMPLETENESS					
QA WCS SIGNATURE (QAO/QAS SIGNATURE FOR SUBSAFE/SOC/SFCC ONLY)				DATE	

(This Page Intentionally Left Blank)

QA FORM 17 INSTRUCTIONS
TEST 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. The QA form 17 will not be used in lieu of a QA form 26A in DSS/SOC applications.

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 including paragraph/table/section/item number) 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 (TO INCLUDE APPLICABLE PRE-REQUISITE STEPS) 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/URO DATA REPORT FORMS OR ADDITIONAL INFORMATION IS REQUIRED TO SUPPLEMENT THIS REPORT, EACH DRAWING, ETC., WILL BE LABELED AS AN ATTACHMENT TO ITS RESPECTIVE QA FORM 17, INCLUDING THE PAGE NUMBER, WHICH SHALL BE SIGNED (INCLUDE PRINTED NAME, DATE) BY THE CRAFTSMAN AND QAI FILLING OUT THE QA FORM 17. (FOR ATTACHMENTS WITH MULTIPLE PAGES, ONLY THE FIRST PAGE REQUIRES SIGNATURES.)
- 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. IF LISTING THE ACTUAL TEST PRESSURE VALUE WOULD CLASSIFY THE WORK PROCEDURE, THEN THE SYMBOLS "J" OR "H" (WITH THE APPLICABLE REFERENCE, INCLUDING PARAGRAPH/TABLE/SECTION/ ITEM NUMBER) MAY BE USED INSTEAD OF CLASSIFYING THE DOCUMENT. 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 QA Work Center supervisor shall sign and date the form signifying the accuracy of the completed form.

EPOXY REPAIR RECORD

QA FORM 17A (06/05) 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/ROTATABLE POOL SER NO.		♦ 6. REFERENCES (COMP DETAIL/ASSY DWG & REV)			
										A.			
♦ 7. EPOXY REPAIRS ARE IAW: <input type="checkbox"/> UIPI 2560-107 <input type="checkbox"/> UIPI 6300-905 <input type="checkbox"/> OTHER _____				8. LEGEND FOR EPOXY METHOD (ENTER APPLICABLE SYMBOL(S) IN BLOCK 9) SH – SHIM PE – POWDER EPOXY REPAIR CP – COLD PATCH ♦ OT - OTHER (specify): B – BUSHING CE – COLD EPOXY COATING SL – SLEEVE _____								B.	
												C.	
9. DESCRIPTION OF REPAIR(S)				10. REPAIR(S) & TEST ACCOMPLISHED									
				10A. PRE-EPOXY DIMENSIONS				10B. EPOXY APPLIED		10C. REQUIRED TESTS/RESULTS			
♦ PART NO./NAME & DESCRIPTION OF DEFECT AREA(S) (USE BLOCK 11 FOR ADDITIONAL INFO, IF REQUIRED)		♦ REF DWG LTR	♦ UIPI 2560-107 METHOD OR EPOXY METHOD (See Block 8)		DEPTH OF MACHINING (INCHES)	DEPTH (INCHES) OF REMAINING DEFECTS	SHIM/SLEEVE THICKNESS (INCHES) & MAT'L USED		EPOXY MATERIAL & BATCH NO. USED		REQUIRED TEST LEGEND (Enter number below) 1. TAP 2. PULL 3. SPARK 4. VT CURE 5. OTHER (Specify)		
A.											♦ REQUIRED TEST (See Test Legend)		
											TEST RESULTS <input type="checkbox"/> SAT <input type="checkbox"/> UNSAT FINAL SURFACE FINISH MEETS REQUIREMENTS		
				SIGNATURE/BADGE/DATE				SIGNATURE/BADGE/DATE		SIGNATURE/BADGE/DATE			
B.											♦ REQUIRED TEST (See Test Legend)		
											TEST RESULTS <input type="checkbox"/> SAT <input type="checkbox"/> UNSAT FINAL SURFACE FINISH MEETS REQUIREMENTS		
				SIGNATURE/BADGE/DATE				SIGNATURE/BADGE/DATE		SIGNATURE/BADGE/DATE			
11. ADDITIONAL INFORMATION/SKETCHES: This block may be used to provide additional information, signatures, and sketches to clarify EPOXY repair area(s). Use the back of the sheet for additional space. (CRAFTSMAN/QAI SUBMIT A DF TO RESOLVE UNSAT DATA)													
12. QA INSPECTOR/SHOP SUPERVISOR SIGNATURE/BADGE NO. (RECORD REVIEWED FOR FINAL ACCEPTANCE)								13. QAS SIGNATURE /BADGE NO. (RECORD HAS BEEN REVIEWED FOR COMPLETENESS)					
								DATE				DATE	

V-1-11-59

COMUSFLTFORCOMINST 4790.3 REV C CH-5

(This Page Intentionally Left Blank)

QA FORM 17A INSTRUCTIONSEPOXY REPAIR RECORD

PURPOSE: To document the proper OQE for epoxy repairs on components when directed by the Technical Work Document.

NOTE:

1. EACH FORM ALLOWS FOR TWO EPOXY REPAIRS TO BE DOCUMENTED, BUT MUST BE LIMITED TO A SINGLE COMPONENT (E.G., TD-29/30 VALVE ASSEMBLY).
2. REWORK: IN CASES WHERE REWORK IS REQUIRED AFTER CRAFTSMAN CERTIFICATION OF A RECORD, A NEW RECORD AND WORK AUTHORIZING DOCUMENT IS REQUIRED.
3. IN CASES WHERE REWORK IS REQUIRED DUE TO AN IN-PROCESS FAILURE, THE FOLLOWING PROCESS SHALL BE USED:
 - a. CHECK THE "UNSAT" BOX IN THE "TEST RESULTS" SECTION OF BLOCK 10 ALONG WITH AN EXPLANATION OF FAILURE IN BLOCK 11. LEAVE REMAINING UNSIGNED BLOCKS BLANK.
 - b. ENTER "REWORK FOR ITEM 9X" (WHERE X IS THE LETTER DESIGNATOR FOR THE BLOCK 9 ITEM LINE (E.G., 9A, 9B)) OR SIMILAR WORDS IN THE NEXT BLANK "PART NO./NAME/ DESCRIPTION OF DEFECT AREAS" BLOCK, ALONG WITH AN ASTERISK OR OTHER MARK WITH A CORRESPONDING EXPLANATION IN BLOCK 11 WITH SIGNATURE, BADGE NUMBER AND DATE. IF THERE IS NO EMPTY ITEM LINE, ANOTHER QA FORM 17A MAY BE USED AS A CONTINUATION SHEET. IF THE RECORD CONTAINS MULTIPLE PAGES, IDENTIFY THE PAGE THAT CONTAINS THE ITEM LINE FOR WHICH THE REWORK IS ACCOMPLISHED (E.G., 9A OF PAGE 1).
 - c. RE-ENTER ALL OF THE ORIGINALLY REQUIRED TESTS IN THE NEW ITEM LINE AND COMPLETE ALL BLOCKS EXCEPT THE "PART NO./NAME/DESCRIPTION OF DEFECT AREAS" BLOCK WHICH IS ANNOTATED AS DESCRIBED IN PARAGRAPH B. ABOVE. IT IS ACCEPTABLE FOR THE CRAFTSMAN TO COPY ENTRIES INTO PLANNING BLOCKS FROM THE ORIGINAL PLANNING ENTRIES.

SCOPE: Documentation with this QA form is required for epoxy repair of the following:

- SUBSAFE components
- Scope of Certification (SOC) components
- Seawater ball valves

PROCEDURE: PLANNING DEPARTMENT: Provide guidance in accordance with UIPI 2560-107 or UIPI 6300-905, and provide QA-17A records as part of the TWD or DL.

The numbered blocks on QA form 17A correspond with the instructions listed below. Planning shall fill in blocks identified by a ♦ prior to issuing QA form 17A. The shop craftsman is responsible for all other blocks on the form unless otherwise specified.

TOP OF FORM - PAGE _____ OF _____

Enter page numbers.

BLOCK 1 - SHIP HULL NO.

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

Enter the Job Control Number (JCN). Naval shipyards enter Job Order and KeyOp.

BLOCK 3 - **LWC/SHOP**

Enter the lead shop (e.g., X38, outside machinist).

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

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

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

Enter the noun name of the system and component (if applicable) (e.g., MSW-25). If the record is for in-shop restoration of rotatable/factory pool material, enter the serial number of the material.

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

BLOCK 6 - **REFERENCES (COMP DETAIL/ASSY DWG & REV)**

Enter all references used to identify component parts, material information and test/inspection requirements. Include revision letter and if applicable, identify the assembly number (e.g., Assy D, Assy RA, etc.). For original issue (non revised) drawings, enter a dash (-). Revisions for Technical Manuals are not required. Include vendor name for vendor drawings.

BLOCK 7 - **EPOXY REPAIRS ARE IAW**

Check the "UIPI 2560-107" or "UIPI 6300-905" box when applicable; otherwise check the "OTHER" box and specify the procedure.

BLOCK 8 - **LEGEND FOR EPOXY METHOD**

Identifies the designators for Block 9 (EPOXY METHOD). Planning shall specify the type of epoxy repair on the line following the "OT - OTHER" designator when a required repair method is not listed.

BLOCK 9 - **DESCRIPTION OF REPAIR(S)**

NOTE: PLANNING SHALL COMPLETE ALL SECTIONS OF BLOCK 9. ADDITIONAL QA 17A FORMS MAY BE ADDED AS CONTINUATION SHEETS IF NECESSARY.

PART NO./NAME & DESCRIPTION OF DEFECT AREA(S)

Enter part number and/or name (e.g., pc 5, bonnet; pc 3, body, etc.) and description of defect areas (e.g., O-ring groove pitted, stem bore, backseat, etc.). Ensure each surface area being epoxy repaired is clearly identified.

NOTE: USE BLOCK 11 AND/OR THE BACK OF THE SHEET FOR ADDITIONAL INFORMATION AND/OR SKETCHES.

REF DWG LTR(S)

Enter the letters corresponding to the reference listed in Block 6 which provides the material, dimensional and testing/inspection information for the items listed in the "PART NO./NAME & DESCRIPTION OF DEFECT AREA(S)" block.

UIPI 2560-107 METHOD OR EPOXY METHOD

Enter the epoxy repair method code from UIPI 2560-107 when applicable, or use a symbol from the legend in Block 8 that identifies the method of epoxy repair being accomplished when UIPI 6300-905 or OTHER instruction is identified in Block 7. For an epoxy repair method not identified in the Block 8 legend, enter "OT" and specify the epoxy repair method on the line following "OT - OTHER" in Block 8.

BLOCK 10 - **REPAIR(S) & TEST ACCOMPLISHED**

NOTE: CRAFTSMAN SHALL COMPLETE ALL SECTIONS OF BLOCKS 10A AND 10B. PLANNING SHALL COMPLETE BLOCK 10C.

BLOCK 10A. - PRE-EPOXY DIMENSIONS**DEPTH OF MACHINING**

When required by the TWD, record the thickness of the material removed during machining. Enter "NA" when not required by the TWD or material removal is not accomplished.

REMAINING WALL THICKNESS

When required by the TWD, enter the wall thickness dimensions after machining or removing material. Dimensions must take into account the depth of remaining defects. Enter "NA" when material is not removed or wall thickness documentation is not required by the TWD.

DEPTH OF REMAINING DEFECTS

Enter the maximum depth of remaining defects. Enter "No Defects Remain" if there are no remaining defects after machining.

SHIM/SLEEVE THICKNESS & MAT'L USED

Enter "NA" when shims are not used. Enter the thickness of the shim or sleeve (or bushing used as a sleeve) used (e.g., 0.032, 1/8 or 3/32, etc.). When installing "S", "L", or top hat shims, enter the thickness of the upper, the middle and the lower legs as applicable. Enter the generic material (e.g., titanium) or a stock number of the shim when provided by the naval or local stock program. When this block is being used to document installation of the shim in lieu of a QA form 34, then the stock number (NSN), part number, drawing and piece number, generic or material spec marking, or results of generic material identity testing shall be documented here also. If reinstalling an existing shim, enter "Reinstalled existing".

SIGNATURE/BADGE/DATE

Craftsman enter signature, badge number and date for pre-epoxy dimensions recorded in Block 10A.

BLOCK 10B. - EPOXY APPLIED**EPOXY MATERIAL & BATCH NO. USED**

Enter the epoxy material (e.g., 3M Epoxy Adhesive EC-2216B/A) used and the batch number when provided on the container (e.g., Batch 1234).

SIGNATURE/BADGE/DATE

Craftsman enter signature, badge number and date signifying the epoxy was applied per the requirements and the data recorded in Block 10B.

BLOCK 10C. - REQUIRED TESTS/RESULTS

Enter the number(s) for the required test(s) from the legend.

TEST RESULTS FINAL SURFACE FINISH MEETS REQUIREMENTS

The craftsman shall check the SAT or UNSAT block to indicate test.

SIGNATURE/BADGE/DATE

Craftsman enter signature, badge number and date signifying that each epoxy repair has been satisfactorily accomplished and tested in accordance with the requirements and the OQE documented in Blocks 7, 9, 10A, 10B and 11, and the surface finish meets requirements.

If UNSAT, the craftsman will initiate action to resolve the unsat condition and indicate the action taken in Block 11 and sign in Block 11. Do not sign Block 10 (for the specific line item) unless a satisfactory repair is completed or the unsat condition is accepted. If the condition is accepted, identify the document that grants acceptance in Block 11.

BLOCK 11 - ADDITIONAL INFORMATION/SKETCHES

This block can be used to provide additional information, signatures, and sketches (if required to clarify epoxy repair area(s) and/or shim/sleeve). If there is insufficient room, the back of the form or the addition of a second page is allowed for use. Include a signature, badge number and date with any additions to this block. 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.

NOTE: IF MORE THAN ONE EPOXY REPAIR IS BEING ACCOMPLISHED, IDENTIFY THE ADDITIONAL INFORMATION, SIGNATURES AND SKETCHES BY THE LINE ITEM LETTERS IN BLOCK 9 (E.G., 9A, 9B).

BLOCK 12 - QA INSPECTOR/SHOP SUPERVISOR SIGNATURE/BADGE NO./DATE

Naval Shipyards: Production Shop Supervisor shall sign that the records have been reviewed for completeness.

BLOCK 13 - QAS SIGNATURE/BADGE NO./DATE

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.

ELECTROPLATING REPAIR RECORD

QA FORM 17B (6/05)

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. REFERENCES (COMP DETAIL/ASSY DWG & REV)				
6. SYSTEM/COMPONENT/ROTATABLE POOL SER NO.		♦ 7. ELECTROPLATING PROCESSES ARE IAW: <input type="checkbox"/> UIPI 0810-451 <input type="checkbox"/> OTHER _____		8. LEGEND FOR TYPE OF REPAIR, SEE BLOCK 9 D = DYNAMIC SURFACES (CL 3) S = STATIC SURFACES (CL 2) ♦ OT = OTHER (SPECIFY)(e.g., CL-1, CL-3A, etc.)		A. B. C.				
♦ 9. DESCRIPTION OF DEFECT & TYPE OF REPAIR				10. MATERIAL VERIFICATION & REPAIR (S) ACCOMPLISHED				♦ 11. REQD TEST (S)	12. TEST (S) RESULTS	
♦ ITEM A. PART NO./ NAME/DESCRIPTION OF DEFECT (S)	♦ REF DWG LTR	♦ BASE MATL	♦ TYPE OF REPAIR (SEE BLOCK 8 ABOVE)	♦ PLATING MATL REQD	BASE MATL VERIFIED <input type="checkbox"/> SAT	APPLIED PLATING THICKNESS WITHIN MAX ALLOWED OR RANGE <input type="checkbox"/> SAT	ELECTROPLATING HAS BEEN ACCOMPLISHED IN ACCORDANCE WITH REQUIREMENTS (Use Block 13 for clarification) SIGNATURE/BADGE/DATE	1. ADHESION 2. VT 3. PT 4. THICK 5. OTHER (SPECIFY)	2 ND OPERATOR VERIFICATION OF SATISFACTORY TEST ACCOMPLISHED SIGNATURE/BADGE /DATE	
	♦ EXISTING PLATING MATL NONE <input type="checkbox"/>		♦ H2 BAKE REQD <input type="checkbox"/> YES <input type="checkbox"/> NO	♦ MAX THICKNESS OR RANGE	AFTER MACHINING DIMENSIONS: REMAINING DEFECTS DEPTH _____ <input type="checkbox"/> NONE					PLATING MATL APPLIED:
♦ ITEM B. PART NO./ NAME/DESCRIPTION OF DEFECT (S)	♦ REF DWG LTR	♦ BASE MATL	♦ TYPE OF REPAIR (SEE BLOCK 8 ABOVE)	♦ PLATING MATL REQD	BASE MATL VERIFIED <input type="checkbox"/> SAT	APPLIED PLATING THICKNESS WITHIN MAX ALLOWED OR RANGE <input type="checkbox"/> SAT	ELECTROPLATING HAS BEEN ACCOMPLISHED IN ACCORDANCE WITH REQUIREMENTS (Use Block 13 for clarification) SIGNATURE/BADGE /DATE	1. ADHESION 2. VT 3. PT 4. THICK 5. OTHER (SPECIFY)	2 ND OPERATOR VERIFICATION OF SATISFACTORY TEST ACCOMPLISHED SIGNATURE/BADGE/DATE	
	♦ EXISTING PLATING MATL NONE <input type="checkbox"/>		♦ H2 BAKE REQD <input type="checkbox"/> YES <input type="checkbox"/> NO	♦ MAX THICKNESS OR RANGE	AFTER MACHINING DIMENSIONS: REMAINING DEFECTS DEPTH _____ <input type="checkbox"/> NONE					PLATING MATL APPLIED:
13. ADDITIONAL INFORMATION/SKETCHES: USE THE BACK OF THE SHEET FOR ADDITIONAL SPACE TO PROVIDE ADDITIONAL INFORMATION, AND SKETCHES TO CLARIFY ELECTROPLATE REPAIR AREA (S) (CRAFTSMAN/QAI SUBMIT A DF TO RESOLVE UNSAT DATA)										
14. QA INSPECTOR/SHOP SUPERVISOR SIGNATURE/BADGE NO. (RECORD REVIEWED FOR FINAL ACCEPTANCE)					15. QAS SIGNATURE/BADGE NO. (RECORD HAS BEEN REVIEWED FOR COMPLETENESS)					
DATE					DATE					

V-I-11-65

COMUSFLTFORCOMINST 4790.3 REV C CH-5

(This Page Intentionally Left Blank)

QA FORM 17B INSTRUCTIONS
ELECTROPLATING REPAIR RECORD

PURPOSE: To document the proper OQE for electroplating repairs on components when directed by the work procedure.

PROCEDURE: The numbered blocks on QA form 17B correspond with the instructions listed below. The planner shall fill in blocks identified by a ♦ (1 through 9 and 11) prior to issuing the CWP.

TOP OF FORM - Page ___ of ___

Enter page numbers.

BLOCK 1 - **SHIP HULL NO.**

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**

Enter the Job Control Number (JCN). Naval shipyards enter Job Order and KeyOp.

BLOCK 3 - **LWC/SHOP**

Enter the lead shop (e.g., X38, outside machinist).

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

(Work Packaging/Planning Organization/Craftsman) Enter the CWP or REC serial number or enter NA if no CWP/REC is required. Do not list the REC revision.

BLOCK 5 - **REFERENCES (COMP DETAIL/ASSY DWG & REV)**

Enter all references used to identify component parts, material information, and test/inspection requirements including revision letter and if applicable, the assembly number (e.g., Assy D, Assy RA, etc.). For original issue (non revised) drawings, enter a dash (-). Revisions for Technical Manuals are not required. Include vendor name for vendor drawings.

BLOCK 6 - **SYSTEM/COMPONENT/ROTATABLE POOL SER NO**

Enter the noun name of the system and component (if applicable) being plated, (e.g., MSW-25). If the record is for in-shop restoration of rotatable pool material, enter the serial number of the material when known.

NOTE: ROTATABLE POOL SERIAL NUMBERS MAY BE ENTERED BY THE CRAFTSMAN IF NOT ENTERED BY PLANNING ORGANIZATION.

BLOCK 7 - **ELECTROPLATING PROCESSES ARE IN ACCORDANCE WITH**

Mark the applicable box for the electroplating process. Specify the process when OTHER is marked. Do not enter revision/change of procedure.

BLOCK 8 - **LEGEND FOR TYPE OF REPAIR**

Identifies the designators for Block 9 (TYPE OF REPAIR). For other than DYNAMIC (D) or STATIC (S) surfaces, PLANNING ORGANIZATION shall specify the type of repair on the line following the "OT=OTHER" designator, or in Block 13 if additional space is needed.

BLOCK 9 - **DESCRIPTION OF DEFECT & TYPE OF REPAIR**

NOTE: PLANNING ORGANIZATION SHALL COMPLETE ALL SECTIONS OF BLOCK 9 EXCEPT AS NOTED. ADDITIONAL QA 17B FORMS MAY BE ADDED AS CONTINUATION SHEETS IF NECESSARY.

PART NO./NAME/DESCRIPTION OF DEFECT AREA(S)

Enter part number or name (e.g., pc. 5, bonnet, body, etc.) and description of defect areas. Include dimension after machining and maximum depth of remaining defects prior to plating (e.g., Stem bore O-ring groove pitted, machined 0.010", removed all defects). For more than one of a kind component (XYZ fitting, threaded end) enter the total number of items (e.g., XYZ fitting, threaded end, 6 ea.). Identify each surface area being plated as a separate line item.

NOTE: USE BLOCK 13 AND THE BACK OF THE SHEET FOR ADDITIONAL INFORMATION AND/OR SKETCHES.

REFERENCE DRAWING LETTER

Enter the letter(s) corresponding to the reference(s) listed in Block 5 which provided the material, dimensional, and/or test and inspection information for the items listed in the "PART NO./NAME/DESCRIPTION OF DEFECT(S)" block(s).

BASE MATERIAL

Enter the required base material.

EXISTING PLATING MATERIAL

Identify any known existing plating or mark the NONE box.

TYPE OF REPAIR

Enter the symbol from the legend in Block 8 that identifies the type of electroplating repair being accomplished.

HYDROGEN BAKE REQUIRED

Mark the YES box when hydrogen bake is required; otherwise mark the NO box.

PLATING MATERIAL REQ'D

Enter the plating material to be applied.

MAXIMUM THICKNESS OR RANGE ALLOWED

Enter the maximum plating thickness allowed or the allowable thickness range (minimum/maximum).

BLOCK 10 - MATERIAL VERIFICATION & REPAIR(S) ACCOMPLISHED

NOTE: THE CRAFTSMAN SHALL COMPLETE ALL SECTIONS OF BLOCK 10.

BASE MATERIAL VERIFIED

Craftsman shall visually compare the required base material identified and the base material to be plated for obvious discrepancies such as color of material or material markings, and ensure that all existing plating has been removed or identified as being existing. Perform a generic material test if existing material cannot be identified. Check the "SAT" block if no discrepancies are found. Report any discrepancies to PLANNING ORGANIZATION for resolution.

AFTER MACHINING DIMENSIONS

When required by the TWD, record the dimensions after machining.

REMAINING DEFECTS DEPTH

Record the depth of any remaining defects. If no defects remain, mark the NONE box.

APPLIED PLATING THICKNESS WITHIN MAX ALLOWED OR RANGE

Mark SAT if the thickness of plating meets the maximum thickness or range identified by PLANNING ORGANIZATION in Block 9.

PLATING MATERIAL APPLIED

Enter the generic plating material applied (e.g., nickel cap, copper fill, etc.).

NOTE: IF THE APPLIED PLATING THICKNESS IS BEYOND THE MAXIMUM ALLOWED OR NOT WITHIN THE SPECIFIED RANGE, STOP WORK AND OBTAIN FURTHER TECHNICAL DIRECTION.

ELECTROPLATING REPAIR HAS BEEN ACCOMPLISHED IN ACCORDANCE WITH REQUIREMENTS

Craftsman(s) shall sign, record badge number, print name and date verifying that each ELECTROPLATING application has been satisfactorily accomplished in accordance with the requirements and the OQE documented in Blocks 7, 9 and 10 (and 13 when used) and is complete and accurate. For cases where further machining is required, the electroplating craftsman that completed the plating shall sign this block to indicate application of electroplating only, prior to sending the component to the machining craftsman. After the machining and test have been accomplished, a final signature shall be made indicating satisfactory completion of the form and the testing. The last signature indicates final acceptance. Use Block 13 for clarification of requirements.

BLOCK 11 - REQUIRED TEST(S)

Enter the designator(s) (i.e., 1-5) for the test(s) required to ensure proper installation/bonding. For "Other" (5), enter the type of test required in the block or in Block 13 if additional space is needed.

BLOCK 12 - TEST(S) RESULTS

2ND Operator, Inspector, or other person qualified to the plating procedure (other than the workpiece craftsman) shall sign, record badge number, print name and date to indicate the coating meets the acceptance criteria of the required test(s).

NOTE: SATISFACTORY LIQUID PENETRANT TEST RESULTS SHALL BE DOCUMENTED IN ONE OF THE FOLLOWING MANNERS:

1. A QUALIFIED NDT INSPECTOR OR QAI MAY SIGN, RECORD BADGE NUMBER AND DATE TO INDICATE SATISFACTORY TEST RESULTS.
2. THE CRAFTSMAN MAY ENTER THE NON-DESTRUCTIVE TEST (NDT) RECORD NUMBER (OR ATTACH A COPY OF THE RECORD) THAT DOCUMENTS THE SATISFACTORY RESULTS OF NDT PERFORMED BY A QUALIFIED NDT INSPECTOR. THE CRAFTSMAN SHALL SIGN (NAME, BADGE, DATE) FOR EACH ENTRY.

BLOCK 13 - ADDITIONAL INFORMATION/SKETCHES

This block may be used to provide additional information, signatures, and sketches (if required to clarify electroplate repair area(s)). If there is insufficient room, use of the back of the form or the addition of a second page is allowed. Include signature, badge number and date (except where the entry is pre-printed on the form by PLANNING ORGANIZATION with any entries in this block). Initials may be entered in lieu of an employee's signature and badge number, if a corresponding employee's signature and badge number/printed name appears elsewhere on the same page.

NOTE: IF MORE THAN ONE ELECTROPLATING REPAIR IS BEING ACCOMPLISHED, IDENTIFY THE ADDITIONAL INFORMATION, SIGNATURES, AND SKETCHES BY THE LINE ITEM NUMBERS IN BLOCK 9 (e.g., 9a, 9b, etc.). IF THE RECORD CONTAINS MULTIPLE PAGES, INCLUDE THE PAGE NUMBER OF THE REFERENCED ITEM LINE NUMBER.

BLOCK 14 - QUALITY ASSURANCE INSPECTOR/SHOP SUPERVISOR SIGNATURE/BADGE NO.

Production shop supervisor shall sign and print name that the record has been reviewed for completeness.

BLOCK 15 - QAS SIGNATURE/BADGE NUMBER/RECORD HAS BEEN REVIEWED FOR COMPLETENESS

For SUBSAFE or SOC Components Only: QAS or authorized QAO representative, as defined by local instructions, will sign, enter badge number, print name and date this block to indicate the completeness of the entries.

(This Page Intentionally Left Blank)

COMPONENT REPAIR RECORD – (MACHINING/MANUFACTURING/MODIFICATIONS)

QA FORM 17C (6/05)

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

♦6. REFERENCES (COMPONENT DETAIL/ASSEMBLY DRAWING AND REV, SPECIFY ASSEMBLY NO. IF APPLICABLE)					
A.		B.		C.	
D.		E.		F.	

♦7. DESCRIPTION OF REPAIR(S)					8. RESULT OF REPAIR(S)							
LINE NO.	♦ PART NO./ DESCRIPTION	♦ REF DWG LTR	♦ QTY	♦ DESCRIPTION OF MODIFICATION(S) / MANUFACTURING PROCESS / SUPPLEMENTAL INFORMATION / INSTRUCTION Describe action or use the following legends: MM-Minor Machining HW-Hand Working MF- Manufacturing V - Vulcanizing O-rings	♦ REQUIRED/ MINIMUM FINAL DIMENSION(S) AND TOLERANCE	ACTUAL FINAL DIMENSION(S)	NEW MATERIAL MANUFACTURED/INSTALLED			♦ TEST REQ'D	PROCESS IDENTIFIED, MATERIAL AND TEST HAS BEEN SATISFACTORILY ACCOMPLISHED IN ACCORDANCE WITH REQUIREMENTS. MATERIAL NOT LISTED AS NEW, IS EXISTING AND IS ACCEPTABLE FOR RE-USE & IS INSTALLED.	
							QTY	L O E	MATERIAL IDENT/ DESCRIPTION		CRAFTSMAN SIGNATURE/ BADGE NO.	DATE
1												
2												
3												
4												

9. ADDITIONAL INFORMATION/SKETCHES: This block can be used to provide additional information, signatures and sketches (if required). Use back of the sheet for additional space. If NDT is required, record satisfactory NDT report number in this block or attach a copy of the report. (CRAFTSMAN/QAI SUBMIT A DF TO RESOLVE UNSAT DATA)

10. QA INSPECTOR/SHOP SUPERVISOR SIGNATURE /BADGE NO. (RECORD REVIEWED FOR FINAL ACCEPTANCE)	DATE	11. QAS SIGNATURE/ BADGE NO. (RECORDS HAVE BEEN REVIEWED FOR COMPLETENESS)	DATE
---	------	--	------

V-1-11-71

(This Page Intentionally Left Blank)

QA FORM 17C INSTRUCTIONS
COMPONENT REPAIR RECORD

PURPOSE: To document the proper OQE for multiple repairs to a single component (i.e., machining, manufacturing, modifications) when directed by the work document.

PROCEDURE: The numbered blocks on QA form 17C correspond with the instructions listed below. Planning shall fill in blocks identified by a ♦ prior to issuing the CWP.

NOTE: THIS FORM ALLOWS MULTIPLE REPAIRS TO BE ACCOMPLISHED, BUT SHOULD BE LIMITED TO A SINGLE COMPONENT (E.G., TD-29/30 VALVE ASSEMBLY).

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

BLOCK 3 - **LWC/SHOP**

PLANNER - Enter the lead shop (e.g., X56, outside machinist).

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

(REC Originator or PLANNER as defined by local instructions) Enter the CWP/REC serial number if applicable; otherwise mark NA. Do not list the REC Revision.

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

PLANNER - Enter the noun name of the system, component (e.g., MSW-25). If the record is for in-shop repair/manufacture of rotatable pool item, enter the serial number of the item when known.

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

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

PLANNER - Enter all references used to identify component parts, material information and required testing/inspection. Include revision letter and if applicable, the assembly number (e.g., Assy D, Assy RA, etc.). For original issue (non revised) drawings, enter a dash (-). For vendor drawings, include vendor name. Revisions for technical manuals are not required.

BLOCK 7 - **DESCRIPTION OF REPAIR(S)**

NOTE: PLANNING SHALL COMPLETE ALL SECTIONS OF BLOCK 7.

LINE NO. Pre-filled. A number to provide traceability to new material documented in Block 8.

PART NO./DESCRIPTION Enter part number/description/component assembly (e.g., pc 5, bonnet, body, stem bore, backseat, etc.).

NOTE: USE BLOCK 9 AND THE BACK OF THE SHEET FOR ADDITIONAL INFORMATION AND/OR SKETCHES.

REF DWG LTR Enter applicable reference letter(s) of the drawing or document listed in Block 6 that provides the material and/or dimensional information for the items listed in the "PART NO./DESCRIPTION" block.

QTY Enter quantity of items to repair. Enter NA if not applicable.

DESCRIPTION OF MODIFICATION(S) / MANUFACTURING PROCESS / SUPPLEMENTAL INFORMATION / INSTRUCTION

Enter description of action to perform (e.g., drill and nylok in accordance with reference (b), **MF** stem in accordance with reference (c), **V** in accordance with reference (d), **MM** .005” to remove pits, splice o-rings, etc.). The description must clearly identify the surface(s) to be machined. Use legend for abbreviation.

NOTE: USE BLOCK 9 AND THE BACK OF THE SHEET FOR ADDITIONAL INFORMATION AND/OR SKETCHES. IF ADDITIONAL SPACE IS REQUIRED, ADDITIONAL SHEETS SHALL HAVE CONTINUING PAGE NUMBERS AND INFORMATION FROM BLOCKS 1 THROUGH 5 ON EACH SHEET.

REQUIRED MINIMUM/FINAL DIMENSION(S) AND TOLERANCE

When minimum/final dimension documentation is required, Planning shall specify the final dimension(s) and tolerance(s) numerically, do not cite a drawing detail or other reference. Enter NA in this block and the Block 8 ACTUAL FINAL DIMENSIONS section if not applicable.

BLOCK 8 - RESULT OF REPAIR(S)

NOTE: THE CRAFTSMAN SHALL COMPLETE ALL SECTIONS OF BLOCK 8 EXCEPT THE SECTION TITLED “TEST REQ'D”.

ACTUAL FINAL DIMENSION(S)

When final dimension documentation is required by Planning, the craftsman shall record the actual final dimension(s) identified in Block 7. If final dimension documentation is not required, Planning shall enter NA in the block.

NOTE: CRAFTSMAN MAY ENTER “NA” IF REQUIRED/MINIMUM FINAL DIMENSION(S) AND TOLERANCE SECTION OF BLOCK 7 IS MARKED “NA” BY PLANNING.

NEW MATERIAL - MANUFACTURED/INSTALLED

Enter the following information for any parts/material, Level I and non-level, in the appropriate blocks. If a portion of a new valve is used to replace parts (e.g., bonnet and disc assembly), document the Level I number of the new valve and list the parts that the assembly consists of in the remarks block with a note that the stem and disc assembly were taken from the new valve.

QTY Enter the quantity of the replacement parts installed. Enter NA for raw material used in manufacture.

NOTE: THE TERM “ASSEMBLY” REFERS TO ONE PACKAGE OF PARTS (E.G., STEM AND DISC ASSEMBLY OR BALL AND SEAT ASSEMBLY) WHERE THE ITEM IS ORDERED UNDER ONE STOCK NUMBER, AND IS ASSIGNED ONE LEVEL I NUMBER.

LOE (Level of Essentiality, Level I) – Enter the MIC level (e.g., “I” or “LI”) for the part or assembly. Enter NA or dash (-) for non-Level.

MATERIAL IDENT/ DESCRIPTION Identification shall be in accordance with Table 1 or Forces Afloat. Record one of the following for raw material used to manufacture components:

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: <ol style="list-style-type: none"> Stock Number (from package/container) Part Number (from package/piece) Part Number and associated Manufacturing Work Procedure (for manufactured items) Local Traceability Number (from piece/tag) Drawing and Piece Number (from piece/tag) Generic, MIL-SPEC, or Material Specification Marking (from piece) 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.

- MIC NUMBER
- RAW MATERIAL NSN
- GENERIC MATERIAL
- MIL-SPEC
- MATERIAL SPECIFICATION MARKING
- NDT RECORD OR TESTING RESULTS FOR GENERIC MATERIAL TESTING

NOTE: IF NDT IS REQUIRED, RECORD SATISFACTORY NDT REPORT NUMBER OR ENCLOSURE NUMBER IN THIS BLOCK AND ATTACH/INCLUDE A COPY OF THE REPORT.

TEST REQ'D Planning shall enter the test(s) (e.g., NDT, hydrostatic pressure testing, etc.) required to ensure proper certification.

PROCESS IDENTIFIED, MATERIAL AND TEST HAS BEEN SATISFACTORILY ACCOMPLISHED IN ACCORDANCE WITH REQUIREMENTS

Craftsman shall sign, record badge number and date of the signature, verifying that each repair process, material installed/utilized, and test has been satisfactorily accomplished in accordance with the requirements and the OQE documented in Blocks 7 and 8, respectively.

NOTE: IF UNSATISFACTORY, THE CRAFTSMAN WILL INITIATE ACTION TO RESOLVE THE UNSATISFACTORY CONDITION (E.G., SUBMIT A DF). INDICATE THE ACTION TAKEN TO RESOLVE THE UNSATISFACTORY CONDITION ALONG WITH A SIGNATURE, BADGE NUMBER AND DATE IN BLOCK 9. DO NOT SIGN BLOCK 8 (FOR THE SPECIFIC LINE NO.) UNLESS A SATISFACTORY REPAIR IS COMPLETED OR THE UNSATISFACTORY CONDITION IS ACCEPTED.

BLOCK 9 - ADDITIONAL INFORMATION/SKETCHES

This block can be used to provide additional information, signatures, and sketches (if required to clarify repair area(s)). If there is insufficient room, the back of the form or the addition of a second page is allowed. Include a signature, badge number, and date with any additions to this block. 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.

NOTE: IF MORE THAN ONE REPAIR IS BEING ACCOMPLISHED, IDENTIFY THE ADDITIONAL INFORMATION, SIGNATURES, AND SKETCHES BY THE LINE ITEM NUMBERS IN BLOCK 7.

BLOCK 10 - QA INSPECTOR/SHOP SUPERVISOR/BADGE NO./DATE

NA if inspection is not required by the technical work document (e.g., TGI, FWP).

BLOCK 11 - QAS SIGNATURE/BADGE NO. (RECORDS HAVE BEEN REVIEWED FOR COMPLETENESS)

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/Work Center Supervisor shall sign that the records have been reviewed for completeness.

SUBMARINE FLIGHT CRITICAL COMPONENT (SFCC) ACCESS, REMOVAL AND INSTALLATION RECORD

QA FORM 17D (1/08) 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(S) COMPONENT		♦ 6. NOMENCLATURE		♦ 7. REFERENCE DESIGNATION

♦ 8. REFERENCES

A.		B.		C.	
D.		E.		F.	

9. DIAGNOSTICS BLOCK CONTINUED ON REVERSE

ALERT MESSAGE(S)	SYSTEM STATUS DISPLAY FAULT STATUS	LINE REPLACEABLE UNIT (LRU) CALLOUT(S)	ADDITIONAL DIAGNOSTIC INDICATIONS
------------------	------------------------------------	--	-----------------------------------

EXISTING PERTINENT FAULT DATA

10. EXISTING SFCC REMOVAL

SFCC NSN with SMIC	SFCC PART NUMBER	SFCC SERIAL NUMBER	CHASSIS LOCATION & INFO	SW VERSION REMOVED

11. NEW SFCC INSTALLATION/SFCC PROGRAMMED IN PLACE

SFCC NSN with SMIC	SFCC PART NUMBER	SFCC SERIAL NUMBER	CHASSIS LOCATION & INFO	SW VERSION INSTALLED	SFCC CONFIGURED	PROPERLY INSTALLED & ENGAGED/ CABLE RECONNECTED
					<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT

12. SFCC RESTORATION

13. OPERATIONAL VERIFICATION

SFCC POWERED UP	ONLINE/AVAILABLE	SYSTEM STATUS OK	BUILT IN TEST	SFCC ENGAGED	OPERABILITY TEST
<input type="checkbox"/> SAT/UNSAT					

14. SOFTWARE INSTALLATION

15. SOFTWARE VERIFICATION

INSTALLATION SOFTWARE REV	SFCC SOFTWARE REV	VDD CHECKSUM	INSTALLATION CHECKSUM	NEW SFCC CONFIGURED SIMILARLY AS REMOVED SFCC
				<input type="checkbox"/> SAT/UNSAT

16. REMARKS

--	--	--	--

17. CRAFTSMAN SIGNATURE

DATE

18. AIT LEADER/INSPECTOR SIGNATURE

DATE

--	--	--	--

19. RECORD HAS BEEN REVIEWED FOR COMPLETENESS

OSIC/QAS/QAO SIGNATURE	DATE

(This Page Intentionally Left Blank)

QA FORM 17D INSTRUCTIONSSUBMARINE FLIGHT CRITICAL COMPONENT (SFCC) ACCESS, REMOVAL AND INSTALLATION RECORDREFERENCES:

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

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

PURPOSE: To provide a standard form to document the SFCC access, replacement, removal and installation record capturing the requirements of reference (a), Appendix H.

REQUIREMENTS:

1. The FORM 17D is required for all SFCC work within the boundary specified in reference (a).
2. Form 17D shall be used for each component that requires controlled access, replacement, removal or installation.

NOTE: ANY BLOCK NOT USED WILL BE MARKED "N/A".

BLOCK 1 - SHIP/HULL NO.

Planner enter the ship's name and hull number.

BLOCK 2 - JCN

Planner enter the Job Control Number (JCN).

BLOCK 3 - LWC/SHOP

Planner enter the lead shop assigned to install the component.

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(S)/COMPONENT

Planner enter the noun name of the system and component (if applicable) (e.g., SCPU CHANNEL A CPU#2 or CIRCUIT 1DB). If record is for inshop restoration, enter the serial number of the material if known.

BLOCK 6 - NOMENCLATURE

Planner enter the system/component nomenclature as described in the technical documentation.

BLOCK 7 - REFERENCE DESIGNATION

Planner enter the reference designation of the component as described in the technical documentation.

BLOCK 8 - REFERENCES

Planner enter the applicable component technical reference documents.

BLOCK 9 - DIAGNOSTICS

Check the block if diagnostic codes/data are continued on reverse of form. If necessary, additional diagnostic codes/data may be listed on reverse of form.

Craftsman record diagnostic data as appropriate for SFCC being replaced as part of repair efforts. Mark "N/A" if repair effort is not being performed.

- Alert Messages - Enter any observed Alert Messages displayed by the Ship Control Station
- Fault Status - Enter any fault status message observed at the system status display
- LRU Callout - Enter any Line Replaceable Unit (LRU) Callouts

- Additional Diagnostic Indications - Record any additional diagnostic information
- Existing pertinent fault data - Record any existing pertinent fault data identified on the MC/DMAC

BLOCK 10 - **EXISTING SFCC REMOVAL**

List data required as appropriate for each of the provided blocks. Record the specific components software revision level. If software is pre-programmed on SFCC, record the software revision level identified on the applicable SFCC Certificate of Conformance.

BLOCK 11 - **NEW SFCC INSTALLATION**

Craftsman mark as "SAT", "UNSAT" or list data required as appropriate for each of the provided blocks. Record the specific components software revision level. If software is pre-programmed on SFCC, record the software revision level identified on the applicable SFCC Certificate of Conformance.

BLOCK 12 - **SFCC RESTORATION**

Craftsman mark as "SAT" or "UNSAT" as appropriate.

BLOCK 13 - **OPERATIONAL VERIFICATION**

Craftsman mark as "SAT" or "UNSAT" as appropriate.

BLOCK 14 - **SOFTWARE INSTALLATION**

NOTE: **BLOCK 14 ONLY USED DURING SYSTEM/SOFTWARE UPGRADES/ALTERATIONS.**

Craftsman list data required as appropriate for each of the provided blocks (N/A if not used).

- Installation Software Rev - Record the Ship Control System operational software revision level identified in the change vehicle.
- VDD Checksum - Record the checksum value identified in the Version Description Document (VDD). Should match Installation Checksum.

BLOCK 15 - **SOFTWARE VERIFICATION**

NOTE: **"INSTALLATION CHECKSUM" IS ONLY USED FOR PROGRAMMED SW SMIC SFCC COMPONENTS OR DURING VU SMIC UPGRADES/ALTERATION (N/A IF NOT USED).**

- Installation Checksum - Record the checksum as observed during installation. Should match VDD Checksum from original installation.
- New SFCC Configured Similarly as Removed SFCC - Verify that the SFCC is configured similarly as the SFCC removed from the FBW SCS chassis in accordance with the controlled work package documentation. This includes satisfactory VDD Checksum verification (if applicable).

BLOCK 16 - **REMARKS**

Craftsman or Alteration Installation Team (AIT) Lead will record amplifying information as required or additional space is required, and will sign, print name and date Block 16.

BLOCK 17 - **CRAFTSMAN SIGNATURE**

Craftsman shall sign this block signifying that the work has been accomplished.

BLOCK 18 - **AIT LEADER/INSPECTOR SIGNATURE**

(SHIP'S FORCE) INSPECTOR/QAI will enter signature, date and badge number for final review, signifying the accuracy of the completed form and witnesses testing associated with Blocks 13, 14 and 15 (as applicable). 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 19 - **RECORD HAS BEEN REVIEWED FOR COMPLETENESS**

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

STUD INSTALLATION RECORD

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

Page ____ of ____

QA FORM 17SI (6/05)

♦1. SHIP	HULL NO.	♦2. JCN	♦3. LWC/SHOP	♦4. CWP/REC SER NO.	♦5. SYSTEM/COMPONENT/ROTATABLE POOL NO.
6. NEW MATERIAL DESCRIPTION		QTY	LOE	IDENT (E.G., MIC NO/NSN/TRACEABILITY NO.)	
♦7. DESCRIPTION OF STUD DATA REQUIREMENTS:					
♦ JOINT MAPPING DRAWING & REV		♦ JOINT NO/JOINT DESCRIPTION		♦ REQUIRED STUD DIAMETER AND THREAD SERIES	
♦ DETAIL DRAWING & REV		♦ STUD PIECE NO.		♦ REQUIRED STUD LENGTH	
♦ AUTHORIZED INSTALLATION METHOD: <input type="checkbox"/> CLASS 3 FIT: ANAEROBIC THREAD LOCKING COMPOUND <input type="checkbox"/> CLASS 5 FIT: INTERFERENCE FIT			♦ REQUIRED MIN BREAKAWAY TORQUE OR STUD SETTING TORQUE (List Torque Reference)		
			♦ <input type="checkbox"/> FT-LB <input type="checkbox"/> IN-LB		
8. STUD INSTALLATION DOCUMENTATION					
♦ REQUIRED ANAEROBIC LOCKING COMPOUND: GRADE (Leave blank for class 5 fit)			ACTUAL ANAEROBIC LOCKING COMPOUND: MANUFACTURER & GRADE (Leave blank for class 5 fit)		
♦ REQUIRED STUD STANDOUT & TOLERANCE			ACTUAL STUD(S) STANDOUT:		
9. SKETCH/REMARKS: PROVIDE A SKETCH OF THE FASTENER CIRCLE, SHOWING ALL THE STUDS INSTALLED & ORIENTATION TO COMPONENT: (CRAFTSMAN/QAI SUBMIT A DF TO RESOLVE UNSAT DATA)					
CRAFTSMAN SIGNATURE VERIFIES: 1. FASTENER SIZE, LENGTH, AND CLASS OF FIT IS IAW STATED REQUIREMENTS. 2. MINIMUM BREAKAWAY TORQUE OR STUD SETTING TORQUE IS SATISFACTORY. 3. STUD INSTALLATION COMPLIES WITH ALL INSTALLATION REQUIREMENTS. 4. ALL NEW MATERIAL MEETS SPECIFIED REQUIREMENTS, IS INSTALLED & LISTED ABOVE. MATERIAL NOT LISTED AS NEW, IS EXISTING AND IS ACCEPTABLE FOR RE-USE & IS INSTALLED.				10. CRAFTSMAN SIGNATURE/BADGE NO. DATE	
11. QAI/SHOP SUPERVISOR SIGNATURE /BADGE NO. (RECORD REVIEWED FOR FINAL ACCEPTANCE)				DATE	
12. QAS SIGNATURE/BADGE NO. (RECORDS HAVE BEEN REVIEWED FOR COMPLETENESS)				DATE	

(This Page Intentionally Left Blank)

QA FORM 17SI INSTRUCTIONSSTUD 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.

REQUIRED STUD STANDOUT & TOLERANCE

Enter the required stud standout and tolerance.

ACTUAL STUD(S) STANDOUT

Record the actual stud standout for each new or reset existing stud.

BLOCK 9 - SKETCH/REMARKS

Provide a sketch of the fastener circle, showing all the newly installed and all re-installed existing studs and their orientation to the component.

BLOCK 10 - CRAFTSMAN SIGNATURE/BADGE NO./DATE

Craftsman print name, enter signature, badge number and date after completing Blocks 6, 8 and 9. Do not sign Block 10 unless signing for satisfactory results. If unsat, the craftsman will report the unsat condition and document the rework on the applicable QA form. If only one fastener is unsat, the craftsman may sign for completing the installation of the remaining studs but must clearly annotate in Block 9 the location of the stud and reason for the unsatisfactory condition.

Craftsman signature signifies the following:

- Fastener size, length, and class of fit are per the stated requirements
- Minimum breakaway torque or stud setting or stud setting torque (as applicable) is satisfactory

- Stud installation complies with all installation requirements
- All new material meets specified requirements, is installed and listed in Block 6
- Material not listed as new is existing, and is acceptable for re-use and is installed

BLOCK 11 - QAI/SHOP SUPERVISOR SIGNATURE/BADGE NO./DATE

NOTE: REQUIRED FOR SOC, SUBSAFE AND LEVEL I COMPONENTS ONLY.

Inspector/shop supervisor print name, enter signature, badge number and date certifying the accuracy of the data recorded in Block 6, 8 and 9. This signature is only required for SOC, SUBSAFE and Level I components.

BLOCK 12 - RECORDS HAVE BEEN REVIEWED FOR COMPLETENESS

QAS or QAO will print name, enter signature, badge number 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.

(This Page Intentionally Left Blank)

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:			
TMDE TYPE OF EQUIPMENT / RANGE		TMDE ID. NUMBER	TMDE CAL DUE
TMDE TYPE OF EQUIPMENT / RANGE		TMDE ID. NUMBER	TMDE CAL DUE
TMDE TYPE OF EQUIPMENT / RANGE		TMDE ID. NUMBER	TMDE CAL DUE

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 <input type="checkbox"/> RE-QUAL <input type="checkbox"/> MAINTENANCE OF QUAL				♦ 7. INSTALLATION DWG.				♦ 8. JOINT ID/DESCRIPTION								
♦ 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"/> FACE FEED <input type="checkbox"/> SINGLE INSERT				15. ACCESS <input type="checkbox"/> RESTRICTED (<4") <input type="checkbox"/> UNRESTRICTED		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																
JOINT DATA IS CORRECT, JOINT AND MATERIAL MEETS SPECIFIED REQUIREMENTS					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		BRAZING REQUIREMENTS ARE SATISFACTORY				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)									

(This Page Intentionally Left Blank)

QA FORM 18 INSTRUCTIONSSILVER 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.

(This Page Intentionally Left Blank)

ULTRASONIC INSPECTION RECORD
QA FORM 18A

PAGE OF

2. SHIP		HULL		3. JCN				4. LWC/SHOP				5. CWP/REC SERIAL NO.			
ULTRASONIC EQUIPMENT AND INSPECTION DATA															
6. EQUIPMENT MANUFACTURER		7. MODEL NO.		8. SERIAL NO.		9. TRANSDUCER MANUF.		10. SIZE/FREQ		11. SERIAL NO.					
12. SCANNING METHOD <input type="checkbox"/> STATIC <input type="checkbox"/> 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 <input type="checkbox"/> ACCEPT <input type="checkbox"/> REJECT		20. TOTAL % BOND				21. INSPECTOR/DATE									
ULTRASONIC EQUIPMENT AND INSPECTION DATA															
6. EQUIPMENT MANUFACTURER		7. MODEL NO.		8. SERIAL NO.		9. TRANSDUCER MANUF.		10. SIZE/FREQ		11. SERIAL NO.					
12. SCANNING METHOD <input type="checkbox"/> STATIC <input type="checkbox"/> 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 <input type="checkbox"/> ACCEPT <input type="checkbox"/> 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.

(This Page Intentionally Left Blank)

QA FORM 18A INSTRUCTIONS
ULTRASONIC 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)

◆ PAGE 1 OF

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
BASE MATERIAL DATA					
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.
WELDING MATERIAL SPECIFICATIONS AND DATA					
27. TYPE OF FILLER(S)	28. SIZE	29. MATL	30. MIL-SPEC	31. MIC NO.	
WELD HISTORY					
◆ 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. TEMP REQD:	START TIME: 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:					
94. FINAL DISPOSITION: <input type="checkbox"/> ACCEPT <input type="checkbox"/> REJECT		95. 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		
70. NDT INSPECTION DATA REPAIR NO. _____			Defect: L	W	D
71. Repair Method:			Excavation: L	W	D
72. INSP LAYER	73. INSP METHOD	74. INSP PROC NO.	75. ACCEPT/REJECT	76. NDT INSPECTOR SIGNATURE	77. DATE
			[] ACCEPT [] REJECT		
			[] ACCEPT [] REJECT		
78. NDT INSPECTION DATA REPAIR NO. _____			Defect: L	W	D
79. Repair Method:			Excavation: L	W	D
80. INSP LAYER	81. INSP METHOD	82. INSP PROC NO.	83. ACCEPT/REJECT	84. NDT INSPECTOR SIGNATURE	85. DATE
			[] ACCEPT [] REJECT		
			[] ACCEPT [] REJECT		
86. NDT INSPECTION DATA REPAIR NO. _____			Defect: L	W	D
87. Repair Method:			Excavation: L	W	D
88. INSP LAYER	89. INSP METHOD	90. INSP PROC NO.	91. ACCEPT/REJECT	92. NDT INSPECTOR SIGNATURE	93. DATE
			[] ACCEPT [] REJECT		
			[] ACCEPT [] REJECT		
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 INSTRUCTIONSWELDING 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 penetrameter selection for radiographed piping joints in accordance with NAVSEA T9074-AD-GIB-010/271, NAVSEA S9074-AR-GIB-010/278, and NAVSEA T9074-AD-GIB-010/1688 and for determining fillet legs on partial penetration welds in accordance with NAVSEA T9074-AD-GIB-010/271, NAVSEA T9074-AD-GIB-010/1688 and MIL-STD-1689 (for Surface Force Ships only).

BLOCK 19 - MATL SPEC

Enter the appropriate material specification for the material.

BLOCK 20 - MIC NO.

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

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

Check the appropriate block for the type of backing.

BLOCK 22 - MATERIAL

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

BLOCK 54 - INSPECTION STANDARD

Enter the applicable inspection standard.

BLOCK 55 - WELD CLASS

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

BLOCK 56 - ACCEPTANCE STANDARD

Enter the applicable acceptance standard.

BLOCK 57 - ACCEPT CLASS

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

BLOCK 58 - WELD PREP - COMPONENT A/B

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

BLOCK 59 - INSPECTION METHOD

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

BLOCK 60 - ACCEPT/REJECT

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

BLOCK 61 - NDT INSPECTOR SIGNATURE

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

BLOCK 62 - DATE

Enter the date Block 61 is signed.

BLOCK 63 - JOINT FIT-UP

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

BLOCK 64 - INSP LAYER

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

BLOCK 65 - **INSP METHOD**

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

BLOCK 66 - **INSP PROC NO.**

Enter the inspection procedure number.

BLOCK 67 - **ACCEPT/REJECT**

Enter accept or reject to indicate disposition of the weld layer. If final disposition of the weld is rejectable, document reason(s) for rejection, description and location of the defect(s) in Block 53. Document the repair number, length, width and depth of the defect(s) in Block 70, 78, or 86, as applicable.

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, RECORD THE INSPECTIONS IN BLOCKS 72 THROUGH 77, 80 THROUGH 85, AND 88 THROUGH 93 IN THE SAME MANNER AS BLOCKS 64 THROUGH 69. BLOCKS NOT COMPLETED WILL BE LEFT BLANK EXCEPT AS DIRECTED BELOW.

BLOCK 70 - **REPAIR NUMBER/L W D**

The NDT Inspector will enter the repair number, length, width and/or depth of the defect(s) if known. Enter N/A for length, width or depth if unknown based on the limitations of the inspection method performed.

BLOCK 71 - **REPAIR METHOD/L W D**

The welder will record the method of repair (e.g., file, excavate and weld, weld only). Document the length, width and depth of the excavation. If excavation was not required for weld repair, enter N/A for L W D.

BLOCK 78 - **REPAIR NUMBER/L W D**

The NDT Inspector will enter the repair number, length, width and/or depth of the defect(s) if known. Enter N/A for length, width or depth if unknown based on the limitations of the inspection method performed.

BLOCK 79 - **REPAIR METHOD/L W D**

The welder will record the method of repair (e.g., file, excavate and weld, weld only). Document the length, width and depth of the excavation. If excavation was not required for weld repair, enter N/A for L W D.

BLOCK 86 - **REPAIR NUMBER/L W D**

The NDT Inspector will enter the repair number, length, width and/or depth of the defect(s) if known. Enter N/A for length, width or depth if unknown based on the limitations of the inspection method performed.

BLOCK 87 - **REPAIR METHOD/L W D**

The welder will record the method of repair (e.g., file, excavate and weld, weld only). Document the length, width and depth of the excavation. If excavation was not required for weld repair, enter N/A for L W D.

BLOCK 94 - **FINAL DISPOSITION**

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

BLOCK 95 - **NDT SUPERVISOR SIGNATURE DATE**

NDT Supervisor print name, enter signature and date signifying all information in Blocks 1 through 93 is technically and administratively correct.

(This Page Intentionally Left Blank)

(This Page Intentionally Left Blank)

QA FORM 20A INSTRUCTIONSRADIOGRAPHIC 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 24 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.

QA FORM 20B (PART A) INSTRUCTIONSSTRUCTURAL PRIMARY RECORD

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

NOTES:

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

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

BLOCK 1 - RECORD NO.

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

BLOCK 2 - LWC/SHOP

Enter local work center or lead shop.

BLOCK 3 - SHEET

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

BLOCK 4 - SHIP/HULL NO.

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

BLOCK 5 - JCN

Enter the Job Control Number (JCN).

BLOCK 6 - CWP/REC

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

BLOCK 7 - **REFERENCES**

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

BLOCK 8 - **JOINT NUMBER**

Enter the Joint Numbers.

BLOCK 9 - **SS/SOC**

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

BLOCK 10 - **REC (SHIPYARD USE ONLY)**

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

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

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

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

BLOCK 12 - **COMPONENT NUMBER 2**

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

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

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

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

BLOCK 14 - **REMARKS**

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.

STRUCTURAL WELD HISTORY
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					
7. REFERENCES										
A.		B.			C.					
JOINT IDENTIFICATION										
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)		
WELD HISTORY										
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 FIN AL NDT			CRAFTSMAN/CRAFTSMAN SUPERVISOR (SIGNATURE/DATE)							
REQUIRED NDT										
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										

QA FORM 20B (PART B) (BACK)				
REQUIRED NDT (CONT.)				
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 & 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)	

(This Page Intentionally Left Blank)

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:

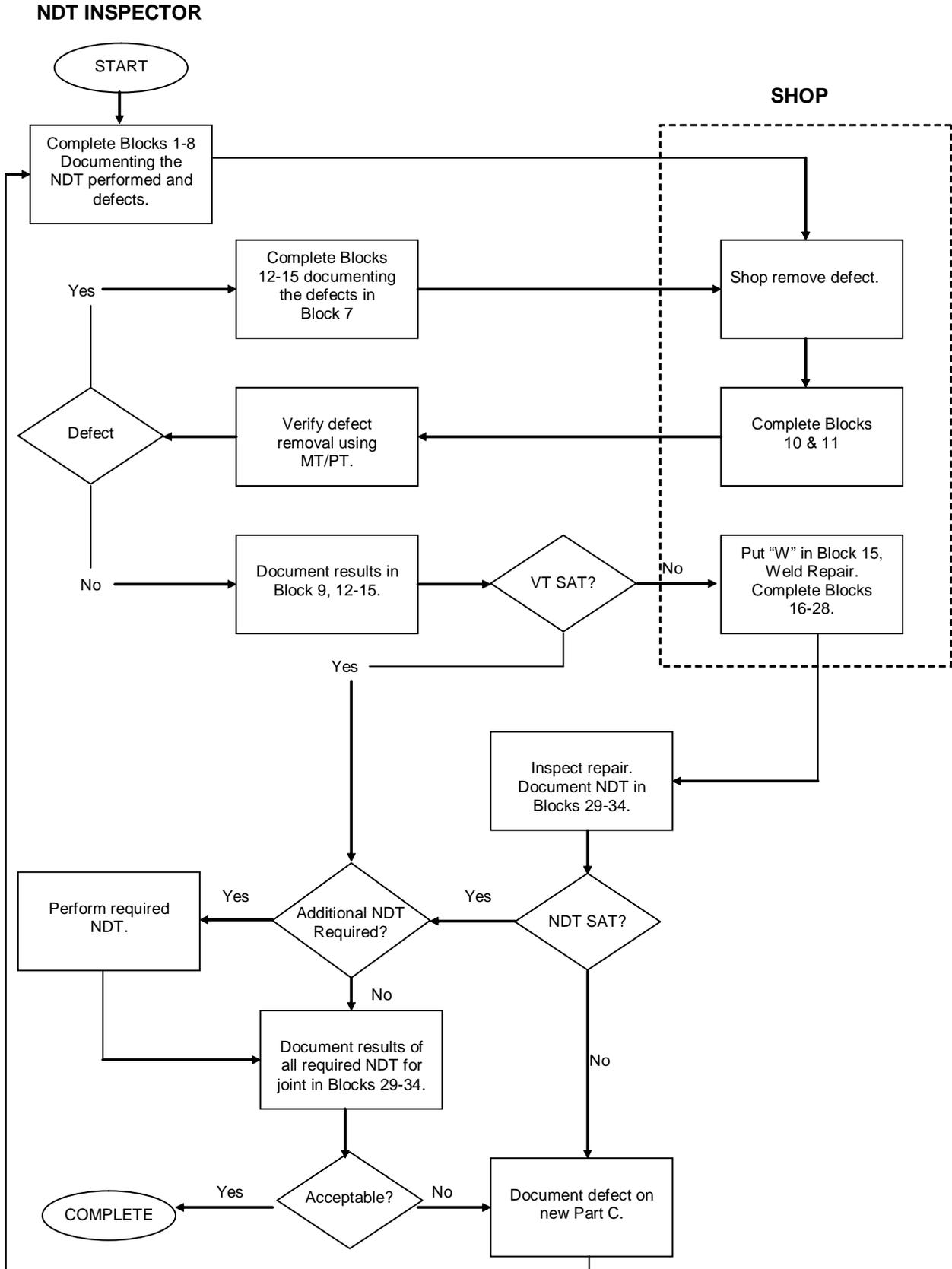
(WELDER) Transcribe entries from the associated Part B record (sheet 1) onto the continuation sheet for Blocks 1, 4, 5 and 6.

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.

(This Page Intentionally Left Blank)

QA-20B PART C FLOWCHART



(This Page Intentionally Left Blank)

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.

(This Page Intentionally Left Blank)

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		♦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"/> NEW	<input type="checkbox"/> EXISTING	<input type="checkbox"/> EXST MATL MKS	<input type="checkbox"/> GEN MATL TEST	PART NO. 2 <input type="checkbox"/> NEW	<input type="checkbox"/> EXISTING	<input type="checkbox"/> EXST MATL MKS	<input type="checkbox"/> GEN MATL TEST	
	MATERIAL MRKS/TEST RESULT:								
	NEW MATERIAL (INCLUDING CONSUMABLE INSERTS, BACKING MATERIAL, ETC.)								
	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	PREWELD NDT <input type="checkbox"/> COMP	JOINT DESIGN INSTALLED	FITUP: <input type="checkbox"/> SAT	FITTER (Signature, Badge, Date)	
NO. 2	♦ Nom: ♦ Min:		Min:	♦ <input type="checkbox"/> NA		♦ <input type="checkbox"/> SAT ♦ <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:	25. FABRICATION LOCATION: SHOP/BLDG _____ SHIPBOARD			
	26. LAYER(S) (T/R/I/F)	27. FILLER TYPE	28. FILLER SERIAL NO. (e. g., Level I No.)		MAX INTERPASS TEMP:	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)					
WELD INSPECTIONS: (I) = INTERMEDIATE, (F) = FINAL # = PREWELD INSPECTION (EXCAVATION, END-PREP, ETC.) ## = NUCLEAR ONLY									
♦34. ACCEPTANCE STANDARD:				♦ CLASS					
♦35. INSP <input type="checkbox"/> # <input type="checkbox"/> NA	♦36. INSPECTION TYPE ♦ <input type="checkbox"/> 5X <input type="checkbox"/> RT <input type="checkbox"/> PT TYPE II-C <input type="checkbox"/> MT EQPT NO: _____			37. PROCEDURE USED		38. INSPECTOR (Signature, Badge, Date)			
♦ <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)				

PIPE, MACHINERY AND PRESSURE VESSEL WELD RECORD – WELD DEFECT REPAIR SHEET QA FORM 20C-2				
SHIP:		DWG/JCN:		JOINT NO.:
			PAGE	OF
52. DEFECT DESCRIPTION				
<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)	
DEFECT REPAIR				
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	
REPAIR INSPECTIONS				
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				

(This Page Intentionally Left Blank)

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: <ul style="list-style-type: none"> 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.

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 GAGES 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

(This Page Intentionally Left Blank)

QA FORM 26 INSTRUCTIONSHYDROSTATIC/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. The QA form 26 will not be used in DSS/SOC applications.

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: LOCAL EXCEPTIONS TO GAGE RANGE AND OR INCREMENTS WILL BE APPROVED BY AN INDIVIDUAL WITH A TECHNICAL WARRANT.

NOTE: SHIPS, FLEET MAINTENANCE ACTIVITIES AND REGIONAL MAINTENANCE CENTERS MANAGED BY UNITED STATES 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 GAGS 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): b. ACTUAL TEST PRESSURE:		a.	b.	11. a. FINAL PRESSURE AT END OF TEST: 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

(This Page Intentionally Left Blank)

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: LOCAL EXCEPTIONS TO GAGE RANGE AND OR INCREMENTS WILL BE APPROVED BY AN INDIVIDUAL WITH A TECHNICAL WARRANT.

NOTE: SHIPS, FLEET MAINTENANCE ACTIVITIES AND REGIONAL MAINTENANCE CENTERS MANAGED BY UNITED STATES 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.

(This Page Intentionally Left Blank)

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.

(This Page Intentionally Left Blank)

QA FORM 34 INSTRUCTIONSJOINT/COMPONENT TORQUE AND ASSEMBLY RECORDREFERENCES:

- (a) NAVSEA 389-0317 - Procedures for Maintenance and Repair of Naval Reactor Plants (Nuclear)

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

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

REQUIREMENTS:

1. Torque documentation is required for the following joints and must be documented on a QA form 34.

- a. All nuclear Level I system piping joints (i.e., flanges) governed by Chapter 14 of reference (a).
- b. All joints assembled as a Controlled Assembly.

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

c. SUBSAFE:

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

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

d. Scope of Certification:

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

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

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

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

TOP OF FORM - PAGE _____ OF _____

Enter page numbers.

BLOCK 1 - SHIP/HULL NO.

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

BLOCK 2 - JCN

Planner enter the Job Control Number (JCN).

BLOCK 3 - LWC/SHOP

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

BLOCK 4 - CWP/REC SER. NO.

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

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

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

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

BLOCK 6 - REFERENCES

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

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, 1/2"-13; stud, 1/2"-12; SHCS, 1/2"-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: 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.

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 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.

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

Torque documentation is required for the following joints:

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 5.4.3.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 5.4.3.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 5.4.3.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 5.4.7 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.). **Planner enter "N/A" if the joint being assembled does not contain threaded fasteners (bolts, studs, or stud-bolts, bolt-studs and nuts).**

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 LI	Yes (when a torque is specified)	No
Controlled Assemblies	Yes	Yes - New LI Only	Yes	Yes
SUBSAFE Hull Integrity Joints	Yes	Yes - New LI Only	Yes	Yes
SUBSAFE Bolted Pressure Boundary Joints	No	Yes - New LI Only	No	No
EHF Installations	Yes	Yes - New LI Only	Yes	Yes
SOC Bolted Pressure Boundary Joints	Yes	Yes - New LI Yes - MCD-A Yes - MCD-B Yes - MCD-C	Yes	Yes
SOC Unions	Yes	Yes - New LI 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.

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 5.4.7 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, **to include SMIC if given**, 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. **QAI sign, print and date in Block 11 for new MCD-C material installed by craftsman in Block 10 to ensure material conforms to specified requirements.**

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. **For controlled assemblies on systems requiring MIL-STD-1622 for critical applications or MIL-STD-1330, document "Cleanliness maintained per (MIL-STD-1622 Critical Applications or MIL-STD-1330 (as applicable))" and include the Craftsman's signature and date.**

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.

NOTE: (SUBMARINES ONLY) THIS BLOCK SHALL NOT BE USED FOR ANY JOINT ASSEMBLIES.

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.

(This Page Intentionally Left Blank)

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. The QA form 34A is not to be used in SOC applications.

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 **to include non-pressure boundary 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, ½"-13; stud, ½"-12; SHCS, ½"-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 5.4.7 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.

(This Page Intentionally Left Blank)

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	
CAL DUE DATE:				DELAY <input type="checkbox"/>							
				CONTACT <input type="checkbox"/>							
				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.					

(This Page Intentionally Left Blank)

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	
SHIP TO SHOP TAG (GENERAL USE) TAG ___ OF ___	
(PART 1)	
SHIP _____	JCN _____
EIC/APL _____	SER. NO. _____
JOB BRIEF/EQUIP NOMENCLATURE _____ _____	
LEAD W/C _____	DATE DELV'D _____
	DELIVERED BY _____
(PART 2)	
READY FOR PICK UP TAG	
SHIP* _____	JCN* _____
JOB BRIEF-WORK PERFORMED _____ _____	
REPAIR ACTIVITY REP. _____	DATE _____
(PART 3)	
CUSTOMER MATERIAL RECEIPT	
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	

(This Page Intentionally Left Blank)

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 I
CHAPTER 13
WIRE REMOVAL AND REPLACEMENT

LISTING OF APPENDICES.

- A Wire Removal/Replacement Form MAT-2
- B **Submarine Wire Removal/Replacement Form MAT-3**

13.1 **PURPOSE.** To establish requirements, procedures and administrative tools to control work involving wire removal and connection.

13.1.1 **Discussion.** The disconnecting and reconnecting of electrical leads must be formally controlled to preclude inadvertent equipment configuration changes. Improper wire connections during maintenance have caused incidents of equipment malfunction and damage, and may result in increased personnel hazard.

13.2 **ACTION.** All operations which involve the physical removal or connection of one or more wires from their termination point will be documented using **either Appendix A or Appendix B** of this chapter. **Appendix B is to be used for submarines.** A separate form will be used for each separate component or system (e.g., maintenance on two instrumentation drawers should be documented on two separate forms).

- a. For maintenance actions which will result in an intentional wiring configuration change (e.g., Ship Alteration installation) Appendix A **or Appendix B** of this chapter shall be documented such that the disconnecting of old wiring and the reconnecting of new wiring is verified to be per print.
- b. Blueprints, drawings, and schematic diagrams will be reviewed prior to work. The expected configuration shall be entered on the Wire Removal/Replacement Form (Appendix A **or Appendix B** of this chapter) before any wires are disconnected or moved. This will identify any discrepancy between the reference drawing and the ship's wiring configuration. Temporary wire markings will be used for positive identification if necessary and all checks will include proper hardware stack-up (lugs, washers, fastener tightness, etc.).
- c. A clear method of identifying wire connections must be used (e.g., a worker who was not involved in the disconnection will be able to reconnect the wires without the need for further information sources). If necessary, a simple sketch can be generated and kept with the wire removal form to facilitate this, but the sketch is not intended to replace **the use of Appendix A or Appendix B.**
- d. Jumpers. Use of jumpers internal to cabinets requires use of Appendix A **or Appendix B** of this chapter, and if more than one jumper is used, a marking system must be used to identify them and prevent confusion (i.e., marked as Jumper-1, Jumper-2 or use different colored wires). When installing jumpers, fill out the "Wires Reconnected" blocks of Appendix A **or Appendix B** of this chapter first, then the "Wires Disconnected" blocks after the jumpers are removed. These procedures are not intended to replace any of the requirements of Section 4.d of Appendix F of the Tagout Users Manual.

(This Page Intentionally Left Blank)

APPENDIX B

SUBMARINE WIRE REMOVAL/REPLACEMENT FORM MAT-3

Page ____ of ____

Job Description _____ Date _____

Equipment/Component Affected _____

Wiring Diagram used _____

WIRES TO BE DISCONNECTED					DISCONNECTED		WIRES TO BE RECONNECTED					RECONNECTED	
Lead Number	Terminal Board#	Color Code	1 st CK	2 nd CK	1 st CK	2 nd CK	Lead Number	Terminal Board#	Color Code	1 st CK	2 nd CK	1 st CK	2 nd CK

Print name and initials for each 1st and 2nd checker listed above

Initials	Print Name		Initials	Print Name

Supervisor Review _____ Title _____ Date _____

(This Page Intentionally Left Blank)

APPENDIX A
LIST OF ACRONYMS

ADS	Atmospheric Diving System
CMH	Controlled Material Handler
CMPO	Controlled Material Petty Officer
COC	Certificate of Compliance
COMNAVSPECWARGRU	Commander, Naval Special Warfare Group
COT	Certificate of Test
CSP	Certification Survey Plan
CWP	Controlled Work Package
DDS	Dry Deck Shelter
DFS	Departure From Specification
DSS	Deep Submergence System
DSSP	Deep Submergence Systems Program
DSSRG	Deep Submergence Systems Review Group
EHF	Electrical Hull Fitting
FADS	Fly Away Dive Systems
FBW	Fly-By-Wire
FFF	Form, Fit, Function
FMA	Fleet Maintenance Activity
HIP	Hull Integrity Procedure
ISIC	Immediate Superior In Command
JCN	Job Control Number
LWC	Lead Work Center
MCD	Material Control Division
MIC	Material Identification and Control
MOA	Memorandum of Agreement
MRC	Maintenance Requirement Card
MTT	Material Tracking Tag
NA or N/A	Not Applicable
NAVSEA	Naval Sea Systems Command
NSN	National Stock Number
OQE	Objective Quality Evidence
PMS	Planned Maintenance System
PTC	Personnel Transfer Capsule
QA	Quality Assurance
QAI	Quality Assurance Inspector
QAO	Quality Assurance Officer
REC	Re-Entry Control
RFI	Ready for Issue

SCA	System Certification Authority
SCS	Ship Control System
SDS	Salvage Dive Systems
SDV	Seal Delivery Vehicle
SMIC	Special Material Identification Code
SOC	Scope of Certification
SRC	Submarine Rescue Chamber
SRCFS	Submarine Rescue Chamber Fly Away System
SUBSAFE	Submarine Safety
TYCOM	Type Commander
URO	Unrestricted Operation
WSS	Weapons Systems Support

VOLUME V
PART III
CHAPTER 1
ORGANIZATIONAL RESPONSIBILITIES

REFERENCES.

- (a) NAVSEA SS800-AG-MAN-010/P-9290 - System Certification Procedures and Criteria Manual for Deep Submergence Systems
- (b) COMSUBLANT/COMSUBPACINST 3502.1 - Submarine Force Internal Monitoring and Critiques

1.1 **PURPOSE.** To provide a list of responsibilities and duties of key personnel within the organizations that are involved in the Scope of Certification (SOC) Program. Responsibilities and/or duties listed in this section are SOC specific and are in addition to the responsibilities listed in Part I, Chapter 1 of this volume.

1.1.1 **Scope of Certification Organization.**

- a. Type Commander (TYCOM).
- b. Immediate Superior In Command (ISIC).
- c. Sustaining Activity.
- d. User Activity.

1.2 **RESPONSIBILITIES.**

1.2.1 **Type Commander.** The TYCOM for Deep Submergence Systems (DSS) is responsible for the following items:

- a. Obtain System Certification Authority (SCA) approval for exception to Re-Entry Control (REC) requirements in SOC systems.
- b. Administer a Departure from Specification (DFS) system to:
 - (1) Establish and maintain an auditable method of processing requests for approval of DFS.
 - (2) Review and evaluate DFS requests and obtain clarification of technical specifications from Naval Sea Systems Command (NAVSEA) where appropriate.
 - (3) Approve or disapprove Non-SOC DFS requests.
 - (4) Monitor all outstanding major DFS and ensure ISIC records agree with TYCOMs and pursue DFS clearance.
 - (5) Obtain Program Manager approval of all DFSs in DSS SOC systems, unless the Program Manager has delegated, in writing, authority to approve specific routinely recurring DSS SOC DFSs or authority to approve minor DSS SOC DFSs.
 - (6) Keep the Program Manager and SCA informed of all DFS requests.
 - (7) Liaison with the Program Manager on any outstanding DFS items requiring NAVSEA action. Provide a periodic status report to the Program Manager of those DFSs for which NAVSEA action is overdue.
- c. Perform assessments of ISICs responsible for DSSs annually not to exceed 18 months.
- d. At the discretion of the TYCOM perform random, unannounced User/Sustaining Activity Quality Assurance (QA) assessments and monitor visits.

NOTE: THE SCA, NOT THE TYCOM, ALSO APPROVES INITIAL DSS CERTIFICATION.

- e. Review and evaluate ISIC reports of corrective action taken on QA assessments to ensure compliance with this program.
- f. Perform an annual self evaluation of the QA program.
- g. Evaluate and analyze proposed changes to this volume.
- h. Recommend to the SCA suspension and reinstatement of DSS certification as appropriate.
- i. Perform annual SOC awareness training for staff members that routinely review SOC Objective Quality Evidence (OQE), make determinations on SOC DFSs and perform other SOC work oversight functions.

1.2.2 Immediate Superior In Command. The ISIC for the DSS and host submarines and ships is responsible for the following:

- a. Organize and implement a QA program to carry out the provisions of this volume.
- b. Organize and implement a program to verify performance of required maintenance to sustain the material condition necessary to support Unrestricted Operations to authorized operating depth in accordance with the applicable class Hull Integrity Procedure Maintenance Requirement Card manual and Volume VI of this manual.
- c. (Submarines only) Organize and implement a work request screening process such that those jobs requiring special controls are recognized and the supporting technical documentation is provided to the maintenance activity as required by this volume (not applicable to COMNAVSPECWARCOM).
- d. Ensure DSS certification continuity report, when required by this volume, is received and reviewed before DSS manned use. In particular, the ISIC will ensure all Hull Integrity Procedure planned maintenance is up to date. Discrepancies noted must be resolved prior to underway.
- e. In accordance with reference (a), paragraph 3.7.4, when performing manned operations (manned use) in pursuit of certification or reinstatement of certification, review and approve User/Sustaining Activity requests prior to conducting these operations, as applicable.
- f. Review and sign the Memorandum of Agreement (MOA) required by Volume II, Part I, Chapters 3 and 4, of this manual and reference (a). This agreement will list the responsibilities and actions of each party before start of any availability (e.g., Tiger Team repairs, technical assist visits) that involves work within SOC boundaries to ensure responsibilities for recertification of work performed is not split between maintenance activities and that each activity is responsible to certify the work they performed.
- g. Administer a DFS system to:
 - (1) Establish and maintain system of processing requests for DFSs.
 - (2) Review and evaluate DFS requests and obtain clarification of technical specifications from TYCOM/NAVSEA where appropriate.
 - (3) Approve or disapprove DFS requests as authorized by the applicable SOC Notebook.
 - (4) Obtain TYCOM/NAVSEA approval of DFS when required by the appropriate TYCOM/NAVSEA directive, technical specification or manual.
 - (5) (Submarines only) Ensure the deployed ISIC directing the supporting Fleet Maintenance Activity (FMA) will act as the cognizant ISIC for those actions required to approve, review and track DFSs for ships deployed. The parent ISIC, with concurrence from the deployed ISIC, may, on a case by case basis, perform these functions. In such cases, the parent ISIC will inform the deployed ISIC when such action(s) concurred upon is/are complete.
 - (6) (Submarines only) The parent ISIC will provide a complete file of all outstanding DFSs to the deployed ISIC, prior to any ship deployment. The deployed ISIC will provide a complete file of all outstanding DFSs to the parent ISIC at the end of deployment.
 - (7) Specify procedures for:

- (a) Submission of OPNAV form 4790/2K for DFSs that require a future maintenance action to clear the departed condition.
 - (b) Submission of OPNAV form 4790/CK for permanent repair DFSs which result in new Allowance Parts List and Coordinated Shipboard Allowance List support requirements.
- (8) (Submarines only) Keep parent ISIC apprised on the status of DFSs for deployed units.
- (9) Maintain files of outstanding DFSs.
- (10) Aggressively pursue clearing of DFSs.
- h. (Submarines only) Monitor the QA program and procedures of assigned FMA periodically and monitor corrective actions on discrepancies noted during the last TYCOM audit.
- i. (Submarines only) Schedule and conduct a QA Program assessment in conjunction with the Fleet Readiness Training Plan (or as determined by each TYCOM) of all assigned ships to ensure the repair actions undertaken by Ship's Force conform to the provisions of the QA Program as well as pertinent technical requirements.
- j. (Submarines only) Review and endorse TYCOM audit report of assigned FMA(s).
- k. Conduct periodic monitoring of Ship's Force work and QA program on all assigned DSS during maintenance periods.
 - (1) Perform at least one surveillance during each refit/upkeep/FMA availability.
 - (2) Conducting monitoring during industrial availabilities (e.g., Selected Restricted Availability, Drydocking Selected Restricted Availability, Extended Refit Period, Post Shakedown Availability, Phased Maintenance Availability, Docking Phased Maintenance Availability, Depot Modernization Period, Engineered Refueling Overhaul and Regular or Refueling Overhaul).
- l. Properly maintain certification on assigned DSS.
- m. Review and evaluate User/Sustaining Activity reports of corrective action taken on SCA Surveys to ensure compliance with this program. Retention of OQE to substantiate reviews or evaluations is not required except in the case where the review or evaluation of a Survey response was determined to be unsatisfactory.
- n. Ensure the Sustaining Activities properly perform internal surveys in accordance with reference (a).
- o. Ensure Sustaining Activities properly process requests for sustaining certification.
- p. Perform QA assessments of the Sustaining Activities/User Activities associated with the DSS and host submarines and ships annually not to exceed 18 months. Forward results of the assessments to the TYCOM and Program Manager.
- q. Route all appropriate DSS SOC DFSs to TYCOM and Program Manager for approval.
- r. Conduct a vertical audit of assigned DSS unit's OQE for all work within the SOC accomplished by the User Activity and the Sustaining Activity prior to the first sea trials or manned operation at the end of each major availability and after completion of any major repairs, modifications or alterations completed during non-depot level availability periods. Not required if an SCA Survey is scheduled at the conclusion of the availability.
- s. Perform annual SOC awareness training for staff members that routinely review SOC OQE, make determinations on SOC DFSs and perform other SOC work oversight functions.
- t. Ensure fact-finding critiques are held to establish underlying causes and pursue corrective actions when necessary. When major errors or problems occur during maintenance of DSS/SOC systems, a critique may be necessary. Examples include when significant problems or trends occur or those that did result or could result in incidents, significant unplanned rework, serious equipment damage, malfunction or

personnel injury. Minor problems are isolated deficiencies with minimal overall impact and no significant consequences; these should normally be corrected on the spot and without expending much time and effort.

- (1) Contact the TYCOM immediately of issues which will be result in a Submarine Safety (SUBSAFE)/Fly-By-Wire (FBW) Ship Control System (SCS)/DSS/SOC critique, SUBSAFE/FBW SCS/DSS/SOC trouble report and/or SUBSAFE/FBW SCS/DSS/SOC fact-finding.
- (2) (Submarines only) Additional guidance and direction for critiques is contained in reference (b).
- (3) (Submarines only) Copies of critiques and incident reports for DSS/SOC issues that result in a problem severity level of Level 1 (critical) will be sent to the TYCOM electronically.

1.2.3 Sustaining Activity/User Activity. Sustaining and User Activities in some cases may be the same organization. The Sustaining Activity is responsible for ensuring that the requirements established in the Letter of Certification and reference (a) are met. The Sustaining Activity and User Activity will:

- a. Follow REC procedures during re-entry of a certified component, system or a portion of a system.
- b. Document all deviations from the certification requirements in a form suitable for survey.
- c. Accomplish periodic maintenance actions as specified in the supporting requirements developed for each DSS and ensure that adequate OQE is available during surveys in a format conducive to review.
- d. Ensure accountability of maintenance for each DSS and establish an auditable system of scheduling, performing and reporting accomplishment of Maintenance Requirement Cards.
- e. Submit an official request to NAVSEA for continuation of certification for a specific time period and include written rationale for the continuation together with a status of maintenance and system condition.
- f. Sustaining Activities will conduct internal surveys in accordance with section 4.1.2 of reference (a) and:
 - (1) If the SCA sustaining certification survey periodicity is 15 months or greater, perform at least two internal surveys between the SCA surveys, not to exceed a 12 month periodicity.
 - (2) Prior to the SCA on-site survey, conduct an internal survey to evaluate compliance with certification requirements.
 - (3) For other than overhaul or new construction, complete the Sustaining Activity's internal survey and submit it to the Program Manager in accordance with the applicable SOC notebook or reference (a) section 4.1.2.
 - (4) Overhaul/New Construction. The activity's internal survey must be completed not more than 30 days prior to the SCA survey and the results of the internal survey must be submitted to NAVSEA at least 10 working days prior to the start of the SCA survey.
 - (5) Obtain NAVSEA approval of an updated Certification Survey Plan at least two weeks prior to the SCA survey for an SCA Certification Survey Only.
- g. Report to NAVSEA resolution of all survey deficiencies.
- h. Retain the completed maintenance and dive log, including, where required, pre-dive and post-dive check-off procedures for all evolutions from survey to survey. The procedures utilized must have prior Program Manager and SCA concurrence.
- i. Obtain NAVSEA approval for alterations to items within the SOC. This includes the addition of any mission-related equipment outside the defined lines of the DSS as deemed necessary by the SCA.
- j. Accomplish and report Maintenance Requirement Cards and Hull Integrity Procedures in accordance with assigned periodicities approved by the Program Manager and immediately resolve any unacceptable conditions found as a result of conducting the maintenance procedures or inspections.

- k. Review and sign the MOA required by Volume II, Part I of this manual. This agreement, as a minimum, shall define the activity's functions and responsibilities for implementing and administrating REC procedures. Volume II, Part I of this manual contains specific requirements for MOAs. All applicable activities must sign the MOA prior to the start of work.
- l. The User Activity must issue the DSS certification continuity report before manned operations (Not applicable when in pursuit of certification or reinstatement of certification per reference (a) paragraph 3.7.4.). For vehicles loaded on submarines the certification continuity report must be issued prior to the underway of the host ship (not required to issue DSS certification continuity report for work performed at sea).
- m. Obtain formal approval for any temporary modifications prior to installation in a DSS from the Program Manager. Submit the request to the Program Manager and include the items listed in section 5.4.4 of reference (a) and any other items as required by the Program Manager.
- n. Operate the DSS within the limits specified as part of the requirements for each sustaining certification.
- o. The Sustaining Activity shall report any violation of the DSS operating limits to NAVSEA stating the cause or justification for the violation.
- p. Keep the Program Manager and SCA advised of any failure or improper operation experienced by, or damages sustained to, any item or system within the SOC.
- q. The responsibilities listed in Part I, Chapter 1 Section 1.5 of this volume apply to the User/Sustaining Activity. Each activity shall comply with the applicable responsibilities listed in this section. For instance, DSSs are responsible for the duties listed in the Ship Commanding Officer section.
- r. When the sustaining Activity is different than the user activity, the Sustaining Activity will issue a written report to the User Activity, with a copy to parent ISIC, which addresses the status of SOC RECs, testing of SOC systems, Hull Integrity Procedure maintenance requirements completed and DFS items.
- s. Ensure fact-finding critiques are held to establish underlying causes and pursue corrective actions when necessary. When major errors or problems occur during maintenance of DSS/SOC work, a critique may be necessary. Examples include when significant problems or trends occur or those that did result or could result in incidents, significant unplanned rework, serious equipment damage, malfunction or personnel injury. Minor problems are isolated deficiencies with minimal overall impact and no significant consequences; these should normally be corrected on the spot and without expending much time and effort. Contact the ISIC immediately of issues which will result in a SUBSAFE/FBW SCS/DSS/SOC critique, SUBSAFE/FBW SCS/DSS/SOC trouble report and/or SUBSAFE/FBW SCS/DSS/SOC fact-finding (Submarines only) Additional guidance and direction for critiques is contained in reference (b). Copies of critiques and incident reports for DSS/SOC issues that result in a problem severity level of Level 1 (critical) will be sent to the TYCOM electronically.

Examples include, but are not limited to the following:

- (1) Noncompliant work or technical direction resulting in nonacceptable material within the DSS/SOC boundary (e.g., incorrect material installed, failure to complete recertification actions, incorrect torque applied, improper conduct of testing, wrong weld procedure, lack of/incorrect Nondestructive Test, unqualified welder, failure to use specified measuring device, etc.).
- (2) Inaccurate or missing information/data provided on deliverable DSS/SOC technical documents affecting the certification status (e.g., certification messages, Unrestricted Operations Maintenance Requirement Card data reports).
- (3) Conduct of work within the SOC boundary without required authorization or re-entry control.
- (4) Failure to accomplish mandatory SOC related PMS within the required periodicity.

- (5) Performance of DSS manned operations with an open Category 1A, Category 1B (unless as allowed by the card) or expired Category 1C system certification survey card, or outside of the allowed sustaining certification periodicity.
- (6) Operation of SOC systems contrary to/or without a NAVSEA approved procedure.

VOLUME V
PART III
CHAPTER 3
PERSONNEL QUALIFICATION AND TRAINING

REFERENCE.

- (a) NAVEDTRA 43523 - Personnel Qualification Standard for Quality Maintenance Program

3.1 APPLICABILITY. Use the training and qualification requirements specified in Part I, Chapter 3 of this volume as modified in the following paragraphs.

3.2 GENERAL. Personnel who screen, plan, perform, inspect and supervise maintenance as listed in Part I, Chapter 2, paragraph 2.2.1 and Part III, Chapter 2 of this volume shall be trained and qualified in accordance with this volume and reference (a).

3.3 DISCUSSION. For Deep Submergence Systems, modify the training specified in the qualification standard of reference (a) and the appendices of Part I, Chapter 3, of this volume to include Scope of Certification (SOC) knowledge and practical factors. Send the revised qualification cards to the applicable Type Commander via the Immediate Superior In Command. The Type Commander will standardize qualification requirements for all subordinate commands dealing with SOC issues.

3.4 QUALIFICATION REQUIREMENTS.

3.4.1 Qualifications. Most User Activities are too small and do not have billets for Quality Assurance Officers (QAO). However, the responsible Immediate Superior In Command will have a QAO qualified in accordance with Part I, Chapter 3, paragraph 3.4.3 of this volume. The Sustaining Activity will have a QAO qualified in accordance with Part I, Chapter 3, paragraph 3.4.4 of this volume.

3.4.2 Scope of Certification Quality Maintenance Qualifications. Use the qualification requirements for other qualifications as listed in Part I, Chapter 3 of this volume. Note that not all qualifications would apply.

3.5 TRAINING.

3.5.1 Scope of Certification Awareness Training (Submarines and Submarine Repair Facilities only). All maintenance crew members required to qualify as craftsman on board submarines with SOC systems or components shall receive SOC awareness training during initial indoctrination and annually thereafter. All personnel assigned to a command responsible for performing maintenance on submarine system(s) within the SOC boundary shall receive SOC awareness training during initial indoctrination and annually thereafter. Immediate Superior In Command and Type Commander staff members that routinely review SOC Objective Quality Evidence, make determinations on SOC Departures from Specifications and perform other SOC work oversight will receive annual SOC awareness training to keep knowledge and proficiency levels high.

(This Page Intentionally Left Blank)

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. 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. **Any incomplete SOC PMS and/or SOC PMS not performed when scheduled requires a major Departure From Specification (DFS) to be processed and adjudicated prior to executing manned SOC operations.** 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 INSPECTIONS.

5.6.1 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.

5.6.2 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).

5.6.3 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:

NOTE: THESE ARE CONSIDERED MINIMUM REQUIREMENTS FOR USAGE OF AN INDEPENDENT INSPECTOR DURING THE PERFORMANCE OF SOC CONTROLLED WORK. IT MUST BE UNDERSTOOD THAT THE REQUIREMENTS FOR AN INDEPENDENT INSPECTOR DO NOT NECESSARILY MEAN THAT THE DATA PROVIDED IS RETAINABLE AS OQE. VARIOUS SOURCE DOCUMENTS ADDRESS RECORD RETENTION AND SHALL BE FOLLOWED FOR ENSURING THE PROPER OQE IS RETAINED.

- a. Inspections performed for all acceptance testing (e.g., hydrostatic testing, drop tests, joint tightness tests, weight tests) for certification of work completed under a CWP.
- b. Inspections performed to verify permanent traceability markings of SOC Material Control Division A material assigned and made locally at either a Fleet Maintenance Activity (FMA), a Sustaining Activity or at the User Activity. These inspections may also be performed by a Controlled Material Petty Officer.
- c. Inspections performed to verify permanent markings of Level I/SOC material (those which the FMA manufacture or transfer to smaller pieces of controlled material). These inspections may also be performed by a Controlled Material Petty Officer.
- d. Mechanical measurements used to verify wall thickness of components for work performed using a CWP.
- e. Inspections performed for post machining of any SOC component.
- f. All sealing surface inspections for work performed as a Controlled Assembly.

5.8.6.1 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) Verification that cleanliness was maintained in accordance with MIL-STD-1622 for critical applications or reference (c) (where applicable). Document "Cleanliness maintained per [MIL-STD-1622 or reference (c) (as applicable)]" and include the Craftsman's signature and date in the remarks block of the QA form 34.

5.8.7 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 dockside manned operations and/or each underway for submerged operations (not required to issue DSS certification continuity report for work performed at sea). 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.
- 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.

5.9 MATERIAL CONDITION MONITORING (SUBMARINES ONLY).

5.9.1 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 5.8.7 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.

5.10 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.

5.10.1 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.

5.10.2 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.

DROP TEST RECORD FOR DEEP SUBMERGENCE SYSTEMS QA FORM 27A (DSS)					PAGE 1 OF 2
◆1. DSS PLATFORM	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.			
D.	E.	F.			
◆7. REQUIRED TEST AND INSPECTION – SPECIFY TEST REQUIREMENTS [i.e., TYPE OF TEST, 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 OR ATTACH SKETCH).					
9. GAGE DATA	RANGE (PSIG)	SERIAL #	CAL DATE	CAL DUE DATE	
PRIMARY					
BACKUP					
◆10. REQUIRED TEST FLUID:					
◆11. REQUIRED TEST PRESSURE:		12. INITIAL TEST PRESSURE:		13. FINAL PRESSURE AT END OF TEST:	
14. TEMPERATURE AT START OF TEST:		15. TEMPERATURE AT END OF TEST:		16. CHANGE IN TEMPERATURE:	
◆17. REQUIRED TEST DURATION:			18. ACTUAL TEST DURATION:		
◆19. ALLOWABLE PRESSURE DROP% IN MINUTES/HOURS:			20. FINAL PRESSURE DROP CORRECTED FOR TEMPERATURE CHANGE:		
21. TEST RESULTS (CHECK ONE): <input type="checkbox"/> SAT <input type="checkbox"/> UNSAT					
22. REMARKS:					
23. CERTIFICATION					
CERTIFICATION SIGNATURES SHALL BE MADE BY THE CRAFTSMAN WHO PERFORMED THE TEST AND THE QAI WHO WITNESSED THE TEST					
PERFORMED BY:			INSPECTED BY:		
CRAFTSMAN SIGNATURE	DATE	QA INSPECTOR SIGNATURE	DATE		

QA FORM 27A INSTRUCTIONSDROP TEST RECORD

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

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

PROCEDURE: The numbered blocks on QA form 27A correspond with the instructions listed below. Any block not used will be marked NA. The planning organization shall fill in blocks **identified by a ♦** prior to issuing the CWP.

BLOCK 1 - DSS Platform/Hull Number

Planner enter the DSS or ship's name and hull number.

BLOCK 2 - JCN

Planner enter the JCN.

BLOCK 3 - LWC

Planner enter the shop number of the LWC.

BLOCK 4 - CWP SER. NO.

Planner enter the CWP serial number.

BLOCK 5 - SYSTEM/COMPONENT

Planner enter the name of the system and component to be tested.

BLOCK 6 - TEST REFERENCES

Planner 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

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

BLOCK 8 - DIAGRAM OF TEST AREA

Planner 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: LOCAL EXCEPTIONS TO GAGE RANGE AND OR INCREMENTS WILL BE APPROVED BY AN INDIVIDUAL WITH A TECHNICAL WARRANT.

NOTE: SHIPS, FLEET MAINTENANCE ACTIVITIES AND REGIONAL MAINTENANCE CENTERS MANAGED BY UNITED STATES 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

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

BLOCK 10 - REQUIRED TEST FLUID

Planner enter the required test fluid.

BLOCK 11 - REQ'D TEST PRESSURE (PSIG)

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

BLOCK 12 - INITIAL TEST PRESSURE

Craftsman enter initial test pressure achieved at start of test.

BLOCK 13 - FINAL PRESSURE AT END OF TEST

Craftsman enter final pressure reading when the required test time is completed.

BLOCK 14 - TEMPERATURE AT START OF TEST

Craftsman enter temperature at start of the test with units.

BLOCK 15 - TEMPERATURE AT END OF TEST

Craftsman enter temperature at the end of the test with units.

BLOCK 16 - CHANGE IN TEMPERATURE

Craftsman subtract temperature at the end of the test recorded in Block 15 from temperature at the start of the test recorded in Block 14.

BLOCK 17 - REQUIRED TEST DURATION

Planner enter the required test duration including units.

BLOCK 18 - ACTUAL TEST DURATION

Craftsman record actual duration of the test.

BLOCK 19 - ALLOWABLE PRESSURE DROP % IN MINUTES/HOURS

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

BLOCK 20 - FINAL PRESSURE DROP CORRECTED FOR TEMPERATURE CHANGE

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

BLOCK 21 - TEST RESULTS

Craftsman

- 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 DEPARTURE FROM SPECIFICATION MUST BE PROCESSED IN ACCORDANCE WITH PART 1, CHAPTER 8, OF THIS VOLUME OR THE TASK MUST BE REWORKED AND RETESTED.

BLOCK 22 - REMARKS

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

BLOCK 23 - CERTIFICATION

PERFORMED BY

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

INSPECTED BY

QAI print name, enter signature and date verifying the accuracy of test results recorded and inspection performed satisfactory.

NOTE: SHIPS, FLEET MAINTENANCE ACTIVITIES AND REGIONAL MAINTENANCE CENTERS MANAGED BY UNITED STATES FLEET FORCES COMMAND OR TYCOMS SHALL DISREGARD THE BLOCK 24 DIAMOND WHEN TESTING IS PERFORMED BY AN ACTIVITY OTHER THAN THE ACTIVITY PERFORMING REPAIR. THE ACTIVITY PERFORMING THE TESTING SHALL COMPLETE THE VALVE LINEUP REQUIRED BY BLOCK 24.

BLOCK 24 - VALVE/SYSTEM LINEUP FOR PRESSURE TESTING

List all the valves within the test boundary and those valves that make up the test boundary. The required position for adequate testing of the component/system will be listed. Each valve will have the initials of the initial positioner, or in the event the valve is in the correct position and does not require positioning "NA" will be marked. Each valve will have 1st and 2nd checkers initials. Personnel involved with initial positioning, 1st and 2nd checking will print their names, sign, initial and date the required blocks at the bottom of the form.

(This Page Intentionally Left Blank)

**ELECTRICAL/ELECTRONIC CABLE CONNECTOR
ASSEMBLY AND TEST RECORD**

QA FORM 34B
(DSS)

PAGE 1 OF 1

A separate QA Form 34B must be used for each connector requiring controlled assembly documentation. The QA Form 34B shall be used to provide: 1) Stand alone documentation for cable connector reconnection when controlled assembly is required by authorized REC exception; or 2) QA Form 34B will be included in CWP/REC packages when documentation of controlled assembly is required as OQE for the work performed.
Planning shall fill in blocks identified by a ♦ prior to issuing.

♦1. DSS PLATFORM HULL NO.	♦2. JCN	♦3. LWC/SHOP	♦4. CWP/REC SER NO.	♦5. SYSTEM(S) COMPONENT
♦6. CONNECTOR DESIGNATION		♦7. CABLE DESIGNATION		♦8. CONNECTOR SIZE

♦9. REFERENCES

10. NEW MATERIAL

PC NO.	REF.	DESCRIPTION	QTY	LOE	IDENT (e.g., MIC NO/NSN/TRACEABILITY NO)	R/I

11. INSPECTION

PINS		SEALING SURFACES ♦ [] NOT APPLICABLE			THREADS ♦ [] NOT APPLICABLE		
PLUG SAT _____ UNSAT _____	JACK SAT _____ UNSAT _____	PLUG SAT _____ UNSAT _____	JACK SAT _____ UNSAT _____	VENT SCREW SAT _____ UNSAT _____	PLUG SAT _____ UNSAT _____	JACK SAT _____ UNSAT _____	VENT SCREW SAT _____ UNSAT _____

12. TORQUE DOCUMENTATION ♦ [] TORQUE DOCUMENTATION NOT REQUIRED

VENT SCREW ♦ [] NOT APPLICABLE	♦REQUIRED TORQUE	FINAL TORQUE	TORQUE DEVICE/INSTRUMENT USED		
	<input type="checkbox"/> IN-LB <input type="checkbox"/> FT-LB	<input type="checkbox"/> IN-LB <input type="checkbox"/> FT-LB	RANGE	SERIAL NUMBER	CAL DUE DATE
COUPLING RING	♦REQUIRED TORQUE	FINAL TORQUE	TORQUE DEVICE/INSTRUMENT USED		
	<input type="checkbox"/> IN-LB <input type="checkbox"/> FT-LB	<input type="checkbox"/> IN-LB <input type="checkbox"/> FT-LB	RANGE	SERIAL NUMBER	CAL DUE DATE

CRAFTSMAN SIGNATURE	DATE	QAI SIGNATURE	DATE

13. LOCKWIRE/LOCKING CABLE INSTALLATION	MATL. DESCRIPTION/NSN/PC NO.	CRAFTSMAN SIGNATURE	DATE
SAT _____ ♦NA _____			

14. REMARKS/RECORD OF REPAIRS, MODIFICATIONS, INSPECTIONS (e.g., LIST OF ASSOCIATED RECORDS)

15. RECORD HAS BEEN REVIEWED FOR COMPLETENESS	QAS SIGNATURE	DATE

(This Page Intentionally Left Blank)

QA FORM 34B INSTRUCTIONSELECTRICAL/ELECTRONIC CABLE CONNECTOR ASSEMBLY AND TEST RECORD

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

PURPOSE: To provide a standard form to document the assembly and test of Scope of Certification electrical and electronic cable connector assemblies.

PROCEDURE: The numbered blocks on QA form 34B correspond with instructions listed below. Any block not used will be marked N/A. The planning organization shall fill in blocks identified by a * prior to issuing the CWP.

BLOCK 1 - DSS PLATFORM/HULL NO.

Planner enter the DSS or ship's name and hull number.

BLOCK 2 - JCN

Planner enter the JCN.

BLOCK 3 - LWC

Planner enter the LWC.

BLOCK 4 - CWP/REC SER. NO.

Planner enter the CWP serial number.

BLOCK 5 - SYSTEM(S)/COMPONENT

Planner enter the noun name of the system(s) and component (if applicable).

BLOCK 6 - CONNECTOR DESIGNATION

Planner enter the designation of the connector as listed on prints or other reference material.

BLOCK 7 - CABLE DESIGNATION

Planner enter the designation of the cables entering the connector as listed on prints or other reference material.

BLOCK 8 - CONNECTOR SIZE

Planner enter the **type and size of the male** connector (ex. M24231/13-001, where the M24231 is the standard for the type of receptacle and the 13-001 is the size and number of contacts from the standard).

BLOCK 9 - REFERENCES

Planner enter all references used to identify component parts, joint, material, and assembly information. Include revision letter and, if applicable, the assembly number (e.g., Assy D, Assy RA, etc.). Revisions for technical manuals are not required. If joint numbers are assigned in a sketch in a Work Procedure, include the Work Procedure sketch number. For Electrical Hull Fittings, include both the assembly drawing and electrical hole assignment drawing.

BLOCK 10 - **NEW** MATERIAL

Craftsman

PC NO: Enter piece numbers of parts. List only the new replacement parts actually being installed.

REF: Record the reference letter of the drawing or document listed in Block 9 which provides the material specification or assembly information for the piece listed in the "PC NO." block.

DESCRIPTION: Describe all new parts associated with the assembly or joint. For O-rings: record the MIL SPEC and the size. Enter the stock number of the O-ring lubricant or any sealant used during assembly.

QTY: Record quantity of new material installed.

LOE: Identify the Level of Essentiality (MIC Level). Example: L1, NA. For SOC material, enter the appropriate Material Control Division (A, B or C).

IDENT: Record the National Stock Number or traceability number of the new materials that were used.

R/I (Receipt Inspection): Enter receipt inspection results from the QA form 2 (SAT). For non-controlled material enter "N/A". For SOC MCD C material, the craftsman will perform a receipt inspection per Part III Chapter 6 of this volume and document the inspection results in the R/I column of Block 10.

BLOCK 11 - INSPECTION

PINS: Craftsman record "SAT" or "UNSAT" for the plug and jack inspection using requirements of the references listed in Block 9.

SEALING SURFACE: Craftsman record "SAT" or "UNSAT" for the sealing surface inspection using requirements of the references listed in Block 9.

Planning. If the sealing surface is not required to be checked, mark the "NOT APPLICABLE" block.

THREADS: Craftsman record "SAT" or "UNSAT" for the fastening thread inspection using requirements of the references listed in Block 9.

Planning. If the thread inspection is not required to be checked, mark the "NOT APPLICABLE" block.

REMARKS: Enter any pertinent remarks or additional information related to the inspection of the pins, thread or sealing surfaces in Block 14. Each entry shall contain a signature and date except where the entry is pre-printed on the form by planning.

BLOCK 12 - TORQUE DOCUMENTATION

Not all electrical/electronic cable connectors require torque documentation. For those joints not requiring torque documentation, the Planner will mark the "NOT APPLICABLE" block. The craftsman will still sign indicating that the joint was assembled in accordance with specification and the correct O-ring was used.

For those electrical/electronic cable connectors which require torque documentation:

REQUIRED TORQUE: The Planner will list the required torque for the vent screw and coupling ring as applicable in accordance with the requirements of the reference(s) listed in Block 9.

FINAL TORQUE: The craftsman will record the final torque applied to the vent screw and/or coupling ring.

TORQUE DEVICE DATA: Craftsman record range, serial number and calibration due date for the torque wrench or other device used during the assembly of the connector.

CRAFTSMAN(S) AND QAI CERTIFICATION BLOCK FOR JOINT DATA: Craftsman(s) and QAI shall sign, record badge number and date of the signature after the satisfactory completion of assembly in accordance with the requirements. This signature provides certification that the joint meets the requirements for the following:

- (1) The applied lubricant is acceptable per the technical direction.
- (2) The final required pre-load torque has been applied in accordance with specified requirements.
- (3) Sealing surfaces meet the acceptance criteria of the applicable Maintenance Standard.

QAI CERTIFICATION BLOCK FOR JOINT DATA: QAI shall sign and date the signature after the satisfactory completion of assembly in accordance with the requirements. This signature provides certification that the joint meets the requirements for the following:

- (1) The applied lubricant is acceptable per the technical direction.
- (2) The final required pre-load torque has been applied in accordance with specified requirements.
- (3) Sealing surfaces meet the acceptance criteria of the applicable Maintenance Standard.

BLOCK 13 - LOCKWIRE/LOCKING CABLE/DEVICE INSTALLATION

NOTE: THIS BLOCK APPLIES TO LOCKING DEVICES OTHER THAN SELF-LOCKING NUTS, SELF-LOCKING INSERTS OR SELF-LOCKING BOLT/CAP SCREWS.

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

NOTE: FOR MCD-C LOCKWIRE/LOCKING CABLE/DEVICE, THE QAI WILL UTILIZE SPACE IN BLOCK 14 TO DOCUMENT COMPLETION OF INSPECTION OF MCD-C MATERIAL DURING INSTALLATION.

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 13 (e.g., 2 locking devices), record the quantity in addition to the description (Block 14 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 10.

QAI sign, print and date in Block 14 for new MCD-C material installed by craftsman in Block 13, to ensure material conforms to specified requirements.

BLOCK 14 - REMARKS/RECORD OF REPAIRS/MODIFICATIONS/INSPECTIONS

Enter any pertinent remarks or additional information related to the repair/assembly of the component. Each entry shall contain a signature and date except where the entry is pre-printed on the form by planning.

BLOCK 15 - RECORD HAS BEEN REVIEWED FOR COMPLETENESS

Quality Assurance Supervisor or Quality Assurance Officer will print name, enter signature and date for final review, signifying the accuracy of the completed form. If any entry is UNSAT, the Quality Assurance Officer 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.

(This Page Intentionally Left Blank)