VOLUME VI

FOREWORD

INTRODUCTION

REFERENCES.

(a) OPNAVINST 3120.32 - Standard Organization and Regulations of the U.S. Navy
(b) OPNAVINST 4700.7 - Maintenance Policy for Naval Ships
(c) COMLANTFLTINST 5400.2 - U.S. Atlantic Fleet Regulations
(d) COMPACFLTINST 5400.3 - U.S. Pacific Fleet Regulations
(e) OPNAVINST 4790.4 - Ships' Maintenance and Material Management (3-M) Manual

LISTING OF APPENDICES.

A List of Acronyms

1.1 PURPOSE. To provide guidance in the execution and management for maintenance programs applicable to units of the Navy.

a. Volume I of this manual contains a master listing of all references used throughout the Joint Fleet Maintenance Manual. These references are arranged in alphanumeric order to facilitate their procurement for use with this manual. References used in specific chapters of this volume are listed at the beginning of each chapter in the order in which they appear in the chapter text.

b. Acronyms are identified when they are initially used in each chapter of this volume. Appendix A of this chapter contains a master listing of acronyms used throughout all chapters of this volume.

c. References (a) through (e) shall be used in conjunction with this manual, however, the requirements of this manual shall **not** take precedence over these higher authority directives, or technical directives from applicable Systems Commands (SYSCOM). Where conflicts exist with previously issued Fleet Commander, Commander, Naval Reserve Force (COMNAVRESFOR), Type Commander (TYCOM) letters, transmittals and instructions, other than references (c) and (d), this manual shall take precedence. Conflicts shall be reported to the cognizant TYCOM for resolution.

1.2 SCOPE. This volume applies to all ships and shore activities under the cognizance of Commander, Atlantic Fleet (COMLANTFLT), Commander, Pacific Fleet (COMPACFLT) and COMNAVRESFOR. This volume is not intended to be all encompassing, since the guidance for many elements of the maintenance programs and their execution are promulgated by higher/technical authority (e.g., Naval Ships' Technical Manuals (NSTM), Office of the Chief of Naval Operations Instruction (OPNAVINST)).

a. This volume contains general programs applicable to all ships and units under the cognizance of COMLANTFLT or COMPACFLT. In those cases where chapters, sections and/or paragraphs of chapters are not applicable to certain Forces, an applicability statement has been used for clarification.

b. Equipment under the cognizance of the Strategic Systems Project Office or Naval Sea Systems Command Nuclear Propulsion Directorate (NAVSEA 08) is maintained in accordance with Strategic Systems Project Office and NAVSEA 08 directives, respectively.

1.3 CHANGES AND CORRECTIONS. Changes and corrections will be issued as required. Comments and suggestions for improving or changing this volume are invited. Address comments, recommendations, and requested changes to Submarine Maintenance Engineering, Planning and Procurement (SUBMEPP) Activity utilizing the change request form located in the front of this manual. If changes are submitted in electronic format, facsimile or E-mail, each change request shall contain the information required on the change request form.

1.4 REQUEST FOR COPIES OF THE MANUAL. Activities on distribution for the Joint Fleet Maintenance Manual (JFMM) that require additional copies or activities wanting to be added to distribution should submit a letter to their applicable TYCOM, identifying CD-ROM/paper requirements along with justification for the request. To the maximum extent possible, technical publications libraries at each activity will receive all copies of the manual for that activity and coordinate local distribution and updates.

APPENDIX A

LIST OF ACRONYMS

2M	Miniature/Microminiature
3-M	Maintenance and Material Management
3-MPR	3-M Performance Rate
A&I	Alteration and Improvement
ACCCIT	Aircraft Carrier Climate Control Investigating Team
ACF	Accomplishment Confidence Factor
ACN	Advance Change Notice
ADP	Automated Data Processing
AEL	Allowance Equipage List
AER	Alteration Equivalent to Repair
AERP	Advanced Equipment Repair Program
AIMD	Aviation Intermediate Maintenance Department
AIT	Alteration Installation Team
APL	Allowance Parts List
ARRS	Analysis, Records and Reports Section
ASI	Automated Shore Interface
ASRR	Aviation Safety Readiness Review
ATE	Automated Test Equipment
AWP	Availability Work Package
AWR	Automated Work Request
BART	Beartrap Acoustic Radiated Trials
BCE	Battery Charging Electrician
BCEF	Battery Charging Electrician Forward
BER	Beyond Economical Repair
BRB	Battery Record Book
C5RA	Combat Systems, Command, Control, Communications and Computer Readiness Review
CASREP	Casualty Report
CCA	Circuit Card Assembly
CD-ROM	Compact Disk - Read Only Memory
CEMAT	Carrier Engineering Maintenance Assist Team
CFM	Cubic Feet per Minute
CFOSS	Cargo Fuel Operational Sequencing System
CIL	Critical Instruments List
CMF	Confidence Management Factor
CMP	Class Maintenance Plan
CNASR	Consolidated Nuclear Alteration Status Report
CNO	Chief of Naval Operations
COMLANTFLT	Commander, Atlantic Fleet
COMLOGWESTPAC	Commander Logistics Western Pacific
COMNAVAIRLANT	Commander Naval Air Force Atlantic
COMNAVAIRPAC	Commander Naval Air Force Pacific
COMNAVRESFOR	Commander Naval Reserve Force
COMNAVSURFGRUMIDPAC	Commander Naval Surface Group Middle Pacific
COMNAVSURFGRUPACNORWEST	Commander Naval Surface Group Pacific North West
COMNAVSURFLANT	Commander Naval Surface Force Atlantic
COMNAVSURFPAC	Commander Naval Surface Force Pacific
COMPACFLT	Commander, Pacific Fleet

COMPATRECONFORLANT	Commander Patrol Reconnaissance Forces Atlantic
COMPATRECONFORPAC	Commander Patrol Reconnaissance Forces Pacific
COMSUBLANT	Commander Submarine Force Atlantic
COMSUBPAC	Commander Submarine Force Pacific
COMSUBRON	Commander Submarine Squadron
COSAL	Coordinated Shipboard Allowance List
CPO	Chief Petty Officer
CPR	Calibration Problem Report
CRL	Calibration Requirements List
CS/CCS	Command and Control Systems
CSMP	Current Ship's Maintenance Project
CSRR	Combat Systems Readiness Review
CTRA	Consolidated TAMS Readiness Assessment
CVF	CSMP Validity Factor
CWP	Controlled Work Package
DDS	Dry Deck Shelter
DFS	Departure From Specification
DLR	Depot Level Repairable
DMP	Depot Modernization Period
DO	Duty Officer
DPP	Deployment Preparation Period
DSN	Defense Switched Network
DSRV	Deep Submergence Rescue Vehicle
EDO	Engineering Duty Officer
EGL	Equipment Guide List
EM	Electronic Module
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMO	Electronics Material Officer
EOOW	Engineering Officer Of the Watch
EPCP	Electric Plant Control Panel
EQOL	Enhanced Quality Of Life
ERR	Engineering Readiness Review
ESD	Electrostatic Discharge
ESL	Equipment Status Log
FC	Field Change
FCA	Field Calibration Activity
FCFBR	Fleet COSAL Feedback Report
FLR	Field Level Repairable
FMA	Fleet Maintenance Activity
FMAV	Fleet Maintenance Activity Availability
FMP	Fleet Modernization Program
FMPMIS	Fleet Modernization Program Management Information System
FTA	Fleet Technical Assistance
FTSC	Fleet Technical Support Center
GPETE	General Purpose Electronic Test Equipment
HM&E	Hull, Mechanical and Electrical
ICCP	Impressed Current Cathodic Protection
ICV	Individual Cell Voltage
ILRRR	Inflatable Life Raft Recertification Record

ILS	Integrated Logistics Support
IMI	Intermodulation Interference
IMMP	Integrated Maintenance and Modernization Planning
INSURV	Board of Inspection and Survey
IPE	Industrial Plant Equipment
ISEA	In-Service Engineering Activity
ISIC	Immediate Superior In Command
JCN	Job Control Number
JFMM	Joint Fleet Maintenance Manual
JSN	Job Sequence Number
LMA	Last Maintenance Action
LOEP	List Of Effective Pages
LSD	Logistics Support Data
LTD	Logistics Technical Data
LWC	Lead Work Center
MACHALT	Machinery Alteration
MCF	MDS Confidence Factor
MCV	Maximum Corrected Voltage
MDCO	Maintenance Document Control Office
MDS	Maintenance Data System
MEASURE	Metrology Automated System for Uniform Recall and Reporting
METCAL	Metrology and Calibration
MI	Material Inspection
MILCON	Military Construction
MILSPEC	Military Specification
MIP	Maintenance Index Page
MJC	Master Job Catalog
MOA	Memorandum of Agreement
MOGAS	Motor Gasoline
MPR	MDS Performance Rate
MR	Maintenance Requirement
MRC	Maintenance Requirement Card
MRMS	Maintenance Resource Management System
MS	Maintenance Standard
MSF	Magnetic Silencing Facility
MSRA	Module Screening and Repair Activity
MSS	Major Shore Spares
MTR	Module Test and Repair
MTRF	Module Test and Repair Facility
NAVAIR	Naval Air Systems Command
NAVICP	Naval Inventory Control Point
NAVSEA	Naval Sea Systems Command
NAVSEA 08	Naval Sea Systems Command Nuclear Propulsion Directorate
NAVSUP	Naval Supply Systems Command
NC	Critical Noise Deficiency
NCR	No Calibration Required
NEC	Navy Enlisted Classification
NFE	No Fault Evident
NICC	Navy Integrated Call Center
NP	Potential Noise Deficiency
NRPO	Noise Reduction Petty Officer
NSN	National Stock Number

NSTM	Naval Ship's Technical Manual
NSWC	Naval Surface Warfare Center
NSWCCD	Naval Surface Warfare Center, Carderock Division
OJT	On the Job Training
OMMS	Organizational Maintenance Management System
OOD	Officer Of the Deck
OPALT	Operational Alteration
OPNAVINST	Office of the Chief of Naval Operations Instruction
OPTAR	Operating Target
ORDALT	Ordnance Alteration
PEP	Plant Equipment Project
PFR	Periodic Force Revision
PLAD	Plain Language Address Directory
PMR	Periodic Maintenance Requirement
PMS	Planned Maintenance System
PMT	Performance Monitoring Team
POM	Pre-Overseas Movement
PPR	PMS Performance Rate
PQS	Personnel Qualification Standard
PRWL	Planned Refit Work List
QA	Quality Assurance
QBR	Quarterly Battery Report
RADIAC	Radiation Detection, Indication and Computation
RAF	Reporting and Automated Shore Interface Processing Confidence Factor
RAR	Recorded Accomplishment Rate
REC	Re-Entry Control
RFI	Ready For Issue
RLP	Regional Loan Pool
RMC	Regional Maintenance Center
ROV	Repair Other Vessel
RPCCR	Reactor Plant Configuration Change Report
RPPO	Repair Parts Petty Officer
RPSM	Reactor Plant Ship Modification
RSG	Regional Support Group
SCAT	Sub-Category
SCLSIS	Ship's Configuration and Logistics Support Information System
SDI	Ship's Drawing Index
SEF	Ship's Equipment File
SEMAT	Systems and Equipment Material Assessment Team
SEMCIP	Shipboard Electromagnetic Compatibility Improvement Program
SEOC	Submarine Engineered Operating Cycle
SFWL	Ship's Force Work List
SG	Specific Gravity
SGCP	Shipboard Gage Calibration Program
SHIPALT	Ship Alteration
SISCAL	Shipboard Instrumentation System Calibration
SNAP	Ship's Non-Tactical Automated Data Processing System
SPAWAR	Space and Naval Warfare Systems Command
SPETE	Special Purpose Electronic Test Equipment
SPETERL	Ship's Portable Electronic Test Equipment Requirements List

SPRUCE	Scheduled Preservation Upkeep Coordinated Effort
SRA	Selected Restricted Availability
SSM	Ship Systems Manual
SSP	Submarine Strategic Program
SSR	Ship's Selected Records
STAN	Shipboard Electromagnetic Compatibility Improvement Program Technical Assistance Network
SUBMEPP	Submarine Maintenance Engineering, Planning and Procurement Activity
SUBSAFE	Submarine Safety
SUPSHIP	Supervisor of Shipbuilding
SUPSHIP NN	Supervisor of Shipbuilding Newport News
SWLIN	Ship Work List Item Number
SYSCOM	Systems Command
TAMS	TYCOM Alteration Management System
TAMS	Test and Monitoring System
TAVR	Technical Assistance Visit Report
TCV	Total Corrected Voltage
TDMIS	Technical Document Management Information System
TEMPALT	Temporary Alteration
TFBR	Technical Feedback Report
TFBR H/T	Technical Feedback Report History Tracking
TOMA	Technical Onboard Monitoring Assist
TPS	Test Program Set
TRIPER	TRIDENT Planned Equipment Replacement
TRIREFFAC	TRIDENT Refit Facility
TRS	Technical Repair Standard
TVG	Temperature Voltage Gassing
TYCOM	Type Commander
TYKIT	TYCOM Alteration Kit
TZ	Type Zero
UIC	Unit Identification Code
UMAT	Underway Material Assessment Team
UMI	Underway Material Inspection
URO	Unrestricted Operation
VIDS/MAF	Visual Information Display/Maintenance Action Form
WC	Work Center
WCS	Work Center Supervisor
WCWL	Work Center Work List
WP	Work Package
WPS	Work Package Supplement

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JOINT FLEET MAINTENANCE MANUAL

VOLUME VI

MAINTENANCE PROGRAMS

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RECORD OF CHANGES

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VOLUME VI

CHAPTER 1

WATERBORNE UNDERWATER HULL CLEANING

REFERENCES.

(a) NAVSEA S9086-CQ-STM-010 - NSTM Chapter 081 R4 - (Waterborne Underwater Hull Cleaning of Navy Ships)
(b) NAVSEA MS 6310-081-015 - (Submarine Preservation)
(c) OPNAVINST 3150.27 - Navy Diving Program
(d) NAVSEA S9213-33-MMA-000/(v) - Radiological Controls for Ships
(e) NAVSEA 389-0288 - Radiological Controls for Ships

1.1 PURPOSE. To implement the program established by reference (a) and to provide guidance for waterborne hull cleaning of naval ships. This process applies to surface ships and submarines, both conventionally powered and nuclear powered.

1.2 SCOPE. As stated in reference (a), commercial and Naval experience has demonstrated that appreciable savings in energy are obtainable by preserving smooth underwater hull and propeller surfaces. Additionally, this program provides a means in which hull damage can be detected in early stages and corrective action can be taken. One of the methods chosen to achieve these objectives is the implementation of a Waterborne Hull Cleaning and Inspection Program. The hull cleaning and propeller polishing requirements of this instruction apply to all ships. It is intended to conserve fuel, restore effectiveness of sonar systems, and reduce ship self-noise which increases anti-submarine warfare effectiveness. Reference (a) provides necessary criteria, methodology, and guidelines for this process. Attachment 1 of reference (b) provides additional requirements for submarines. Reference (a) provides a rating scale for inspecting and reporting fouling patterns, fouling thresholds for cleaning procedures and approved cleaning equipment for various hull sections and appendages, safety precautions to be taken, guidelines for establishing cleaning intervals and documentation, and reporting requirements. To meet the objectives of reference (a), special attention will be given to ensure that appropriate action will be taken to clean ships within 30 days of sailing on an extended deployment. Reference (c) provides information and guidelines regarding the duties and responsibilities of the On-Scene Navy Representative when hull cleaning is performed.

1.3 POLICY.

a. Scheduling of periodic cleaning will be the responsibility of the Type Commander (TYCOM) and accomplished in accordance with reference (a).

b. Full hull cleaning will normally be accomplished by Naval Sea Systems Command (NAVSEA) contracted divers. Interim or partial hull cleaning will be done by a certified navy activity or a civilian contractor under the authority of NAVSEA. Funding will be provided by the TYCOM.

c. Require all ships to request scheduled cleaning efforts via the cognizant Regional Maintenance Center through a work candidate in the ship's Current Ship's Maintenance Project. The request shall be uplined to the Regional Maintenance Center not later than 30 days prior to scheduled hull cleaning or inspection.

d. Adhere to radiological control requirements of references (d) and (e) as applicable.

NOTE: ONLY QUALIFIED U.S. NAVY TRAINED RADIOLOGICAL CONTROL DIVERS WILL BE USED IN THE INITIAL HULL SURVEY OF NUCLEAR POWERED SHIPS.

1.4 INSPECTION.

a. Pre-cleaning inspections will be conducted to verify the necessity for level of hull cleaning.

b. Conduct post-hull cleaning inspection per reference (a).

c. The ship shall be breasted out a minimum of 4 feet from the pier and clear on the outboard side. Prior to any cleaning operation, observe the diver precautions and warning of paragraph 081-3.2 of reference (a).

1.5 RESPONSIBILITIES.

1.5.1 Fleet Commanders.

a. Maintain liaison with Commander, Naval Sea Systems Command for technical assistance and guidance.

b. Coordinate the overall hull cleaning program.

c. Provide funding for the program.

1.5.2 Type Commanders.

a. Implement Waterborne Hull Cleaning Program of ships in accordance with reference (a).

b. Establish inspection periodicity for ships that is applicable to geographic areas.

c. Formulate and submit hull cleaning schedule prior to the start of each quarter, giving names and dates. The contractor will perform hull cleaning services as scheduled and authorized by NAVSEA contract in accordance with reference (c).

d. Coordinate pre-/post-inspection and waterborne hull cleaning efforts of ships to be cleaned with Quality Assurance Dive Team and Fleet On-Scene Navy Representative.

e. Ensure that ships scheduled for hull cleaning meet the berthing requirements of reference (a).

f. Adhere to radiological control requirements of reference (d) when required.

NOTE: ONLY NAVY DIVERS WILL BE USED IN THE INITIAL HULL SURVEY OF NUCLEAR POWERED SHIPS. CONTRACT DIVERS USED TO CONDUCT FULL/INTERIM HULL CLEANINGS ON NUCLEAR POWERED SHIPS OR NUCLEAR SUPPORT TENDERS MUST BE U.S. CITIZENS.

g. Review, verify, and approve cost summary report for hull cleaning.

h. Maintain hull cleaning schedules and pre- and post-hull cleaning inspection reports for each ship. Post-hull cleaning reports will be maintained for five years.

NOTE: VISUAL DOCUMENTATION REPORTS BY THE HULL CLEANING CONTRACTOR ARE REQUIRED ON A CASE BASIS ONLY, TO DOCUMENT PROBLEMS WITH AN APPLICABLE UNDERWATER HULL.

i. Ensure that the ship's hull is clean prior to deployment.

j. Ensure that ships with special hull coatings are scheduled for hull cleanings and proper precautions are taken for divers in accordance with reference (a).

1.5.3 Quality Assurance Dive Team.

a. Conduct pre-hull cleaning inspection in accordance with reference (a).

b. Conduct post-hull cleaning inspection in accordance with reference (a).

1.5.4 On-Scene Navy Representative. Act as Navy representative in accordance with reference (c).

1.6 REPORTS. All waterborne underwater hull cleaning and inspection shall be documented on the standard Diver Hull Inspection Data form (NAVSEA 4730). This form is available on-line at http://www.supsalv.org/pdf/divfrm.pdf.

a. The report documentation shall be submitted to the respective TYCOM and NAVSEA 00C for review. This documentation may be mailed or electronically transmitted to the appropriate organizations.

b. A copy of the report documentation shall be provided to the serviced ship or submarine and to the cognizant Regional Maintenance Center. To facilitate close out of ship generated work candidate for submission into the Open Architectural Retrieval System, this report should include costs associated with hull cleaning and inspection.

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CHAPTER 2

FLEET TECHNICAL ASSISTANCE

REFERENCES.

(a) COMLANTFLT/COMPACFLTINST 5450.89B/5450.120B - Mission, Functions and Tasks of the Fleet Technical Support Centers, Atlantic (FTSCLANT) and Pacific (FTSCPAC)

LISTING OF APPENDICES.

A Sample Technical Assistance Visit Report (TAVR) Message

2.1 PURPOSE. This instruction provides procedures and guidance regarding utilization of Fleet Technical Assistance (FTA) program resources. Commander, U. S. Atlantic Fleet (COMLANTFLT) and Commander, U.S. Pacific Fleet (COMPACFLT), Fleet Maintenance Officers (N43), will ensure that appropriate Fleet resources are available to provide technical assistance to the Naval operating forces under their cognizance.

2.2 BACKGROUND. It is important that ships use their own capabilities to maintain and assess the operational status of installed shipboard systems whenever possible. When Ship's Force is unable to resolve a technical problem using onboard expertise, they should attempt to utilize the capabilities of other local area assets. If still unable to resolve a problem, the ship should contact the Navy Integrated Call Center (NICC)/Anchor Desk (paragraph 2.4 of this chapter) who will then contact the appropriate Fleet Technical Support Center (FTSC) to provide assistance. In accordance with reference (a), FTSCPAC/FTSCLANT will be the first point of contact for direct technical assistance for shipboard systems and equipment for Fleet units. Follow on requests for Source of Support providers will be handled in accordance with paragraph 2.3.3 of this chapter. Guidelines outlined below are intended to ensure optimum utilization of available technical resources to enhance the material condition of the Fleet.

2.3 RESPONSIBILITIES.

2.3.1 Ship's Commanding Officer.

a. Ensure all requests for technical assistance are accurate, complete and timely. Technical assistance requests should contain a detailed problem description enabling technical assistance personnel to adequately research the problem and provide timely and accurate technical assistance.

b. Ensure that Type Commander (TYCOM)/Immediate Superior In Command (ISIC) is kept informed of technical issues and technical assistance requests in accordance with current TYCOM policies.

c. Ensure Distance Support alternatives are exhausted before on-site technical assistance is requested. Distance support encompasses various two-way communication means such as telephone, radio, email, web chat, etc. Distance support not only provides the most rapid means of getting technical assistance to the requesting unit, it also enables scarce technical experts to service a wider customer base in a more efficient and effective manner. If distance support is incapable of resolving an issue, an on-site technical assist will be arranged in accordance with current TYCOM policy.

d. Ensure Ship's Force technicians who are qualified on the systems/equipment in question are available to support technical assistance personnel.

e. Immediately upon completion of the technical assistance visit, the Fleet unit shall release the FTA personnel. When redirection of the same personnel to other problems is desired, the Fleet unit shall coordinate with FTSC or Source of Support provider as appropriate.

f. Ships will establish a central, secure E-mail account that will be available to all FTSC technicians that visit the ship. The account will be used by visiting technical representatives to communicate with their home office or detachment for technical support/information. The account will be "FTSCTECHASSIST@Ship.navy.smil.mil".

2.3.2 Commanding Officer Fleet Technical Support Center Pacific/Atlantic. FTSC Commanding Officers will:

a. Ensure sufficient capability exists to provide timely response to all requests for technical assistance.

b. Provide technical support to Fleet units in accordance with the Mission, Functions and Tasks, detailed in reference (a) and the work priorities contained in this chapter. In the event there is a conflict, FTSC will coordinate with the appropriate TYCOM or Fleet Commander for resolution.

c. Ensure Distance Support alternative is exhausted before on-site technical assistance is considered.

d. Ensure personnel responding to request for technical assistance are thorough in their review of the specific technical problem, including system trouble shooting, fault isolation, root cause analysis, failed parts identification, logistic support, and system restoration assistance while imparting the maximum amount of On Board Maintenance Training to Ship's Force.

e. Ensure that personnel providing on-site technical assistance keep the cognizant ship's department head, or designated representative, informed of the scope of the problem and the recommended corrective action.

f. Ensure that all activities who respond to a technical assistance request submit a Technical Assistance Visit Report (TAVR) as outlined in this chapter and in the format provided in Appendix A. FTSC technicians who are not supported by Ship's Force maintenance personnel are authorized to depart the ship and terminate the visit. Termination of the ship's visit under these circumstances will be detailed in a follow up message to the appropriate ISIC/TYCOM with information to the appropriate Fleet Maintenance Officer (N43) and Regional Maintenance Center (RMC).

2.3.3 Source of Support Provider. A Source of Support Provider is any non-FTSC activity that responds to a technical assistance request. Examples of Source of Support Providers include: Naval Warfare Center, Original Equipment Manufacturer, commercial repair firms, Systems Command, Naval Shipyard, etc. Source of Support Providers will:

a. Acknowledge receipt of FTA assignment to the tasking FTSC and requesting unit.

b. First use Distance Support to resolve the problem.

c. If required, coordinate and execute an on-site technical assist if Distance Support is unable to resolve the problem. Ensure personnel providing on-site technical assistance are thorough in their review of the specific technical problem, including system trouble shooting, fault isolation, root cause analysis, failed parts identification, logistic support, and system restoration assistance while imparting the maximum amount of On Board Maintenance Training to Ship's Force.

d. Ensure that personnel providing on-site technical assistance keep the cognizant ship's department head, or designated representative, informed of the scope of the problem and the recommended corrective action.

e. Submit a TAVR as outlined in this chapter and in the format provided in Appendix A.

2.4 REQUESTING FLEET TECHNICAL ASSISTANCE.

2.4.1 Technical Assistance Request Procedures. For technical issues, as well as requests concerning personnel, logistics, medical, or other Quality of Service areas, the NICC/Anchor Desk may be utilized. The cognizant TYCOM/ISIC should also be notified as directed by current TYCOM policy.

a. The NICC can be contacted 24-hours a day via a toll free phone number (1-877-418-6824, DSN 510-428-6824) or via the worldwide web as follows:

(1) SIPR Web site: WWW.ANCHORDESK.NAVY.SMIL.MIL

(2) NIPR Web site: WWW.ANCHORDESK.NAVY.MIL

(3) SIPR E-mail: ANCHORDESK@FTSCLANT.NAVY.SMIL.MIL

(4) NIPR E-mail: HELP@ANCHORDESK.NAVY.MIL

(5) Message Plad: ANCHOR DESK NORFOLK VA//JJJ//

NOTE: UTILIZE SECURE COMMUNICATIONS AS APPROPRIATE TO MAINTAIN SECURITY OF CLASSIFIED EQUIPMENT AND OPERATIONAL PARAMETERS.

b. Direct Fleet-FTSC contact is authorized for urgent technical assistance matters. The cognizant TYCOM/ISIC should be notified of urgent technical assistance calls as directed by current TYCOM policy. FTSC contact numbers are:

(1) FTSCLANT: (COMM) 757-443-3872, ext 2450 (DSN) 646-3872

(2) FTSCPAC: (COMM) 619-556-3608, (DSN) 526-3608

c. When requesting Technical Assistance, the following information is necessary to assist in a timely and accurate response:

(1) Job Control Number and Casualty Report (if applicable) numbers.

(2) Equipment identification: (Noun name, nomenclature, model, MK/MOD, etc.).

(3) Equipment failure mode: Detailed description of the nature of failure or casualty, including symptoms, operational condition at time of casualty, current symptoms and indications, and any other information to assist in diagnosing the problem.

(4) Repair actions taken to date, including any extra-unit assistance: (e.g., Ship Repair Facility, Tender).

(5) Parts status: (Indicate spare parts required, if known).

(6) Technical manual: (NAVSEA/NAVSHIPS/NAVORD Technical manual number, if available).

(7) Dates: (Include earliest through latest possible dates assist is required. Provide alternate dates if possible).

(8) Location: (Country, port, Naval Base, pier, berth, etc.).

(9) Contact information: (Ship/staff Point of Contact name(s) and rate/rank, DSN/INMARSAT/commercial phone numbers, FAX number, SIPRNET/NIPRNET E-mail).

(10) Manufacturer of equipment for which assistance is required.

2.4.2 Requests During Chief of Naval Operations Availability. Fleet units may request technical assistance while in a Chief of Naval Operations scheduled maintenance availability; however, the request must be coordinated with the Naval Supervising Authority (e.g., Supervisor of Shipbuilding, Naval Shipyard, Naval Ship Repair Facility) for systems/equipment that are under the Naval Supervising Authority's cognizance or are part of the availability work package. On a cost reimbursable basis, FTSC may provide technical support (quality assurance, overhaul guidance, acceptance testing oversight, etc.) to industrial overhaul/repair activities (Ship Repair Facilities, Fleet Maintenance Activities, Supervisors of Shipbuilding, RMCs, TYCOMs, etc.) as outlined in reference (a).

2.5 PRIORITIZATION. To assist in the resolution of multiple tasks competing for the same resources, the following priority order for support shall be used for technical assistance requests:

Priority 1 - Casualties that involve clear and immediate action to offset personnel safety hazards or catastrophic equipment damage.

Priority 2 - Services to deployed ships.

Priority 3 - Services to ships scheduled for major deployment within 90 days.

Priority 4 - Other Technical Assists.

Priority 5 - Other Functional Checks.

Priority 6 - Technical assistance requests from non-Navy organizations (e.g., Coast Guard, Maintenance Support Center, Fleet Maintenance Support).

If a conflict in priorities arises that cannot be resolved to the satisfaction of all parties involved, the appropriate RMC/FTSC Commanding Officer shall be notified.

2.6 REPORTING REQUIREMENTS.

a. At the conclusion of an on-site technical assistance visit, the FTSC representative or representative will assist the ship in completing block 35 of the Ships Maintenance Action Form (OPNAV 4790-2K) and provide a final debrief to the ship's cognizant Department Head, or his/her designated representative, prior to departing the ship.

b. A TAVR is required at the completion of any technical assistance visit. The TAVR will normally be submitted via naval message for quick dissemination of information. Letter TAVRs are acceptable when attachments are required. TAVRs should be submitted within 5 working days of visit completion. A sample TAVR message is provided in Appendix A. Letter TAVRs should provide the same information as outlined in the sample TAVR message.

APPENDIX A

SAMPLE TECHNICAL ASSISTANCE VISIT REPORT (TAVR) MESSAGE

FROM FTSC XXX//JJJ// (AS APPROPRIATE)
TO REQUESTOR OF ASSISTANCE
ADDITIONAL ACTION ADDRESSEES (AS APPROPRIATE)
INFO COMLANTFLT NORFOLK VA//43// (AS APPROPRIATE)
COMPACFLT PEARL HARBOR HI//N43// (AS APPROPRIATE)
NUMBERED FLEET COMMANDER
TYCOM
GROUP
SQUADRON
COMNAVSEASYSCOM WASHINGTON DC//(PROGRAM MANAGER)//
ISEA/PROGRAM MANAGER//XXXX//
REGIONAL MAINTENANCE CENTER (AS APPROPRIATE)
FTSCPAC SAN DIEGO CA//XXXX// (AS APPROPRIATE)
FTSCLANT NORFOLK VA//XXXX// (AS APPROPRIATE)
FTSC DET (AS APPROPRIATE)
NSWC CORONA CA//QA33// (FOR ASSISTS ON C4I/COMBAT SYSTEM)
COMNAVSAFECEN NORFOLK VA//XXX// (SAFETY RELATED ITEMS ONLY)
NETC PENSACOLA FL//ETE5// (TRAINING ISSUES ONLY)
SERVSCOLCOM GREAT LAKES IL//00// (TRAINING ISSUES ONLY)
FLEASWTRACEN SAN DIEGO CA//00// (ASW TRAINING ISSUES ONLY)
FCTCLANT DAM NECK VA//00// (FOR ASSISTS ON C4I/COMBAT SYSTEM)
SIMA SAN DIEGO CA//3B00/SSMD// (FOR PACFLT SSN ONLY)
NAVSUBSCOL GROTON CT//00// (FOR SUBMARINES ONLY)
TRITRAFAC KINGS BAY GA//00// (FOR SSBN/SSGN SUBMARINES)
TRITRAFAC BANGOR WA//00// (FOR SSBN/SSGN SUBMARINES)
OTHERS (AS APPROPRIATE)
UNCLAS //N0XXXX//
MSGID/GENADMIN/FTSC XXXX//
SUBJ/USS XXXX (HULL) EQUIPMENT NAME-NOMENCLATURE TECH ASSIST VISIT REPORT//
REF/A/CASREP/MSG/TELCON REQUESTING TECH ASSIST//
REF/B/DOC/APPLICABLE TECH MANUAL/(OPTIONAL)//
REF/C/OTHER REFS AS NECESSARY//
NARR/REF A IS SHIP MESSAGE OR TELCON BETWEEN XXXX/X AND XXXX/X.//
POC/NAME/CIV/CODE/-/TEL:DSN XXX-XXXX/TEL:XXX XXX-XXXX//
RMKS/1. BACKGROUND: REF A REPORTED (PROBLEM). AS REQ REF A, FTSCLANT/PAC REP, (NAME) PROVIDED TECH ASSIST (DATE) AT (LOCATION) TO ASSIST WITH CORRECTION OF THE PROBLEM. REF B IS THE APPLICABLE TECHNICAL MANUAL.
2. FINDINGS:
    A. BRIEF PROBLEM DESCRIPTION:
    B. SUMMARIZE FINDINGS & CORRECTIVE ACTION ON HARDWARE. (INCLUDE COMMENTS REGARDING THE USE AND SUCCESS OF DISTANCE SUPPORT).
    C. SUMMARIZE FINDINGS & CORRECTIVE ACTION ON LOGISTICS (IF ANY).
3. CONCLUSION:
    A. STATEMENT ON CAUSE OF PROBLEM (IF NOT OBVIOUS).
    B. SOMETIMES CONVENIENT TO COMBINE WITH FINDINGS.
4. LEVEL OF SHIP'S FORCE SUPPORT:
    A. ABOVE AVERAGE/AVERAGE/BELOW AVERAGE.
    B. NUMBER OF SHIP'S FORCE PERSONNEL TRAINED DURING VISIT.

SAMPLE

5. RECOMMENDATIONS:
   A. FOR USS XXXXX:
      (1) IDENTIFY FOLLOW-ON ACTION.
      (2) ABOVE DISCUSSED WITH (NAME) PRIOR TO DEPARTING SHIP.
   B. FOR TYCOM/RSG:
      (1) IDENTIFY FOLLOW-ON ACTION.
      (2) ABOVE DISCUSSED WITH (NAME) ON (DATE).
   C. FOR NAVSEA/ISEA:
      (1) IDENTIFY FOLLOW-ON ACTION.
      (2) ABOVE DISCUSSED WITH (NAME) ON (DATE).
6. INFORMATION FOR BLOCK 35 OF 2-KILO PROVIDED TO SHIP DURING DEBRIEF.
JCN _____ APPLIES.
7. A. MAN HOURS EXPENDED FOR TECHNICAL ASSISTANCE.
   B. MAN HOURS EXPENDED FOR TRAINING.
   C. MATERIAL COSTS.
8. EVALUATION OF NECESSITY FOR TECHNICAL ASSISTANCE:
   A. WAS ADEQUATE TECHNICAL DOCUMENTATION AVAILABLE TO SHIP'S FORCE TO CORRECT PROBLEM?
   B. WERE ADEQUATE TOOLS AVAILABLE TO SHIP'S FORCE TO CORRECT THE PROBLEM?
   C. WAS ADEQUATE MATERIAL/SPARE PARTS AVAILABLE TO SHIP'S FORCE TO CORRECT THE PROBLEM?
   D. WAS SHIP'S FORCE LEVEL OF KNOWLEDGE ADEQUATE TO CORRECT THE PROBLEM?

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

SAMPLE

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CHAPTER 3

FLEET MODERNIZATION PROGRAM

REFERENCES.

(a) NAVSEA SL720-AA-MAN-010 - Fleet Modernization Program (FMP) Management and Operations Manual
(b) OPNAVINST 4720.2 - Fleet Modernization Program (FMP); Policy for
(c) NAVSEAINST 9210.14 - Changes to Submarine Tenders and Destroyer Tenders with Nuclear Support Facilities, Requirements Concerning
(d) NAVSEAINST C9210.4 - Changes, Repairs and Maintenance to Nuclear Powered Ships
(e) NAVSEAINST 4720.14 - Temporary Alterations to Active Fleet Submarines; Control of
(f) NAVSEA Technical Specification 9090-310 - Ship Alteration Accomplishment by Installation Teams
(g) OPNAVINST 4790.4 - Ships' Maintenance and Material Management (3-M) Manual
(h) NAVSEA 0989-LP-037-2000 - Commissioned Submarine General Reactor Plant Overhaul and Repair Specification
(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
(k) COMLANTFLT/COMPACFLTINST 4720.3A - Management of Afloat Combat Systems and C41 Installations and Improvements
(l) NAVSEAINST 4720.11 - Shipboard Installation and Modifications Performed by Alteration Installation Teams

LISTING OF APPENDICES.

A Major Ship Alteration Types Executive Summary
B1 Alteration Request Format
B2 Alteration Request Format (Aircraft Carriers)
C RPCCR Forwarding Letter Format
D Sample TEMPALT/OPALT Reporting Message (Submarine Force Only)
E TYKIT Requisition Form (Submarine Force Only)
F Sample Alteration Feedback Message
G Sample TYCOM Quarterly Alterations Scheduling Message (Surface and Naval Air Forces Only)
H TYCOM Alteration Management System Interpretation Guide (Submarine Force Only)

3.1 PURPOSE. To establish procedures, policy and responsibilities for the management and execution of the Fleet Modernization Program (FMP). Amplifying information is contained in references (a) and (b).

3.1.1 Scope. The scope of this chapter is limited to Ship Alterations (SHIPALT), Naval Sea Systems Command Nuclear Propulsion Directorate (NAVSEA 08) Alterations, Alteration and Improvement (A&I) items, Alterations Equivalent to Repair (AER), Machinery Alterations (MACHALT), Type Zero (TZ) Improvements, Engineering Changes, Field Changes (FC), Ordnance Alterations (ORDALT) and Strategic Systems Program Alterations, Temporary Alterations (TEMPALT), Operational Alterations (OPALT), TRIDENT Command and Control System Modifications, Temporary Engineering Changes and Type Commander (TYCOM) Discretionary Changes. Appendix A of this chapter provides an executive summary of these major alteration types.

3.1.2 Definition. An alteration is defined as any modification in the hull, machinery, equipment or fittings that involves a change in design, materials, number, location or relationship of an assembly's component parts, whether the change is separate from, incidental to, or in conjunction with repairs. All modifications affecting ship's configuration, both major and minor, are prohibited without the applicable Systems Command (SYSCOM) approval and TYCOM authorization. For tenders and nuclear powered ships, the requirements concerning SYSCOM approval are contained in references (c) and (d).

3.2 RESPONSIBILITIES.

3.2.1 Immediate Superior In Command. The Immediate Superior In Command (ISIC) is responsible for managing the alteration program for each assigned unit as follows:

a. Informing the Fleet Maintenance Activity (FMA) of upcoming availabilities.

b. Monitoring FMA long range modernization and availability planning.

c. Establishing installation priorities.

d. Ensuring no action is taken to accomplish alterations which are not authorized for Forces Afloat accomplishment. TYCOM concurrence is required for exceptions.

e. Maintaining a file of alteration briefs and other related documentation.

f. Assisting units in the preparation of alteration requests (Appendix B of this chapter). Reviewing alteration requests for technical adequacy, applicability and recommend the level of accomplishment. Alteration requests should be limited to alterations affecting ship and personnel safety or providing a substantial maintenance or operational benefit.

g. Identifying deficiencies, changes to the hull applicability of alterations, or the availability of material/design.

h. Ensuring that only TYCOM authorized or partially completed alterations appear on the individual ship's Current Ship's Maintenance Project (CSMP). Review the Type Availability Code to ensure alterations have been properly screened for either FMA or Ship's Force accomplishment (Type Availability Two for FMA or Type Availability Four for Ship's Force).

i. Ensuring that the Master Job Catalog (MJC) contains all alterations authorized for Forces Afloat accomplishment. The TYCOM representative and Maintenance Document Control Office (MDCO) are responsible for the retrieval of authorized alteration information from the MJC and its addition to the Maintenance Resource Management System (MRMS) master CSMP. If an authorized alteration is not contained in the MJC, take appropriate steps to add it.

j. Ensuring that all OPNAV 4790/CKs are collected three days prior to the end of the availability, and that Reactor Plant Configuration Change Reports (RPCCR) are collected prior to critical operations for submarines or at the end of the availability for surface ships. Within two days of receipt, the MDCO/Supervisor of Shipbuilding Newport News (SUPSHIP NN), Code 1800 (Nuclear Powered Aircraft Carriers)/applicable TYCOM (other Surface Ships) will input the original OPNAV 4790/CK and Section I of the RPCCR into the on-site MRMS computer. MDCO/SUPSHIP NN, Code 1800/TYCOM will stamp all documents "ADP PROCESSED" to verify MRMS reporting.

k. Ensuring RPCCRs are distributed by the ship's Commanding Officer within seven days of receipt in accordance with Appendix C of this chapter and that they identify all applicable FCs and Reactor Plant Ship Modifications (RPSM) to the correct revision level.

l. Scheduling required ship checks prior to accomplishment of the alteration.

m. Ensuring situational alterations are accomplished when conditions warrant.

n. Informing ships of alterations planned during an availability in the pre-arrival message. Include alterations being accomplished by outside activities (industrial activity, vendor, Alteration Installation Team (AIT), etc.).

o. Reviewing reports of alteration completions provided by the industrial activity during Chief of Naval Operations (CNO) Maintenance Availabilities.

p. Ensuring that alterations authorized for Forces Afloat accomplishment are completed to the maximum extent possible prior to ship entry into a CNO Maintenance Availability.

q. For deploying units, provide to the receiving FMA a listing of alterations desired for accomplishment during the deployment upkeep in the Material Transfer message and on the ship's CSMP.

r. Allocating a portion of the FMA Repair Other Vessel (ROV) funding for use in procuring alteration material for installation by Forces Afloat.

s. Before installation begins onboard assigned units, ensure a Memorandum of Agreement (MOA) is in place for any alteration or TEMPALT/OPALT accomplished by an industrial activity. Ensure the MOA provides the duration of installation and scheduled removal date for TEMPALTs/OPALTs. (See Volume II, Chapter 4 of this manual).

t. (Submarine Force only) Ensuring installation of TEMPALTs/OPALTs are in accordance with reference (e) and installation/removal is reported in the format provided in Appendix D of this chapter.

u. Ensuring installation of alterations by the AIT is in accordance with reference (f).

v. (Submarine Force only) Ensuring that the FMA obtains TYCOM Alteration Kits (TYKIT), which are Ready For Issue (RFI), using a TYKIT Requisition Form shown in Appendix E of this chapter.

w. (Submarine Force only) Ensuring no action is taken to procure material for alterations designated as TYKITs or other type packages. In the event that material procurement was started prior to the time the alteration was designated as a package, initiate immediate action to preclude duplicating material procurement.

x. (Submarine Force only) Ensuring that Category "A" A&I's are completed within 12 months of the date of authorization. Category "A" items affect the structural or operational capability of the ship such that non-accomplishment would result in unsafe ship conditions. Failure to complete a Category "A" A&I within 12 months will require the ISIC to submit a major Departure From Specifications (DFS) in accordance with Volume V, Part I, Chapter 8 of this manual. Category "A" A&I items will be assigned to the parent FMA for management.

y. Maintaining a current status of alterations by annotating a TYCOM Alteration Management System (TAMS)/Fleet Modernization Program Management Information System (FMPMIS) report and the Consolidated Nuclear Alteration Status Report (CNASR).

z. Preparing and forwarding TAMS/FMPMIS reports to individual units a minimum of once per quarter.

aa. (Surface Force only) Conducting a Quarterly Alteration Planning Conference.

3.2.2 Fleet Maintenance Activity. The FMA will establish and maintain an Alteration Management Group. This group will be responsible for:

a. (Submarine Force only) Using the priorities set by the TYCOM/ISIC, commence alteration planning in time to permit accomplishment of alterations on designated units by the end of the fiscal year designated by the TYCOM Fiscal Year Program in TAMS.

b. Ensuring required ship checks are conducted by the installing activity in a timely manner. Request Ship's Force verify an alteration's status. In cases where Ship's Force cannot conclusively verify an alteration's status, provide necessary assistance.

c. Ensuring no action is taken to accomplish alterations which are not authorized for Forces Afloat.

d. Notifying the ISIC that an alteration is ready to work when all procedures have been prepared and all material is on hand.

e. Upon completion of each non-reactor plant alteration, ensure that the OPNAV 4790/CK is completely filled in by the Lead Work Center in accordance with reference (g) and returned with the signed off Automated Work Request (AWR) to the Analysis, Records and Reports Section (ARRS). The OPNAV 4790/CK will be forwarded by the ARRS to MDCO/SUPSHIP NN, Code 1800 (Nuclear Powered Aircraft Carriers)/applicable TYCOM (other Surface Ships) for entry into MRMS and then forwarded to the ship for follow-up.

f. Upon completion of each reactor plant alteration, prepare an RPCCR using the procedures outlined in references (h), (i) and (j). Prior to forwarding the RPCCR to Ship's Force, forward it to MDCO for entry into MRMS. Forward the MDCO processed RPCCRs to the ship in a timely manner, using the format in Appendix C of this chapter to facilitate their final processing and return to the ISIC/TYCOM three days prior to the end of the availability.

g. Maintaining a file of TAMS/FMPMIS/CNASR reports, alteration briefs, alteration software and related documentation.

h. Maintaining a current status of alterations by annotating the TAMS/FMPMIS/CNASR reports.

i. For deploying units, the assembly and provisioning of all material (other than standard FMA stock items) for alterations specified on the material transfer message for accomplishment during the deployment upkeep.

j. Maintaining the status of alteration planning for all alterations authorized for Forces Afloat accomplishment.

k. Preparing an Alteration Feedback (Appendix F of this chapter) when problems are encountered during the planning for or installation of an alteration. Forward the Alteration Feedback to the TYCOM.

l. (Submarine Force only) Requisitioning authorized and RFI TYKITs using Appendix E of this chapter.

m. (Submarine Force only) Ensuring material necessary for the installation of alterations not designated as TYKITs is procured in sufficient time to ensure availability during scheduled upkeeps using ROV funding. This includes obtaining all hardware and software required for Ship's Force responsible alterations.

n. (Submarine Force only) Providing for proper stowage of TYKITs and other alteration material.

o. (Submarine Force only) Upon completion of a Category "A" A&I item, ensure the Re-Entry Control (REC) Number (if required) is specified on the OPNAV 4790/CK or RPCCR reporting completion.

3.2.3 Ship's Alteration Coordinator. Ships will designate, in writing, the Ship's Maintenance Manager, the Maintenance and Material Management (3-M) Coordinator, or a designated assistant as the Alteration Coordinator. Responsibilities will include:

a. Acting as the central point of contact for all matters relating to alterations.

b. Responding to specific requests for ship checks made by the TYCOM/ISIC or FMA.

c. Maintaining a copy of all outstanding alteration briefs applicable to the ship.

d. Ensuring no alteration is attempted by Ship's Force until the alteration appears in the unit's CSMP as planned for accomplishment by Work Center 991.

e. Ensuring that all OPNAV 4790/CK forms provided by the installing activity are expeditiously completed and submitted to MDCO/SUPSHIP NN, Code 1800 (Nuclear Powered Aircraft Carriers/applicable TYCOM (other Surface Ships) in accordance with reference (g) three days prior to end of upkeep.

f. Ensuring that all RPCCRs provided by the installing activity are expeditiously completed in accordance with references (h), (i) and (j) and forwarded in accordance with Appendix C of this chapter three days prior to end of upkeep.

g. Monitoring the accomplishment of alterations during CNO Maintenance Availabilities by both the industrial activity and Ship's Force and reviewing alteration completion reports provided by the industrial activity. Report any discrepancies to the ISIC/TYCOM.

h. Ensuring proper 3-M reporting by monitoring the submission of OPNAV 4790/CK forms or RPCCRs regardless of the installing activity or availability. If an OPNAV 4790/CK form or RPCCR has not been submitted for a completed alteration, obtain one. The certification letter of alterations accomplished by industrial activities will be processed as an OPNAV 4790/CK as shown in reference (g).

i. Ensuring an MOA is in place before installation of an alteration or TEMPALT/OPALT by any industrial activity. Ensure the MOA provides the duration of installation and scheduled removal date for TEMPALTs/OPALTs. (See Volume II, Chapter 4 of this manual).

j. (Submarine Force Only) Ensuring installation of TEMPALTs/OPALTs is in accordance with reference (e) and installation/removal is reported in the format provided in Appendix D of this chapter.

k. Ensuring TEMPALTs are removed by the scheduled removal date.

l. Ensuring all TEMPALTs are removed prior to an industrial availability.

m. Ensuring installation of alterations by an AIT is in accordance with reference (f).

n. Verifying the accuracy of TAMS/FMPMIS/CNASR reports and reporting any discrepancies to the ISIC/TYCOM.

o. (Submarine Force only) When reporting a Category "A" A&I item as complete, ensure the REC number (if required) is specified on the OPNAV 4790/CK or RPCCR reporting completion.

p. (Nuclear Powered Ships only) Ensuring onboard repair parts are ordered in sufficient time to ensure availability prior to a reactor plant SHIPALT installation.

3.3 ALTERATION PROGRAMS.

3.3.1 Reactor Plant Ship Alteration Package Program (Nuclear Powered Ships Only). A NAVSEA 08 program to package and position reactor plant alteration material at the Naval Inventory Control Point (NAVICP) Mechanicsburg for requisition and installation by Forces Afloat. RFI reactor plant alteration packages should be requisitioned via official correspondence to the following address:

Department of the Navy
Naval Inventory Control Point
Code 009F, Building 07
5450 Carlisle Pike
P.O. Box 2020
Mechanicsburg, PA 17055-1788

3.3.2 Alteration Installation Team Program. A program to support installation of alterations by an industrial team outside of an industrial availability. Specific guidelines governing AITs are contained in references (f), (k) and (l). The AIT is responsible for providing the ship with:

a. All Integrated Logistics Support (ILS), equipment (including on-board spares) and documentation.

b. Ship's Selected Records (SSR) documentation.

c. A complete set of installation drawings red-lined to indicate all variances.

d. For Ship's Non-Tactical Automated Data Processing System II/III ships, appropriately formatted media for updating databases to properly reflect any configuration changes, new repair parts, and support requirements.

e. For Non-Ship's Non-Tactical Automated Data Processing ships, hard copy Coordinated Shipboard Allowance List (COSAL) pages.

f. A copy of the completion message.

NOTE: IF ANY OF THE ITEMS IN PARAGRAPH 3.3.2 ARE NOT PROVIDED BY THE AIT, REPORT THE MISSING ITEMS IN THE COMPLETION REPORT, WITH A COPY TO THE TYCOM FMP MANAGER.

3.3.2.1 Alteration Reporting (Surface and Naval Air Forces only). The alteration must be identified on the TYCOM AIT Quarterly Scheduling Message in accordance with the format of Appendix G of this chapter.

3.3.3 Type Commander Alteration Kit Program (Submarine Force Only). A TYCOM program which packages all hardware and software required to plan, install and report completion of the alteration. No action should be taken by Forces Afloat to obtain material to accomplish an alteration designated as a TYKIT. Accomplishment will be authorized in TAMS when the TYKIT becomes available. The installing activity should request shipment of RFI TYKITs from the TYCOM using Appendix E of this chapter.

3.4 MONITORING OF ALTERATION STATUS.

3.4.1 Type Commander Alteration Management System (Submarine Force Only). An automated system operated by COMSUBLANT/COMSUBPAC containing information relating to an alteration's completion status, authorization, scheduling and designated accomplishing activity for all A&I items, TZ Improvements, TEMPALTs/OPALTs and all SHIPALTs with the exception of Title K non-reactor plant SHIPALTs. TAMS is the instrument by which the TYCOM authorizes the accomplishment and maintains a completion status. Appendix H of this chapter provides a TAMS Interpretation Guide.

3.4.2 Fleet Modernization Program Management Information System. The official automated system supporting the information and decision support requirements of FMP managers Navy wide. The FMPMIS database contains data related to: ships and their availability schedules; alteration applicability; alteration material requirements and procurement status; and material, installation and outfitting costs for non-nuclear alterations. The FMPMIS database is the authoritative planning baseline for FMP operation throughout the Navy FMP community.

3.4.3 Alteration Installation Planning System. The Alteration Installation Planning System is the system that supports the planning and information reporting objectives for ORDALTs installed under the FMP. This system contains ORDALT planning details, such as procurement, scheduling and installation information. Life Cycle Managers or In-Service Engineering Activities (ISEA) are responsible for the timely submission of status and planning information to the Alteration Installation Planning System.

3.4.4 Consolidated Nuclear Alteration Status Report. The CNASR provides information required to accomplish nuclear SHIPALTs and A&I items. The FCR-03 Report is issued to applicable ships, ISICs and FMAs quarterly. It provides information on all outstanding nuclear alterations applicable to an individual ship.

3.5 REPORTING CHANGE IN ALTERATION STATUS.

3.5.1 Reactor Plant Alterations. The RPCCR provides the format for reporting reactor plant configuration changes to the TYCOM, SYSCOMs, appropriate planning yards, reactor plant prime contractors, and NAVICP. Further guidance on its completion is contained in references (h), (i) and (j). Appendix C of this chapter provides formats for distribution of RPCCRs.

3.5.2 All Other Alterations. The OPNAV 4790/CK provides the format for reporting non-reactor plant configuration changes. Further guidance on its completion and submission is contained in reference (g).

3.6 ALTERATION REQUESTS. Requests for new alterations should be made using the format provided in Appendix B_1 or B_2, as applicable, of this chapter or for Commander, Naval Surface Force Atlantic (COMNAVSURFLANT) units via an OPNAV 4790/2K. Alteration requests should be limited to alterations affecting safety or those providing a substantial warfighting or maintenance benefit.

3.7 ALTERATION FEEDBACKS. An Alteration Feedback Message (Appendix F of this chapter) is to be submitted to the TYCOM when a problem is encountered during the planning for or installation of a non-reactor plant alteration. Liaison Action Requests should be used to report problems encountered during the planning for or installation of a reactor plant alteration in accordance with reference (h).

3.8 PERMANENT MODIFICATIONS TO TENDERS WITH NUCLEAR SUPPORT FACILITIES.

3.8.1 Modification. Rearrangement or modification to spaces within or adjacent to the Nuclear Support Facility shall be accomplished in accordance with references (i) and (j).

3.8.2 Improvements. Improvements designated for Ship's Force action (less space relocations or major equipment reorientations or rearrangements of spaces covered by paragraph 3.8.1 of this chapter) as specified in a Naval Sea Systems Command (NAVSEA) Upgrade Program Book or in a NAVSEA conducted Industrial Plant Equipment (IPE) Survey (subject to the stipulations of paragraph 3.8.3 and 3.8.4 of this chapter) for a unit or a unit of the same class may be used as authority to accomplish the improvement without further correspondence.

3.8.3 Changes. Changes prescribed by applicable and authorized Title D/F FMA Upgrade SHIPALTs may be accomplished by Forces Afloat when authorized by the TYCOM. Changes prescribed by applicable authorized Title K FMA Upgrade SHIPALTs must be authorized by NAVSEA.

3.8.4 Internal Space Rearrangements.

a. Internal space rearrangements other than those addressed in paragraph 3.8.2 and 3.8.3 of this chapter are authorized provided prior TYCOM approval is obtained and in each case, none of the following are involved:

(1) Changes in structural bulkheads.

(2) Changes or modifications to ship systems such as ventilation, lighting (other than fixture relocation), potable water, etc.

(3) Relocation or reorientation of major equipments. A major equipment is defined as any piece of IPE or ship machinery permanently mounted to the hull structure.

(4) Rearrangement or modification to spaces within or adjacent to the Nuclear Support Facility as defined and further discussed in reference (c).

(5) Modification to weapon stowage spaces.

b. Changes outside the scope of paragraphs 3.8.2, 3.8.3 or 3.8.4 of this chapter shall be submitted in accordance with reference (a).

c. Changes made by Forces Afloat under the authorization provided in paragraphs 3.8.2, 3.8.3, and 3.8.4 of this chapter must be documented. If not covered by an approved alteration, they must be submitted to the appropriate planning yard via the TYCOM.

d. FMA Upgrade Program Book or IPE Survey recommendations which specify "NAVSEA action is required" should not be accomplished until specifically authorized.

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APPENDIX A

MAJOR SHIP ALTERATION TYPES EXECUTIVE SUMMARY

TYPE ALTERATION	BRIEF	WHO FUNDS FMP INSTALLATION (1)
Title K SHIPALT	Most complex military characteristic change; requires Industrial Activity expertise; usually requires CPM or HCPM.	FMP (SHIPALT Installation Funds)
Title K-P SHIPALT	Approved package alteration.	FMP (Package Alterations)
Title D SHIPALT (2)	Requires Industrial Activity/FMA, or Ship's Force expertise. AER can require CPM (3).	Fleet Commander/TYCOM (NON-FMP)
Title F SHIPALT (2)	Less complex; requires FMA/Ship's Force expertise. AER cannot require CPM.	Fleet Commander/TYCOM (NON-FMP)
AER (4)	Approved by NAVSEA.	Fleet Commander/TYCOM (NON-FMP)
ORDALT	Changes to Naval Ordnance Equipment.	FMP (ORDALTs)
MACHALT	Hull, Mechanical and Electrical (HM&E) changes within strict equipment/system boundaries and with limited system ramifications.	FMP (MACHALTs)
NAVSEA FCs	Approved minor changes to NAVSEA 06 combat systems equipment.	FMP (ORDALTs)
NAVSEA Command and Control Systems (CS/CCS) Engineering Change	Approved minor changes to selected NAVSEA CS/CCS equipment.	FMP (ORDALTs)
Space and Naval Warfare Systems Command (SPAWAR) FC	Approved minor changes to SPAWAR electronic equipment.	FMP (SPAWAR FCs)
A&I (2)(5)	Tests, inspections and minor alterations to submarines and submarine tenders; no significant ILS impact.	Fleet Commander/TYCOM
TZ Improvements (6)	Minor alterations to SSBN/SSGN 726 Class submarines; no significant ILS impact.	Fleet Commander/TYCOM
TYCOM Discretionary Changes	Minor alteration to SSBN/SSGN 726 Class submarines at the discretion of the TYCOM/ISIC; no significant ILS impact.	Fleet Commander/TYCOM
TRIDENT Command and Control System Modification	Alterations on the TRIDENT Command and Control System.	NAVSEA
Temporary Engineering Changes	Emergent temporary modification to the TRIDENT Command and Control System.	NAVSEA

TYPE ALTERATION	BRIEF	WHO FUNDS FMP INSTALLATION (1)
TEMPALT	Emergent temporary modification to submarines; installed for short, predetermined time frame.	Technical Sponsor
OPALT	Emergent temporary modifications to submarines requiring ILS support; interim to SHIPALT development.	Technical Sponsor

NOTES:

(1) Some FMP Products may also be installed in NON-FMP funded availabilities/conversions and therefore funded from NON-FMP funds (e.g., Title K SHIPALTs in CV SLEP availabilities and Title K SHIPALTs/Nuclear Alterations in CVN, SSN, SSBN/SSGN Refueling Overhauls).

(2) Also Includes AER.

(3) All Title D SHIPALTs requiring HCPM are being redesignated as Title K SHIPALTs.

(4) AER. A TYCOM program for authorizing and monitoring the status of accomplishment of minor repair alterations that require installation drawings and may require changes to SSRs or ILS.

(5) A&I Program. A COMSUBLANT/COMSUBPAC program for authorizing and monitoring the status of accomplishment of minor ship modifications, inspections and tests. An A&I does not normally require installation drawings, changes to SSR or ILS. Category "A" A&I items will identify the requirement for the maintenance activity to invoke Controlled Work Package (CWP) requirements for fabrication and installation because these A&Is affect the structural or operational capability of the ship such that non-accomplishment would result in unsafe ship conditions. Additionally, the CWP/REC number(s) will be documented on the associated OPNAV 4790/CK or RPCCR.

(6) TZ Improvement. A NAVSEA program for authorizing minor technical configuration changes which require minimal ILS on SSBN/SSGN 726 Class submarines.

APPENDIX B_1

ALTERATION REQUEST FORMAT

4720
Ser
Date

From: Commanding Officer, USS (Ship's Name and Hull No.)
To: Commander, Naval Sea Systems Command
Via: ISIC (as appropriate)
TYCOM (as appropriate)

Subj: USS (Ship's Name and Hull No.) ARN (Hull No.-CY-Ser No.)REQUEST FOR ALTERATION TO (PROVIDE/REMOVE/REPLACE/RELOCATE/INSTALL/CORRECT/etc.) IN (Ship Type/Class)

Ref: (a) COMFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual

Encl: (1) (Photographs, sketches, etc. to fully describe the proposed alteration)
(2) Recommended Changes to Technical Documentation

1. Existing Deficiency/Condition. Statement of circumstances which warrant initiation of alteration request.

2. Alteration Request. In accordance with Volume VI, Chapter 3 of reference (a), request that the following alteration be approved for (Ship Type/Class) ships and be authorized for accomplishment on USS (Ships Name and Hull No.).

Group Name Group Number

a. Brief: Description of alteration desired.

b. Justification: Statements that the alteration meets one or more of the following criteria:

(1) Significant improvement in ship/equipment safety.

(2) Significant improvement in equipment/system reliability and/or reduction in maintenance requirements.

(3) Significant benefits to health/safety of personnel.

(4) Significant improvement in mission capability.

c. Applicable Plans/Publications: List applicable technical manuals, drawings, correspondence, maintenance documentation, etc.

d. Priority: Defined by TYCOM instructions.

e. Relationship to other issued alterations:

f. Manual Changes: Recommended manual changes (attached as enclosure (2)).

g. Affect on Habitability.

h. Materials.

i. Work to be accomplished by:

SAMPLE

ISIC ENDORSEMENT OF
ALTERATION REQUEST FORMAT

4720
Ser
Date

FIRST ENDORSEMENT on Commanding Officer, USS (Ship's Name and Hull No.) ltr 4720 (Ser No. and Date)

From: ISIC (as appropriate)
To: Commander, Naval Sea Systems Command
Via: TYCOM (as appropriate)

Subj: USS (Ship's Name and Hull No.) ARN (Hull No.-CY-Ser #) REQUEST FOR ALTERATION TO (PROVIDE/REMOVE/REPLACE/RELOCATE/INSTALL/CORRECT/ETC.) IN (Ship Type/Class Ships)

1. Forwarded, concurring with the basic correspondence (with the following comments).

2. The alteration should be applicable to (Type/Class/Hulls).

3. This alteration should be issued as an (AER/A&I/Title D/F/K/P SHIPALT).

4. This alteration should be accomplished by (Forces Afloat/industrial activity).

Copy to:
USS (Ship's Name and Hull No.)(requesting ship)

SAMPLE

APPENDIX B_2

ALTERATION REQUEST FORMAT (AIRCRAFT CARRIERS)

4720
Ser
Date

From: Commanding Officer, USS (Ships Name and Hull No.)
To: Commander, Naval Air Force, U.S. (Atlantic/Pacific) Fleet (N43)

Subj: USS (Ship's Name and Hull No.) ARN (Hull No.-CY-Ser No.) REQUEST FOR ALTERATION TO (Provide/Remove/Replace/Relocate/Install/Correct/etc.) IN (CVN 68 CLASS SHIPS, CVN 65, CV 63 CLASS SHIPS, CV 67).

Ref: (a) COMFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual

Encl: (1) (AWR/JSN/4790 2K)
(2) (Photographs, sketches, etc. to fully describe the proposed alteration)
(3) Recommended Changes to Technical Documentation

1. Existing Deficiency/Condition. Statement of circumstances which warrant initiation of alteration request.

2. Alteration Request. In accordance with Volume VI, Chapter 3 of reference (a), request the following alteration be approved for (CVN 68 Class ships, CVN 65, CV 63 Class ships, CV 67) and be authorized for accomplishment on USS (Ships name and Hull No.).

Group Name Group Number

a. Brief: Description of alteration desired.

b. Justification: Statements that the alteration meets one or more of the following criteria:

(1) Significant improvement in ship/equipment safety.

(2) Significant improvement in equipment/system reliability and/or reduction in maintenance requirements.

(3) Significant benefits to health/safety of personnel.

(4) Significant improvement in mission capability.

c. Applicable Plans/Publications: List applicable technical manuals, drawings, correspondence, maintenance documentation, etc.

d. Priority: Defined by TYCOM instructions (Class A - mandatory, Class B - essential, Class C - desirable).

e. Relationship to other issued alteration:

SAMPLE

f. Manual Changes: Recommended manual changes (attached as enclosure (3)).

g. Affect on habitability:

By direction

Copy to:
SUPSHIP NEWPORT NEWS (Code 1821, 1822)
COMNAVAIR_____(N43)(other coast TYCOM, PAC or LANT)
USS (Ship's Name and Hull No. for all CVN 68 CL or CV 63 CL)

SAMPLE

APPENDIX C

RPCCR FORWARDING LETTER FORMAT

Installing Activity
Format for End of Availability

RPCCR Status Letter

9210
Ser
Date

NOFORN (When filled in)

From: Commanding Officer, (Installing Activity)
To: Commanding Officer, USS (Ship's Name and Hull No.)

Subj: END OF AVAILABILITY REACTOR PLANT ALTERATION STATUS

Ref: (a) COMFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual

Encl: (1) RPCCR Job Control Number (JCN) _____

1. Per the requirements of Volume VI, Chapter 3 of reference (a), enclosures (1) through (__) forward an RPCCR for each change in reactor plant configuration accomplished by (Installing Activity) on (Ship's Name and Hull No.) during the period (Date) to (Date).

2. The following changes to the reactor plant alteration status are reported:

	Alteration Identification/Rev	Previous Status	Current Status	Installing Activity	Remarks
a. Reactor Plant SHIPALTs:					
b. Reactor Plant A&Is:					

3. The following other reactor plant configuration changes, including component replacements in accordance with the applicable NAVSEA reactor plant component replacement and modification technical manual, were accomplished during the availability:

a.

b.

Copy to:
ISIC
TYCOM (N4)
EBDIV/NNS (as applicable)

SAMPLE

Ship's Force
Format for Endorsing Installing Activity Letter

RPCCRs

9210
Ser
Date

NOFORN (When filled in)

FIRST ENDORSEMENT on (Installing Activity) ltr 9210, Ser _____ of (Date)

From: Commanding Officer, USS (Ship's Name and Hull No.)
To: TYCOM
Via: ISIC

Subj: END OF AVAILABILITY REACTOR PLANT ALTERATION STATUS

Ref: (a) NAVSEAINST 4720.16; Logistics Management Procedures for Configuration Changes Installed Outside of Depot Level Availabilities
(b) NAVSEAINST 9210.37; Naval Reactor Plant Material History

1. Readdressed and forwarded/forwarded with the following changes:

2. The ship's master copy of the Ship's Drawing Index (SDI) has been marked up to reflect these actions in accordance with reference (a). Ship's Material History Records have been revised in accordance with reference (b) to reflect these modifications and changes to onboard repair part support have been initiated.

Copy to:
(Installing Activity)

SAMPLE

Ship's Force
Format for Forwarding RPCCRs
in the Absence of Installing Activity Letter

9210
Ser
Date

NOFORN (When filled in)

From: Commanding Officer, USS (Ship's Name and Hull No.)
To: TYCOM
Via: ISIC

Subj: CHANGES TO REACTOR PLANT ALTERATION STATUS

Ref: (a) COMFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual
(b) NAVSEAINST 4720.16; Logistics Management Procedures for Configuration Changes Installed Outside of Depot Level Availabilities
(c) NAVSEAINST 9210.37; Naval Reactor Plant Material History

Encl: (1) RPCCR JCN _____

1. Per the requirements of Volume VI, Chapter 3 of reference (a), enclosures (1) through (__) forward an RPCCR for each change in reactor plant configuration accomplished by (Installing Activity) on USS (Ship's Name and Hull No.) during the period (Date) to (Date).

2. The following changes to the reactor plant alteration status are reported:

	Alteration Identification/Rev	Previous Status	Current Status	Installing Activity	Remarks
a. Reactor Plant SHIPALTs:					
b. Reactor Plant A&Is:					

3. The ship's master copy of the Ship's Drawing Index (SDI) has been marked up to reflect these actions in accordance with reference (b). Ship's Material History Records have been revised in accordance with reference (c) to reflect these modifications and changes to onboard repair part support have been initiated.

Copy to:
(Installing Activity)

SAMPLE

ISIC
Format for Endorsement of
Letter Forwarding RPCCRs

9210
Ser
Date

FIRST/SECOND ENDORSEMENT on (Ship/Installing Activity) ltr 9210 Ser _____ of (Date)

From: ISIC
Subj: END OF AVAILABILITY REACTOR PLANT ALTERATION STATUS

1. Forwarded.

2. Data from Section I of each attached RPCCR has been entered into the CSMP.

Distribution:
TYCOM (N4)
NAVSEA (08H)
ANSTR Pittsburgh
ANSTR Schenectady
EBDIV/NNS (as applicable)
NAVICP Mechanicsburg (Code 87)

Copy to:
(Ship)
(Installing Activity)

SAMPLE

APPENDIX D

SAMPLE TEMPALT/OPALT REPORTING MESSAGE
(Submarine Force Only)

FM (INSTALLING ACTIVITY)//
TO COMNAVSEASYSCOM WASHINGTON DC//PMS392 (SSN/SSBN/SSGN)//
TYCOM//N4072// (AS APPROPRIATE)
INFO COMSUBRON (SQUADRON NO.)//
USS (SHIP'S NAME AND HULL NO.)//
BT
UNCLAS //N04720//
MSGID/GENADMIN/(INSTALLING ACTIVITY)//
SUBJ/(SUBS) INSTALLATION/REMOVAL OF TEMPALT (TEMPALT NO.) (ON/FROM) USS (SHIP'S NAME AND HULL NO.)//
REF/A/LTR/(ORIGINATOR, SERIAL NO.)/(DATE)//
REF/B/LTR/(ORIGINATOR, SERIAL NO.)/(DATE)//
NARR/REF A APPROVED DESIGN OF TEMPALT (TEMPALT NO.). REF B APPROVED INSTLN OF TEMPALT (TEMPALT NO.)//
POC/(NAME)/(RANK/RATE/TITLE)/(LOCATION)/(DSN/COMM TELEPHONE)//
RMKS/1. TEMPALT (TEMPALT NO. AND NARRATIVE DESCRIPTION), DESIGN APPROVED BY REF A, INSTALLATION APPROVED BY REF B, WAS (INSTALLED/REMOVED)(ON/FROM) USS (SHIP'S NAME AND HULL NO.) ON (DATE). INSTALLATION WAS IAW NAVSEA APPROVED TECHNICAL DATA PACKAGE (TDP). DEVIATIONS WERE APPROVED BY _____. THIS TEMPALT IS SCHEDULED FOR REMOVAL ON (DATE)//
BT

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

SAMPLE

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APPENDIX E

TYKIT REQUISITION FORM
(Submarine Force Only)

DATE:

FROM:

TO: TYCOM (as appropriate)

1. REQUEST SHIPMENT OF BELOW LISTED TYKIT(S):

TYKIT# HULL#

2. COMPLETE SHIPPING ADDRESS:

3. POINT OF CONTACT:

4. TELEPHONE (VOICE/FAX):

5. DATE REQUIRED:

6. SPECIAL INSTRUCTIONS:

SAMPLE

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APPENDIX F

SAMPLE ALTERATION FEEDBACK MESSAGE

FM USS (SHIP'S NAME AND HULL NO.)//
TO TYCOM//(AS APPROPRIATE)
INFO ISIC//(AS APPROPRIATE)
NAVSEA (APPROPRIATE CODE)//
PLANNING YARD//(AS APPROPRIATE)
BT
UNCLAS //N04720//
MSGID/GENADMIN/(SHIP'S NAME AND HULL NO.)//
SUBJ/ALT FEEDBACK//
REF/A/(ALTERATION NUMBER)//
AMPN/REF A IS (DESCRIPTION OF ALTERATION)//
RMKS/1. DURING (PLANNING/ACCOMPLISHMENT) OF REF A THE FOLLOWING AREAS WERE EVALUATED:

A. (INSTALLATION ACCOMPLISHES INTENT OF ALTERATION)
B. (ADEQUACY AND AVAILABILITY OF MATERIAL)
C. (APPLICABILITY OF ALTERATION TO ASSIGNED SHIP)
D. (THE RECOMMEND CATEGORY/CAPABILITY IN TAMS/FMPMIS/CNASR AS APPROPRIATE)

2. (DETAILS OF PROBLEM AREAS NOTED IN PARAGRAPH 1 OR OTHER PROBLEMS ENCOUNTERED)
3. (RECOMMEND CORRECTIVE ACTIONS/IMPROVEMENTS/COMMENTS)
4. (RECOMMEND SCHEDULING/PROGRAMMING CHANGES)//
BT

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

SAMPLE

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APPENDIX G

SAMPLE TYCOM QUARTERLY ALTERATION SCHEDULING MESSAGE
(Surface and Naval Air Forces Only)

FM TYCOM//(AS APPROPRIATE)
TO AIG TWO NINE TWO//(INCLUDES ISIC, SYSCOM, ISEA, FTSC)
(APPROPRIATE SHIPS)//
INFO (AS REQUIRED)//
BT
UNCLAS //N04720//
MSGID/GENADMIN/TYCOM//(AS APPROPRIATE)
SUBJ/FY__QTR__ALTERATION INSTALLATION FOR (NO. OF SHIPS) SHIPS//
REF/A/MSG/TYCOM/(DTG)//
REF/B/MSG/TYCOM/(DTG)//
REF/C/DOC/NAVSEAINST 4720.16//
NARR/REF A IS FY __ QTR __ ALTERATION INSTALLATION SCHEDULING MSG//
REF B IS FY__ QTR__(TYCOM) QTR ALTERATION SCHEDULING CONFERENCE. REF C PROVIDES LOGISTICS MANAGEMENT PROCEDURES FOR CONFIG CHANGES INSTALLED OUTSIDE OF INDUSTRIAL AVAILS.//
POC/(NAME)/(RANK/RATE)/(TYCOM-CODE)/(DSN/COMM TELEPHONE NO.)//
RMKS/1. THIS MSG SUPERSEDES REF A.
2. ANY ALTS SKED BY REF A TO START ON OR BEFORE (DATE) WHICH ARE NOT INCLUDED IN THIS MSG ARE CANCELED.
3. ALTERATION UPDATES AND MAINTENANCE EVOLUTIONS FOR FY__ QTR__ WERE SCHEDULED DURING REF B ICW SHIPS ISIC. ALTERATION DATE APPLICABILITY AND ESTIMATED WORK DAYS ARE GIVEN TO FACILITATE PLANNING. FUNDING CONSTRAINTS, SHORTAGES OF INSTALLATION PERSONNEL AND CHANGES IN SHIP SCHEDULES WILL CONTINUE TO MAKE IT NECESSARY FOR CLOSE COORDINATION BETWEEN TYCOM, ISIC, SHIP, AND FTSC TO MAXIMIZE COMPLETION.
4. FOR GROUP-SQUADRON CDRS. ISICS ARE REQUESTED TO VERIFY AND MONITOR THE AVAILABILITY AND READINESS OF SHIPS TO RECEIVE SCHEDULED ALTERATIONS, SHIPS INABILITY TO PERFORM PRE-ALTERATION EQUIPMENT CHECKS, OR NON-AVAILABILITY OF SHIP DUE TO EMERGENT SCHEDULE CHANGES. SCHEDULE CHANGES ARE TO BE PROMPTLY REPORTED TO FTSC INFO APPLICABLE TYCOM. GIVE REASON FOR RESCHEDULE AND PROVIDE ALTERNATE INSTALLATION DATES.
5. FOR AFLOAT UNITS. REPORT ANY SCHEDULE CHANGES THAT MAY AFFECT SCHEDULED ALTERATIONS TO YOUR GROUP-SQUADRON. SYSTEMS REQUIRING ALTERATIONS SCHEDULED IN THIS MSG MUST BE FULLY OPERATIONAL. IF NOT CONTACT FTSC FOR ASSISTANCE A MIN OF 10 DAYS PRIOR TO SCHEDULED INSTALLATION. ENSURE INSTALLING ACTIVITIES PROVIDE FOLLOWING FOR EACH ALTERATION: COSAL UPDATE, REPAIR PART SUPPORT, TECHNICAL MANUAL UPDATES AND PMS DOCUMENTATION. WORK SHOULD NOT START ON ANY ALTERATIONS THAT DO NOT HAVE ABOVE SUPPORT AS REQUIRED BY REF C. SUBMIT 4790-CK FOR EACH ALTERATION COMPLETED.

SAMPLE

6. FOR INSTALLING-VISITING ACTIVITIES. ACCESS TO SURFACE SHIPS FOR INSTALLING ACTIVITIES OR CONTRACTORS TO PERFORM INSTALLATIONS, ALTERATIONS, CHANGES AND UPDATES NOT LISTED IN THIS MSG IS NOT AUTHORIZED. IAW REF C PROVIDE FOLLOWING FOR EACH ALTERATION: COSAL UPDATE, REPAIR PART SUPPORT, TECHNICAL MANUAL UPDATES AND PMS DOCUMENTATION. TRANSMIT VISIT REQUEST AT LEAST TWO WEEKS PRIOR TO SCHEDULED INSTALLATION AND DOCUMENT COMPLETIONS IAW REF C. IF A VISIT, SCHEDULED IN THIS MSG, MUST BE CANCELED OR RESCHEDULED NOTIFY THE SHIPS GROUP-SQUADRON INFO TYCOM, FTSC AND SHIP. GIVE REASON FOR CANCELLATION OR RESCHEDULE. COORDINATE RESCHEDULE WITH THE SHIPS GROUP-SQUADRON. REQUESTS FOR ADDITIONAL INSTALLATIONS OR VISITS DURING FY__ QTR__ MUST BE SPECIFICALLY APPROVED BY TYCOM AND COORDINATED THRU GROUP-SQUADRON CDRS. ALTERATIONS FOR FY__ QTR__ WILL BE SCHEDULED AT THE NEXT TYCOM QTR ALTERATIONS SCHEDULING CONFERENCE.
7. EVOLUTIONS ARE SCHEDULED AS FOLLOWS: (INSTALLATIONS FOLLOW DATES LISTED)
SHIP NAME-ALT
USS (SHIP'S NAME AND HULL NO.)
SA#
SA#
SA#
8. POC FOR ACTIVITIES AS FOLLOWS:
ACTIVITY POC DSN COM//
BT

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

SAMPLE

APPENDIX H

TYCOM ALTERATION MANAGEMENT SYSTEM INTERPRETATION GUIDE (Submarine Force Only)

ALTID: Alteration Identification Number

Format of ALTID is as follows:

PR Type 00000

Alt Prefix Ship Type Alt Number

The Alt Prefix is SA for SHIPALTs, TY for A&I items, TA for TEMPALTs, OP for OPALTs and MA for MACHALT. Ship Type is a four character element for the type of ship (SSN, SSBN/SSGN, AS, etc.), and the Alt Number is a five digit number which begins with a 0 for SHIPALTs and a letter prefix for A&I items.

Ship Type Abbreviation	A&I Prefix	Ship Type
SSN	N	Nuclear-Powered Attack Submarine
SSBN	B	Nuclear-Powered Fleet Ballistic Missile Submarine (Non-SSBN 726 Class)
AS	A	Submarine Tender
ARD	D	Floating Dry Dock
DSRV	V	Deep Submergence Rescue Vehicle
AGSS	G	Deep Submergence Ship
SRC	P	Submarine Rescue Chamber
TWR	W	Torpedo Weapons Retriever
SSN	Q	Reactor Plant Modifications
AFDM	M	Floating Dry Dock
YTB	Y	Yard Tug Boat
---	I	Shore Based FMA Facilities
TRID	T	SSBN/SSGN 726 Class Submarine

REV: Revision Number

INCR: SHIPALT Increment Number (if applicable).
NI = Not Incremented

TITLE: SHIPALT Title
- K = Funded & scheduled by NAVSEA
- P = Funded by NAVSEA and scheduled by TYCOM/NAVSEA
- F = Funded & scheduled by TYCOM
- D = Funded & scheduled by TYCOM

NOUN NAME: Noun Name of Alteration

EIC: Equipment Identification Code (Z0ZZ = Reactor Plant Equipment)

SWAB: Ship Work Authorization Boundary

ICNC: Alteration Cancellation Indicator
- 0 = Active
- 1 = Canceled
- 2 = Superseded
- 3 = Never Issued
- 4 = Completed
- 5 = Not Used
- 6 = Low Priority/Obsolete/Deferred

08: Nuclear Indicator (denoted reactor plant alteration)

CAP: Capability Code/Recommended Level of Accomplishment
- S/F = Ship's Force
- FMA = Fleet Maintenance Activity
- SY = Shipyard (Industrial Activity)
- AIT = Alteration Installation Team
- FA = Forces Afloat

CAT: Category Code/(non-reactor plant A&I items only)
- A = Mandatory/Safety of Ship - Accomplish within one year of authorization or submit major DFS in accordance with Volume V, Part I, Chapter 8 of this manual. Invoke SUBSAFE work requirements and document SUBSAFE/REC numbers on the associated OPNAV 4790/CK or RPCCR (NAVSEA ltr 92L23/197 of 1 Jan 95).
- B = Mandatory/Safety - Accomplish within two years of authorization.
- C = Mandatory/Maintenance Improvement - Accomplish within three years of authorization and all applicable FCs/RPSMs have been completed.
- D = Optional (Habitability).
- E = Optional (Minor Improvement).
- F = Situational - Accomplish when specific situation occurs.

ALT NARR: Narrative description of the alteration.

TYST: TYCOM Status
- A = Applicable but not yet authorized. No action should be taken to accomplish this alteration without TYCOM concurrence.

B	=	Applicable and Authorized.
C	=	Alteration has been fully completed in accordance with the alteration document. For non-reactor plant alterations, "C" is assigned only after the completion report has been upline reported in the 3-M System. For reactor plant alteration, "C" is assigned only after the RPCCR has been distributed in accordance with reference (c) and all applicable FCs/RPSMs have been completed.
D	=	Deferred. No action should be taken to accomplish without TYCOM concurrence.
E	=	Intent of the alteration has been equivalently accomplished via a method other than the alteration document.
H	=	May or may not have been accomplished during new construction/Post Shakedown Availability via Headquarters or Field Modification Request. A shipcheck is required to determine status.
I	=	Incomplete Reactor Plant Alteration (all applicable FCs/RPSMs have not been completed).
J	=	Title P SHIPALT package scheduled for installation by the FMA.
K	=	Title P SHIPALT package scheduled for installation by an industrial activity during CNO Maintenance Availabilities.
L	=	Title P SHIPALT package scheduled for AIT installation.
N	=	Not Applicable.
P	=	Partial.
Q	=	A reactor plant alteration reported complete via an improperly distributed RPCCR.
R	=	Removed TEMPALT/OPALT
T	=	Technically applicable, however, requirement to accomplish has been negated by another alteration.
X	=	Canceled.
Z	=	Interim completion. For non-reactor plant alterations, awaiting feedback from the 3-M system that the completion has been upline reported. For reactor plant alterations, awaiting distribution of an endorsed RPCCR.

FYPR: Fiscal Year Programmed - Fiscal year in which alteration is to be accomplished (**denotes situational alteration).

PRRMK: Programming Remarks - Assigned Accomplished Level

AIT	=	Alteration Installation Team
ARP	=	Advance Equipment Repair Program
CNX	=	Canceled
CON	=	New Construction
DCA	=	Depot Conversion Availability
DEF	=	Deferred
DMA	=	Docking Maintenance Availability
DMP	=	Depot Modernization Program
DPM	=	Docking Phased Maintenance Availability
DRA	=	Docking Restricted Availability
EOG	=	EOGASP Program
ERO	=	Engineered Refueling Overhaul
FA	=	Forces Afloat
FMA	=	Fleet Maintenance Activity
IDD	=	Interim Dry-docking
MAC	=	MACHALT
MTS	=	Moored Training Ship
PKG	=	Title P Package SHIPALT
PMA	=	Phased Maintenance Availability
POU	=	Post Overhaul Upkeep Period
PSA	=	Post Shakedown Availability
PSC	=	Status Confirmed by Shipcheck
RAV	=	Restricted Availability
ROH	=	Regular Overhaul
SAV	=	Special Availability
SCA	=	Surface Craft Availability
S/F	=	Ship's Force
SIT	=	Submarine Installation Team
SMP	=	Submarine Extended Operating Cycle Modernization Program
SRA	=	Selected Restricted Availability
TAV	=	Technical Availability
TKT	=	TYCOM Alteration Kit
TSY	=	TYKIT for Depot Level Installation
TYC	=	No Installing Activity Assigned

SHPCK: Shipcheck Indicator

REQD	=	Shipcheck is required
COMP	=	Status has been confirmed by Shipcheck

AUTH/COMP: If alteration is outstanding, this date is the authorization date. If the alteration is complete, this date is the completion date.

LAST UPDATE: Date the record was the last updated by TYCOM.

REMARKS: Used to record information relating to hull status or situational requirements.

VOLUME VI

CHAPTER 4

SHIPBOARD ELECTROMAGNETIC COMPATIBILITY

REFERENCES.

(a) NAVSEA STD DWG 407-5291780 - Standard Electromagnetic Interference (EMI) Survey Procedures
(b) SUBMEPP Test Procedure 441-5-7001 - SSN 688 Class Submarine, Systems EMI Measurements, Dockside
(c) Maintenance Plan 4100-02-01 - Command and Control System (CCS) Electromagnetic Interference (EMI) Testing
(d) NAVSEA STD DWG 407-5287556 - Electronics Material Officer's Guide to Shipboard Electromagnetic Interference Control
(e) NWP 1-03.1 - Naval Warfare Publication Operational Report
(f) NAVSEA S9040-AA-GTP-010/SSCR - Shipboard Systems Certification Requirements for Surface Ship Industrial Periods (Non-Nuclear)
(g) N6-NTSP-S-70-8003H - Navy Training System Plan (NTSP) for Electromagnetic Interference (EMI) Control
(h) NAVSEA STD DWG 407-5287561 - Industrial Electromagnetic Compatibility (IEMC) Work Process Instructions

4.1 PURPOSE. To provide guidance in the execution of a shipboard Electromagnetic Compatibility (EMC) program in the U.S. surface and submarine fleets.

4.1.1 Background. The Shipboard Electromagnetic Compatibility Improvement Program (SEMCIP) was established by Naval Sea Systems Command (NAVSEA) under the sponsorship of the Chief of Naval Operations (CNO). The goals of SEMCIP are to rectify mission degrading Electromagnetic Interference (EMI) problems, support fleet EMC training, and maintain shipboard EMC. SEMCIP is divided into five major elements; Up-front Systems Engineering, Fleet Response and EMI Problem Quantification, Spectrum Management/EMC in the D30 Process, Engineer EMI Fixes and Fleet EMC Support Tools. One of the Fleet tools is the SEMCIP Technical Assistance Network (STAN), a database containing current and historical information on all known shipboard submarine and battle force EMI problems. Since some SEMCIP elements are normally associated with the development of new systems, all elements will not be discussed here.

4.2 ELECTROMAGNETIC COMPATIBILITY ASSESSMENTS OR SURVEYS. EMC assessments are an important line of defense against shipboard EMI problems and are performed by NAVSEA or NAVSEA qualified activities for the purpose of testing various ship's systems for EMI degradation. During an EMC assessment or Survey, EMI problems are investigated and evaluated, applicable EMI fixes are installed and effects of EMI on each system tested is ascertained.

4.2.1 Shipboard Electromagnetic Compatibility Assessments. Deploying surface ships will receive an EMC assessment from Fleet Technical Support Center (FTSC) as part of a Combat Systems, Command, Control, Communications and Computers Readiness Review (C5RA) approximately 4 to 6 months prior to deployment. Non-deploying ships may submit requests for an EMC assessment to the FTSC or by submitting an OPNAV 4790/2K to their Regional Support Group (RSG). Submarines will receive an EMI survey or EMI groom within two months prior to deployment during Pre-Overseas Movement 2 portion of the submarine deployment cycle. The surface ship EMC assessment and the submarine EMI survey address different types of ship's systems and therefore will be discussed separately.

4.2.1.1 Surface Ships. EMC assessments should not be scheduled coincidental with evolutions that restrict either antenna radiation or personnel movement about the ship. EMC assessments must be performed per the requirements of reference (a), and include, but are not limited to:

a. Using STAN to verify that all available EMI fixes have been installed, or if not installed, documented in ship's Current Ship's Maintenance Project.

b. Performing topside visual surveys to ensure the ship conforms to the applicable topside electromagnetic control drawing as specified in STAN for that ship.

c. Performing Intermodulation Interference (IMI) test.

d. Performing instrumented IMI source location when IMI level exceeds the 19th order.

e. Performing broadband noise test.

f. Identifying source location when broadband noise is detected.

g. Performing Time-Domain Reflectometer measurements on all high frequency, very high frequency, and ultra high frequency transmission lines.

h. Conducting Voltage Standing-Wave Ratio tests on all high frequency, very high frequency, and ultra high frequency transmit antennas.

i. Performing insulation resistance tests on high frequency antennas, where required by the Planned Maintenance System (PMS).

j. Documenting all discrepancies noted on OPNAV 4790/2Ks.

k. Assisting Ship's Force with hands-on training and technical guidance in correcting discrepancies as appropriate.

4.2.1.2 Submarines. EMI surveys require up to four working days depending on the ship class being evaluated. EMI surveys can be accomplished concurrently with most submarine work but must not be scheduled coincidental with evolutions that would impede access to the forward sonar and communications system units or cause power-down of systems during the EMI survey without prior notification of the EMC technician conducting the survey. If an equipment must be powered down, the EMC technician will determine if further EMI testing can be accomplished. For an accurate assessment of the submarine EMI posture, the ship's forward electronics must be energized as close as possible to the ship's at sea lineup. The electronics and hydraulics for both multifunction mast antennas must be operational. In addition, crane service is required to lift two antenna shields (approximate weight 130 lbs. each) to cover both partially raised multifunction mast antennas for testing. Major sonar, communications, fire control or navigation system casualties will cause test data to be invalid. EMI surveys must be performed per reference (b) or (c) by qualified Navy Enlisted Classification (NEC)-1421 EMC technicians or by NAVSEA qualified activities and include but are not limited to:

a. Using STAN to verify all available EMI fixes have been installed.

b. Briefing Ship's Force on the details of the EMI survey and discussing testing time-lines and potential impacts to the EMI survey.

c. Coordinating antenna shield installation and removal with the ship, RSG and port services.

d. Performing a visual survey in the submarine to verify EMI corrective action installations in sonar and communications equipment and to look for potential EMI coupling areas associated with these systems.

e. Energizing forward electronics in accordance with the equipment energized list, provided in reference (b) for SSN Class submarines or reference (c) for TRIDENT Class submarines.

f. Conducting EMI surveys on sonar and communications equipment.

g. Installing and/or repairing any EMI corrective action needed to produce EMI reduction in order to improve the total shipboard EMC of all shipboard electronic equipment and systems. This will include a retest to determine the actual reduction achieved.

h. Analyzing test data, noting all discrepancies, and generating a Naval Departure Message documenting the results of the EMI survey.

i. Providing EMC posture debrief to the designated submarine's officers and leading petty officers. The Naval Departure Message will also be provided to the ship at the debrief for transmission from the ship.

j. Assisting ship with hands-on training and technical guidance in correcting discrepancies as appropriate.

4.3 FLEET ELECTROMAGNETIC COMPATIBILITY SUPPORT TOOLS. SEMCIP provides Fleet EMC Support Tools to help eliminate emergent EMI problems between C5RAs. When a ship encounters an EMI problem beyond the scope of Ship's Force, FTSC and Fleet Maintenance Activity (FMA) capabilities, outside technical assistance can be arranged on short notice. The problem should be reported using a standard message format or by Casualty Report (CASREP), as outlined in reference (d) and in accordance with reference (e). In addition to the normal message addressees the message should also be sent to COMNAVSEASYSCOM WASHINGTON DC//623//, NAVSURFWARCENDIV DAHLGREN VA//J54//, NAVUNSEAWARCENDIV NEWPORT RI//3431// (submarines only), and COMSPAWARSYSCOM SAN DIEGO CA //051-1C//.

4.4 ENGINEER ELECTROMAGNETIC INTERFERENCE FIXES. SEMCIP EMC engineers identify and characterize new EMI problems and develop and formalize solutions for these problems. When new EMI problems are detected through testing per references (a), (b), and (c), SEMCIP Engineering will develop a fix. SEMCIP engineering also updates standard EMI test procedures for references (a), (b), and (c).

4.4.1 Shipboard Full-scale Electromagnetic Compatibility Evaluations. Shipboard full-scale EMC evaluations are performed by NAVSEA in the lead ship of a class or in individual ships at the conclusion of any major event (such as conversion, modernization, or overhaul) which could effect the EMC status of the ship. SEMCIP engineering teams energize, test, and evaluate the capability of electromagnetic emitters and sensors to operate simultaneously on the same ship without interference.

4.5 ELECTROMAGNETIC COMPATIBILITY CERTIFICATION. NAVSEA 623 coordinates EMC Certification in new construction ships, ships undergoing industrial availabilities and ships receiving new systems both in and outside of industrial availabilities. There are two types of EMC Certification; they are Ship and System EMC Certification. Each type is addressed below.

4.5.1 System Electromagnetic Compatibility Certification. System EMC Certification ensures all newly installed electrical/electronic systems are compatible with previously installed systems. Systems EMC Certification will be accomplished in accordance with reference (f):

a. For electrical/electronic systems installed by Ship Alteration, Alteration Equivalent to Repair, Type Commander Issued Alteration or other alteration.

b. Following the System Operation Verification Test or other operation test for the newly installed system.

c. By NAVSEA 623 test team for the first two ships of a class, flight or baseline.

d. By Program Acquisition Resource Manager, Ship Program Manager, Naval Supervisory Authority, FTSC, FMA or a contractor witnessed by a government activity for the subsequent System EMC Certifications using test procedures provided in reference (a).

4.5.1.1 System Electromagnetic Compatibility Certification Requirements. System EMC Certification mandates:

a. The system has an approved (Stage 4) Application for Frequency Allocation (JF-12).

b. No mission-degrading EMI has been introduced by installation of the system.

c. EMI fixes have been installed to correct mission-degrading EMI caused by the installation of the system.

4.5.2 Ship Electromagnetic Compatibility Certification. Ship EMC Certification ensures all shipboard systems are compatible with each other and topside EMI mitigation treatments are in place. Ship EMC Certifications will be accomplished in accordance with reference (f):

a. For all Ship Construction Navy ships to establish an initial EMC Baseline.

b. For deployers after Target Configuration Date, typically 6 months prior to deployment.

c. Following industrial availabilities greater than 120 days.

d. Every three years for non-deployers.

4.5.2.1 Ship Electromagnetic Compatibility Certification Requirements. Ship EMC Certification mandates that:

a. All "available EMI fixes" that correct mission degrading EMI problems are installed. Available EMI fixes are fixes that have been developed and listed in the STAN database. An "available EMI fix" is required for certification even if the kit/parts are not in stock. In that case, priority would be given for procurement and installation of the fix required for certification.

b. All mission degrading EMI problems that remain uncorrected due to non-availability of EMI fixes, must be identified and reported to the ship's Commanding Officer.

c. All discrepancies causing IMI above the 19th order must be corrected. IMI levels are defined in reference (a).

4.6 ELECTROMAGNETIC COMPATIBILTY CERTIFICATION MAINTENANCE. System Commands provide support during ship construction and CNO Maintenance Availabilities at industrial activities to achieve EMC certification. It is the responsibility of the Type Commander, the FMA and Ship's Force to maintain EMC at the highest level practical.

4.6.1 Fleet Maintenance Activity. EMC technical billets (NEC ET-1419 surface and NEC ET-1421 submarine) have been established in reference (g) for FMAs, Aircraft Carriers and selected larger ships to provide technical assistance to Ship's Force in maintaining EMC. These technicians conduct EMI inspections, install known fixes, test for problems and investigate new problems.

4.7 SHIPBOARD ELECTROMAGNETIC COMPATIBILITY IMPROVEMENT PROGRAM TECHNICAL ASSISTANCE NETWORK. STAN is NAVSEA's computer-based EMC information network which resides on the World Wide Web at https://www.semcip.com. Each user is required to obtain a User ID and password.

a. STAN contains information required to help a ship maintain EMC. This includes but is not limited to:

(1) A listing of all EMI problems for an individual ship.

(2) A listing of Category 1 and 2 problems for an individual ship.

(3) A listing of Category 1 and 2 fixable problems, where a fix has been identified for an individual ship.

(4) Brief sheet listings for an individual ship, containing a description of each problem and the solution and/or status.

(5) Topside electromagnetic control drawings for all surface ship classes.

(6) Reference (a), Standard EMI Survey Procedures.

(7) Individual Shipboard EMI Assessment Reports.

(8) EMC certification data and EMI/EMC reports.

(9) Hazards of Electromagnetic Radiation to Personnel and Fuel certifications and reports.

b. EMC technicians at the FTSCs, FMAs, Aircraft Carriers, and various other maintenance commands have access to STAN and will provide applicable information upon request.

c. Requests for access to STAN may be obtained by contacting the STAN Manager, NAVSEA 623 at (202) 781-3554, Defense Switched Network (DSN) 326-3554.

d. Assistance can also be obtained by contacting Navy Distance Support at 1-877-418-6824 or by e-mail at help@anchordesk.navy.mil.

4.8. RESPONSIBILITIES.

a. Type Commander shall:

(1) Coordinate with the System Commands in identifying, solving and correcting operational EMI deficiencies.

(2) Arrange for SEMCIP services when required and schedule SEMCIP EMC technician training/qualification visits for FMA and FTSC technicians.

(3) Prior to promulgation, review and authorize all documents prepared by technical agencies that contain procedures relative to EMI reduction and the fleet EMC process.

(4) Evaluate comments and recommendations regarding EMI reduction and the fleet EMC process. If necessary, promulgate changes to existing policy and procedures.

(5) Ensure that FMA and FTSC have adequate EMC technicians to support EMI surveys. If qualified EMC Technicians are not available at local FMA and FTSC, NAVSEA personnel will be contacted to perform the EMC assessment or survey.

b. Group/Squadron/RSG/SSSU Commanders shall:

(1) Schedule FMA/FTSC EMC assessments or EMI surveys prior to deployment for each unit. For submarines the EMI survey should be within two months of deployment during Pre-Overseas Movement 2, take up to four days to perform and can be scheduled concurrently with most shipboard evolutions provided power is not secured to a major system.

(2) Review and take the appropriate action to correct EMI discrepancies on EMC reports for subordinate units.

(3) Request SEMCIP engineering assistance when determined necessary.

c. FMAs and FTSCs shall:

(1) Maintain qualified EMC personnel (NEC-1419/Surface Ships) and (NEC-1421/Submarines) in coordination with NAVSEA 623/NUWC 3431 and ensure that test equipment assets are available to perform EMC assessments and surveys.

(2) Assist surface ships/submarines in conducting EMC related PMS procedures when requested.

(3) Conduct EMC assessments and surveys in accordance with applicable references (a) through (f) and (h).

(4) Install authorized limited corrective actions when required in STAN.

(5) Write a departure message describing the results of the EMI survey using the latest message formats. Message is submitted to the surface ship/submarine during the EMI survey departure briefing.

(6) Ensure participation of each surface ship/submarine EMC technician in at least one EMI survey every 6 months. Qualified EMC technicians must meet this requirement to retain qualification status.

(7) Maintain an active account on STAN.

(8) Maintain an up to date file of EMI/EMC information, which includes Naval Messages generated on tended submarines, and original data recorded during the EMI Surveys.

d. Surface Ship/Submarine Commanding Officers shall:

(1) Ensure PMS is conducted. Request FMA assistance when required.

NOTE: EMI SURVEYS CONDUCTED WITHIN ONE MONTH PRIOR TO DEPLOYMENT WILL PROVIDE THE BEST EMI DATA SINCE THE MAJORITY OF NEW EQUIPMENT INSTALLS WOULD BE ACCOMPLISHED BY THEN.

(2) Request an EMI survey within six months of deployment or when any new indications of EMI in ship's electrical/electronic systems appear.

(3) Transmit the EMC departure message promulgating the results of the EMI survey to all cognizant activities.

(4) Maintain an up-to-date file of EMI/EMC information that includes EMC departure messages from the last three surveys.

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CHAPTER 5

COMMON ASSESSMENT PROGRAM

5.1 PURPOSE. To maintain ships in a material condition that ensures the highest degree of operational readiness and the ability to accomplish assigned missions.

5.1.1 Applicability. Implementation will be as directed by the applicable Type Commander (TYCOM).

5.2 COMMON ASSESSMENT PROGRAM. Ship assessments, grooms and evaluations encompass many current and former stand-alone programs, such as UMAT, ERR, CEMAT, Systems and Equipment Material Assessment Team (SEMAT), SEMAT II, Enhanced Quality of Life (EQOL), and ASRR. Such efforts typically include technical personnel from the Naval Surface Warfare Center, Fleet Technical Support Centers, TYCOM Staffs, Naval Sea Systems Command and civilian contractors. These people are experienced in the operation, repair and testing of a select list of shipboard equipment and systems.

5.3 OBJECTIVES. The principle objectives are:

a. Assist Ship's Force in identifying and performing system/equipment repairs.

b. Assist Ship's Force in improving material readiness.

c. Assist Ship's Force in defining work for their upcoming maintenance availabilities.

d. Conduct training in maintenance and supply support procedures.

e. Conduct periodic material assessments of selected equipment and systems and document the results.

5.4 PRINCIPLES. Assessments will employ standard test (i.e., Planned Maintenance Systems) procedures for Ship's Force material assessment. Specifically, the scheduling of assessments and correction of discrepancies are integrated into the continuous maintenance process, as directed by the TYCOM, who will:

a. Develop and use standard test (i.e., Planned Maintenance Systems) procedures for Ship's Force self-assessment.

b. Document discrepancies on OPNAV 4790/2K forms and configuration discrepancies on OPNAV 4790/CK forms. Discrepancies will be reviewed and screened by Ship's Force and the Maintenance Manager.

c. Use the Navy and Federal Supply System, to the maximum extent possible.

d. Schedule ship visits on a quarterly employment schedule.

5.5 SHIP COMMON ASSESSMENT PROGRAM VISITS.

5.5.1 Technical Common Assessment and Repair Program Assist Visits. Ships will undergo assessments as scheduled by the TYCOM and promulgated in the Quarterly Employment Schedule. Systems and equipment are selected for assessment based upon review of the Current Ship's Maintenance Project, ship class trends, and Ship's Force and Maintenance Manager inputs. No grades or performance evaluations are assigned as a result of this visit. The visit will include, as directed by the TYCOM:

a. Conduct Ship's Force pre-visit brief in order to effect maximum support for the visit.

b. Determine system material condition and a review of documented system deficiencies, using established test procedures and Ship's Force/Maintenance Manager input. Ship's Force personnel shall be included in this process as a training effort.

c. Provide daily progress review by the team leader for Ship's Force and the Maintenance Manager.

d. Determine preliminary level-of-effort required to correct deficiencies, in conjunction with ship Maintenance Managers. This will include the numbers of personnel, their ratings, and who will receive training from the technical instructors.

e. Produce Automated Work Requests (OPNAV 4790/2Ks) or configuration change requests (OPNAV 4790/CKs) for direct input into the ship's Maintenance Support Center/Technical Library.

f. Establish configuration baseline (sight validation) of selected systems to upgrade logistics support documentation.

g. Repair and groom as required and as dictated by time constraints and operational necessity.

h. Prepare list of the material requirements to effect repairs during follow-on visits.

i. Provide a preliminary report to the ship's Commanding Officer, describing significant findings and determining the requirements and schedule for follow-on repair visits.

5.6 RESPONSIBILITIES.

5.6.1 Type Commander. TYCOMs shall:

a. Schedule visits.

b. Direct participants in how and when to assist in visit execution.

c. Provide funding for execution and support, when required.

d. Conduct periodic program reviews.

e. Establish standards of effectiveness to ensure continuous program improvement.

5.6.2 Immediate Superior In Command (Commander, Naval Surface Force Atlantic/Pacific only). Submit schedule recommendations to the TYCOM in sufficient time to support scheduling.

5.6.3 Fleet Technical Support Center. Fleet Technical Support Centers shall:

a. Support assessments as requested by the TYCOM.

b. Initiate change recommendations for program improvement.

5.6.4 Fleet Maintenance Activity. Fleet Maintenance Activities shall:

a. Assist Ship's Force with authorized repairs, as directed by the TYCOM.

b. When requested by the TYCOM, provide a representative to attend briefings and deficiency screening. Participate in the adjudication of deficiencies which may become Fleet Maintenance Activities work items.

5.6.5 Ship Commanding Officer. Commanding Officers, as directed by the TYCOM, should:

a. Ensure ship Maintenance Managers and appropriate personnel attend the pre-visit, arrival and exit briefings.

b. Ensure the necessary Work Center personnel are present during the assessment/repairs of ship's systems/equipment.

c. Submit OPNAV 4790/2K work requests for outside assistance on visit related repair items.

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VOLUME VI

CHAPTER 6

INDUSTRIAL PLANT EQUIPMENT

REFERENCES.

(a) NAVSO P 1000 - Navy Comptroller Manual, Volume 3, Chapter 6
(b) NAVCOMPTINST 7000.38 - Productivity Enhancing Incentive Fund (PEIF)/The Productivity Enhancement Capital Investment Fast Payback Program
(c) NAVSUP 5009 (DLAM 4215.1) - Management of Defense-Owned Industrial Plant Equipment
(d) NAVSO P 3635 - Federal Acquisition Regulation, Section 13, Chapter 312
(e) SECNAVINST 4855.3A - Product Data Reporting and Evaluation Program (PDREP)

LISTING OF APPENDICES.

A Plant Equipment Project Form

6.1 PURPOSE. To define the responsibilities and procedures for the acquisition and management of Class Three and Class Four Plant Property.

6.1.1 Scope. This instruction applies to Class Three and Class Four Plant Property as defined in reference (a) with the following exclusions:

a. Alterations. Develop and submit requests for alterations in accordance with Volume VI, Chapter 3 of this manual. Requests for additional shipboard equipment that will be permanently installed require an approved alteration.

b. Productivity enhancement/fast paybacks. Develop and submit requirements in accordance with reference (b). Due to payback documentation requirements the Productivity Enhancement Incentive Fund is most often used in requesting new technology equipment for the establishment of major new capabilities. This fund is also used for the implementation of radical procedural, productivity or efficiency improvements to current maintenance capabilities.

c. Plant property assigned an active National Stock Number (NSN). Forward requirements by requisition through the supply system to the cognizant Inventory Control Point. Acquisition of new equipment discussed in this chapter pertains only to items that are not assigned an active NSN.

d. Operating Forces Support Equipment. Submit requirements to the cognizant Type Commander (TYCOM) for funding consideration and local procurement by the requesting activity. Operating Forces Support Equipment refers to equipment such as test equipment, fixtures, hand tools, etc., required for the maintenance, assembly, disassembly, overhaul, repair, and test of the end item. Equipment included in the definition of Class Four Plant Property in paragraph 6.2.3 of this chapter does not qualify as Operating Forces Support Equipment.

e. Materials Handling Equipment is under the single manager control of the Naval Supply Systems Command (NAVSUP) (see Volume IV, Chapter 13 of this manual). Civil engineering support equipment is under the single manager control of the Naval Facilities Engineering Command. General Purpose Electronic Test Equipment (GPETE) is under the single manager control of Naval Sea Systems Command (NAVSEA) 04DS (see Volume VI, Chapter 9 of this manual).

6.1.2 Background. The program for acquisition of Class Three and Class Four Plant Property (as defined in section 6.2 of this chapter) is managed and funded by NAVSEA PMS 335. References (a) and (c) provide instructions to facilitate procurement and management of Class Three and Class Four Plant Property within the Department of the Navy.

6.2 DEFINITIONS.

6.2.1 Plant Equipment - Classes Three and Four Plant Property. Navy owned plant property of a capital nature (consisting of equipment, machine tools, test equipment, furniture, vehicles, accessories and auxiliary items, but excluding special tooling and special test equipment) used or capable of use in the manufacture of supplies or in the performance of services or for any administrative or general purpose.

6.2.2 Class Three Plant Property - Other Plant Equipment. That part of plant equipment, with an acquisition cost of $100,000 or more, used in or in conjunction with the manufacture of components or end items relative to maintenance, supply processing, assembly or research and development operations, but excluding items categorized as Industrial Plant Equipment (IPE).

6.2.3 Class Four Plant Property - Industrial Plant Equipment. That part of plant equipment with an acquisition cost of $100,000 or more, used for the purpose of cutting, abrading, grinding, shaping, forming, joining, testing, measuring, heating, treating or otherwise altering the physical, electrical or chemical properties of materials, components, or end items entailed in manufacturing, maintenance, supply processing, assembly or research and development operations as identified by noun name in references (a) and (d).

6.3 PROCUREMENT REQUIREMENTS.

6.3.1 Requesting Activities. All requesting activities shall submit requests for plant property as follows:

6.3.1.1 New Procurement. Submit all replacement (new equipment) requirements, with an acquisition cost of $100,000 or more, to the cognizant TYCOM. Use the Plant Equipment Project (PEP) form, Appendix A of this chapter, to submit requirements one calendar year prior to the start of the fiscal year in which equipment is actually required (e.g., 1 October 1995 for Fiscal Year 1997).

a. Identify each different requirement by individual project format. Instructions for completing the PEP form are included in Appendix A of this chapter.

b. Provide a priority listing of all projects with each annual submission.

c. Activities, such as Fleet Maintenance Activities, having an IPE Management System or IPE Maintenance Module Program shall submit PEPs on computer disk accompanied by a hard copy.

d. New procurement requirements, with an acquisition cost of less than $100,000 and Other Plant Equipment/IPE Maintenance Requirements (e.g., major repairs or overhaul) shall be forwarded to the cognizant TYCOM for funding consideration.

6.3.1.2 Urgent Replacement. Submit previously unidentified requirements to the cognizant TYCOM. Use the PEP form of Appendix A of this chapter, or message format if the replacement is associated with correcting a Casualty Report. Assign an integrated priority position for each requirement. If message format is used, justification and all relevant data for equipment acquisition must be provided.

a. All PEPs shall be prioritized and evaluated to ensure compatibility with maintenance capability requirements/configuration.

b. PEPs for replacement of currently installed equipment shall be screened to ensure there is no conflict with other maintenance actions.

c. Cancel any project which is no longer required. Notify the TYCOM by letter of any canceled requirements.

6.3.1.3 Receipt of Plant Property. Upon receipt of plant property, comply with the procedures described below:

a. Receive the equipment from the staging area.

b. Notify the procurement activity immediately if deficient conditions are found after receipt. Notifications will be made via a Product Quality Deficiency Report with an information copy to the cognizant TYCOM. Product Quality Deficiency Report preparation and processing instructions are available in reference (e).

(1) When timing is critical, such as near the end of the warranty period, or when an urgent need to correct the problem exists, notify the procurement activity by the most expedient method (i.e., telephone or message).

(2) Provide the contract number, model and serial number of the plant property, date accepted, date problem developed, nature of the problem and local point of contact (name and telephone numbers).

c. Notify the TYCOM of actual equipment delivery date.

d. Notify the TYCOM when installation is satisfactorily completed.

e. Submit an OPNAV 4790/CK and/or Allowance Change Request as required to initiate Coordinated Shipboard Allowance List support for new equipment and, if appropriate, to stop Coordinated Shipboard Allowance List support for IPE replaced by new equipment.

f. Submit requests for excess IPE/Other Plant Equipment disposition instructions to the cognizant TYCOM.

6.4 RESPONSIBILITIES.

6.4.1 Fleet Commander. Fleet Commanders shall:

a. Review all PEPs submitted by the TYCOMs.

b. Prioritize and assign a Project Number to PEPs and forward the approved requests to NAVSEA PMS 335. Return the unapproved requests to the TYCOM.

c. Upon notification from NAVSEA PMS 335, forward the information regarding disposition (approval/disapproval), acquisition status and delivery dates for PEPs to the submitting activities with an information copy to the cognizant TYCOM.

6.4.2 Type Commander. TYCOMs shall:

a. Review all PEPs submitted by cognizant afloat and shore activities for technical accuracy and completeness.

b. Review each PEP that requests replacement of currently installed equipment to ensure there is no conflict with other maintenance actions (e.g., separate repair, rebuild or replacement action).

c. Prioritize all PEPs and evaluate each project to ensure compatibility with the requesting activity's maintenance capability requirements and site configuration.

d. Forward the approved requests to the Fleet Commander for consolidation. Return unapproved requests to the submitting activity.

e. Schedule an annual assessment of IPE and coordinate repairs.

6.5 REPORTS. Information forwarded on forms pertaining to the requirements of PEP, as required in this chapter, are exempt from the report controls required by reference (e).

APPENDIX A

PLANT EQUIPMENT PROJECT FORM

PLANT EQUIPMENT PROJECT						
1. Activity, UIC & Location	2. Activity Priority	3. Type Commander Priority		4. MILCON Proj Number		
		5. Project Number	6. Fiscal Year	7. Date		
8. Description			9. Plant Equipment Code (12 Digits)			
			10. Number of Equip Items/Systems Requested			
			11. DD Form 1419 (List Req Numbers for each)			
12. ESTIMATED COST - PROJECT				13. JUSTIFICATION CATEGORY (Check Approp. Block)		
(1) Total Cost	(2) Equipment	(3) Transportation	(4) Installation	☐ A. Additional	☐ B. Replacement	
C. ☐ Economic	D. ☐ Mandatory	E. ☐ Safety/OSHA	F. ☐ Pollution Abatement			
14. SPECIAL PROGRAM						
A. ☐ FORCES AFLOAT	B. ☐ SHIPALT	C. ☐ PRODUCTIVITY ENHANCEMENT/FAST PAYBACK				
D. ☐ NUCLEAR SUPPORT	E. ☐ COLLATERAL EQUIP.					
15. PROCUREMENT				16. LOCATION OF EQUIPMENT		
☐ A. Procured by NAVSEA	☐ B. Procured Locally by Activity			A. Shop/Code	B. WC	C. Bldg.
17. Purpose, Description and Justification of Project (Identify other special projects here)						
18. Typed Name of Project Preparer	19. Signature of Preparer	20. Date Signed		21. APL No.		
				PAGE of		

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INSTRUCTIONS FOR COMPLETION OF PLANT EQUIPMENT PROJECT FORM

1. (Block 1). Activity, Unit Identification Code (UIC) and Location.

   a. Activity. The name of the military facility (and hull number if applicable) where the proposed equipment is to be used. (mandatory)

   b. UIC. (mandatory)

   c. Location. For shore activities: building number, street, city, state and zip code. (mandatory)
   For ships: homeport and building number (if applicable), street, city, state and zip code. (mandatory)

2. (Block 2) Activity Priority. Priority of requested equipment. (Example: 001-94) (mandatory)

3. (Block 3) Type Commander Priority. Priority order for TYCOM. (mandatory)

4. (Block 4) Military Construction (MILCON) Project Number. MILCON Project Number if equipment requested is to be installed as part of a MILCON project.

5. (Block 5) Project Number. Assigned by the cognizant Fleet Commander.

6. (Block 6) Fiscal Year. The fiscal year in which the equipment is requested to be purchased. (mandatory)

7. (Block 7) Date. Record the month, day and year the PEP is developed. (mandatory)

8. (Block 8) Description. Description title of the proposed equipment or system. Include capacity or size. (mandatory)

9. (Block 9) Plant Equipment Code. Use Plant Equipment Code number and include all 12 digits, if possible. Plant Equipment Code numbers are assigned in accordance with reference (e). For Class Three, use NSN (preferred), or Federal Supply Class.

10. (Block 10) Number of Equipment Items or Systems Requested. The total number of items or systems in Block 8 required by this project. (mandatory)

11. (Block 11) DD Form 1419. Required only for surplus Class Four equipment acquisition.

12. (Block 12) Estimated Costs - Project.

    (1) The total estimated cost including equipment, transportation and installation. (mandatory)

    (2) The estimated cost of the equipment includes all desired accessories. (mandatory)

    (3) The estimated cost of transportation shipping from the supplier to the activity. (mandatory)

    (4) The estimated installation cost. (mandatory)

13. (Block 13) Justification Category. Check Appropriate Block. (mandatory)

A. Indicate if equipment is an additional requirement (additional shipboard requirements to be permanently installed require an approved alteration).

B. Indicate if equipment is a replacement requirement. For shipboard activities this requires entering the Allowance Parts List (APL) number (if assigned) in Block 21 when replacing existing equipment. A copy of the APL page shall be attached with the PEP submission.

NOTE: CHECK ONLY ONE OF THE ABOVE TWO CHOICES.

C. Indicate if equipment is being replaced or added for economic reasons. Economic reasons may include frequent and costly maintenance or an advanced equipment design that makes the installed version obsolete.

D. Indicate if equipment replacement or addition is mandatory. This block should be checked if new or additional equipment is required to meet significant increases in, or new, tasking.

E. Indicate if equipment is being replaced or added to meet safety or Occupational Safety and Health Administration requirements. Reasons for checking this block could include replacement of equipment that has become unsafe to operate or is required to meet new safety/Occupational Safety and Health Administration regulations.

F. Indicate if equipment is being replaced or added to meet pollution abatement standards. This block should be checked if the replacement or addition of equipment will facilitate significant reduction in the generation of hazardous waste or is required to satisfy newly levied pollution abatement criteria.

NOTE: MORE THAN ONE BLOCK (C THROUGH F) MAY BE CHECKED.

14. (Block 14) Special Program.

A. Indicate if equipment is for Forces Afloat Program.

B. Indicate if equipment is for Ship Alteration Program.

C. Indicate if equipment is for Productivity Enhancement/Fast Payback Program.

D. Indicate if equipment is for Nuclear Support.

E. Indicate if equipment is Collateral Equipment for MILCON.

15. (Block 15) Procurement. (mandatory)

A. Indicate if project is recommended for procurement by NAVSEA.

B. Indicate if project is recommended for procurement locally by requesting activity.

16. (Block 16) Location of Equipment.

A. Shop/Code. The shop number, activity code, cost center or organizational segment, as applicable, where the proposed equipment or system is to be used. (mandatory if applicable)

B. Work Center. Work Centers where the equipment will be assigned. (mandatory if applicable)

C. Building. The building number where the proposed equipment or system is to be used. (mandatory if applicable)

17. (Block 17) Purpose, Description and Justification of Project.

NOTE: BLOCK 17 MAY BE CONTINUED ON THE BACK OF THE FORM OR ON ADDITIONAL PAGES. IF BLOCK 17 IS CONTINUED ON ADDITIONAL PAGE(S), REPEAT BLOCKS 1 AND 8 ON EACH PAGE. ENSURE ADDITIONAL PAGE(S) ARE ANNOTATED IN THE SPACE PROVIDED BELOW BLOCK 21.

a. Purpose. Purpose for which the new equipment or system is to be used. In addition, state increased capacities and/or capabilities (increased power, speeds, feeds, safety, state of the art improvements, pollution abatement features, etc.). An alteration may be required for shipboard applications if other than a "one-for-one" replacement (mandatory).

b. Description. Include a complete technical description and specifications in sufficient detail to ensure procurement of the exact equipment required (include necessary accessories and attachments). If any of the description is restrictive or proprietary to one manufacturer, underline this portion and give adequate justification for the proprietary requirement. State the manufacturer, model number(s), size, weight, or utility restrictions (mandatory).

c. Justification. Information and data concerning the following items will constitute the basis of the requirements. Each item should be addressed as fully as possible and in the same sequence in which they are listed below: (A positive or negative statement should be used in lieu of yes or no answers) (mandatory).

(1) Reason for the replacement of the equipment. Identify item being replaced (include manufacturer, model number, serial number, plant account number (where applicable), size and capacity).

(2) Is additional space required for the installation? If so, where will the installation be made? Submit sketches, complete with size restrictions, including hatch sizes to be considered if equipment must pass through them.

(3) Is military or minor construction required? If MILCON, give the title of the MILCON project and beneficial occupancy date, if available. If MILCON, ensure the project number is in Block 4.

(4) Indicate the particular electrical characteristics from which the equipment is to be powered (voltage, frequency, phase, number or wires, and if power source is grounded or ungrounded). Also state whether or not sufficient power is available.

(5) Is the need for the requested equipment generated wholly or partially by the assignment of new tasks or by new or tightened specifications for existing task(s)? If so, give details.

(6) Will the new equipment produce products of better usable quality (products which will last longer, perform better, ensure ready interchangeability, etc.)? If so, give details.

(7) What would happen if the present equipment failed? Also, answer the following:

(a) What is the remaining life expectancy of present equipment?

(b) Is the present equipment worn? To what extent?

(c) Is the present equipment unsafe? To what extent?

(d) Does the present equipment have an adequate capacity and/or capability?

(8) Is the proposed equipment a mandatory requirement (capability increase)? If so, give reason.

(9) Is the proposed equipment recommended for local procurement? Block 15B must be checked. If so, give justification.

(10) Does the requested equipment require an hour meter?

(11) Will this equipment or system be installed in a secure area thus requiring the prime contractor to provide the installer(s) with current security clearance requirements to enable the timely accomplishment of installation services, training, or warranty repairs.

18. (Block 18) Typed Name of Project Preparer. (mandatory)

19. (Block 19) Signature of Preparer. (mandatory)

20. (Block 20) Date Signed. (mandatory)

21. (Block 21) APL Number.

VOLUME VI

CHAPTER 7

BOARD OF INSPECTION AND SURVEY MATERIAL INSPECTIONS POLICY

REFERENCES.

(a) OPNAVINST 4730.5 - Material Inspection of Ships Conducted by the Board of Inspection and Survey
(b) NWP 1-03.1 - Naval Warfare Publication Operational Report
(c) OPNAVINST 4790.4 - Ships' Maintenance and Material Management (3-M) Manual
(d) OPNAVINST 4700.8 - Trials, Acceptance, Commissioning, Fitting Out, Shakedown, and Post Shakedown Availability of U.S. Naval Ships Undergoing Construction or Conversion
(e) OPNAVINST 4730.7 - Material Inspection of Submarines Conducted by the Board of Inspection and Survey
(f) INSURVINST 4730.1 - Trials and Inspections of Surface Ships
(g) INSURVINST 4730.2 - Trials and Material Inspections of Submarines
(h) INSURVINST 4730.11 - Preparation of Deficiency Forms
(i) INSURVINST 4730.8 - Reports of Trials, Material Inspections and Survey Conducted by INSURV

LISTING OF APPENDICES.

A Underway Material Inspection Milestones

7.1 PURPOSE. To define the responsibilities and provide guidance for the preparation and conduct of a Board of Inspection and Survey (INSURV) Underway Material Inspection (UMI).

7.1.1 Scope. The policies and actions required by this chapter are applicable to all ships of the U.S. Navy.

7.1.2 Policy.

a. As designated in reference (a), Material Inspections (MI) are to provide assurance to Commanding Officers and higher authority that mechanisms to identify, document and resolve material deficiencies are adequate. To this end the ship will establish a program to complete administrative and organizational preparations for the INSURV inspection commencing approximately 12 months prior to the scheduled inspection. A listing of milestones for a UMI is shown in Appendix A of this chapter.

b. Adequate preparation for an INSURV inspection does not imply that all deficiencies must be corrected. The goal is to present a ship that is fully aware of all existing deficiencies. All deficiencies must be properly documented and those which are considered to be mission degrading must be reported by Casualty Report (CASREP) in accordance with reference (b). Administrative preparations, in addition to deficiency documentation, must be complete and comprehensive.

7.1.3 Background. INSURV was established by Title 10, U.S. Code, Section 7304, as a board of Naval Officers to make recommendations to the Secretary of the Navy as to which vessels, if any, should be stricken from the Naval register. Additionally, per reference (a), the Board has been tasked with providing assurance to the Chief of Naval Operations regarding the ship's material readiness and command's self-assessment effectiveness.

7.1.4 Discussion.

a. The INSURV Board is charged with conducting three basic types of inspections.

NOTE: COMBINED TRIALS AND GUARANTEE MATERIAL INSPECTIONS ARE CONDUCTED ON SUBMARINES ONLY. ACCEPTANCE TRIALS AND FINAL CONTRACT TRIALS ARE CONDUCTED ON ALL OTHER SHIPS.

(1) Combined Trials/Acceptance Trials for new construction or conversion ships. Details are discussed in Volume I, Chapter 4 of this manual.

(2) Guarantee Material Inspection/Final Contract Trials for new construction or conversion ships. Details are discussed in Volume I, Chapter 4 of this manual.

(3) UMI for commissioned ships.

b. Detailed procedures for reporting UMI deficiencies in the Maintenance and Material Management (3-M) system are contained in reference (c).

c. Typical milestones for UMIs are shown in Appendix A of this chapter.

7.2 RESPONSIBILITIES.

7.2.1 Type Commander. The Type Commander (TYCOM) shall:

a. Act as the cognizant authority for the conduct of INSURV inspections for all ships of the force (including new construction ships) and maintain a schedule of inspections due.

b. Nominate active ships (including ships scheduled for inactivation, if appropriate) for UMIs by the INSURV Board. Promulgate schedules of inspections to be conducted by INSURV on ships of the force.

c. Schedule Hull, Mechanical and Readiness Assessment and Command, Control, Communication, Computers, Combat Systems Readiness Assessment inspections/assessments within 60 days of the scheduled UMI (see reference (a)).

7.2.2 Immediate Superior In Command. The Immediate Superior In Command (ISIC) shall (TYCOM responsible if ISIC is not assigned):

a. Schedule a Navy Safety Center Safety Survey. This survey is to be conducted at some point during the 12 months preceding the UMI.

b. Monitor Ship's Force preparation for the UMI.

c. Ensure post inspection reporting procedures are followed.

d. Attend post-INSURV inspection critiques.

e. Ensure supporting subordinate commands are prepared for the scheduled INSURV.

f. Ensure that the ship is prepared to discuss those deficiencies which have not been corrected, and those items which have been removed from the Current Ship's Maintenance Project (CSMP) and passed to history.

g. Approximately two weeks prior to the inspection, provide the ship an original and three copies of the Automated Work Request (AWR) package and CSMP printouts. Routines, Integrated Maintenance and Modernization Planning Procedures, Unrestricted Operation MRCs, and alterations should be omitted.

h. Monitor the reporting and correction of UMI deficiencies through the CSMP.

7.2.3 Ship Commanding Officer. The Commanding Officer shall:

a. Ensure that the ship is prepared for the UMI.

b. Be prepared to discuss with the senior member of the board any item from the previous INSURV Inspection which is still on the CSMP, all items which were determined to be not correctable and designated "pass to history", or those for which reporting had been deferred by the TYCOM, including supporting rationale and reference material.

c. Designate an officer as INSURV Coordinator and a Chief Petty Officer, preferably the 3-M Coordinator, as his assistant.

d. Assign a senior coordinator for each INSURV departmental category.

7.2.4 Board of Inspection and Survey Coordinator. The INSURV Coordinator shall:

a. Brief all Department Heads on the review of the CSMP, confirm existing Job Control Numbers as valid, and report any existing deficiencies which are not in the CSMP.

b. Review the AWR/CSMP package with the TYCOM/ISIC Maintenance Document Control Office to ensure quality (e.g., readability, proper printing and page-break by Work Center).

c. Segregate the AWR originals by INSURV departmental designations for turnover to the INSURV team.

d. Provide the original of the complete CSMP Report to the INSURV team.

e. Retain a copy of the AWRs and the CSMP for use during the UMI.

f. Distribute copies of the AWRs to Department Heads and Work Centers.

g. Collect and track all INSURV deficiencies identified during the UMI.

h. Coordinate Work Center updating of the CSMP and the processing of updated OPNAV 4790/2Ks or AWRs.

i. Coordinate production of the Post INSURV Report.

7.3 INSPECTION SCHEDULING.

7.3.1 Combined Trial/Acceptance Trial Inspections. The scheduling of these trials for new construction or conversion ships will be coordinated by the TYCOM in accordance with Volume I, Chapter 4 of this manual and reference (d).

7.3.2 Guarantee Material Inspection/Final Contract Trials. The scheduling of the Guarantee Material Inspection or Final Contract Trials will be coordinated by the TYCOM in accordance with Volume I, Chapter 4 of this manual and reference (d).

7.3.3 Underway Material Inspections. An INSURV MI will be included in a unit's five-year plan. The desired outcome is for INSURV's MIs to be conducted at the maximum interval at a consistent time within the Inter-Deployment Training Cycle, and in a manner not to interfere with battle group operations. In achieving this end state, TYCOMs will avoid scheduling INSURV MIs in the time frame between the Composite Training Unit Exercise and the end of post-deployment stand down. INSURV MIs forced into the post-deployment time frame should be conducted no earlier than ten weeks following deployment. Conduct of INSURV MIs during these time frames requires approval from the Fleet Commander.

a. Surface Ships. The MI will optimally be conducted after the Basic Phase Assessment and prior to Composite Training Unit Exercise. These MIs should make maximum use of the TYCOM assessment visits integral to the surface ship continuous maintenance process. With these scheduling considerations, the overall average time between examinations for surface ships will be about 56-60 months, not to exceed 60 months.

b. Aircraft Carriers/Nuclear-Powered Aircraft Carriers. The optimal time to conduct MIs is 60 to 90 days following the completion of the Chief of Naval Operations maintenance availability. INSURV MIs conducted during this time frame should make maximum use of shipyard and TYCOM testing and assessment programs. Avoid conducting MIs after the air wing is embarked for carrier qualification, Composite Training Unit Exercise and Fleet Exercise. With these scheduling considerations, the overall average time between examinations for carriers will be about 56-60 months, not to exceed 60 months.

c. Submarines. INSURV MIs are integrated into the submarine engineered operating cycle per reference (e). MIs should be scheduled post Depot Modernization Period/Engineered Refueling Overhaul and at mid-cycle. With these scheduling considerations, the overall average time between examinations for submarines will be about 78-84 months, not to exceed 84 months.

Scheduling the INSURV MI at a consistent time in the Inter-Deployment Training Cycle will provide invaluable independent assessments of how well our maintenance processes perform. Coordinating these inspections with TYCOM assessment events reduces the burden placed on our sailors and saves money.

7.4 PREPARATION FOR THE BOARD OF INSPECTION AND SURVEY MATERIAL INSPECTION.

7.4.1 Active Preparation. Ships routinely must maintain their CSMP in accurate condition and continuously monitor and accurately report their own material readiness posture (per reference (b). However, due to outside agency assessments/audits/inspections the scheduling of a UMI should occur at an optimum time when full material condition awareness is maximized. Active preparation for the INSURV inspection will commence upon receipt of the TYCOM approved proposed INSURV inspection schedule. The TYCOM will notify the Commanding Officer (via the ISIC if applicable) of the proposed dates with specific guidance for the preparation and execution of the inspection. Direct and early liaison with the INSURV Board is essential to ensure agenda approval, facilitate travel arrangements, berthing and other similar items. Ships shall make use of the information and data available at the INSURV website to better understand and prepare for a UMI. Ships are strongly encouraged to liaison with INSURV regarding current material problem areas that may exist within the fleet and to actively resolve them as appropriate within their own command.

7.4.2 Ship's Internal Organization. The ship will establish an internal organization for the INSURV. While the details of such an organization will vary from ship to ship, two key elements must be addressed:

a. Specific personnel assignments shall be made to ensure that all necessary logistic and support arrangements for the INSURV Board are adequately covered (e.g., transportation, berthing, laundry, clerical assistance).

b. The Board inspects by INSURV departmental category, which may not exactly correspond to the standard ship's organization. For purposes of the inspection, the ship will provide one-to-one correspondence for each inspector, with a senior coordinator for each INSURV departmental category. Assigned individuals should be thoroughly familiar with each deficiency, show the inspector exactly where the deficiency is, be able to explain why it has not been corrected and answer questions about related items in the same category, etc. Knowledgeable ship's representatives are essential for a successful inspection.

7.4.3 Updating the Current Ship's Maintenance Project.

a. The CSMP must be reviewed, updated and purged of all deferrals which have been completed. All outstanding corrective maintenance should be documented as a deferral. This evolution is important since the CSMP is the primary source of deficiencies that will be presented to the INSURV. A vital part of the review is to ensure that deficiencies are properly assessed and documented.

b. Results of the CSMP review and pre-INSURV audit will be entered in the CSMP and reissued for final INSURV documentation.

c. Upon receipt of the automated AWR/CSMP listing, the following steps will be taken:

(1) Verify all pre-printed forms for accuracy and separate those that are not applicable to the INSURV inspection. If there is any doubt as to whether or not a deferral should be submitted to the INSURV Board, the deferral should be submitted.

(2) Complete the applicable blocks identifying the location of the deficiency including Compartment, Deck, Frames and Side.

(3) Prepare an OPNAV 4790/2K for each ship discovered deficiency not included in the pre-printed package. This type of documentation should be limited to significant items as denoted within reference (c).

7.5 BOARD OF INSPECTION AND SURVEY TRIAL CONDUCT AND DOCUMENTATION.

7.5.1 Trial Conduct. The INSURV Trial will be conducted as specified in reference (f) for surface ships and reference (g) for submarines.

a. All scheduled events, demonstrations, and schedule changes will be announced over the General Announcing System.

b. Flight operations (if applicable) and other ship evolutions will not be scheduled during the conduct of the trial, except when scheduled in direct support of the trial or when specifically requested by the INSURV Board.

c. A proposed "open and inspect" list will be submitted to the ship's assigned senior coordinator for each INSURV department category no later than the start of the underway portion of the trial. The senior INSURV Board member may modify the "open and inspect" list at any time.

d. Correct minor deficiencies as they occur with priority given to safety and mission critical items.

7.5.2 Deficiency Documentation.

a. Preparation of INSURV deficiency forms will be in accordance with reference (h).

b. The INSURV Board will provide the ship with a printout of new deficiencies found during the inspection.

c. The final forms generated by the INSURV Board will be screened by the TYCOM following the trial. Whenever an item is considered not cost-effective to correct or is inconsistent with reference (c), the TYCOM will authorize passing the item to the history file.

7.6 POST BOARD OF INSPECTION AND SURVEY TRIAL ACTIONS.

7.6.1 Deficiency Processing and Resolution.

a. Immediately after the INSURV inspection, representatives of the ship will meet with the TYCOM Representative to determine the disposition of INSURV deficiencies per the requirements of reference (c).

b. INSURV inspection deficiencies will be reported by entering them into the ship's CSMP within 30 days following completion of the inspection.

c. Upon completion of the INSURV inspection, Ship's Force shall take the following actions:

(1) With TYCOM assistance, screen all INSURV deficiencies. Identify those which are mission degrading or safety items.

(2) Initiate prompt action on all mission degrading and safety items. All Part I "Mission Degrading" items and any additional items that are deemed to significantly degrade the ability of the ship to carry out its assigned mission shall be documented by an appropriate CASREP in accordance with reference (a).

(3) Correct all deficiencies within the capability of Ship's Force as soon as possible. Deficiencies corrected within seven days shall be documented as completed maintenance actions. All other outstanding deficiencies originated by INSURV shall be incorporated into the CSMP as soon as possible but no later than 30 days following the inspection.

(4) Modify deficiencies previously identified and processed to include the assigned INSURV number and any modifications, in accordance with the requirements of reference (c).

(5) Comply with the requirements of reference (c) if instances occur where INSURV enters multiple deficiencies under a single INSURV number.

7.6.2 Post Board of Inspection and Survey Inspection Reports. The INSURV Board will issue a final report in accordance with reference (i).

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APPENDIX A

UNDERWAY MATERIAL INSPECTION MILESTONES

MILESTONE	DUE	RESPONSIBLE ACTIVITY
Notify Ship of Scheduled INSURV	I-365 days	TYCOM
Schedule Safety Survey	I-365 to I-30 days	TYCOM/ISIC
Develop Departmental/Ship's Plan Of Action and Milestones for INSURV Preparation	I-330 days	Ship
Conduct pre-brief aboard Ship	I-150 to I-120 days	INSURV/Ship
Begin Review and Update of CSMP	I-120 days	Ship
INSURV Package Delivered to Ship	I-90 days	INSURV Board
Review Previous Inspection Reports (INSURV, OPPE, ORSE, NWAI, EAAV, EEB, etc); Update CSMP as Necessary	I-90 days	(TYCOM/ISIC)/Ship
Identify Ship's INSURV Coordinator to INSURV Board	I-90 days	Ship
Conduct Pre-Trial Self Audit	I-60 days	(TYCOM/ISIC)/Ship
Conduct Hull, Mechanical and Electrical Readiness Assessment and Command, Control, Communication, Computers, Combat Systems Readiness Assessment	I-60 to I-15 days	TYCOM/ISIC/Ship
Provide 3-M Technical Assistance	I-45 days	TYCOM/ISIC
Utilizing INSURV proposed trial agenda listed in references (f) and (g), submit trial agenda to INSURV	I-45 days	Ship
Issue Approved INSURV Agenda	I-14 days	Ship
Provide AWR/CSMP Package to Ship	I-14 days	TYCOM/ISIC
Prepare Work Requests for all INSURV Deficiencies; Segregate into Cognizant INSURV Departmental Groupings	I-7 days	Ship

MILESTONE	DUE	RESPONSIBLE ACTIVITY
Screen Deficiencies; Identify those which are Mission Degrading or Safety Items	I+1 day	TYCOM/Ship
Submit CASREPs as appropriate; Enter all Mission Degrading and Safety Deficiencies into CSMP	I+2 days	Ship
Enter all Deficiencies into CSMP	I+30 days	Ship
Screen Remaining Deficiencies and Assign Responsible Actions	I+45 days	(TYCOM/ISIC)/Ship
Authorize Pass to History Items	I+120 days	TYCOM
Update CSMP	I+150 days	TYCOM/ISIC

VOLUME VI

CHAPTER 8

MINIATURE/MICROMINIATURE ELECTRONIC REPAIR PROGRAM

REFERENCES.

(a) NAVSUP 485 - Afloat Supply Procedures
(b) NAVSEAINST 4790.17 - Fleet Test and Repair of Shipboard Electronic Equipment
(c) NAVSEA SE004-AK-TRS-010/2M Marine Corps TM 5895-45/1B - Standard Maintenance Practices 2M Electronic Assembly Repair
(d) OPNAVINST 4790.4 - Ships' Maintenance and Material Management (3-M) Manual
(e) COMNAVAIRLANTINST 4790.42/COMNAVAIRPACINST 4790.54 - CV/CVN Intermediate Maintenance Activity (IMA) Module Test and Repair Facility (MTRF)
(f) NAVSEA TE000-AA-PLN-010 - Certification Plan for 2M Program
(g) MIL-HDBK-263 - Electrostatic Discharge Control Handbook for Protection of Electrical and Electronic Parts, Assemblies and Equipment
(h) COMNAVAIRLANTINST 4790.34 - Electrostatic Discharge (ESD) Control Program
(i) NAVSUP 484 - Supply Afloat Fleet and Field Packaging Procedures
(j) OPNAVINST 5100.19 - Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat
(k) NAVPERS 18068 - Manual of Navy Enlisted Manpower and Personnel Classification and Occupational Standards
(l) OPNAVINST 4700.7 - Maintenance Policy for Naval Ships
(m) COMNAVSURFLANT/COMNAVSURFPACINST 4400.1 - Surface Force Supply Procedures
(n) MIL-STD 1686 - Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment
(o) MIL-HDBK-773 - Electrostatic Discharge Protective Packaging
(p) SPCCINST 4441.170 - COSAL Use and maintenance Manual
(q) NAVAIR 01-1A-23 - Electronic Assembly Repair Standard Maintenance Practice
(r) NAVAIR 17-1-124 - Microminiature Component Repair Set
(s) NAVAIR 17-600-141-6-1 - Microminiature Repair Status Pre-operational Check List
(t) NAVAIR 17-600-141-6-2 - Microminiature Repair Station
(u) COMNAVAIRLANTINST 13650.1 - Individual Material Readiness List (IMRL) Program
(v) COMSUBPACINST 4419.1 - Submarine Tender Supply Management Procedures for AN/BSY-1 Repairables
(w) COMSUBLANTINST 4419.1 - Module Screening and Repair Activity (MSRA) Repairables Management Procedure

LISTING OF APPENDICES.

A Emergency 2M Repair Process
B Normal 2M Repair Process
C MTRF 3-M Reporting (Aircraft Carriers Only)
D Sample MTRF Amplifying Procedures Message
E Sample CV/CVN MTRF Repair Request Message
F Sample MTRF Quarterly Report Message (Aircraft Carriers Only)
G MTRF Equipment Configuration

8.1 PURPOSE. To promulgate policy, guidelines and procedures for the management of the Miniature/ Microminiature (2M) Electronic Repair Program.

8.1.1 Scope. This chapter applies to all activities engaged in the repair of electronic equipment, assemblies, subassemblies, and modules. This chapter does not apply to electronic equipment under the cognizance of Naval Sea Systems Command Nuclear Propulsion Directorate (NAVSEA 08) or the Strategic Systems Project Office.

8.1.2 Policy. All failed Circuit Card Assemblies (CCA)/Electronic Modules (EM) are candidates for 2M screening and repair using Automated Test Equipment (ATE), General Purpose Electronic Test Equipment (GPETE) (including AN/USM-646(V) and the Huntron 2000), and test bed installations. CCAs/EMs may be certified Ready For Issue (RFI) per reference (a).

8.1.3 Background. The 2M Electronic Repair Program, established by reference (b), supports the test and repair of electronic equipment at the Fleet level. Reference (c) describes 2M capabilities which include the performance of high quality repairs on CCAs and EMs. This 2M repair capability includes training, tools, techniques, technical documentation and certification.

8.2 RESPONSIBILITIES.

8.2.1 Fleet Commander. Fleet Commanders shall:

a. Operationally administer the 2M Electronic Repair and the Module Test and Repair Programs.

b. Inspect and certify 2M repair facilities and technicians in accordance with reference (b) in conjunction with the Combat Systems Readiness Review (CSRR).

c. Ensure all 2M maintenance actions are documented in accordance with reference (d).

8.2.2 Type Commander/Immediate Superior In Command. Type Commanders (TYCOM)/Immediate Superiors in Command shall:

a. Coordinate and manage the 2M program.

b. Monitor the effectiveness of the 2M program and provide recommendations concerning 2M equipment, tools, and training.

c. Implement progressive repair procedures.

d. Coordinate logistic support, outfitting requirements, and deployment priorities for 2M repair stations and associated test equipment.

e. Monitor 2M certification status and direct corrective actions as required.

f. Schedule 2M certifications in conjunction with the CSRR prior to deployment, or as required.

g. (Aircraft Carriers only) Conduct Module Test and Repair Facility (MTRF) inspections in accordance with reference (e) during the CSRR, as required, or prior to deployment.

8.2.3 Commanding Officer/Officer In Charge. Commanding Officers/Officers In Charge shall:

a. Establish a 2M program under the cognizance of the Electronics Material Officer (EMO) and the Combat Systems Officer. For Fleet Maintenance Activities (FMA), utilize the Electronics Repair Officer as the overall coordinator.

b. Maintain certified 2M stations and technicians.

c. Screen and repair all CCAs/EMs using the progressive repair process. Submit CCAs/EMs beyond Ship's Force repair capability to the FMA.

d. (Aircraft Carriers only) Establish a MTRF with the EMO, Combat Systems Officer, or, for FMAs, the Electronics Repair Officer as the overall coordinator.

e. (Aircraft Carriers only) Maintain an active MTRF. Use the Module Test and Repair (MTR) Tracking System to maintain the ship's MTR performance and production database. Ensure quarterly production/performance reports are submitted in accordance with reference (e).

8.2.4 Miniature/Microminiature Repair Program Coordinator/Module Test and Repair Facility Coordinator. The 2M/MTRF Coordinator shall:

a. Coordinate and monitor the effectiveness of the 2M Work Center (WC) and the repair program.

b. Provide adequate space with environmental controls to support the 2M WC using the guidance of references (c) and (f).

c. Submit additional/new 2M and test equipment requirements to the TYCOM Representative, providing complete justification (e.g., workload, documented manhours, added capabilities with addition of new equipment).

d. Ensure adequate numbers of 2M trained and technically qualified personnel support the WC.

e. Ensure 2M personnel and station requirements are met per the criteria of Section 8.4 of this chapter.

f. Ensure 2M WC personnel are formally trained in the operation and maintenance of all ATE and MTRF equipment.

g. Maintain an up to date library inventory of Gold Disks for the AN/USM-646(V) and test documentation for other installed ATE, in accordance with TYCOM outfitting requirements. Develop and submit Silver Disks to Naval Undersea Warfare Center, Fleet Engineering Office for CCAs/EMs which are not supported by Gold Disks.

h. Ensure all 2M repair actions are documented per reference (d).

i. Ensure the Electrostatic Discharge (ESD) procedures of references (g) and (h) are implemented within the 2M WC to provide adequate protection for ESD sensitive CCAs/EMs.

j. Coordinate with supply to ensure all CCAs/EMs meet the packaging requirements of per reference (i).

k. Ensure all CCAs/EMs certified RFI are processed as discussed in Section 8.5 of this chapter.

l. Maintain a complete inventory of 2M, ATE, AN/USM-646(V), materials and consumables.

m. Ensure compliance with all applicable safety procedures in accordance with reference (j).

n. Ensure that the MTR Tracking System is used to record all maintenance actions and produces required production reports.

8.2.5 Fleet Technical Support Center. The FTSC shall:

a. Conduct 2M certifications on personnel and stations in conjunction with the CSRR.

b. Maintain certification of 2M inspectors.

c. Report results of the inspections to all concerned.

d. Issue operator proficiency cards to recertified 2M technicians.

8.3 AUTHORIZED MINIATURE/MICROMINIATURE OUTFITTING. Authorized 2M outfitting is identified in reference (b).

8.4 MINIATURE/MICROMINIATURE PERSONNEL AND STATION REQUIREMENTS. References (f) and (k) provide certification criteria for all 2M stations and technicians. Reference (f) contains information on 2M repair stations and the Quality Assurance (QA) standards for workmanship.

8.5 PROGRESSIVE REPAIR PROCESS. The progressive repair process is the sequential attempt to test and repair CCAs/EMs. Reference (l) requires repairs at the lowest possible level. Reference (a) describes Repairables Management for Depot Level Repairables (DLR) and Field Level Repairables (FLR). 2M repair technicians will screen and attempt to repair all CCAs/EMs within their training and capability, regardless of cognizance or the Source Maintenance and Recoverability code.

8.5.1 Repair Process. The two principal categories of 2M repair are normal and emergency as defined in reference (l). Appendices A and B of this chapter define the emergency and normal processes respectively.

8.5.2 Ship's Force Process. An activity's repair capability and the type of 2M station may differ depending upon TYCOM outfitting. Such differences include the type of 2M station (MN or MC) and outfitting of test capability (AN/USM-646(V), Huntron 2000, GPETE, etc.). These factors plus 2M technicians' training/certification dictate Ship's Force ability to screen and repair CCAs/EMs. Regardless of these differences, an attempt should be made to repair all CCAs/EMs prior to their forwarding to the FMA.

a. The 2M WC shall be designated as CE99 (OE15 for Aircraft Carriers). All 2M work will be documented using these WCs. Final action codes will use "7 series" in accordance with reference (d).

b. Submit Beyond Capability Maintenance to the FMA using an OPNAV 4790/2K or MJC-OXCA-C028. The WC responsible for the system will forward the CCA/EM to the FMA if the CCA/EM repair is beyond the capability of the 2M WC.

c. Supply Officers have different responsibilities for DLRs or FLRs, per references (a) and (m).

(1) DLRs. Carcass tracking procedures are delineated in local command instructions and will identify supply/maintenance personnel responsibilities for tracking CCAs/EMs either at the Ship's Force 2M WC or the FMA WC. Supply Officers are authorized to delay stock issue, replenishment, and non-RFI turn-in for up to 72 hours pending testing and repair. Aircraft Carrier WC OE15 MTRF will use the Progressive Repair Program with the MTR Tracking System to support Supply/MTRF interaction.

(2) FLRs. Disposal of FLRs can be accomplished by either Ship's Force or the FMA.

8.5.3 Fleet Maintenance Activity Process. FMAs have additional 2M repair and ATE capabilities exceeding the Ship's Force level. The FMA will conduct repairs to CCAs/EMs if it is within their capability.

a. An OPNAV 4790/2K or Master Job Catalog item will be submitted to the local Regional Support Group for brokering. The organizational WC/MTRF will advise the Regional Support Group if the CCA/EM is time sensitive (i.e., Casualty Report (CASREP)) to prioritize for immediate scheduling.

b. CASREP driven OPNAV 4790/2Ks will be accepted by the FMA on the same day the job is submitted and worked to support a 24 hour turn-around.

c. Non-CASREP driven OPNAV 4790/2Ks will be screened to support activities and worked to support a 72-hour time limit or deadline date.

d. If the FMA is unable to repair the CCA/EM, it is condemned according to Repairables Management procedures in accordance with the requirements of reference (a).

8.5.4 Certification of Miniature/Microminiature Repaired Assets as Ready for Issue. Reference (a) describes the definition and certification criteria for RFI items. Repaired CCAs/EMs will meet the following basic RFI requirements:

a. Packaging and preservation.

(1) Repaired items from the 2M WC/MTRF will be packaged to meet the minimum standards of reference (a).

(2) A repair unit identification label shall be affixed to the body of each repaired unit in accordance with reference (a). The label must specify the command/activity performing the repair, the date repaired and the name of the 2M technician.

b. ESD protection. ESD sensitive CCAs/EMs will be handled, prepared, and packaged in accordance with references (g) and (n). Ensure all CCAs/EMs are packaged for shipment per reference (o).

8.5.5 Miniature/Microminiature Module Test and Repair Piece Parts. Piece parts required for 2M repairs have been formalized into Allowance Parts Lists (APL) for each ship class having 2M/MTR repair capability. These APLs contain unique high usage piece parts such as resistors, diodes, capacitors, transistors, and integrated circuit chips determined from Fleet wide demand data, TYCOM recommendations and from the latest Gold Disk release which support, and are part of, the equipment and/or systems installed on a specific ship class. 2M/MTR piece part APLs are divided into two distinct groups, Baseline and Augmented APLs.

a. Intermediate-Level Baseline APL. The Intermediate-Level Baseline APL is supply coded Operating Space Item. 2M/MTR piece parts listed in this APL are ordered, staged in three VIDMAR-type cabinets and delivered onboard selective intermediate level ships to the 2M work center. These 2M/MTR piece parts have been identified as maintenance critical. Operating Space Item parts consumed during 2M repairs must be reordered on a one-for-one basis as usage is reported and are eligible for demand base stocking by the supply department.

b. Organizational-Level Baseline APL. The Organizational-Level Baseline APL is supply coded Storeroom Item and contains an Allowance Note Code to ensure that 100% of the listed 2M piece parts are stocked on board regardless of stocks presently on hand and/or past usage.

c. Augmented APL. To ensure that sufficient piece parts are authorized to support increases in 2M/MTR repairs, additional APLs have been developed to support both I- and O-Level 2M/MTR ships and shore facilities. These APLs, labeled "Augmented APLs" list all 2M/MTR piece parts appearing in the latest Gold Disk release and are applicable to a ship's class and/or maintenance capability. These APLs are supply coded Storeroom Item and allowances will be computed using normal Fleet Logistics Support Improvement Program computations. Augmented APLs will continue to be updated as the number of Gold Disks continues to increase. Parts needed for a 2M/MTR repair but not listed in 2M/MTR APLs should be reported by Fleet Coordinated Shipboard Allowance List Feedback Report in accordance with reference (p).

8.6 UNIQUE MINIATURE/MICROMINIATURE GUIDANCE (NAVAL AIR FORCE ONLY).

8.6.1 Aviation Intermediate Maintenance Department.

a. Use reference (q) as the standard maintenance instruction when repairing aircraft or aircraft support equipment CCAs/EMs. Copies of references (q), (r), (s), and (t) shall be maintained in each 2M WC.

b. Ensure all 2M Collateral Duty Inspectors demonstrate in-depth knowledge of 2M repairs. All micro repair should be inspected by Collateral Duty Inspectors familiar with micro repair standards.

c. Initial support equipment outfitting for 2M stations is accomplished under the Individual Material Readiness List Program in accordance with reference (u).

8.6.2 Aircraft Carrier Fleet Maintenance Activity Module Test and Repair Facility.

a. The mission of the MTRF WC OE15 shall be to enhance the parent Aircraft Carrier and Battle Group units' Combat Systems readiness through onboard I-level electronics repair of CCAs/EMs.

b. MTRF evaluations will be conducted by the Naval Underwater Warfare Center, Fleet Engineering Office during the CSRR or prior to deployment in accordance with reference (e).

c. Ensure all MTRF WC repair actions are documented under the Maintenance and Material Management (3-M) system per reference (d) and the procedures delineated in Appendix C of this chapter, using a pre-formatted OPNAV 4790/2K. Maintain a file copy of the OPNAV 4790/2K with the completed QA Form 17 for a period of 12 months or until the next CSRR or QA audit, whichever is the longer period.

d. Ensure the ESD control procedures of references (g), (h), and (i) are instituted at the MTRF WC and all departments (less Aviation Intermediate Maintenance Department) to provide for the adequate protection of ESD sensitive CCAs/EMs.

e. Ensure that the MTR Tracking System is used to record all repairs, maintain the production database and to produce required reports.

f. Aircraft Carrier Combat Systems Material Officers will promulgate amplifying procedures by message for Battle Group units to request MTRF WC assistance. A sample format is provided in Appendix D of this chapter.

g. Units requesting CV/CVN MTRF repairs submit "IMMEDIATE" message in the format of Appendix E of this chapter. MTRFs will not accept CCAs/EMs for repair without prior notification.

h. Each MTRF shall provide Commander, Naval Air Force Atlantic (COMNAVAIRLANT)/Commander, Naval Air Force Pacific (COMNAVAIRPAC) a quarterly summary report of MTRF accomplishments, by message or Naval Telegram, due by the 15th day of the month following the end of each quarter. A sample format is provided in Appendix F of this chapter.

i. Employ the Progressive Repair Program to establish and support the interface between the Supply Department and Combat Systems MTRF in repair of all ship systems CCAs/EMs.

8.7 UNIQUE MINIATURE/MICROMINIATURE GUIDANCE (SUBMARINE FORCE ONLY).

8.7.1 Module Screening and Repair Activity. The Module Screening and Repair Activity (MSRA) has been developed to support the AN/BSY-1(V), AN/BQQ-15D/E, and CCS MK1/2 programs (WC 84). Parts supported by the MSRA Module Support List are managed in accordance with references (v) and (w), as appropriate.

a. MSRAs are located at the Naval Submarine Support Facility New London, CT, Submarine Base Pearl Harbor, HI, and Engineering Development Model, Norfolk, VA.

b. The MSRA suite of test equipment includes a Teradyne tester for digital CCAs/EMs, an LTX for analog CCAs/EMs, a UTS-625 for power supplies, an Amplifier Test Set for Modular Power Amplifiers, and the Display Assembly Test for displays.

c. (Submarine Base & Naval Submarine Support Facility only) FMAs shall establish and maintain an MTRF consisting of the combined capabilities of WCs 67L, 67M, and 84A.

8.7.2 Fleet Maintenance Activity/Submarine Base.

a. Designate the R-4 Division Officer through the Production Officer to be the overall coordinator for the MTRF.

b. FMAs are to maintain 2M/ATE/GPETE repair capability. The minimum acceptable capability is two 2M repair stations, one of which will be microminiature capable.

c. Promulgate amplifying procedures for out-of-area or inter-service customers to request MTRF assistance using the guidance of Appendix D of this chapter.

d. Maintain a complete inventory of MTRF using Appendix G of this chapter.

8.7.3 Reports. FMAs shall utilize the Mandatory Turn-in Repairable Tracking System to generate a quarterly Mandatory Turn-in Repairable Summary Package, with option (1) of the MTRF accomplishments, forwarded to the TYCOM (N42). This summary package is due by the 15th day of the month following the end of each quarter.

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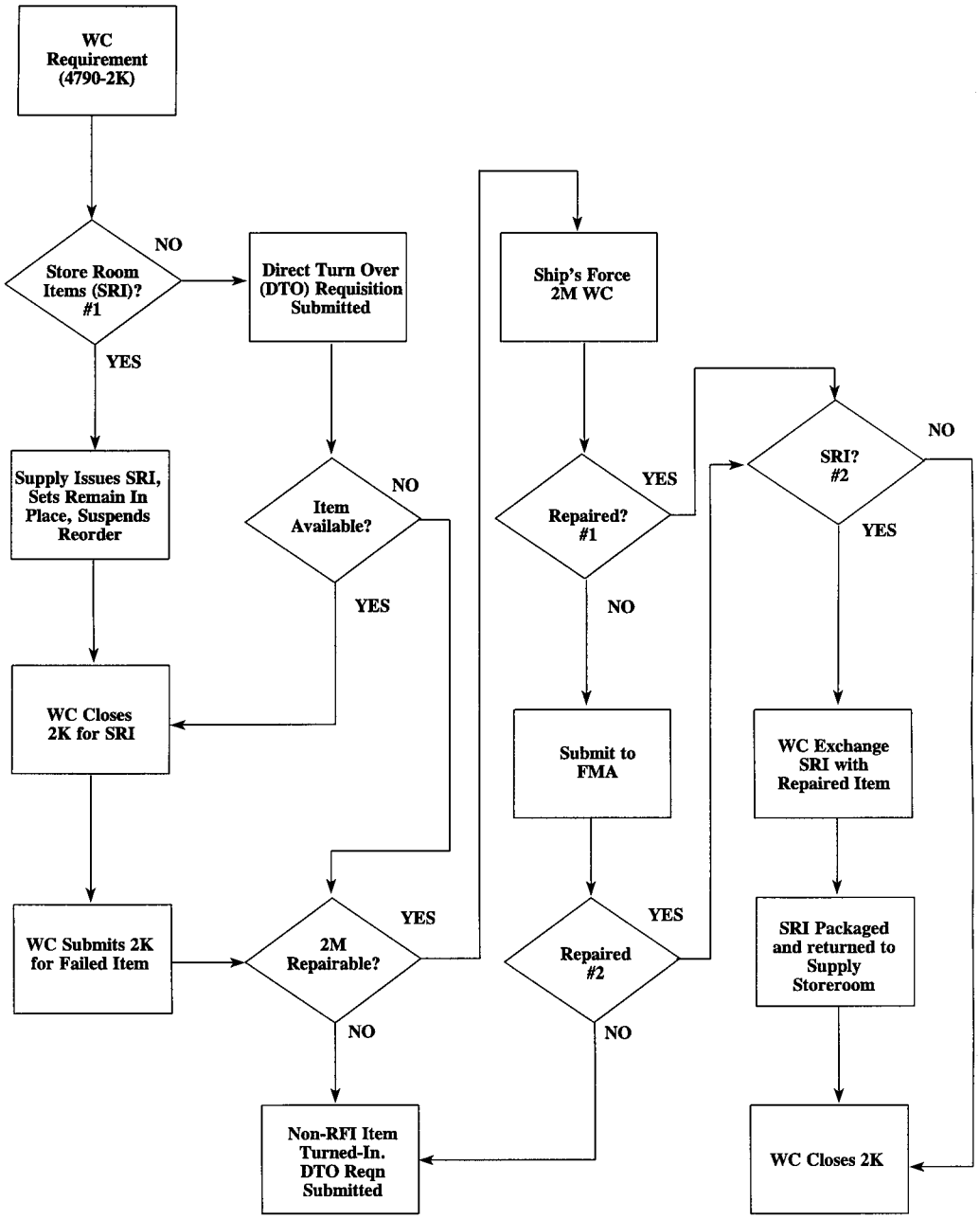
APPENDIX A

EMERGENCY 2M REPAIR PROCESS



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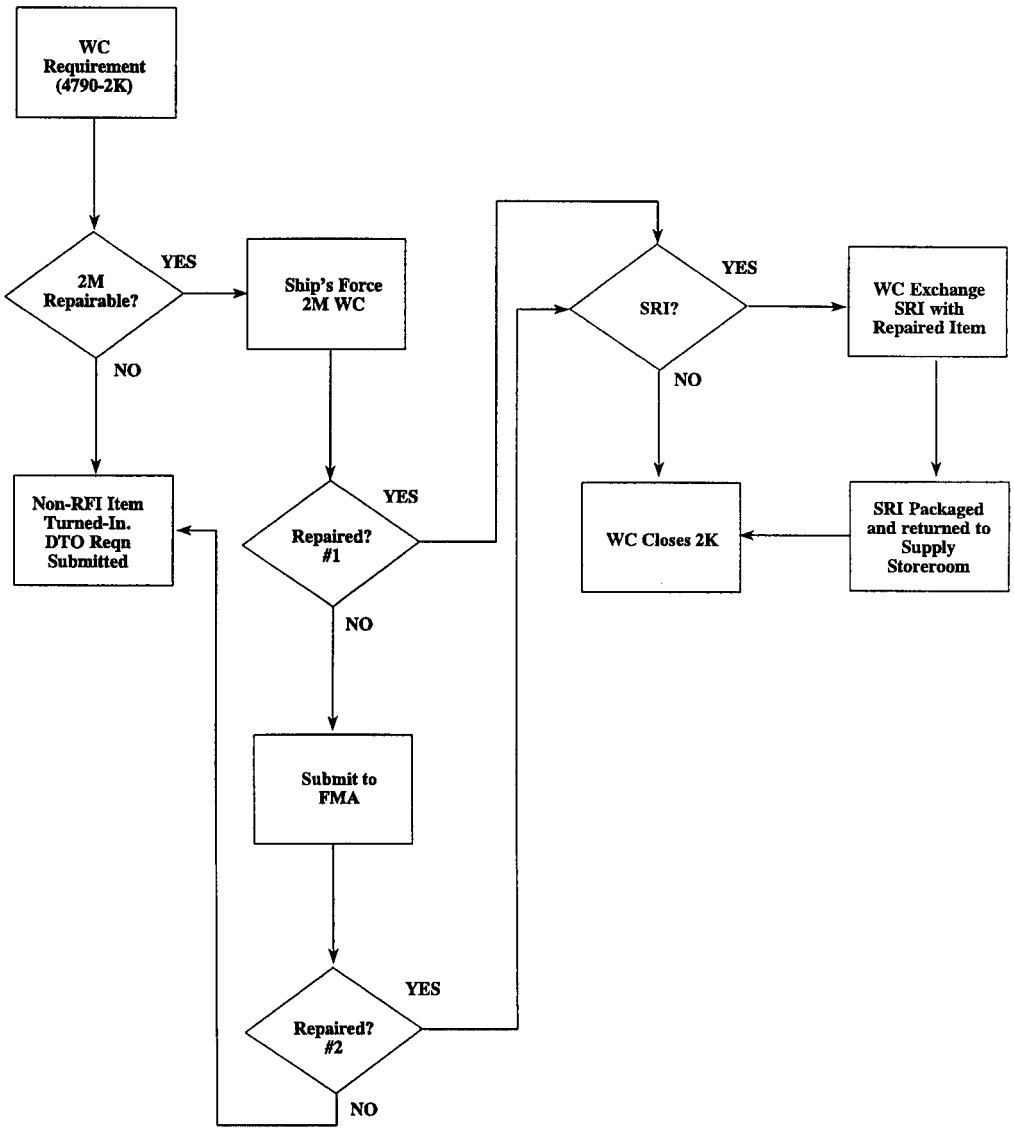
APPENDIX B

NORMAL 2M REPAIR PROCESS



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APPENDIX C

MTRF 3-M REPORTING
(Aircraft Carriers Only)

1. All diagnostic screening and troubleshooting on non-aviation CCAs/EMs or components utilizing the MTRF suite of testers or other GPETE/Special Purpose Electronic Test Equipment in non-aviation WCs shall be documented via the 3-M system using a pre-formatted OPNAV 4790/2K as either a deferred action or a completed action. OE15 will be the Repair WC (block 49) or Originating WC (block 02) depending upon how the job was inducted into the MTRF. This includes CCAs/EMs that are screened "No Fault Evident" (NFE). OE15 will be the Repair WC unless repairing its own equipment; then they would be the Lead Work Center. The pre-formatted OPNAV 4790/2K shall be closed out in the Fleet Maintenance Activity Maintenance Management System and copies retained in OE15 WC files (regardless of Originating WC) for one year. Deferred action OPNAV 4790/2Ks received from tended ships (with failed CCA or EM) will be entered into the Fleet Maintenance Activity Maintenance Management System by OE15 as written, followed by initiation of an OPNAV 4790/2K worksheet to be processed as previously described. Aviation CCAs/EMs should be forwarded to the Aircraft Carrier Aviation Intermediate Maintenance Department with accompanying Visual Information Display System/Maintenance Action Form (OPNAV Form 4790/60).

2. Sections I, II and III of the OPNAV 4790/2K shall be completed per reference (d).

3. Section IV, block 35 of the OPNAV 4790/2K is pre-formatted in fields. The following guidance shall be used when completing these fields:

a.

FIELD IDENTIFIER	DESIRED ENTRY
PN	Enter CCA/EM Part Number
NSN	Enter CCA/EM NSN
RSN	Enter CCA/EM Reference Symbol Number
COST	Enter CCA/EM Cost rounded to nearest dollar; enter no cost if DLR
DE	Enter diagnostic equipment utilized to fault isolate CCA/EM (i.e., AN/USM-465, Huntron 2000, Huntron 5100DS, Fluke 77AN)
TPS	Enter Test Program Sets (TPS) number if TPS is available; enter "NA" if TPS is not available
GD	Enter Gold Disk number if Gold Disk is available; enter "NA" if Gold Disk is not available
NFE	Enter "Y" if NFE; "N" otherwise
QA	Enter "QA" level

FIELD IDENTIFIER	DESIRED ENTRY
CA	Enter "Y" if CASREP averted; "N" otherwise (see Note)
CC	Enter "Y" if CASREP corrected; "N" otherwise
TST	Enter troubleshooting time in hours and tenths of hours (i.e., 0.3, 1.6)
2MT	Enter 2M repair time in hours and tenths of hours (i.e., 0.3, 1.6)
AWPT	Enter delay of CCA/EM repair, in days, due to awaiting parts status

b.

COMPONENTS REPLACED	DESIRED ENTRY
RSN	Enter reference symbol number of component replaced
NSN/PN	Enter NSN or component replaced; if no NSN, enter part number
COST	Enter cost of component replaced
AEL	Enter "Y" if component replaced is included in piece parts Allowance Equipage List; "N" otherwise
COMMENTS	Comment on effectiveness of TPS and Gold Disk if applicable; if "Y" entered in CC field, include CASREP number and the Date Time Group of the message

NOTE: A CASREP HAS BEEN AVERTED WHEN A CCA/EM HAS BEEN:

A. REPAIRED OR FOUND NFE.

B. REPLACEMENT CCA/EM IS NOT CARRIED IN ONBOARD STOCK.

C. INSTALLED IN ANY COMBAT, ENGINEERING, AVIATION OR NON-TACTICAL SYSTEM RESTORING THE SYSTEM TO OPERATION.

APPENDIX D

SAMPLE MTRF AMPLIFYING PROCEDURES MESSAGE

FM USS (SHIP'S NAME AND HULL NO.)//
TO BATTLE GROUP//
INFO TYCOM//(AS APPROPRIATE)
CTF//(AS APPROPRIATE)
CTG//(AS APPROPRIATE)
BT
UNCLAS //N04790//
MSGID/GENADMIN/USS (SHIP'S NAME AND HULL NO.) EMO//
SUBJ/MTRF ADVISORY//
REF/A/DOC/NWP 1-03.1//
REF/B/DOC/NAVSUP P-485//
REF/C/DOC/CNALINST 4790.42/CNAPINST 4790.54//(AS APPROPRIATE)
NARR/REF A SPECIFIES REPORTING PROCEDURES TO BE USED WHEN REPORTING SIGNIFICANT EQUIPMENT CASUALTIES. REF B DETAILS MATERIAL REQUISITION AND HANDLING PROCEDURES. REF C PROVIDES INST FOR OBTAINING MTRF ASSIST//
POC/(NAME)/(RANK/RATE)/(LOCATION)/(DSN/COMM TELEPHONE NO.)//
RMKS/1. MTRF CONTINUES TO BE FULLY OPERATIONAL ONBOARD USS (SHIP'S NAME AND HULL NO.). MTRF ENHANCES BATTLE GROUPS COMBAT SYSTEM READINESS THROUGH ONBOARD FMA ELECTRONICS REPAIR. USS (SHIP'S NAME AND HULL NO.) HAS THE CAPABILITY TO FAULT ISOLATE AND REPAIR MAJORITY OF SUSPECT FAILED CCA/EM FOR THE BATTLE GROUP. MTRF ASSETS INCLUDE: (TAILOR LIST TO MTRF CONFIGURATION)

A. HUNTRON TRACKER MODELS 2000 AND AN/USM-646 (5100DS)
B. AN/USM-465 ATE
C. 2M ELECTRONICS REPAIR
D. 2M PIECE PARTS ELECTRONICS SUPPORT
E. TRIPLE CROWN 700 MICRO-COMPUTER BASED DRAM AND EPROM IC TEST SETS
F. SENCORE LC-77 CAPACITANCE/INDUCTANCE TESTER

2. BRIEF DESCRIPTION OF (CARRIER/FMA) REPAIR CAPABILITIES (TAILOR LIST TO MTRF CONFIGURATION)

A. AN/USM-646 (5100DS) INTERFACES WITH A DEDICATED DESKTOP PC TO ASCERTAIN AND STORE CHARACTERISTICS OF KNOWN GOOD CCAS/EMS ON MAGNETIC DISK OR CD-ROM FOR FUTURE USE AS A COMPARISON STANDARD FOR SUSPECT CCAS/EMS
B. USS (SHIP'S NAME AND HULL NO.) HOLDS MOST CURRENT AN/USM-646 TPS. MAINTENANCE SUPPORT GUIDES ARE AVAILABLE TO FULLY SUPPORT TEST AND PIECE PART REPAIR FOR THE BATTLE GROUP
C. LIMITED CRYPTO REPAIR
D. XEROX COPIER REPAIRS FOR MODELS 2830/1048/1090 AND SAVIN MODEL 7020S
E. FULL MICRO COMPUTER TEST AND REPAIR FOR DESKTOP PC PRINTERS AND ASSOCIATED PERIPHERALS JOTS POST TIMS AND VARIOUS OTHER RAPID PROTOTYPE PC BASED SYSTEMS

3. AN/USM-646 (5100DS) GOLD DISK LIBRARY OF LEARNED CCAS/EMS IS AVAILABLE TO ENHANCE BATTLE GROUP COMBAT SYSTEMS AND OTHER ELECTRONIC SYSTEMS SELF SUFFICIENCY

SAMPLE

4. MTRF WILL ATTEMPT TO REPAIR ANY AND ALL CCAS/EMS WITH FOLLOWING EXCEPTIONS

A. CCA/EM UNIDENTIFIABLE DUE TO:

(1) LACK OF TECHNICAL DOCUMENTATION

(2) LACK OF COMPONENT OR CIRCUIT IDENTIFICATION

(3) UNAVAILABILITY OF KNOWN GOOD CCA/EM

B. CCA/EM GREATER THAN FIFTY PERCENT DESTROYED

C. COMPLEX RADIO FREQUENCY CCAS/EMS

D. EPROM CCA/EM WITHOUT DOCUMENTATION OR DUPLICATE CCA/EM

E. UNIQUE EXPERIMENTAL CIRCUITRY

5. MTRF IS GUIDED BY THE FOLLOWING RULES:

A. UPON RECEIPT OF NON-RFI CCA/EM MTRF WILL EVALUATE PROGNOSIS FOR COMPLETING REPAIRS AND PROVIDE ECD TO ALCON BY IMMED MSG WITHIN 48 HOURS. MTRF CANNOT ACCEPT CCAS/EMS OR OTHER MATERIALS REQUIRING REPAIR WITHOUT PRIOR MTRF NOTIFICATION AND DIRECTIONS PROVIDED FOR SHIPMENT BY MATCONOFF

B. REPAIRED ITEMS WILL BE TAGGED RFI AND RETURNED TO THE REQUESTING UNIT

C. CASREPS WILL BE SUBMITTED IAW REF A CONCURRENT WITH MTRF REPAIR REQUEST. CASREP WILL IDENTIFY MTRF REQUIREMENTS IN THE ASSIST AND AMPN BLOCKS WHEN APPLICABLE. WHEN MTRF REPAIR IS SUCCESSFUL CASREP REQUISITION WILL BE CANX IAW REF B AND CASCOR SUBMITTED IAW REF A. IF MTRF IS UNSUCCESSFUL NON-RFI ASSET WILL BE RETURNED TO REQUESTING UNIT

D. ITEMS SUBMITTED TO MTRF WILL NOT BE HELD IN AWAITING PARTS STATUS. IF PARTS ARE UNAVAILABLE FROM MTRF PRE-EX BINS CV SUPPLY OR MATCONOFF SCREEN NON-RFI ASSET WILL BE RETURNED TO ORIG AS NOT REPAIRABLE BY MTRF

6. UNITS REQUESTING MTRF ASSIST SEND IMMED MSG IAW ENCL 7 OF REF C

7. ADDITIONAL INFORMATION

A. PACKAGE AND MARK ALL ELECTROSTATIC DEVICES PROPERLY FOR SHIPMENT

B. INCLUDE COPY OF MTRF REPAIR REQUEST MSG WITH 4790/2K AND ORIG DD 1348-1 IN SHIPPING CONTAINER. SHIP TO USS (SHIP'S NAME AND HULL NO.) MARKED ATTN EMO FOR MTRF REPAIR. USS (SHIP'S NAME AND HULL NO.) WILL PROVIDE RED STRIPE MTRF REPAIR STICKERS TO ALCON VIA SEPCOR

C. ALL NON-RFI AND RFI ASSETS WILL BE COORDINATED BY MATCONOFF//

BT

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

SAMPLE

APPENDIX E

SAMPLE CV/CVN MTRF REPAIR REQUEST MESSAGE

FM USS (SHIP'S NAME AND HULL NO.)//(TENDED SHIP)
TO USS (SHIP'S NAME AND HULL NO.)//
INFO CTF//(AS APPROPRIATE)
CTG//(AS APPROPRIATE)
MATCONOFF//
BT
UNCLAS //N04790//
MSGID/GENADMIN/USS (SHIP'S NAME AND HULL NO.)//(TENDED SHIP)
SUBJ/MTRF REPAIR REQUEST//
REF/A/DOC/CNALINST 4790.42/CNAPINST 4790.54//(AS APPROPRIATE)
AMPN/REF A SPECIFIES PROCEDURES FOR REQUESTING CV/CVN MTRF ASSIST//
RMKS/1. IAW REF A, REQ MTRF ASSIST AS FOLLOWS:

A. PRIME EQUIPMENT/(AN/SPS-49, MK-86, AN/UYQ-21(V) ETC.)
B. CIRCUIT SYMBOL AND PN OF CCA/EM/ITEM TO BE TESTED
C. NSN OF CCA/EM/ITEM TO BE TESTED
D. DOCUMENT NUMBER/JSN/APL
E. PRIORITY

PRI ONE - CASREP/(ITEM REQUIRED TO CORRECT CASUALTY (A, C-4 B, C-3 C, C-2 D, ANORS))

PRI TWO - SYSTEM/EQUIPMENT IS OPERABLE FROM ONBOARD OR BATTLE GROUP STOCK. FWD NON-RFI CCA/EM TO MTRF FOR REPAIR

PRI THREE - REPAIR TO SPARE CCA/EM

F. BRIEF DESCRIPTION OF EQUIPMENT FAILURE
G. AVAILABLE TECH DOCUMENTATION
H. DISPOSITION OF NON-RFI IF NOT REPAIRABLE//

BT

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

SAMPLE

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APPENDIX F

SAMPLE MTRF QUARTERLY REPORT MESSAGE
(Aircraft Carriers Only)

FM USS (SHIP'S NAME AND HULL NO.)//
TO TYCOM//(COMNAVAIRLANT OR COMNAVAIRPAC AS APPROPRIATE)
INFO CNO WASHINGTON DC//N86B/N77/N88/N61/N62/N63/94//
COMLANTFLT NORFOLK VA//N435//
COMPACFLT PEARL HARBOR HI//N4315//
COMNAVSEASYSCOM WASHINGTON DC//06Q//06QM/04DS/56Y/PMS312/PMS331/
PMS400/PMS411/PMS412//
NUWC DET NORFOLK VA//2431/24311//
NAVSURFWPNCEN CRANE IN//PM6/607/6073//
COMSPAWARSYSCOM WASHINGTON DC//003A/003-22/003-222D/PD-50/PD-
60/PMW151/PMW152/PMW156/PMW162//
COMNAVSUPSYSCOM WASHINGTON DC//031/03113/03114//
BT
UNCLAS //N04790//
SUBJ/CV/CVN MTRF (OE15) WORK CENTER QUARTERLY SUMMARY REPORT//
MSGID/GENADMIN/USS (SHIP'S NAME AND HULL NO.)//
REF/A/DOC/CNALINST 4790.42/CNAPINST 4790.54//(AS APPROPRIATE)
AMPN/REF A CONTAINS REQ FOR MTRF QUARTERLY REPORT//
RMKS/1. IAW REF A FOL DATA PROVIDED FOR O1JAN - 31MAR/

		CV EQUIP	BG EQUIP
A.	MTRF REPAIRS REQUESTED	(QTY)	(QTY)
B.	MTRF REPAIRS INDUCTED	(QTY)	(QTY)
C.	MTRF REPAIRS COMPLETED	(QTY)	(QTY)
D.	CASREPS AVERTED/CORRECTED	(QTY)	(QTY)
E.	CCAS/EMS TESTED WITH NO FAULT EVIDENT	(QTY)	(QTY)
F.	OE15 WORK CENTER REPAIRS DOCUMENTED VIA 3-M SYSTEM	(QTY)	
G.	TOTAL ESTIMATED MONETARY SAVINGS	(AMOUNT)	
H.	SURFACE MOUNT TECHNOLOGY STATION UTILIZATION		(QTY)
I.	PRIMARY DIAGNOSTIC EQUIPMENT USED FOR REPAIR		
	(1) AN/USM-465		(QTY)
	(2) AN/USM-646 (5100DS)		(QTY)
	(3) HUNTRON TRACKER 2000/1000		(QTY)
	(4) OTHER (SPECIFY EQUIPMENT)		(QTY)
J.	RETURNED TO SUPPLY RFI		
	(PART NO.) (NSN) (EQUIP/SYSTEM)		
K.	CV/CVN DEPARTMENT/DIVISION/WORKCENTER/SUPPORT DEPT		
	(DEPT) (DIV) (WC/SD) (EQUIP/SYSTEM)		
L.	RECOMMENDATIONS/COMMENTS//		

BT

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

SAMPLE

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APPENDIX G

MTRF EQUIPMENT CONFIGURATION

1. The following list comprises the minimum MTRF WC equipment and accessory configuration.

a. Digital and Analog Testing Capability:

GPETE.

Huntron Tracker AN/USM-646 (5100DS)
Huntron Tracker 2000
Huntron Switcher 410
Huntron Shortracker Model 90

b. Personal Computer:

386 microprocessor with math co-processor
4MB RAM
3.5 or 5.25 inch floppy disk drive
80MB hard drive
Compact Disk - Read Only Memory (CD-ROM)
VGA monitor
Mouse
2 serial ports
1 parallel port

c. 2M Repair Station.

d. Modular Transfer Kits.

e. ESD Protection (Mat, Support Accessories).

f. Piece Parts Support:

Allowance Equipage List configured to site requirements.
VIDMAR parts cabinet.

g. Gold Disks for Huntron 5100DS.

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VOLUME VI

CHAPTER 9

METROLOGY AND CALIBRATION PROGRAM

REFERENCES.

(a) OPNAVINST 3960.16 - Navy Test and Monitoring Systems (TAMS)
(b) OPNAVINST 4790.2 - The Naval Aviation Maintenance Program (NAMP)
(c) OPNAVINST 4700.7 - Maintenance Policy for Naval Ships
(d) OPNAVINST 4000.57 - Logistic Support of the TRIDENT and POSEIDON Fleet Ballistic Missile (FBM) Systems
(e) NAVSEAINST 4734.1 - Metrology and Calibration (METCAL) Program
(f) NAVSEA ST700-AA-LST-010/NAVAIR 17-35NCA-1 - Navy Calibration Activity (NCA) List
(g) NAVSEA OD 45845/NAVAIR 17-35MTL-1 - Metrology Requirements List (METRL)
(h) NAVSEA ST000-AA-IDX-010 - Test Measurement Diagnostic Equipment
(i) NAVAIR 17-35QAL-15 - Naval Aircraft Carrier (METCAL) Program Manual
(j) NAVSEA ST700-AM-PRO-010 - Test and Monitoring Systems (TAMS) Program Operations and Procedures
(k) OPNAVINST 4790.4 - Ships' Maintenance and Material Management (3-M) Manual
(l) NAVSEA OD 45843/NAVAIR 17-35FR-01 - Calibration Facility Requirements for Navy Field Calibration Activities
(m) OPNAV 43P6B - MEASURE Users Manual
(n) NAVSEA ST700-AS-PRO-010 - Shipboard Gage Calibration Program; Calibration Procedures
(o) NAVSUP 485 - Afloat Supply Procedures
(p) NAVSEAINST C9210.4 - Changes, Repairs and Maintenance to Nuclear Powered Ships

LISTING OF APPENDICES.

A Sample Calibration Overflow Assignment Message
B Calibration Decision Logic Tree
C Generic Critical Instruments List

9.1 PURPOSE. To promulgate policy and assign responsibility for the management of the Navy Test and Monitoring Systems (TAMS) which includes the associated Metrology and Calibration (METCAL) program, reference (a).

9.1.1 Scope. This instruction applies to all Navy commands whose maintenance policy and practices are under the cognizance of references (b), (c), and (d). Excluded are calibration activities and equipment under the technical cognizance of the Radiation Detection, Indication, and Computation (RADIAC) program.

9.1.2 Policy. The Chief of Naval Operations (CNO), OPNAV N4, sets policy to ensure all TAMS used for quantitative measurements are maintained and calibrated at the lowest practical level. Specific CNO policy is stated in reference (a).

9.2 RESPONSIBILITIES.

9.2.1 Fleet Commander.

a. Operationally administer the METCAL program. Non-aviation fleet and shore activities shall operate in accordance with reference (e).

b. Ensure calibration is performed at the lowest level practical using certified laboratories and trained personnel.

c. Monitor the effectiveness of the Calibration Overflow Program and all METCAL programs.

d. Chair Fleet Test Measurement Diagnostic Equipment METCAL Working Groups. Commander, Atlantic Fleet chair Fleet Standing Support Committee.

e. (Surface Forces only) Establish the Shipboard Instrumentation System Calibration (SISCAL) program in accordance with reference (e).

f. Provide funding for calibration and repair of TAMS, including standards, except as follows:

(1) Naval Air Systems Command (NAVAIR) will fund for fleet aviation TAMS calibration and repair.

(2) Submarine Strategic Program (SSP) will fund for TRIDENT TAMS calibration and repair.

9.2.2 Type Commander.

a. Assign a METCAL program single point of contact to administer program requirements in accordance with reference (a). Serve as a voting member to the Fleet Test Measurement Diagnostic Equipment TAMS Working Groups.

b. Submit TAMS Allowance Change Requests to the TAMS Allowance Manager. TAMS Allowance Managers are: Type Commander (TYCOM) for aviation activities, SSP for TRIDENT activities and Naval Sea Systems Command (NAVSEA) for all remaining activities.

c. Redistribute excess TAMS. Aviation activities and TRIDENT activities will follow the guidance of NAVAIR and SSP respectively in redistributing TAMS. The Atlantic Fleet and the Pacific Fleet will use the Consolidated TAMS Readiness Assessment (CTRA).

d. Provide properly trained personnel to authorized calibration activities for the repair and calibration of assigned TAMS. Manage assigned standards and calibration laboratories and Field Calibration Activities (FCA) in accordance with reference (a) and the guidance provided by the appropriate Systems Command (SYSCOM).

e. Periodically perform Quality Assurance reviews of laboratories and ensure compliance with this instruction and appropriate SYSCOM instructions.

f. Manage the Calibration Overflow Program. Responsibilities include:

(1) Budget and manage funds to support the Calibration Overflow Program for calibration support beyond the capability of TYCOM shipboard and Fleet Maintenance Activity (FMA) laboratories.

(2) Coordinate cost effective use of calibration support from intra-service Navy and inter-service Department of Defense activities.

g. Ensure that Regional Loan Pools (RLP) are established for FMA/Regional Calibration Laboratories.

h. Evaluate FMA/Regional Calibration Laboratories and coordinate with NAVSEA for standards to support new capabilities.

i. Coordinate with Naval Weapons Station Earle, NJ for Sub-Category (SCAT) assignments and Ship's Portable Electronic Test Equipment Requirements List (SPETERL) revisions.

j. Assist Fleet Commander representatives in managing the Fleet METCAL programs.

9.2.3 Naval Surface Warfare Center Corona Division. Naval Surface Warfare Center (NSWC) Corona Division is the In-Service Engineering Activity for metrology and acts as NAVSEA technical authority. NSWC Corona performs acceptance tests for new equipment for induction into the METCAL program, sets and modifies calibration intervals, and publishes metrology associated documents such as the Naval Calibration Activity List and the Metrology Requirements List (references (f) and (g)) in accordance with SYSCOM directives. NSWC Corona may be contacted by telephone or message for resolution of urgent technical problems related to calibration standards or Instrument Calibration Procedures.

9.2.4 Immediate Superior in Command.

a. Monitor calibration readiness status within their respective organizations, especially ships in a pre-deployment status. Forward requests for assistance to the TYCOM METCAL coordinator.

b. Monitor the effectiveness of electronic FCAs and Shipboard Gage Calibration Program (SGCP) FCAs.

c. Ensure that ships with FCAs extend their service to other ships in company, as appropriate, to reduce cost and turn-around time of calibration.

d. Ensure that each ship with an FCA/SGCP has all the necessary standards, documentation and trained personnel to maintain current certification.

e. Coordinate resolution of calibration problems found by the TYCOM designated support activity for assigned ships.

f. (Submarine Force only) Ensure each activity actively supports the Periodic Maintenance Requirement (PMR)/Maintenance Resource Management System scheduling program by maintaining at least 95% accomplishment rate for all calibration equipment in its inventory. The PMR reports or equivalent will be used to monitor the program.

g. (Surface and Air Forces) Calibration Readiness Goal is 85%.

9.2.5 Commanding Officers All Forces.

a. Maintain a high degree of TAMS calibration readiness.

b. Appoint in writing, a calibration coordinator responsible for all matters related to the calibration of ship's TAMS. Separate coordinators may be appointed for electronic, mechanical and RADIAC equipment.

c. Ensure only operational TAMS are submitted for calibration, including all needed accessories, power cords, and technical manuals required to complete the calibration.

d. Perform repair of TAMS within the capability of Ship's Force. Repairs which break or deface calibration seals must be followed by a full calibration of the equipment before its return to service. Initiate survey actions and submit requisitions for the replacement of TAMS certified by an FMA or overflow repair activity as Beyond Economical Repair (BER). Replacement procedures are described in Section 9.5 of this chapter.

e. Calibration Readiness Goal: Submarine Force - 95%
Air Force and Surface Force - 85%

9.2.6 Commanding Officers Surface Force.

a. Ensure a Calibration Requirements List (CRL) or an approved Critical Instruments List (CIL) for installed shipboard instruments onboard the ship is used to determine calibration requirements.

b. Use a TYCOM approved formal recall system for scheduling, planning, and monitoring the ship's calibration status.

c. Ensure the electronic FCA/SGCP is currently certified and properly staffed with trained personnel, documentation, and calibration standards.

d. Ensure all TAMS within the calibration capability of the FCA/SGCP are calibrated onboard.

e. Ensure FCA/SGCP equipped ships offer support to other ships in company on a not-to-interfere basis with own ship's work schedules.

f. Request calibration services, beyond the capability of the onboard FCA, from the TYCOM designated support activity.

g. Maintain liaison with the TYCOM designated support activity to make sure TAMS scheduled for off-ship calibration are delivered and returned according to the agreed upon schedule.

h. Use the RLP for Maintenance Requirements while the ship's test equipment is being calibrated.

i. Identify all pre-deployment calibration requirements to the TYCOM designated support activity at least 60 days before deployment.

j. Send an updated copy of the ship's TAMS inventory, complete with the current calibration status annotated, to the deployed FMA at least 30 days before deployment.

k. Prepare and submit Calibration Problem Reports (CPR) to NSWC Corona for assistance or guidance regarding any calibration problems encountered in the operation of the FCAs/SGCPs. CPR forms may be obtained from NSWC Corona or the Regional Support Group.

l. Ensure all critical instruments are clearly labeled with current calibration stickers.

m. Ensure all calibration is conducted at the lowest level of calibration feasible.

n. Conduct an annual review of the CIL and submit recommendations for changes or acknowledge the correctness to the Immediate Superior In Command (ISIC). Maintain the ISIC approved CIL, complete with pen and ink changes authorized by the ISIC, for review by inspection teams. CRL ships will have CRL Compact Disk - Read Only Memory (CD-ROM) and recall inventory available for review by inspection teams.

o. Ensure all ship's instrumentation appears in a formal calibration accounting and recall system.

p. Ensure only TAMS authorized in the SPETERL are maintained onboard and coordinate excess offload to CTRA Center.

q. Ensure only TAMS listed in reference (h) are maintained onboard. Non-standard TAMS not listed in reference (h) are to be coordinated with the TYCOM for disposition.

9.2.7 Commanding Officers Naval Air Force. Naval Air Force activities shall follow the procedures outlined in reference (i).

9.2.8 Type Commander Designated Support Activity.

a. TYCOM designated support activities (i.e., Regional Support Groups, Ship Repair Facilities, Regional Maintenance Centers, Intermediate Maintenance Activity Calibration Centers and Intermediate Maintenance Facilities) coordinate and schedule off-ship calibration or repair services for ships within their geographic area of responsibility. Specific lack of capability is the only justification for off-ship calibration.

b. Maintain close liaison with the FMA, shipboard calibration coordinators and the ISIC to prevent or resolve calibration scheduling and readiness problems.

c. Review ship originated calibration work requests to ensure that TAMS within the calibration capability of the ship's FCA/SGCP are not sent to a higher level calibration laboratory.

d. Contact all deploying ships which have not delivered a pre-deployment calibration work package at least 45 days before deployment to determine ship's requirements.

e. Notify COMNAVSURFLANT (N6) or COMNAVSURFPAC (N4353) METCAL Coordinators, as applicable, of any reduction in FMA calibration capability.

f. Assist FMA calibration laboratories in obtaining calibration or repair services for laboratory standards.

g. Identify TAMS calibration requirements beyond the technical capability of the FMAs. Coordinate the scheduling of those TAMS to a TYCOM approved shore-based calibration laboratory. Notify by message, the overflow laboratory selected to receive the calibration assignment (see Appendix A of this chapter). The message must include a certification that calibration is beyond the capability of local FMAs. TYCOM and NSWC Corona must be information addressees on all overflow assignments.

h. Coordinate with ISIC to confirm SISCAL dates and ensure that schedule is inserted in the Quarterly Scheduling messages.

i. Request a TAMS replacement from the COMLANTFLT CTRA Center, (757) 396-0289 extension 190 or COMPACFLT CTRA, (619) 556-1893.

9.2.9 Fleet Maintenance Activity/Regional Calibration Facility.

a. Maintain a current TAMS calibration capability list defining all TAMS calibration within the capability of the individual laboratory. Update and forward this list to the TYCOM designated support activity and TYCOM when changes occur.

b. In the absence of an approved Instrument Calibration Procedure for TAMS within the general range of the laboratory capability, develop a Local Calibration Procedure in accordance with references (e) and (j), and then calibrate the instrument. Technical manuals, manufacturers' guides, or other equipment technical documentation may be used to develop the interim procedure. Forward the locally developed procedure to NSWC Corona for review and approval.

c. Calibrate TAMS assigned by the TYCOM designated support activity. Document all calibration actions using the Metrology Automated System for Uniform Recall and Reporting (MEASURE) or the TYCOM directed data collection method.

d. Ensure all laboratory standards are properly calibrated at the lowest appropriate level. Notify the TYCOM/TYCOM designated support activity of a lost or reduced laboratory capability.

e. Ensure all TAMS repaired by the FMA are completely recalibrated before being returned to service. Calibration of a repaired instrument will serve as Quality Assurance of an accomplished repair.

f. Repair all electronic and mechanical malfunctioning TAMS submitted for calibration. NAVSEA activities shall document all repair actions as identified in reference (k).

g. Coordinate the calibration and repair of calibration standards beyond FMA capability with the TYCOM designated support activity.

h. Prepare and submit CPRs to NSWC Corona for assistance or guidance concerning calibration problems encountered during operation of the calibration laboratory.

i . Refer to Section 9.5 of this chapter for replacing malfunctioning calibration standards certified by a repair facility to be BER, (i.e., having a repair cost in excess of 50% of the replacement cost).

9.3 CALIBRATION MANAGEMENT.

9.3.1 Field Calibration Activities. Electronic and mechanical FCAs provide Ship's Force with the capability to calibrate a wide range of TAMS. References (e), (j), and (l) provide in-depth program management and operating procedures for FCAs. Reference (f) identifies phase packages and authorized FCAs. Electronic FCAs are manned with billeted personnel on larger platforms (AGF, CV, CVN, LHA, and LHD). SGCPs were established to give the ship the capability to calibrate temperature, pressure, vacuum, and torque TAMS. SGCPs are manned by collateral duty personnel.

9.3.2 Calibration Scheduling of Ships In Pre-Overseas Movement. Ships deploying to the Mediterranean or Indian Ocean must have all TAMS in calibration at the time of deployment. All TAMS which would normally become due for calibration during the deployment must be calibrated no later than five working days before deployment.

9.3.3 Calibration Accounting.

a. MEASURE is a recognized Navy data processing system supporting the Navy METCAL Program. MEASURE must be used for TAMS calibration recall scheduling and calibration accomplishment reporting.

b. All TAMS subject to the provisions of the METCAL program are included in the MEASURE.

c. Complete guidance for implementation and operation of MEASURE shall be in accordance with reference (m).

d. No activity may task force units for manually prepared inventories, recall schedules, summaries, status, or other information which can be derived from MEASURE products, without authorization from the appropriate TYCOM METCAL Coordinator.

9.3.4 Submarine Forces Management Policy.

a. Personnel certified as submarine FCA technicians will use Planned Maintenance System (PMS) Maintenance Index Pages (MIP)/Maintenance Requirement Cards (MRC) to accomplish shipboard calibrations. Any A-64 series MIPs currently held on board are to be destroyed as the calibration MIPs are received. PMS MIPs are currently developed for SSBN/SSGN 726 and SSN 21 Class Submarines and are in the validation phase of development for SSN 688 Class. PMS MIPs/MRCs will supersede reference (n) as received.

b. Personnel certified as FCA Technicians for surface platforms assigned to COMSUBLANT/ COMSUBPAC are to utilize reference (n) for the performance of shipboard calibration.

c. The scheduling and reporting of calibration actions will be accomplished via Maintenance Data System using the PMR Scheduling Module and its associated Micro-Calibration and Scheduling Management program. All assigned MIPs/MRCs are to be maintained in accordance with the requirements of reference (k).

d. All components being "tested" or "calibrated" using a calibrator (i.e., 3666, 3641, 1127, 3604, 3605, etc.) will have a calibration sticker affixed. System calibrations will utilize the miniature yellow, Special Calibration, sticker annotated to reflect system calibration and the components tested. This Special Calibration sticker is to be located on the "readout component." The system calibration periodicity will be governed by the applicable Class Maintenance Plan and the most restrictive component within that system except where MRC periodicities have been established for the system.

e. A certified FCA technician is required for the operation of calibration equipment called out for use in the performance of any PMS requirement.

9.4 REGIONAL LOAN POOLS. RLPs are established at the FMAs or Regional Calibration Labs to alleviate shipboard maintenance support shortfalls caused by a lack of shipboard GPETE due to calibration or repair requirements.

a. RLPs include a wide variety of calibrated, Ready For Issue items stocked in sufficient quantity to ensure continuous availability.

b. GPETE from the RLPs may be checked out for a specific purpose (i.e., repair of the AN/SPA-40 Radar, PMS of the AN/WSC-3, etc.) or to satisfy a temporary requirement for special purpose items not normally included in the ship's allowance. Pool items are intended as short term substitutes for unavailable shipboard items. Pool items may be checked out for ten working days; however, TYCOM designated support activities may authorize an extension of the ten day limit on a case basis.

c. All returned GPETE shall be inspected in the presence of a representative from the lending FMA and the borrowing command. The original inventory receipt is checked to see if any portion of the GPETE is missing or returned in a damaged condition. GPETE lost, damaged beyond repair, or destroyed must be surveyed by the borrowing command, using procedures established in reference (o). A copy of the completed survey report shall be forwarded to the appropriate TYCOM METCAL Coordinator.

9.5 REPLACEMENT OF GENERAL PURPOSE ELECTRONIC TEST EQUIPMENT.

9.5.1 Depot Level Repairables. GPETE (7Z Cog), certified by an FMA or a higher level activity as BER will be turned into the Naval Supply System.

a. The FMA certifying the GPETE that are BER may turn the defective unit into the Naval Supply System for the customer ship, provided the customer has given the FMA a requisition document number under which a replacement will be ordered. If the FMA turns the defective GPETE into the Naval Supply System, all turn-in data must be given to the customer to assist in any future carcass tracking follow-up investigations by the Naval Supply System.

b. The customer ship may accept return of the defective GPETE from the FMA and initiate turn-in and replacement procedures through the normal Naval Supply System process.

c. Depot Level Repairable GPETE is not processed for survey by an FMA or customer.

9.5.2 Navy Stock Funded. GPETE (1H or 9N Cog), certified by an FMA or a higher level authority as BER will be processed for survey.

a. The FMA certifying the GPETE that are BER must notify the customer of a requirement to survey the defective GPETE. The customer is responsible for initiating a survey action and requisitioning a replacement item through normal Operating Target funded supply channels.

b. The FMA certifying the GPETE may retain the carcass for cannibalization of repair parts, provided the customer has acknowledged that the survey process has been initiated and has provided a copy of the survey document to the FMA.

9.6 ELECTRONIC TEST AND MONITORING SYSTEM INVENTORY MANAGEMENT.

9.6.1 Ship's Portable Electronic Test Equipment Requirements List. The SPETERL is the allowance document for all GPETE, Special Purpose Electronic Test Equipment (SPETE) and FCA calibration standards. Test equipment and FCA calibration standards allowance requirements (quantity and type) are computed on an individual ship's entire configuration of installed electronic equipment, with due consideration for function, quantity, usage, and location of prime equipment. The Allowance Change Request form, NAVSUP 1220-2, is used to request an increase or decrease in the SPETERL allowance.

9.6.2 Test Measurement Diagnostic Equipment Index. Reference (h) is the primary source for determining test equipment uses and requirements. Consult reference (h) to determine the preferred model of test equipment needed to fill a specific deficiency. Test equipment deficiencies fall into two categories, initial outfitting and replacement.

9.6.3 Sub-Category Code. Defines a family of test and measurements parameters. Test equipment within the SCAT code is prioritized, and the TAMS with the lowest priority number is the TAMS currently being procured to fill outstanding deficiencies. SCAT codes are the basis for identifying TAMS on MRCs.

9.6.4 Ship's Configuration and Logistics Support Information System Index. The primary test equipment inventory document for ships. The Ship's Configuration and Logistics Support Information System (SCLSIS) Index must be kept current by the submission of completed OPNAV 4790/CK forms.

9.6.5 Consolidated Test and Monitoring Systems Readiness Assessment.

9.6.5.1 Consolidated Test and Monitoring Systems Readiness Assessment Program. The CTRA Program is a joint fleet program that improves fleet and shore command non-Aviation TAMS readiness. The CTRA also includes the receipt, staging, and redistribution of Fleet excess electronic test equipment, mechanical test equipment and calibration standards used to replace equipment that is missing or BER.

9.6.5.2 Type Commander Metrology and Calibration/Consolidated Test and Monitoring Systems Readiness Assessment Program Managers. TYCOM METCAL/CTRA Program Managers are responsible for the following:

a. Conduct a CTRA during ship Inter-Deployment Training Cycle or Integrated Logistics Overhaul and every 18 to 24 months for shore commands.

b. Budget for the CTRA program as necessary.

c. Develop an annual CTRA schedule as required.

d. Maintain excess test equipment and calibration standards at CTRA staging area for redistribution to fleet activities.

e. Provide assistance on a case-by-case basis for those activities experiencing significant TAMS problems.

9.6.5.2.1 Review Process.

a. Brief ship's department heads, division officers, and technicians.

b. Conduct training for TAMS management and the calibration recall software.

c. Review SPETERL and electronic inventory with the ship's Combat Systems Test Equipment manager. Review will include: Configuration verification of prime systems and Fleet Supplemental Test Equipment Requirements, verification of shipboard inventory and revision to Electronic "E" inventory, prime system updates to Navy configuration database (if during Integrated Logistics Overhaul availability), identification of SPETERL allowance changes based on actual configuration, listing of inoperable items and coordination of repair of items that fill deficiencies, removal of excess equipment from the ship and filling of deficient equipment from CTRA staging assets. Deficient initial outfitting items will be coordinated through NAVSEA.

d. Review Mechanical "S" inventory with the SGCP Coordinator using the CRL or the CIL to determine calibration requirements. Mechanical test equipment will be listed on this mechanical inventory. Use the CRL/CIL to validate the recall inventory.

e. Identify and monitor calibration of overdue TAMS to cognizant Leading Chief Petty Officer and division officer.

f. Provide the results of the assessment to the ship (results will be provided by Integrated Logistic Overhaul for those ships in availability).

9.7 SHIPBOARD GAGE CALIBRATION PROGRAM (SURFACE FORCE ONLY). Commands that have been provided SGCP FCA capability are required to calibrate their Hull, Mechanical & Electrical (HM&E) instruments within the limitations of their calibration standards. HM&E instruments will only be sent to a Fleet Intermediate level calibration activity when the FCA calibration standard does not cover the required measurement range, in emergency situations, or when repair action beyond the capability of the command is required.

a. Each instrument is categorized as either CRITICAL or NON-CRITICAL. CRITICAL instruments are defined as instrumentation that monitor a parameter which is required to be within a specified operating range, or limits to minimize hazards to human safety, or failure of a mission essential equipment or system. All other instruments are classified as NON-CRITICAL, No Calibration Required (NCR).

b. All certified SGCP FCAs shall calibrate all TAMS within their capability. TAMS not authorized for calibration at the organizational level will be scheduled for calibration by the Regional METCAL Coordinator.

c. CRITICAL instruments shall be calibrated by SGCP trained technicians. The SGCP technicians shall place the appropriate METCAL label on the TAMS and add the calibration data into the TYCOM directed recall system. SGCP calibration procedures are found in the PMS CD-ROM Force Revision under work center FCA1, MIP 9802 series. PMS MIPs/MRCs will supersede reference (n) as received. The Force Revision distribution will also include the Metrology Information and Document Automation System CD-ROM.

d. NON-CRITICAL instrumentation will have a NCR METCAL label attached. When an NCR instrument's reliability is suspect, it will be sight compared with a critical instrument or a SGCP standard. When a NCR instrument is repaired or replaced, it will be installed and sight compared with a critical instrument or SGCP standard.

e. The Engineer Officer is responsible for the periodic calibration of all HM&E TAMS. All instrumentation is identified in the MEASURE Calibration Recall Program, "S" inventory. These ship inventories are either developed by NAVSEA or by shipboard engineers:

(1) CRL

(2) CIL.

9.7.1 Calibration Requirements List CD-ROM (N65540xxxxx). The CRL is mailed to the Engineer Officer.

a. The CRL CD-ROM, latest issue, is the primary technical reference for shipboard installed instrumentation and requires Microsoft Access. Functions of the CRL include:

(1) Documents the calibration requirements for installed instrumentation.

(2) Standardizes the identification data for each instrument.

(3) Provides sufficient data for locating an instrument onboard ship.

(4) Lists the calibration interval and maintenance activity (organizational or intermediate) to perform this calibration.

(5) Ship specific listing of all instrumentation. Initially each ship's inventory will be modeled after the class requirements and will require updates to match shipboard configuration.

b. The CD-ROM contains the calibration requirements for the following ship classes: AOE6, ARS, CG, DD, DDG, LHA, LHD, MCM, MHC, and PC.

Step 1. Validate CRL CD-ROM to make ship specific.

Step 2. Submit NAVSEA Technical Manual Deficiency/Evaluation Report, via mail or email, to document adds, deletes, or changes to shipboard configuration.

Step 3. Match CRL CD-ROM data to the MEASURE inventory and report changes to the MEASURE Operational Control Center East or West. Since the CRL and MEASURE do not have matching data elements, review the CRL CD-ROM Users Guide for guidance.

NOTE: ADD POUND SIGN (#) AFTER SUB CUSTODIAN, BLOCK 6, TO INDICATE CRL CAL "Y" OR CRITICAL ITEM. THERE ARE NO CORRESPONDING BLOCKS ON THE MEASURE METER CARD FOR THE REMAINING DATA FOUND ON THE CRL.

c. CRL Format. Description of data elements found in the CRL Users Guide.

9.7.2 Critical Instruments List. Ships without automated propulsion controls (excluding LHD class), indicate only the particular physical parameter that must be monitored by a single critical instrument. The following ship classes are required to have a CIL: AGF, AOE3, LCC, LPD, and LSD37/38.

a. The Engineer Officer is responsible for generating and maintaining a listing of all critical instruments, CIL, including power distribution and switchboard panel mounted meters. Appendices B and C provide guidance on determining the criteria for designating an instrument as CRITICAL. Instrumentation for all ship's systems supporting nuclear weapon safety requirements is critical and must be included on the ship's CIL.

b. Commanding Officers shall submit the CIL to the ISIC for verification and approval annually. Recommendations for changes to a CIL, with a technical explanation, are forwarded to the ISIC for approval.

c. All CRITICAL and NON-CRITICAL installed instrumentation shall be listed in the CIL and the MEASURE inventory. Since the CIL and MEASURE do not have matching data elements, the following data from the CIL will be placed in the following MEASURE Meter card blocks:

CIL DATA ELEMENT	MEASURE DATA ELEMENT
System	Block 2 - Part Of
Location	Block 12 - Sub Category Code
Model or Range	Block 1 - Model/Part Number
Nomenclature	Block 11 - Nomenclature
Critical Instrumentation	Block 14 - Plant Account Number

NOTE: ADD POUND SIGN (#) AFTER SUB CUSTODIAN, BLOCK 6, TO INDICATE CIL CAL "Y" OR CRITICAL ITEM.

d. CIL Format. The CIL format will include as a minimum the following fields. May use TYCOM directed calibration recall program to print MEASURE Format 350 or specific CIL MEASURE Format.

(1) System. The primary ship system where the instrument is installed. Appendix C is a generic list of Critical Instruments.

(2) Model. The manufacturer's model/part number or range of the instrument. Range is the minimum and maximum measurement point of the instrument.

(3) Nomenclature. The noun name of the instrument (i.e. pressure gage, panel meter, etc.).

(4) Work center. Work center responsible for the instrument.

(5) Serial Number. See paragraph 9.7.5 of this chapter.

e. The ship generated CIL and MEASURE inventory will be available to Afloat Training Group Engineering Department and Propulsion Examining Board ship visits.

9.7.3 Shipboard Instrumentation and System Calibration. With the introduction of ship classes with Automated Machinery Control Systems, NAVSEA established the concept of "system calibration". Since the physical parameters are simultaneously measured by instrumentation and monitored by control systems, a divergence in parameter "readings" exists due to system design. System calibration is the process where the instrumentation is calibrated while the control system is aligned to minimize this divergence.

a. The following ship classes are supported under the SISCAL program: AOE6, ARS50, CG47, DD963, DDG51, FFG7, LCAC, LHD, LSD41, MCM, MHC, and PC. These ship classes have the following documentation:

(1) CRL CD-ROM.

(2) Systems Calibration Procedures. System Calibration Procedures contain system and/or component calibration procedures for each instrument listed in the CRL that requires calibration.

b. SISCAL calibration support is provided by FMA SISCAL Teams, Shop 96B, (SIMA Mayport, SIMA Norfolk, and SIMA NRMF Ingleside, SIMA San Diego, Fleet Technical Support Center, Pacific and IMF Pearl Harbor) and the shipboard SGCP FCA. The SGCP FCA will calibrate all instrumentation within their capability.

(1) The SISCAL Report format is promulgated by the TYCOM.

(2) SISCAL Team manning will vary according to the number of teams needed to support the workload in the homeport.

c. COMREGSUPPGRU Regional METCAL Coordinator schedules SISCALs with the ship's ISIC. TYCOM will grant SISCAL extensions on a case-by-case basis.

9.7.4 Calibration Interval. Since calibration intervals are identified in different technical documents, use the following order of precedence for determining and assigning the proper calibration interval:

a. Reactor Plant Manual.

b. PMS documentation.

c. CRL CD-ROM.

d. Reference (g) of this chapter. Unless superseded by PMS, the generic calibration intervals for all other instruments found in Section 2 of reference (g) will be used.

e. System or equipment technical manuals.

9.7.5 Markings for Installed Instrumentation. All installed instrumentation will be clearly labeled with current calibration stickers and have easily read serial numbers. If the instrument does not have a serial number inscribed by the manufacturer, Ship's Force must inscribe a ship generated serial number in a clearly visible location. Attached tags are acceptable for instruments without space for inscribing a serial number. Limit the serial number to 15 characters due to the MEASURE Meter card serial number field size. If an instrument is replaced, the new instrument should be given the same ship generated serial number as the instrument it is replacing with an alpha letter to allow for history to be maintained, i.e. serial number and A, B, C, etc. The ship generated serial number should be as follows:

a. CRL ship. Ship Hull Number, CRL, reference number, and a two digit sequential number (i.e., DD963-00054B-04).

b. CIL ship. Ship Hull Number, work center, four digit sequential number (i.e., DD963FM01-001).

9.8 NAVAL LHA AND LHD CLASS SHIP METROLOGY AND CALIBRATION PROGRAM.

9.8.1 Purpose. To establish the consolidated METCAL program for LHA and LHD class ships. This guidance implements policy and responsibility for the management of TAMS onboard these ship classes. The CNO METCAL policy is promulgated in reference (a).

9.8.2 Background. LHA and LHD class ships have formerly operated three distinct calibration programs: -Aviation Intermediate Maintenance Department (AIMD) FCA for aviation Support Equipment; Combat Systems Electronic FCA supporting GPETE and SPETE for the ship's non-aviation electronic/electrical and weapons systems; and the Engineering SGCP for installed instrumentation associated with HM&E systems. This guidance establishes and describes a consolidation of the three programs into a single program for shipboard calibration support. For the purpose of this section, TAMS are considered to be all shipboard GPETE, SPETE, Support Equipment, calibration standards, and the installed instrumentation which support HM&E systems.

9.8.3 Discussion. The forces afloat METCAL program for LHA and LHD class ships is intended to improve force readiness and self-sustainability through the consolidation of the three existing, separate calibration programs laboratories into a single management entity under the management of the AIMD Officer. This guidance preserves the positive aspects of all previous calibration programs and results in a more efficient use of personnel, a conservation of physical space, and a reduction of expenditures for calibration standards.

9.8.4 Scope. This guidance is directive in nature and may be cited as authority for actions as the need dictates. Reference (i) is a parallel effort onboard aircraft carriers, and may be used as an authoritative reference for overlapping procedures and responsibilities. Reference (m) provides MEASURE documentation procedures. Reference (g) remains the authoritative reference document for all general procedural issues relating to calibration. Reference (b) addresses CNO concepts, policies, organizations, maintenance support procedures and organizational/intermediate maintenance. In the event the contents of this guidance or reference (i) conflict with any directive issued by higher authority, the latter shall prevail.

9.8.5 Applicability. This guidance is applicable for all calibration performed by LHA and LHD class Ship's Force personnel, with the exception of technical matters pertaining to RADIAC equipment, which are the responsibility of Commander, Naval Sea Systems Deputy for Logistics (SEA 04). Nothing in this directive detracts from these responsibilities.

9.8.6 Action.

a. Commanding Officers shall have the overall responsibility for maintaining a high degree of calibration readiness for all TAMS.

b. AIMD Officers shall:

(1) Be the shipboard METCAL program manager.

(2) Be the consolidated FCA manager.

(3) Provide calibration, per the intervals and procedures of reference (g), and repair services for all qualifying shipboard TAMS per reference (i).

(4) Maintain custody of, and be accountable for, all shipboard standards for calibration of TAMS.

(5) Use MEASURE to plan, schedule, monitor, and document the calibration of all TAMS per reference (m).

(6) Staff the shipboard FCA with qualified calibration technicians and provide training to maintain their proficiency.

(7) Ensure all approved calibration standards are available to support the authorized work load.

(8) Ensure all documentation required to support calibration is current and available to personnel operating the FCA.

(9) Produce appropriate documentation or document the repair requirement and record repair accomplishment into MEASURE and the aviation Maintenance and Material Management system.

(10) Calibrate all TAMS within the capability of the onboard FCA. Calibration standards have first priority for calibration, with all other priorities based on mission requirements determined in coordination with affected department heads.

(11) Schedule required calibration and repair requirements beyond the capability of the shipboard FCA to another calibration laboratory. Calibration of NAVAIR Standards and Support Equipment beyond the capability of the FCA shall be authorized and scheduled in accordance with reference (b).

(a) Coordinate the calibration of TAMS which are beyond FCA capability with external resources based on accessibility and cost effectiveness. Five general categories of external resources are available to the FCA. The resources, in order of precedence to be used, are:

1 Ashore AIMDs, FMAs and Regional Calibration Centers.

2 System Command sponsored Navy Calibration Laboratories.

3 Navy depot level activities.

4 Other Department of Defense calibration laboratories approved for use by TYCOM.

5 Commercial calibration laboratories.

(b) Coordinate all TAMS repairs with outside resources. The precedence (based on cost effectiveness) for selecting the outside resource for repairs is:

1 AIMD and FMAs.

2 COMNAVAIRSYSCOM Depot Level Rework Program for Support Equipment and Items (Individual Material Readiness List).

3 Naval shipyards and ship repair facilities.

4 Designated Overhaul Points listed in the Master Repairable Item List.

5 Naval Systems Command field activities.

6 Commercial repair facilities.

NOTE: REPAIR OF NAVAIR STANDARDS AND SUPPORT EQUIPMENT BEYOND THE CAPABILITY OF THE FCA SHALL BE AUTHORIZED AND SCHEDULED IN ACCORDANCE WITH REFERENCE (b).

(c) Submit only operational TAMS for off-ship calibration. All functions and ranges to be calibrated must be operating and usable unless special calibration is requested. Verify all necessary accessories, power cords, and technical manuals, as required to complete the calibration, are included with the instruments at the time of calibration.

(d) Request TYCOM authorization (COMNAVAIRLANT or COMNAVAIRPAC) for overflow repair of calibration standards by one of the following methods:

Email - n422ja@cnal.navy.mil
Fax - Commercial (757) 444-1690, DSN 564-1690
Message - COMNAVAIRLANT Norfolk VA//N422B/N422B2JA

Or

Email - CNAP.METAL@cnap.navy.mil
Fax - Commercial (619) 545-1317, DSN - 735-1317
Message - COMNAVAIRPAC SAN DIEGO CA//N422B1JV/N422B1M//

(12) Coordinate with Commander, Regional Support Center METCAL manager for SISCAL scheduling. AIMD is authorized to calibrate all instrumentation within the capability of the FCA. Ensure SISCAL instrumentation is calibrated at the periodicity listed in the CRL.

(13) Ensure the FCA provides support under the Battle Force Intermediate Maintenance Activity concept.

c. Engineer Officers shall:

(1) Report all TAMS which require calibration to the AIMD Officer for inclusion in the ship's calibration recall schedule upon request.

(2) Deliver portable TAMS for calibration to the FCA per the AIMD managed calibration recall schedule.

(3) Coordinate in-place calibration requirements for non-portable TAMS with the AIMD Officer.

(4) Ensure only operational TAMS are submitted for calibration. All functions and ranges to be calibrated must be operating and usable unless special calibration is requested. Verify all necessary accessories, power cords, and technical manuals, as required to complete the calibration, are included with the instruments at the time of submission.

(5) Notify the AIMD Officer and, when applicable, the Combat Systems Officer, of any TAMS inventory changes, TAMS configuration changes, CRL changes that may affect the calibration recall schedule or require additional calibration procedures or standards.

(6) Maintain the allowance quantities of authorized TAMS.

(7) Report the inventory and configuration of all TAMS supporting HM&E systems and combat support systems using the SCLSIS.

(8) Maintain a ship specific CRL or Critical Instruments List for ship HM&E systems and combat support systems.

(9) Submit all TAMS repair requirements to the AIMD Officer. A formal repair request, such as a Visual Information Display System/Maintenance Action Form (VIDS/MAF) or an OPNAV 4790/2K, is not required for repair by the shipboard FCA. MEASURE METER cards will be provided by the ship's calibration laboratory.

d. Air Officers shall:

(1) Report all TAMS eligible for calibration to the AIMD Officer for inclusion in the ship's calibration recall schedule.

(2) Deliver portable TAMS for calibration to the FCA per the AIMD managed calibration recall schedule.

(3) Ensure only operational TAMS are submitted for calibration. All functions and ranges to be calibrated must be operating and usable unless special calibration is requested. Verify all necessary accessories, power cords, and technical manuals, as required to complete the calibration, are included with the instruments at the time of submission.

(4) Coordinate in-place calibration requirements for non-portable TAMS with the AIMD Officer.

(5) Notify the AIMD Officer and, when applicable, the Combat Systems Officer, of any TAMS inventory changes, TAMS configuration changes that may affect the calibration recall schedule, in-place calibration requirements or require additional calibration procedures or calibration standards.

(6) Maintain the allowance quantities of authorized TAMS.

(7) Submit all TAMS repair requirements to the AIMD Officer. A formal repair request, such as a VIDS/MAF or an OPNAV 4790/2K, is not required for repair by the shipboard FCA. MEASURE meter cards will be provided by the ship's calibration laboratory.

e. Combat Systems Officers shall:

(1) Report all portable and installed GPETE or SPETE eligible for calibration to the AIMD Officer for inclusion in the ship's calibration recall schedule.

(2) Deliver portable TAMS for calibration to the FCA per the AIMD managed calibration recall schedule.

(3) Ensure only operational TAMS are submitted for calibration. All functions and ranges to be calibrated must be operating and usable unless special calibration is requested. Verify all necessary accessories, power cords, and technical manuals, as required to complete the calibration, are included with the instruments at the time of submission.

(4) Notify the AIMD Officer of any TAMS inventory changes, TAMS configuration changes that may affect the calibration recall schedule or require for additional calibration procedures or calibration standards.

(5) Maintain GPETE/SPETE inventories in quantities allowed in the SPETERL. Include funding procurement of TAMS when assets are not available through CTRA programs.

(6) Report the inventory and configuration of all TAMS supporting combat systems using SCLSIS.

(7) Submit all TAMS repair requirements to the AIMD Officer. A formal repair request, such as VIDS/MAF or an OPNAV 4790/2K, is not required for repair by the shipboard FCA.

9.9 NUCLEAR PROPULSION CALIBRATION REQUIREMENTS. Nuclear propulsion plant gages, meters, thermometers, and other instruments in those reactor plant systems specified by reference (p) must be calibrated in accordance with the requirements of the applicable Reactor Plant Manual. Other nuclear-powered ship's system calibration must be performed per the requirements of reference (a).

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APPENDIX A

SAMPLE CALIBRATION OVERFLOW ASSIGNMENT MESSAGE

FM (TYCOM DESIGNATED SUPPORT ACTIVITY)//
TO (ACTIVITY DESIGNATED TO PERFORM CALIBRATION)//
USS (SHIP'S NAME AND HULL NO.)//
INFO NAVSURFWARCENDIV CORONA CA//MS42//
TYCOM (AS APPROPRIATE)//
BT
UNCLAS //N04734//
SUBJ/CALIBRATION TAMS/STDS OVERFLOW LANTFLT USS (SHIP'S NAME AND HULL NO.)//
MSGID/GENADMIN/(TYCOM)REGSUPPGRU//
REF/A/DOC/COMFLTFORCOMINST 4790.3//
AMPN/REF A IS JOINT FLEET MAINT MAN/VOL VI CH 9 PROVIDES GUIDANCE FOR CAL OVERFLOW ASSIGNMENT//
RMKS/1. IAW REF A REQ CAL/REPAIR SVCS FOR GPETE. MECH/MIRCS STDS/FECL STDS OVERFLOW ITEMS BEYOND THE FMA CAPABILITY. CAL REQUIRED EA RANGE AND FUNCTION/(NO) MERCURY COMPONENTS LISTED.

ITEM	FSCM	NOMEN	ICP	MPN/RANGE	SER NR	DMR
A.						
B.						
C.						

2. FOR OVERFLOW ACTIVITY: PASS TO (APPROPRIATE INDIVIDUAL).
3. FOR USS (SHIP'S NAME AND HULL NO.)/DLVR ITEMS (ITEM NUMBER FROM PARA 1 ABOVE) TO (OVERFLOW ACTIVITY ADDRESS AND CONTACT POINT) SUBMIT CURRENT PRE-PRINTED 3M AWR OR METER CARD WITH EACH ITEM//
BT

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

SAMPLE

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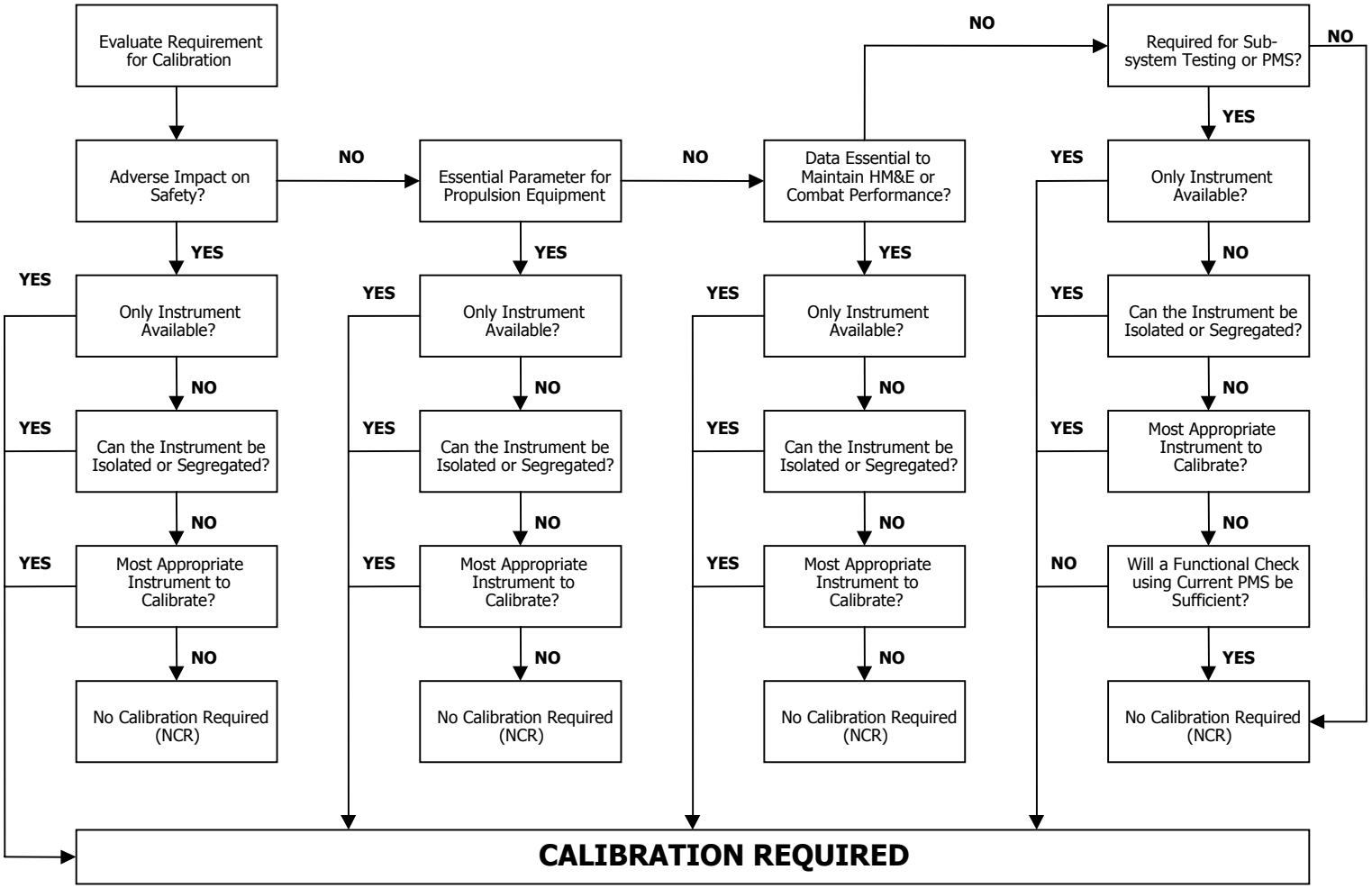
APPENDIX B

CALIBRATION DECISION LOGIC TREE



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APPENDIX C

GENERIC CRITICAL INSTRUMENT LIST

For Naval Surface Ships' Steam and Diesel Powered Propulsion Plants and Auxiliary Systems. As a minimum, one critical instrument that measures the parameters indicated as follows must be calibrated in each applicable system, plant, or major component (i.e. for each lube oil system, each main engine, etc.).

FUNCTION	INSTRUMENT
Boiler Air Casing Pressure	Gage, Inches, Water
Economizer Feedwater Inlet Temperature	Thermometer
Boiler Water Level	Indicator, Level
Steam Drum Pressure	Gage, Pressure
Main Steam Temperature	Thermometer
Main Steam Superheater Outlet Pressure	Gage, Pressure
Main Steam Superheater Outlet Temperature	Thermometer
Desuperheater Steam Pressure	Gage, Pressure
Desuperheater Outlet Temperature	Thermometer
Auxiliary Steam Pressures	Gage, Pressure, Compound.
Main Turbine Steam Chest Pressures	Gage, Pressure
Main Turbine Steam Chest Inlet Temperatures	Thermometer
Main Turbine 1st Stage Pressures	Gage, Pressure
Astern Steam Pressure	Gage, Pressure, Compound.
Turbine Exhaust Temperatures	Thermometer
Turbine Exhaust Trunk Pressures	Gage, Pressure
Turbine Exhaust Trunk Temperatures	Thermometer
Main Condenser Vacuum	Gage, Vacuum
Main Condenser Discharge Pressure	Gage, Pressure
Steam Assist Burner Atomizer Pressure	Gage, Pressure
Steam Assist Burner Atomizer Temperature	Thermometer
Main Feed Pump Discharge Pressure	Gage, Pressure
Main Feed Pump Lube Oil Pressure	Gage, Pressure
Main Feed Booster Pump Discharge Pressure	Gage, Pressure
Emergency Feed Pump Steam Inlet Pressure	Gage, Pressure
Emergency Feed Pump Discharge Pressure	Gage, Pressure
Deaerating Feed Tank Pressure	Gage, Pressure, Compound.
Deaerating Feed Tank Temperature	Thermometer, Bimetallic.
Deaerating Feed Tank Level	Indicator, Level
Forced Draft Blower Speed	Tachometer
Forced Draft Blower Lube Oil Pressure	Gage, Pressure
Forced Draft Blower Lube Oil Temperature	Thermometer, Bimetallic.
Forced Draft Blower Bearing Temperature	Thermometer, Bimetallic
Fuel Oil Service Pump Discharge Pressure	Gage, Pressure
Fuel Oil Service Pump Lube Oil Cooler Outlet Temperature	Thermometer
Fuel Oil Supply Pressure to Burners	Gage, Pressure
Electric Fuel Oil Service Pump Discharge Pressure	Gage, Pressure
Diesel Oil Purifier Pressure	Gage, Pressure
Main Lube Oil Strainer Inlet/Outlet Pressure	Gage, Diff. Press.
Main Lube Oil Pressure to Most Remote Turbine Bearing	Gage, Pressure
Lube Oil Temperature from Cooler	Gage, Pressure
Main Lube Oil Service Pump Discharge Pressure	Gage, Pressure

FUNCTION	INSTRUMENT
Main Reduction Gear Lube Oil Pump Discharge Pressure	Gage, Pressure
Main Shaft Thrust Bearing Temperatures	Thermometer, Bimetallic.
Auxiliary Steam Pressure to Main Condenser Air Ejector	Gage, Pressure
Auxiliary Exhaust Steam Pressure to Deaerating Feed Tank	Gage, Pressure, Compound
Gland Seal Steam Pressures	Gage, Pressure
Distilling Plant Feedwater Pressure	Gage, Pressure
Distilling Plant Temperature, All Stages	Thermometer, Bimetallic.
Distilling Plant Feedwater Heater Outlet Temperature	Thermometer, Bimetallic.
Distilling Plant 1st Stage Feed Pressure	Gage, Pressure
Salinity Systems	Indicator, Salinity
Fire/Flushing Main Pump Discharge Pressure	Gage, Pressure
Fire/Flushing Main Pump Bearing Temperatures	Thermometer
Fire/Flushing Reducing Station Pressure	Gage, Pressure
Emergency Fire/Flushing Pump Discharge Pressure	Gage, Pressure
Sea Chest Injector Temperature	Thermometer
Ship Service Turbo Generator Inlet Pressure	Gage, Pressure
Ship Service Turbo Generator 1st Stage Pressure	Gage, Pressure
Ship Service Turbo Generator Lube Oil Pressure	Gage, Pressure
Ship Service Turbo Generator Bearing Temperatures	Thermometer, Bimetallic.
Ship Service Turbo Generator Governor Control Oil Pressure	Gage, Pressure
Ship Service Turbo Generator Speed	Tachometer
Ship Service Turbo Generator Air Box Temperature	Thermometer
Ship Service Turbo Generator Exhaust Pressure	Gage, Pressure, Compound.
Ship Service Turbo Generator Condenser Vacuum	Gage, Pressure, Compound.
Ship Service Turbo Generator L/O Strainer Inlet/Outlet and Differential Pressure	Gage, Pressure
60/400 Hz and DC Electrical Power Supply and Conversion Switchboards and Panels	All Instruments
Emergency Switchboard	All Instruments
Emergency Diesel Generator Engine Gageboard	All Instruments
Interior Communication Switchboards and Panels	All Instruments
Degaussing Switchboards and Panels	All Instruments
Minesweeper Generator Switchboard/Pilot House	All Instruments
Minesweeper Generator Diesel Engine RPM (Engine Gage Board and Pilot House)	Tachometer
Ship Service Air/Control Air Compressor Air Pressure	Gage, Pressure
Ship Service Air Compressor Lube Oil Pressure	Gage, Pressure
Ship Service Air Compressor Cooling Water Pressure	Gage, Pressure
Ship Service Air Compressor Cooling Water Temperature	Thermometer
High Pressure Air Line Pressure	Gage, Pressure
High Pressure Air Compressor Lube Oil Pressure	Gage, Pressure
Medium Pressure Air Flask Pressure	Gage, Pressure
Automatic Boiler Combustion Control Gage Board	All Instruments
Air Conditioning Chill Water Supply/Return Temperature	Thermometer
Air Conditioning Chill Water Supply Pressure	Gage, Pressure
Air Conditioner Suction	Gage, Pressure
Air Conditioner Lube Oil Pressure	Gage, Pressure
Radar Sea Water/Chilled Water Pump Discharge Pressure	Gage, Diff. Press.
Radar Distilled Water Pump Discharge Pressure	Gage, Pressure
Radar Distilled Water Supply Temperature	Thermometer
Sonar Sea Water/Chilled Water Pump Discharge Pressure	Gage, Diff. Press.

FUNCTION	INSTRUMENT
Sonar Distilled Water Pump Discharge Pressure	Gage, Pressure
Sonar Distilled Water Supply Temperature	Thermometer
NTDS (Naval Tactical Data System) Sea Water/Chilled Water Pump Discharge Pressure	Gage, Pressure
NTDS Distilled Water Pump Discharge Pressure	Gage, Pressure
NTDS Distilled Water Pump Supply Temperature	Thermometer
Sea Water-Fresh Water/Sea Water-Air Heat Exchanger Inlet Pressure	Gage, Pressure
Automotive Gas Purge Source Pressure	Gage, Pressure
Automotive Gas Purge Station Pressure	Gage, Pressure
JP-5 Replenishment-At-Sea (RAS) Station Pressure	Gage, Pressure
JP-5 Purifier Inlet Pressure	Gage, Pressure
JP-5 Purifier Discharge Pressure	Gage, Pressure
JP-5 Transfer Filter/Separator Differential Pressure	Gage, Diff. Press.
JP-5 Service Filter/Separator Differential Pressure	Gage, Diff. Press.
JP-5 Service Station Discharge Pressure	Gage, Pressure
Steering Gear Main Hydraulic Pump Outlet Pressure	Gage, Pressure
LOX/LN2 Charging Pump Discharge Pressure	Gage, Pressure
LOX/LN2 Tank Level, Capacity	Indicator, Level
LOX/LN2 Tank Level, Differential	Indicator, Level
LOX/LN2 Inner Tank Pressure	Gage, Pressure
O2N2 Producer Air Supply Pressure	Gage, Pressure
O2N2 Producer CO2 Absorber Pressure	Gage, Pressure
O2N2 Producer HP Distillation Column Pressure	Gage, Pressure
O2N2 Producer LP Distillation Column Pressure	Gage, Pressure
O2N2 Producer, Liquid Level, HP Distillation Column Pressure	Indicator, Level
O2N2 Producer, Liquid Level, LP Distillation Column Pressure	Indicator, Level
Refrigeration Unit, R-22 Discharge Pressure	Gage, Pressure
Refrigeration Unit, R-22 Suction Pressure	Gage, Pressure
Refrigeration Unit, R-22 Interstage Pressure	Gage, Pressure
Refrigeration Unit, R-22 Oil Pressure	Gage, Pressure

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VOLUME VI

CHAPTER 10

MOTOR GASOLINE HANDLING AND STORAGE

REFERENCES.

(a) NAVSEA S9086-SP-STM-010 - NSTM Chapter 542 (Gasoline and JP-5 Fuel Systems)
(b) COMNAVAIRLANT/COMNAVAIRPACINST 3400.4 - Air Department Standard Operating Procedures

10.1 PURPOSE. To provide guidance and safety requirements for the storage, handling and loading of Motor Gasoline (MOGAS) aboard ship.

10.1.1 Discussion. In view of the special hazards involved in the handling of MOGAS, Commanding Officers must ensure strict compliance with all MOGAS handling safety instructions, Cargo Fuel Operational Sequencing System (CFOSS) (as applicable), references (a) or (b) and this chapter. The Commanding Officer's approval shall be obtained prior to any MOGAS operation. The Aviation Fuels Officer, or other officer as may be directed by the Commanding Officer, shall be directly responsible for the planning of all MOGAS operations (i.e., loading, off-loading or transfer of gasoline, etc.), and the operation of the MOGAS system, including the training of all MOGAS operation and handling personnel. Any deviation from the safety precautions and procedures of reference (a) or this chapter shall have the approval of the appropriate Type Commander. Additionally, the Commanding Officer may specify any additional safety precautions to be taken as the situation dictates.

10.2 CHARACTERISTICS.

a. Gasoline is a highly volatile liquid that gives off vapors under all environmental conditions. This vapor, when combined with air in the proper proportion (approximately 1.4 to 7.6 percent by volume), forms an explosive mixture that can be set off by any ignition source such as a slight spark or flame. If liquid gasoline is present, the violent explosion will be followed by fire.

b. Air, at ordinary atmospheric temperature, can absorb as much as 28 percent gasoline vapor. Gasoline vapors are three to five times heavier than air, and when released, will tend to sink to the lowest level of a compartment. Liquid gasoline will expand 0.7 percent for each ten degree increase in temperature.

10.3 PERSONNEL HAZARDS. Gasoline and gasoline vapors are extremely toxic; breathing air that is rich in gasoline vapor can and has caused unconsciousness and in some cases death. Gasoline vapors, even in concentrations of less than 1.0 percent, may cause nausea and headaches if inhaled for any length of time. Strong concentrations of gasoline vapors produce an excited state leading to unconsciousness. Gasoline saturated clothing will cause irritation and severe burns to the skin and will ignite if exposed to a source of ignition. Gasoline splashed in the eyes can cause blindness. Severe physical and mental complications may result from inhalation or body absorption. Ship's personnel shall be instructed in the characteristics of MOGAS and the necessary precautions to prevent personnel injury by exposure to MOGAS or its vapor.

10.4 STORAGE AND HANDLING.

10.4.1 Tank Conditions. Ships with installed MOGAS tanks/systems will maintain them in one of the following conditions at all times.

a. Tank is empty and gas free certified.

b. Tank is filled with water (Cofferdam may or may not be inert).

c. Tank is filled with gasoline and water (Cofferdam must be inert).

d. Gasoline has been pumped off and the tank is full of water with trace amounts of gasoline. The Cofferdam will remain inert until the tank has been flushed three times in accordance with the CFOSS and has been turned over to an industrial activity or contractor. In no case will the tank be emptied until the industrial activity or contractor is ready to gas free the tank.

10.4.2 Loading and Off-loading.

a. Before transferring MOGAS, the planning phase must include:

(1) Time the operation will start and its expected duration.

(2) CFOSS training of all involved personnel for their respective watch stations. All involved personnel must be Personnel Qualification Standard qualified for their assigned operating stations. A CFOSS talk-through and walk-through must be completed prior to commencing any MOGAS evolution.

(3) Stationing of special fire fighting personnel and their equipment, as required by the CFOSS, plus any additional requirements mandated by the Commanding Officer.

(4) Control of the smoking lamp.

(5) Setting of material condition "YOKE".

(6) Use of non-ferrous (spark-proof) tools.

b. Loading and off-loading of MOGAS to or from the installed ship's system shall be conducted pier-side. Since the MOGAS tanks overflow directly overboard, any single tank shall normally never be filled above 80 percent capacity. Operational necessity, as dictated by the appropriate Type Commander, may require the tank to be filled to 95 percent. During this time, additional precautions must be taken as follows:

(1) MOGAS pumping shall be reduced to the minimum rate.

(2) Posting of additional overboard discharge watches.

(3) Loading only that amount of gasoline that has been calculated to fill the tank to 95 percent.

c. Most MOGAS inventory requirements are controlled by the Fleet Marine Force. They will make necessary arrangements for the delivery and/or pickup of the MOGAS. The ship will be responsible for requesting, by message, an on-load/off-load date and time, and an alternate date and time, for the evolution to commence. This message information will be provided to the local Naval Base Commander and Base Fire Marshal.

d. The Base Fire Marshal shall ensure that all fire fighting equipment is in position, rigged and properly manned. Additionally, the Base Fire Marshal shall ensure that all MOGAS connections are tight, and that no leaks are apparent when the pumps are started.

e. Constant communication shall be maintained between all operating stations throughout the evolution.

f. The Ship's Fire Marshal will ensure that fire fighting equipment is rigged and manned in accordance with the CFOSS and ship's regulations.

g. Sample MOGAS per the requirements identified in paragraph 10.4.3.b below.

10.4.3 Identification and Sampling Requirements.

a. Only unleaded gasoline is used aboard naval ships with installed gasoline tanks. MOGAS color can range from light red to a straw color.

b. MOGAS samples shall be taken for laboratory analysis during on-load evolutions at the following times; just prior to starting the evolution, at approximately the mid point, and just prior to completion. During off-load, laboratory samples need only be taken just prior to commencing the off-load evolution. Gasoline samples must be clearly marked and handled with extreme care.

10.4.4 Safe Handling of Motor Gasoline.

a. Maintain all portable and installed fire fighting equipment and alarm systems in proper operational condition.

b. Maintain all grounding cables in proper operational condition.

c. Conduct frequent inspections to ensure system integrity and tightness.

d. Hold frequent fire fighting drills, with particular emphasis on the MOGAS system and storage tanks.

e. Immediately clean up any spilled or leaked gasoline and dispose of any rags or other cleanup material in accordance with ship's instructions.

f. Gasoline shall not to be used for cleaning purposes under any circumstances.

g. When the MOGAS system is in use, maintain a security watch in accordance with the requirements of the CFOSS. When the system is secured, the aviation fuels watch shall inspect the MOGAS system to ensure that there are no leaks, and that the inert readings and pressures are satisfactory.

10.4.5 Containerized Motor Gasoline. Gasoline in drums, bladders or cans shall be located on the weather deck only, and stored so that the containers can be readily jettisoned as described in reference (a).

10.5 MOTOR GASOLINE ASSESSMENT PROGRAM.

a. The MOGAS Assessment Program has been established to assist Ship's Force personnel in the operation and maintenance of the installed MOGAS systems. This program requires an assessment to be conducted on each MOGAS equipped ship; annually, prior to on-load or off-load of MOGAS evolutions, and prior to an industrial or Fleet Maintenance Activity Availability.

b. The MOGAS Assessment Program shall be conducted by the ISIC, and will consist of the following elements:

(1) Conducting required assessments, and providing assessment reports to the appropriate Type Commander and Fleet Commander.

(2) Taking corrective action on minor discrepancies and providing guidance for repairs of major discrepancies.

(3) Providing On the Job Training for operators and maintenance personnel, as requested.

(4) Reviewing and validating the Coordinated Shipboard Allowance List, CFOSS, Planned Maintenance System, Personnel Qualification Standard and the associated technical manuals.

(5) Providing assistance during MOGAS on-load or off-load evolutions, as requested.

(6) Performing assist visits when requested by the ship.

VOLUME VI

CHAPTER 11

MAINTENANCE, REPAIR AND OVERHAUL OF SERVICE CRAFT, LANDING CRAFT AND SMALL BOATS

REFERENCES.

(a) OPNAVINST 4780.6 - Policy for Administering Service Craft and Boats in the U.S. Navy
(b) OPNAVNOTE 4780 - Service Craft and Boats Accounting Report (SABAR)
(c) NAVSEA S9086-TX-STM-010 - NSTM Chapter 583 (Boats and Small Craft)
(d) NWP 1-03.1 - Naval Warfare Publications Operational Report
(e) NAVSEA S9086-HB-STM-010 - NSTM Chapter 233 (Diesel Engines)

11.1 PURPOSE. To provide guidance and assign responsibilities for the maintenance and repair of service craft, landing craft and small boats.

11.1.1 Policy.

a. Personnel assigned to individual ships, service craft or responsible shore based activities shall perform all landing craft, service craft and boat maintenance within their capabilities.

b. Landing craft, small boats and service craft shall be maintained with the same care that naval ships receive. This is particularly true for boats which also serve as ready lifeboats.

c. (Submarine Force only) If there is no Unit Identification Code (UIC) assigned to the craft, the parent command's UIC and a unique Work Center will be used for Current Ship's Maintenance Project control and any related OPNAV 4790/2K (see Volume VI, chapter 19, Appendix D of this manual).

11.2 MATERIAL READINESS.

a. Regular periodic inspections of landing craft, small boats and service craft shall be conducted by the command to which the craft is assigned (referred to hereafter as the "parent command"). Use Fleet Maintenance Activity (FMA) facilities to conduct the required periodic inspections, whenever possible. The results of these inspections will determine the need for repairing a craft or boat. Submit overhaul and major maintenance items (i.e., engine overhauls and hull repairs beyond the ability of the parent command) to the appropriate Type Commander (TYCOM), no later than 15 January for the current and following two years. The requests for maintenance must cite the boat or craft hull number and the fiscal year quarter in which the overhaul or major maintenance availability is desired. Any significant changes to previously submitted maintenance requests must be discussed in detail (i.e., material condition of the craft affected by the change, operational commitments requiring changes, etc.).

b. To conserve repair funds and assets, and to maintain craft and boats in a satisfactory state of material readiness, Commanding Officers of ships and shore activities shall set up a training program for all personnel connected with the operation and maintenance of craft and boats. Pride of ownership should be instilled in boat crews and assigned unit personnel. Use available personnel and funds to the fullest extent possible before requesting help from the FMA to perform routine or emergent repairs.

c. Active service craft are inspected by the Service Craft Material Inspection Board, per reference (a), to support industrial availability planning. Deficiencies identified by the Service Craft Material Inspection Board must be entered in the Current Ship's Maintenance Project prior to the Work Definition Conference. Service craft parent commands shall ensure reference (b) accurately reflects the current status of requested availabilities.

d. TYCOMs will aid parent commands with landing craft, small boat and service craft industrial availabilities by:

(1) Scheduling Restricted Availabilities or Technical Availabilities.

(2) Establishing overhaul cycles including, budgeting, scheduling, and funding per the requirements of reference (b).

11.3 MAINTENANCE OF LANDING CRAFT AND SMALL BOATS ASSIGNED TO AFLOAT UNITS.

a. Commanding Officers are urged to take full advantage of the FMA facilities for Ship's Force upkeep and repair of their landing craft and boats. A limited quantity of hand and power tools and air compressors are available at the FMA for Ship's Force use. Ships may borrow these tools by sending a properly prepared work request (OPNAV 4790/2K) directly to the FMA/Regional Support Group (RSG). Depending on the workload, assist teams from the FMA/RSG may be available to assist with the inspection of boats and craft. COMNAVSURFLANT and COMNAVSURFPAC ships and units shall obtain tools from the FMA per the requirements of Volume VI, Chapter 30 of this manual.

b. Ship personnel desiring to make use of FMA/RSG facilities should send a work request (OPNAV 4790/2K) to the FMA/RSG requesting crane services to handle the craft or boat and stowage space for accomplishing the work. Limited repair material not normally available on board ship, may be obtained from the FMA/RSG by including required items in the work request.

c. If long usage or extensive damage to any boat or landing craft is such that repairs by Ship's Force cannot keep a boat or craft in a proper state of readiness, a work request (OPNAV 4790/2K) must be submitted to the FMA/RSG via the TYCOM or Immediate Superior In Command (if assigned). The work request must show the following additional information in Section IV of the OPNAV 4790/2K:

(1) Boat or landing craft registry number.

(2) Complete description of the work requested.

d. The FMA/RSG will accept such requests, provided that:

(1) The ship is not scheduled for a routine Chief of Naval Operations (CNO) Maintenance Availability in the immediate future.

(2) The repairs are beyond the capacity and/or capability of Ship's Force to accomplish.

(3) Enough time in advance of the ship's next scheduled operation is allowed for the FMA to perform the repairs and return the boat or landing craft to the ship before departure.

e. When a boat or landing craft is badly damaged, a statement of the circumstances surrounding the damage must be submitted with the request for repairs.

f. Before delivery of a boat or landing craft to the FMA for repairs, Ship's Force must accomplish the following:

(1) Remove all items of outfitting and all portable parts invoiced with the hull, including compass, tools, batteries, and portable lights.

(2) Drain and clean the bilges of dirt, diesel fuel, and oil. When it is not possible to deliver the boat or landing craft in the above condition, the repair activity will be notified in advance so that arrangements can be made for gas free inspections.

g. Reference (c) provides details for transfer, receipt, disposal and survey of boats and landing craft. Replacement boats or landing craft are normally available from Naval Sea Systems Command (NAVSEA), via the TYCOM, upon receipt of a valid Boat Inspection Report per reference (c).

h. If the FMA cannot accomplish the requested boat or landing craft repairs, the Commanding Officer of the FMA will advise the ship to request a Technical Availability from the TYCOM.

11.3.1 Landing Craft and Small Boat Repairs During Chief Of Naval Operations Maintenance Availability.

a. Hull repairs affecting strength and watertight integrity beyond the capability of Ship's Force are considered urgent items. Ship's Force shall ensure that the required repairs are included in the work package for screening at the Work Definition Conference.

b. Boats and landing craft which do not require work by an industrial activity should normally accompany the ship during the availability. Stowage areas can usually be made available at the industrial facility for accomplishment of Ship's Force work. Commanding Officers should not overlook the facilities available at FMAs for accomplishment of this work while the ship is undergoing a CNO Maintenance Availability.

c. Tests of landing craft and boat lifting gear shall be accomplished during the ship's CNO Maintenance Availability in accordance with reference (c) and Volume IV, Chapter 13 of this manual.

11.4 MAINTENANCE OF SERVICE CRAFT, LANDING CRAFT AND SMALL BOATS ASSIGNED TO SHORE ACTIVITIES, GROUP AND SQUADRON COMMANDERS.

11.4.1 Unit Level Maintenance.

a. Maintenance and repair of craft and boats within the capability of the parent command should be budgeted, scheduled, and accomplished to maintain a high state of material readiness. Commands and activities shall appoint a Maintenance Officer as a sole point of contact for all matters relating

to boat and craft maintenance. The Maintenance Officer shall be capable of making maintenance decisions based on engineering and operational parameters and should actively participate in the planning and execution of all maintenance actions affecting the parent command.

b. Annual budget proposals submitted by the parent commands to their TYCOM shall address anticipated funding requirements to maintain the material condition of all assigned boats and craft, the accomplishment of approved modifications and modernization work (within the parent command's capability), and must discuss in detail how these funds will be applied to specific craft or boats.

c. Request for changes to boat or craft inventories, resulting from mission requirement changes, must be assessed in terms of maintenance capabilities and budget constraints. Approval of such changes may require the TYCOM to adjust the units Operating Target allocation for maintenance. The impact on maintenance support for changes in inventory must be assessed for each unit by the TYCOM before instituting changes.

11.4.2 Fleet Maintenance Activity Level/Contractor Assist Maintenance.

a. Repairs to craft and boats which are beyond the capabilities of the parent command, shall be documented on work requests (OPNAV 4790/2K) and submitted to the cognizant FMA/RSG for accomplishment. Repair funds for craft and boats are budgeted for FMA activities, on a quarterly basis, by the TYCOM. Individual craft and boat work packages will be screened by the TYCOM to ensure accomplishment within allocated funding.

b. Work requests which are screened as beyond the capability of the FMA will be submitted to the TYCOM for screening to an industrial activity. Industrial repairs are normally programmed for accomplishment during scheduled craft or boat overhauls or Restricted/Technical Availabilities, unless the repairs are of an emergent nature and have been documented with a Casualty Report in accordance with reference (d). FMAs/RSGs will accept emergent work requests, to clear Casualty Reports, on a case basis with TYCOM approval.

c. Shore based commands which have craft or boat repairs being accomplished by industrial activities retain the responsibility for these repairs. The parent command is responsible for maintaining liaison with the industrial activity and keeping the TYCOM informed, via the RSG/Immediate Superior In Command, of problems or potential problems.

11.4.3 Overhaul of Service/Landing Craft and Small Boats.

a. A four to five year overhaul cycle has been established by the CNO for self-propelled service craft, high value boats and landing craft (e.g., SLWTs, service craft and LCUs). For other craft and boats, the necessity for overhaul is determined by usage and material condition and will generally be conducted every four to five years or as required by reference (a).

b. Service/landing craft and boats undergo CNO Maintenance Availabilities to accomplish major maintenance and modernization items which, in the judgment of the TYCOM, are beyond the unit or FMA capability. All high value boats, landing craft and service craft receive complete and thorough availabilities within the available funding. The primary goal is to accomplish all outstanding repairs and major maintenance items to ensure reliable operations during the craft's projected operational cycle.

c. There are basically two distinct types of availabilities applicable to boats and service/landing craft:

(1) Supervisor of Shipbuilding administered industrial availabilities using a work package consisting of OPNAV 4790/2Ks.

(2) CNO Maintenance Availabilities administered through the Naval Supply Center (contracting agency) by the FMA/RSG for smaller craft/boats with less extensive maintenance and repair packages.

d. After the Work Definition Conference, and before the contracting authority (Supervisor of Shipbuilding/Naval Supply Center) issues the Invitation for Bids to potential bidders, the TYCOM and parent command will review the copies of the bid specifications for accuracy and completeness. The parent command must complete the review quickly and report any discrepancies to the TYCOM. The TYCOM will resolve any discrepancies in the bid specifications with the contracting authority before the Invitation for Bids is released.

e. Post-repair trials for craft and boats are conducted, as applicable, per Volume II, Chapter 3 of this manual.

11.5 RESPONSIBILITIES. For both types of industrial availabilities identified in paragraph 11.4.3.c of this chapter the following responsibilities are assigned:

11.5.1 Type Commander.

a. Coordinate all aspects of the advance planning.

b. Authorize all new industrial work items.

c. Authorize all growth in an existing industrial work item.

d. Provide funding to accomplish all authorized work.

e. Monitor and approve all changes in established milestones (internal milestones, used by the industrial activity to monitor schedule progress, are not subject to TYCOM approval).

f. Direct appropriate action when the quality or completeness of the industrial activity work is in question.

11.5.2 Immediate Superior In Command. (if not assigned, these functions will revert to the TYCOM)

a. Review overhaul progress reports.

b. Review Ship's Force and FMA concurrent work.

c. Ensure pertinent directives are followed concerning the safety of personnel and equipment.

d. Attend sea trial and overhaul completion review conferences.

e. Assist in all aspects of the planning and monitoring of industrial availabilities.

11.5.3 Commanding Officers of Parent Commands.

a. Coordinate all planning aspects of craft and/or boat overhauls with the TYCOM and Immediate Superior In Command (where assigned).

b. Prepare and submit overhaul progress reports in accordance with Volume II, Chapter 3 of this manual.

c. Ensure enough trained personnel are assigned to on-site monitoring of craft or boats while in an industrial availability.

d. Fulfill all responsibilities for safety of craft and personnel.

11.6 REPAIR AND OVERHAUL OF SMALL BOAT ENGINES.

a. Boat and craft custodians shall repair and maintain engines on a continuing basis, using their Operating Target. Replacement parts shall be obtained through the Navy Stock system, when available, to prevent the potential for using erroneous parts and to simplify stocking of parts.

b. Craft and boat engine overhaul intervals are determined by engine operating hours as specified in reference (e) and/or, for engines over 400 Brake Horsepower, by trend analysis.

c. Boat Alterations are issued for the replacement of engines no longer supported by the supply system. Direct questions concerning the status of obsolete engines to NAVSEA (PMS 325) or the TYCOM.

d. All spare boat engines, or engines being turned in for replacement, must be preserved in accordance with reference (e) and stored in an enclosed protective compartment.

11.6.1 Boat Alterations.

a. Submit Boat Alteration requests to NAVSEA, (PMS 325) via the chain of command.

b. The accomplishment and funding of approved Boat Alteration shall be managed by the TYCOM.

11.7 OPERATION OF SMALL BOAT ENGINES. The operation and maintenance of all diesel engines on boats and craft shall be in accordance with reference (e).

VOLUME VI

CHAPTER 12

DEGAUSSING

REFERENCES.

(a) OPNAVINST C8950.2 - Magnetic Silencing
(b) NAVSEA S9086-QN-STM-010 - NSTM Chapter 475 (Magnetic Silencing)
(c) NAVSEA S9475-AC-PRO-010 - Degaussing Forms, Records and Reporting Procedures
(d) NAVSEA S5475-AL-PRO-010 - Principles and Procedures for Magnetic Treatment of Ships
(e) SSPINST 8950.2 - Procedure for Fleet Ballistic Missile (FBM)/Strategic Weapons System (SWS) Components During Flash-Deperm Treatment of an SSBN

12.1 PURPOSE. To provide magnetic silencing and deperming requirements, and the check ranging and reporting procedures defined by reference (a). Reference (b) provides the basic principles and background of degaussing.

12.2 DEGAUSSING DEFINITIONS.

12.2.1 Deperming. Deperming is the magnetic treatment of a ship's hull to minimize permanent magnetism. All newly constructed ships require deperming. The deperming needs of operational ships are established by check ranging.

12.2.2 Installed Degaussing System. A shipboard system which reduces the residual permanent and induced magnetic signature of the ship, and is the ship's primary passive mine countermeasure system.

12.2.3 Check Ranging. The action of a ship making reciprocal range runs over an instrumented range, at a Magnetic Silencing Facility (MSF), for purposes of measuring the ship's degaussed magnetic signature. Check ranging is the principle method of determining the effectiveness and reliability of installed degaussing systems. A satisfactory check range is two range runs on reciprocal headings within a six week period which are determined to be magnetically satisfactory while ship's degaussing equipment is operating properly. Degaussing range services are available at the following locations:

San Diego, CA	Norfolk, VA
Pearl Harbor, HI	Mayport, FL
Yokosuka, Japan	Bangor, WA
Kings Bay, GA	

12.2.4 Degaussing Folder. The Degaussing Folder (NAVSEA 8950/1) is an official ship log. It contains instructions for operation of the degaussing system, degaussing charts, values for current and turn settings, installation forms, compass compensation forms, and a log section showing all pertinent details of magnetic treatment and of action taken on the ship's degaussing system for the information of degaussing authorities. The degaussing folder is issued to a ship by the MSF that renders the initial magnetic treatment and system calibration. Reference (c) provides the detailed requirements for maintaining the degaussing folder.

12.2.5 Degaussing Watch List.

a. The Degaussing Watch List is a list of all degaussing actions required on U.S. Navy ships with installed degaussing systems. The watch list is compiled and distributed by Naval Sea Systems Command based on recommended degaussing actions submitted by the MSF, industrial activities, and other official sources.

b. Each item on the Degaussing Watch List will show the name of the deficient ship and a brief explanation of the circumstances on which the required degaussing action is based (e.g., unsatisfactory magnetic condition, faulty degaussing system, lack of trained degaussing personnel, etc.), and the nature of the required actions to be taken. Degaussing Watch List items are indexed by number and urgency codes for future reference.

c. Afloat units are provided copies of the Degaussing Watch List by Naval Sea Systems Command for those items that apply to their configuration. Type Commanders are provided copies of all Degaussing Watch List items and periodic summaries issued by the MSF.

12.3 SHIPS WITH INSTALLED DEGAUSSING SYSTEMS.

a. Reference (a) mandates check ranging for ships. To meet minimum requirements, a satisfactory check range is required every six months. Requirements for the check ranging of ships are as follows:

(1) After new construction.

(2) Before and after a major dry-docking availability.

(3) After a major shock to the hull from a nearby explosion.

(4) After grounding or collision.

(5) As feasible, before entering mined waters.

(6) Before issuing a Casualty Corrected of any Casualty Report degaussing equipment.

(7) At every opportunity, when entering or leaving a port with ranging facilities. **Declining use of range facilities is not an option**.

b. When ranging facilities are not available in the home port, ships will satisfactorily check range annually.

(1) Ships forward deployed to areas without ranging facilities are exempted from check range requirements by reference (a).

(2) Ships not equipped with an installed degaussing system are not required to check range.

c. A ship which becomes the subject of a Degaussing Watch List item should send an OPNAV 4790/2K deferred action for Current Ship's Maintenance Project (CSMP) documentation. When the item has been corrected, and upon completion of satisfactory check ranging, the ship must submit a completed action document to update the CSMP.

d. Installed degaussing systems will be operated at all times while underway.

12.3.1 Check Ranging.

a. Before check ranging, contact the range facility by voice radio or by flashing light. For best results, ensure the range is clear of other shipping (including tugboats) before crossing.

b. Ranging facility requires the following information:

(1) Coil Settings. Once the ship is on course, and before the ship crosses the range, inform the facility of actual ammeter currents and polarities. Ensure the meter readings are correct for both zone and polarity.

(2) Ship's Draft. Forward and aft drafts. Provide actual keel drafts, vice navigational drafts.

(3) Ship's heading. If more than five degrees off channel course, provide the range with the actual ship's heading. Once the course is established, maintain a steady course and constant speed between 8 to 10 knots, or as the range operator directs.

12.3.2 Responsibilities.

12.3.2.1 Type Commander/Immediate Superior In Command.

a. Monitor the degaussing readiness of assigned ships.

b. Ensure that ships "check range" as required.

12.3.2.2 Ship Commanding Officer.

a. Maintain ship's installed degaussing system. Ensure ship's magnetic signature is minimized by periodic check ranging.

(1) Ships unable to check range or unable to establish communications with the MSF shall make comments as appropriate in the remarks section of the daily Operational Reports.

(2) **Ships with installed systems may not decline check ranging**.

b. Maintain ship's Degaussing Folder.

12.4 SUBMARINES WITHOUT INSTALLED DEGAUSSING SYSTEMS. The submarine force shall maintain all units in the best degaussed condition within expected areas of operation. Expected areas of operation include zones .22, .33, .44, and .55 as shown in reference (d). Operations in zone .55 will necessitate additional treatment, since presently used flashing procedures are designed to provide protection only in zones .22, .33, and .44. Normally, ships are automatically ranged by degaussing facilities as they transit channels between the hours of 0800-1600 weekdays only. Weekend ranging can be arranged with the MSF on a case basis. Reference (a) mandates check ranging for ships. To meet minimum requirements, a satisfactory check range is required annually during peacetime or semi-annually during war time. Other requirements for check ranging of ships are as follows:

a. Before and after Post Shakedown Availability (following new construction).

b. After a CNO Maintenance Availability.

c. After a major shock to the hull from a nearby explosion.

d. After grounding or collision.

NOTE: THE ABOVE ARE THE MINIMUM RANGING REQUIREMENTS. EVERY OPPORTUNITY FOR RANGING SHOULD BE USED TO ENSURE EARLY IDENTIFICATION AND CORRECTION OF MAGNETIC SILENCING DEFICIENCIES.

12.4.1 Responsibilities.

12.4.1.1 Immediate Superior In Command.

a. Ensure that ships check range as required.

b. Schedule ships with unsatisfactory magnetic signatures for flash deperming at the earliest opportunity.

12.4.1.2 Ship Commanding Officer.

a. Ensure ship's magnetic signature is minimized by periodic check ranging.

b. Inform the ISIC upon receipt of an unsatisfactory ranging.

c. Maintain the ship's Degaussing Folder.

d. Undergo flash deperming as directed by the ISIC or TYCOM.

e. Before flash deperming prepare ship's equipment and off-load/protect material in accordance with references (b) and (e). Additional guidance can be obtained from the MSF.

VOLUME VI

CHAPTER 13

CORROSION CONTROL

REFERENCES.

(a) NAVSEA S9086-VD-STM-010/020/030 - NSTM Chapter 631 Volumes 1, 2 and 3 (Preservation of Ships In-Service)

13.1 PURPOSE. To provide basic guidelines necessary to maintain an effective Corrosion Prevention and Control Program. Guidance for prevention and repair of corrosion on ships is contained in reference (a) which supersede all previous class specific Corrosion Control Manuals distributed by Naval Sea Systems Command.

13.1.1 Background. Protective coatings are the most widely used method of corrosion control. These protective coatings have specific applications, therefore, the physical location and operating environment should be taken into consideration when choosing a coating system. Through the application of improved corrosion prevention and control techniques, procedures, and materials, longer lasting and more effective results can be obtained with a reduction in man-hours spent on preservation.

13.2 RESPONSIBILITIES.

13.2.1 Fleet Maintenance Activity.

a. Maintain facilities and sufficient qualified personnel to apply protective coatings.

b. Conduct Technical Assist Visits upon request from a ship during a Fleet Maintenance Activity Availability, or at other times as the workload permits, to include:

(1) Identification of shipboard topside corrosion problem areas.

(2) Recommendations for methods and means of corrosion problem correction.

(3) Informing Ship's Force of local industrial assets, including local Fleet Maintenance Activity, other industrial facilities (i.e., industrial activities) or Commercial Industrial Services assets.

(4) Self-help information for Ship's Force.

(5) Technical assistance on setting up and updating a ship's Corrosion Prevention and Control Program.

13.2.2 Surface Ships.

a. Set up an ongoing corrosion prevention and control program, including all topside structure, equipment, machinery, fixtures, combat and weapons systems, and components, using reference (a) for guidance.

b. Take planned and/or corrective action on all potential discrepancies, and enter all significant discrepancies into the Current Ship's Maintenance Project.

c. Include requests for Corrosion Control Technical Assist Visits in the Fleet Maintenance Activity Availability work packages at least annually, and as necessary.

13.2.3 Submarines. Corrosion control for submarines is covered in Volume VI, Chapter 27 of this volume.

VOLUME VI

CHAPTER 14

CANNIBALIZATION

REFERENCES.

(a) COMSUBLANT/COMSUBPACINST 4406.1 - Submarine Supply Procedures Manual
(b) NWP 1-03.1 - Naval Warfare Publication Operational Report

LISTING OF APPENDICES.

A Sample Cannibalization Request Message

14.1 PURPOSE. To provide guidance for active ship cannibalization and the resultant payback process between ships.

14.1.1 Policy. Cannibalization between active Fleet units is not a normal peacetime practice and will not occur unless:

a. A significant degraded readiness condition has been reported.

b. All possible actions have been taken to satisfy the material requirement through other means.

c. The impact on maintenance personnel has been considered.

14.2 DEFINITIONS.

14.2.1 Self-Cannibalization. When a component is available on board the ship, but in a less essential or already inoperative piece of equipment, it may be desirable for the ship to disable the equipment/system to correct a casualty to a more critical piece of equipment or system. Such self-cannibalization is the prerogative of the Commanding Officer. Self-cannibalization is a temporary measure to return a more critical piece of equipment to an operational status. Replacement of the cannibalized component may or may not be required.

14.2.2 System Cannibalization. System cannibalization is cannibalization of system assets beyond the Type Commander's (TYCOM) purview, including other TYCOM end-use material and inactive ship equipment and components. System cannibalizations are a supply system action whereas active cannibalizations are a maintenance action. TYCOM expediters will initiate all system cannibalizations.

14.2.3 Active Ship Cannibalization. Active ship cannibalization is removal of component(s)/equipment installed in an active ship (or component(s)/equipment removed for overhaul from an active ship) for installation in another active ship. Because of the adverse effects of active ship cannibalization, such action will be taken as a last resort and only in exceptional cases when all other sources have been exhausted. When active ship cannibalization is authorized, the primary source for cannibalization are ships in Chief of Naval Operations Maintenance Availabilities, with recourse to operational ships only as a last resort.

14.3 AUTHORIZATION (Active Ship). Conditions upon which authorization decisions are based, include the following criteria.

a. There is an urgent operational requirement for the equipment and the existing degradation to the equipment/system is considered to be unacceptable to meet the specific operational commitments.

b. A Casualty Report (CASREP) and a Not Operationally Ready Supply requisition for the material or component to be cannibalized have been issued. The scheduled or estimated delivery date must be such that the parts will not be available from the designated supply stocking point in time to achieve satisfactory material readiness at least seven days prior to an underway date or operational commitment. The required part must not be available from other equipment on board the ship, where such equipment is not essential for the ship to accomplish its mission.

c. All other sources, including screening of all ashore supply support sources, afloat inventory assets, local fabrication and system cannibalization have been exhausted.

d. Operational alternatives such as delays in deployment and gaping requirements have been considered. Routine operations may not, at the TYCOMs discretion, be sufficient cause to justify active ship cannibalization.

e. TYCOMs will normally initiate the cannibalization when the Immediate Superior In Command (ISIC) has recommended the action under special circumstances or to meet urgent operational commitments.

14.3.1 Commander Naval Surface Force Pacific Ships.

a. Cannibalization Not Involving Ships in Overhaul. When a system asset is not available and if the degree of readiness degradation (normally C3/C4 CASREP) warrants such action, the only remaining alternative is to cannibalize from an active ship. Approval of active ship cannibalization actions (not involving ships in overhaul) required to satisfy C3/C4 CASREP requirements will be at the lowest appropriate command level. If transferring and receiving ships are in the same squadron, the squadron commander is authorized to approve; if in different squadrons but the same group, the group commander is authorized to approve. If ships are in different groups, the group commander of the transferring ship is authorized to approve the cannibalization upon request from the receiving ship's group commander. Approval by the applicable group exercising operational or administrative control is required in all cases involving cannibalization for C2 CASREPs and non-CASREP requirements.

b. Cannibalization Involving Ships in Availabilities. Cannibalization from ships in availabilities will be minimized since such actions often effect maintenance/operational schedules for several ships. Cannibalization may be initiated only after non-availability of C3/C4 CASREP materials through the supply system or alternate sources has been ascertained. Cannibalization from ships in overhaul/ availability must be approved by the applicable availability manager (i.e., Commander Naval Surface Force Pacific (COMNAVSURFPAC), Commander Naval Surface Group Pacific North West (COMNAVSURFGRUPACNORWEST), Commander Logistics Western Pacific (COMLOGWESTPAC) or Commander Naval Surface Group Middle Pacific (COMNAVSURFGRUMIDPAC). Requests must be submitted via the chain of command.

c. COMNAVSURFPAC (N43) and (N4111) will be included as information addressees for tracking purposes on all cannibalization request and approval messages.

14.3.2 Commander Naval Surface Force Atlantic Ships. All cannibalization shall be authorized by the TYCOM based upon the recommendation of the ISIC.

14.3.3 Naval Air Force Ships. All cannibalization shall be requested from and authorized by the TYCOM. The request and authorizations will be via message. The requesting message will specify the source of replacement parts, and will reference communications indicating the cannibalized ship's Commanding Officer's concurrence with the cannibalization action. The message shall further specify the method of replacement.

14.3.4 Submarine Force Ships. Cannibalization actions shall be requested from and authorized by the TYCOM. In some unique circumstances, intra-squadron cannibalization to resolve CASREPs may be authorized by the Squadron Commander. In all cases cannibalization shall be in strict compliance with Appendix J of reference (a).

14.4 REQUEST AND AUTHORIZATION. The following procedures apply when requesting authorization for active ship cannibalization:

14.4.1 Requesting Ship.

a. Submit a CASREP in accordance with reference (b) on equipment involved.

b. Submit a Not Operational Ready Supply requisition for the parts.

c. Specify the required delivery date. Verify, through the supply system, the part will not be available in time to correct the casualty.

d. Determine that the required parts are not available from on board stock, other ships of the force in the same port, or other non-essential equipment on board the requesting ship.

e. Initiate an active ship cannibalization request via naval message. Appendix A of this chapter contains a sample cannibalization message.

14.4.2 Immediate Superior In Command. When assigned, the ISIC will perform the actions listed below. Where not assigned these functions revert to the responsible TYCOM.

a. Ensure the criteria for active ship cannibalization has been met. This may require TYCOM expediter assistance.

b. Nominate possible sources of cannibalization from ships within the force.

c. When required, request authorization from the TYCOM to cannibalize from a ship within the force.

14.4.3 Type Commander.

a. Confirm that cannibalization is necessary and that all prerequisites for active ship cannibalization, including attempts to supply the components from afloat storeroom spares and system cannibalization, have been met.

b. Determine whether cannibalization is feasible from a ship within the force.

c. If cannibalization is not feasible from a ship within the force request assistance from other TYCOMs.

14.5 PROCEDURES. The following procedures apply when cannibalization is authorized:

14.5.1 Type Commander.

a. Authorize the ISIC (where assigned) to cannibalize from a ship within the Force and provide direction concerning the method of payback to the cannibalized ship. Normally this is done by having the outstanding parts ordered by the receiving ship diverted to the cannibalized ship.

b. When the ship to be cannibalized is undergoing a Chief of Naval Operations Maintenance Availability in an industrial activity, request the industrial activity or Supervisor of Shipbuilding, as appropriate, to perform the cannibalization and to issue replacement parts.

c. Track the payback. The cannibalized ship will monitor/expedite the item(s) requisitioned for payback.

14.5.2 Immediate Superior In Command. When assigned, the ISIC will perform the actions listed below. Where not assigned these functions revert to the responsible TYCOM.

a. Monitor the delivery of cannibalized part(s) to the ship to ensure the parts are received as soon as possible.

b. Request the appropriate FMA/Regional Support Group to assist in performing the cannibalization, to include the removal of the cannibalized parts and providing rigging services, as appropriate.

14.5.3 Requesting Ship. When directed the ship requesting the cannibalized part will:

a. Assist the cannibalized ship, as requested, with the removal of the parts from the equipment.

b. Ensure the outstanding requisition for the cannibalized parts remains active unless otherwise directed by the TYCOM or the supply inventory control point. This requisition is the payback and will be diverted to the cannibalized ship.

14.5.4 Cannibalized Ship. When directed, the cannibalized ship will:

a. Remove the requested parts, prepare shipping documents, package the parts for shipment and deliver the items to the shipping activity, or deliver directly to the requesting ship, as appropriate.

b. Keep the chain of command advised of the supply status of the required parts. The cannibalized ship should follow-up the outstanding requisition(s), and acknowledge receipt of payback material.

APPENDIX A

SAMPLE CANNIBALIZATION REQUEST MESSAGE

FM USS (SHIP'S NAME AND HULL NO.)//(CANNIBALIZING SHIP)
TO TYCOM/ISIC//(AS APPROPRIATE)
INFO TYCOM/ISIC//(AS APPROPRIATE)
NAVICP MECHANICSBURG PA//03113//
USS (SHIP'S NAME AND HULL NO.)//(CANNIBALIZED SHIP)
BT
UNCLAS //N04400//
SUBJ/ACTIVE SHIP CANNIBALIZATION REQUEST//
MSGID/GENADMIN/USS (ORIGINATING SHIP'S NAME AND HULL NO.)//
REF/A/MSG/USS (SHIP'S NAME AND HULL NO.)/(DTG)//
REF/B/DOC/COMFLTFORCOMINST 4790.3//
NARR/REF A IS PROCEDURE FOR INITIAL CASREP/REF B IS FLEET MAINT MAN VOL VI CHAP 14 PROVIDING TYCOM POLICY ON ACTIVE CANNIBALIZATION.//
RMKS/1. TO CORRECT CASREP IAW REF A ON BOARD USS (SHIP'S NAME AND HULL NO.) REQ ACTIVE SHIP CANNIBALIZATION PER REF B. FOLLOWING MATL REQMNT APPLIES:

A.(EQUIPMENT)/(EIC)
B.(CASREP SERIAL NO.)/(C-RATING)
C.(SHIP'S STATUS - D-DEPLOYED; N-NON-DEPLOYED; P-PRE-DEPLOYED; RR-ROH; S-SPECIAL OPS)
D.(COG SYM-NSN/FSCM-PART NUMBER/NOMENCLATURE)
E. (APL NO.)
F. (CIRCUIT SYMBOL, IF APPLICABLE)
G.(QTY REQUIRED)/(QTY ALLOWED)/(QTY ON HAND).

2. SUGGESTED SOURCE IS USS (SHIP'S NAME AND HULL NO.) (CANNIBALIZED SHIP) IF REQUIRED PAYBACK BY DIVERSION. RECONSIGNMENT OF REQN USS (SHIP'S NAME AND HULL NO.) (CANNIBALIZING SHIP) OUTSTANDING REQN (REQUIRED INFORMATION). STATUS AB1/EST AVAIL DATE (DAY, MONTH, YEAR).
3. CANNIBALIZATION ACTION NECESSARY FOR USS (SHIP'S NAME AND HULL NO.) (CANNIBALIZING SHIP) TO MEET (DEPLOYMENT SCHEDULE), (OTHER JUSTIFICATION AS APPROPRIATE)//
BT

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

SAMPLE

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VOLUME VI

CHAPTER 15

AMMUNITION OFF-LOAD

REFERENCES.

(a) NAVSEA OP-4 - Ammunition Afloat
(b) NAVSEA S9086-CH-STM-030 - NSTM Chapter 074 Volume 3 (Gas Free Engineering)

15.1 PURPOSE. This chapter provides guidance and actions to be taken concerning the status of shipboard ammunition and explosives for ships and craft entering an availability whose duration will be in excess of 6 weeks.

15.1.1 Policy. Except for those instances where operational requirements dictate the exception, the policies of reference (a) **must** be adhered to. Operational requirements dictating non-compliance with reference (a) will be addressed in a Type Commander (TYCOM) request for waiver.

15.2 ACTION. Pyrotechnics (except those within life raft containers) and any ammunition which cannot be stowed in sprinkler-protected magazine spaces will be off loaded. Such magazine spaces need not be located below the main deck or waterline of the ship. All ammunition and pyrotechnics must be removed from ready service locations, launchers, and boats. Retention of other ammunition on board may be authorized on a case basis by the Naval Base Commander, Shipyard Commander or Supervisor of Shipbuilding (SUPSHIP), as applicable, provided the following mandatory requirements are met:

NOTE: TYCOM CONCURRENCE IS REQUIRED BEFORE AMMUNITION OFF-LOAD FOR A RESTRICTED AVAILABILITY.

a. If an overriding operational requirement exists, precluding the off-load of all ammunition, the TYCOM will certify that requirement to the cognizant Shipyard Commander/SUPSHIP and/or Naval Base Commander, as applicable.

b. Concurrence of the cognizant Shipyard Commander/SUPSHIP and/or Naval Base Commander must be obtained. This concurrence is based on an evaluation of the work to be done, the spaces involved, the security and damage control capabilities to be maintained on board during the availability, as well as other environmental factors.

c. Within the ship, hot work of any type will not be performed in a space or compartment containing ammunition, or adjacent to a compartment or space containing ammunition. If either condition is expected to exist during the availability, the ammunition in the affected compartment must be off-loaded before starting the availability. For hot work required on external parts of the ship, the requirement for one intervening compartment may be waived by the Shipyard Commander/ SUPSHIP, as applicable, if satisfied with the safety precautions to be taken. For all hot work in the ship, observe the safety and fire precautions in reference (b).

d. Notification shall be made to the base and/or industrial activities emergency services, including fire, security, safety and medical organizations, that ammunition remains on board.

e. There shall be no handling, re-stowage, test sampling or on/off-loading of ammunition while the ship is within an industrial activity.

f. The ship's fire prevention and damage control organizations must remain in effect at all times throughout the availability.

g. Placards and warning signs shall be properly posted per reference (a) for specific spaces containing ammunition.

15.3 NOTIFICATION. When a ship or craft is scheduled to enter a commercial industrial activity, and approval has been granted to allow ammunition to remain on board, the United States Coast Guard Captain of the Port, within whose jurisdiction the industrial activity is located, shall be informed as to name and hull number of the ship, and the types and quantities of ammunition remaining on board. Should there be no cognizant Captain of the Port office, notify the cognizant Coast Guard District Commandant.

VOLUME VI

CHAPTER 16

HABITABILITY

REFERENCES.

(a) OPNAVINST 9640.1 - Shipboard Habitability Program
(b) NAVSEA S9600-AD-GTP-010 - U.S. Navy Shipboard Furniture Catalog
(c) NAVSUP S6161-Q5-CAT-010 - Ship Food Service Equipment Catalog
(d) NAVSEAINST C9210.4 - Changes, Repairs and Maintenance to Nuclear Powered Ships
(e) NAVSEAINST 9210.14 - Changes to Submarine Tenders and Destroyer Tenders with Nuclear Support Facilities, Requirements Concerning

LISTING OF APPENDICES.

A Sample Habitability OPTAR Augment Funding Request
B Advance Planning Milestones

16.1 PURPOSE. To provide guidance in the requirements for implementing various self-help habitability programs, and to identify the sources of assistance available for these programs.

16.1.1 Policy. The Chief of Naval Operation's (CNO) shipboard habitability policy, as set forth in reference (a), sets specific minimum standards for new construction and commissioned naval ships, establishes procedures for attainment, and assigns responsibility for implementation.

a. Expenditure of ship's Operating Target (OPTAR) on habitability improvements, tools, and shipboard furniture and fixtures is considered a part of this program. Funds allocated to habitability must be obligated wisely to ensure the maximum, positive impact on shipboard quality of life.

b. Procurement of furnishings and food service equipment shall conform to references (b) and (c).

c. Unauthorized alterations and rearrangements are prohibited.

d. Changes to spaces or systems covered by references (d) and (e) shall be approved by Naval Sea Systems Command (NAVSEA) and conform to the requirements of Chapter 3 section 3.8 of this volume.

16.1.2 Discussion. Shipboard habitability encompasses ship's systems and facilities which satisfy the basic human needs of the crew. Included are facilities and systems for eating, sleeping, personal hygiene, ventilation, climate control, and recuperative or leisure activity. Since funds are severely limited, a well managed habitability program is essential to ensure ships conform to the minimum standards of shipboard habitability.

16.2 HABITABILITY IMPROVEMENT PROGRAMS.

16.2.1 Ship's Force Habitability Improvement Projects. A short range program, initiated, planned and scheduled by the ship. This program uses ship's OPTAR funds, with the majority of the work being accomplished by Ship's Force.

a. These projects are intended to be practical, workable, short-range projects representing the individual Commanding Officer's strategy for the enhancement of living quarters and personnel services areas on board ship.

b. The emphasis of this program is to improve existing living conditions and the quality of life to meet the standards of reference (a) using Ship's Force labor and, when approved, special habitability fund augmentation. Allocation of these limited funds will be on a "fair share" basis in relation to Force requirements.

c. Not all livability items fall within the purview of ship's habitability improvement projects or qualify for special habitability fund augmentation. Items of the following nature are not within the scope of this program.

(1) Replacement of consumable items such as mattresses, pillows, or utensils. These items should be programmed for regular OPTAR funding on an incremental basis.

(2) Improvements such as furnishings and lighting in working spaces and passageways which are more properly categorized as improvements in safety and/or operations.

(3) Unauthorized modifications or alterations. This includes alterations which affect compartment size or location, or add false bulkheads, overheads, or new equipment not previously installed.

(4) Normal ship maintenance and organizational repair responsibilities.

(5) The deck coverings such as tile, terrazzo, PRC, etc. which are available via the Regional Support Group/ISIC Commercial Industrial Services contracts.

d. Ship's OPTAR funds may be used to renew existing bulkhead sheathing and false overheads in food preparation, medical, dental, flag, Commanding Officer, Executive Officer, chapel, wardroom, and Chief Petty Officer (CPO) messing and lounge areas. Existing sheathing and false overheads in crew messing areas may be replaced when unserviceable. Sheathing and false overheads in all other areas will be removed when unserviceable and will not be replaced. There will be no new installations of bulkhead sheathing or false overheads.

e. Due to the fiscal and physical limitations on this program, individual ships should develop a sensible, realistic and continuing plan for improving overall living conditions, with most of the work to be accomplished by Ship's Force.

f. Commanding Officers may request funds to support an emergent Habitability Improvement Project through the chain of command at any time. The request should contain an itemized listing, in prioritized order, with location, nomenclature, National Stock Number (NSN), cost estimate, and other clarifying information.

g. When requesting funds to replace food service equipment, comply with Type Commander (TYCOM) supply procedures. All requests must have clear and concise justification. Appendix A of this chapter provides a sample request letter.

16.2.2 Naval Sea Systems Command Habitability Self-Help Program. A formalized long range program, using fleet maintenance funds and Ship's Force labor for the accomplishment of NAVSEA approved habitability upgrade alterations during CNO Maintenance Availabilities.

a. This program uses Ship's Force to accomplish TYCOM authorized and funded habitability upgrade projects. This program assigns contractor services for design and engineering support, procurement development and monitoring, overall management, and on board technical assistance during installation. The major advantage of this program is the professional technical advisor who shows untrained and inexperienced Ship's Force personnel how to do the work.

b. A five year NAVSEA Habitability Self-Help Program Plan is developed by the TYCOM to aid in advance planning and budgeting. Ships are selected for induction into the Self-Help Program based on years in-service, non-compliance with the Category II standards of reference (a), and the general scope of habitability deficiencies as noted by the Board of Inspection and Survey inspection and other available documentation. Ship's Force input to the Five-Year Plan is encouraged.

c. NAVSEA Habitability Self-Help Program Projects should be prioritized in the following order.

(1) Crew/CPO Berthing.

(2) Crew/CPO Sanitary Spaces.

(3) Troop Spaces.

(4) Food Preparation and Service Spaces.

d. Per the authority of reference (a), the TYCOM may task and fund Fleet Technical Support Center (FTSC) to perform the following:

(1) Design habitability alterations for Forces Afloat accomplishment.

(2) Prepare and monitor requisitions for materials.

(3) Perform engineering services and offer installation technical assistance.

16.2.2.1 Self-Help Program Responsibilities.

16.2.2.1.1 Chief of Naval Operations.

a. Authorize the Self-Help Program.

b. Establish shipboard habitability standards based on recommendations of the CNO shipboard habitability steering group.

16.2.2.1.2 Naval Sea Systems Command.

a. Establish technical policy and administer the NAVSEA Habitability Self-Help Program.

b. Prepare feasibility studies.

c. Approve furnishings, fixtures, and materials.

d. Develop installation procedures.

e Prepare Alteration records.

f. Perform ship surveys incident to the development of plans.

g. Prepare and approve drawings for space arrangements, ventilation, piping, and electrical modifications.

h. Identify all required equipment, manpower requirements, and necessary tools, working stock, and safety devices.

i. Prepare procurement documents and coordinate procurement with the supply activity.

j. Establish preliminary schedule.

k. Assign technical advisors to guide Ship's Force during installation.

l. Aid Ship's Force in developing training requirements for specific projects.

16.2.2.1.3 Type Commander.

a. Develop the Five Year Plan and establish priorities for attainment of standards.

b. Plan, schedule, coordinate, and monitor projects.

c. Authorize, budget, and fund the NAVSEA Habitability Self-Help Program.

16.2.2.1.4 Supply Activity.

a. Prepare, contract, and procure materials.

b. Administer other associated contracts.

16.2.2.1.5 Ship Commanding Officer.

a. Report habitability deficiencies to TYCOM.

b. Assign project manager and petty officer supervision for projects.

c. Assign the labor force for removal, space preparation, and installation under technical advisor supervision.

d. Conduct training programs.

e. Accept delivery, store, and account for materials.

f. Maintain custody of tools for removal and installation.

g. Report changes affecting repair parts support to Naval Inventory Control Point.

h. Report completion to the TYCOM with summary of lessons learned.

i. Ensure Ship's Selected Records are updated, as appropriate.

16.2.2.2 Self-Help Project Milestones.

a. Advance Planning Letter. This TYCOM generated letter identifies Self-Help Projects proposed for accomplishment, and provides work scope details including Ship's Force manpower requirements. This letter also requests Commanding Officer's comments, concurrence, and commitment of resources to the proposed projects. Advanced Planning milestones for scheduled projects are listed in Appendix B of this chapter.

b. Project Confirmation Letter. Following receipt of the Commanding Officer's concurrence with the proposed work scope and commitment of resources, the TYCOM confirms the projects. Thereafter, any modification or change to the scope of the projects will adversely affect scheduled milestones and could result in project deferral or cancellation.

c. Project Authorization. Upon receipt of the Commanding Officer's project start request, normally about two weeks before the start of the maintenance availability, the TYCOM evaluates readiness to begin the project and authorizes the project to be started. Rip-out shall not proceed until receipt of this authorization.

16.2.2.3 Self-Help Project Completion Report. Following completion of the project, the Commanding Officer shall prepare a letter describing the project experience, which will be used by the TYCOM to update planning and installation practices. The letter should include the name and designation of the project, funds expended, certification that Integrated Logistics Support procedures have been followed, and any significant problems encountered, improvement recommendations, or lessons learned. Forward completion letters on all authorized projects via the chain of command to the TYCOM.

16.2.2.4 Integrated Logistics Support Reporting. Ship's Force is responsible for submitting any necessary OPNAV 4790/CK forms for Coordinated Shipboard Allowance List (COSAL) support. The TYCOM will send as-built data and configuration drawings, as well as weight and moment effects, if any, to the NAVSEA Program Manager, Supervisor of Shipbuilding Newport News (SUPSHIP NN), Code 1800 and the designated Planning Yard, as applicable.

16.3 NEW CONSTRUCTION SHIPS. U.S. Navy ships are built to meet habitability standards of reference (a). Prior to certifying the ship's readiness for In-Service, the ISIC will conduct a Habitability Inspection to determine that the ship is materially ready for the crew to move aboard. The results of the Habitability Inspection shall be reported to the TYCOM by message per Volume I, Chapter 3 of this manual.

16.4 NAVAL AIR FORCE SPECIFIC HABITABILITY IMPROVEMENT PROGRAMS.

16.4.1 Aircraft Carrier Climate Control Investigating Team.

a. The Aircraft Carrier Climate Control Investigating Team (ACCCIT) provides technical assistance to improve aircraft carrier habitability through specific improvements to air conditioning, heating, and ventilation systems serving manned spaces. The TYCOM schedules an ACCCIT visit once per interdeployment training cycle but no greater than 24 months.

b. 30 days prior to the visit, the ship will provide a list of 25 spaces the ship requests to be inspected to SUPSHIP NN, Code 1800 (Nuclear Powered Aircraft Carriers)/TYCOM (other Aircraft Carriers) with an information copy to the TYCOM. Criteria for the spaces to be nominated are as follows:

(1) Normally manned.

(2) Spaces are being utilized as designated. Voids/storerooms that have been converted to offices/workshops by Ship's Force without alteration authorization will not be investigated.

(3) Space has not been investigated during a previous ACCCIT unless all discrepancies were corrected and a problem still exists.

(4) Main Propulsion and Auxiliary equipment spaces.

c. During the visit, the team will provide On the Job Training (OJT) for the ship's ventilation team, validate alteration requirements, validate Planned Maintenance System coverage and assist in the preparation of Current Ship's Maintenance Project (CSMP) deferrals to document discrepancies found. Additionally, with Ship's Force assistance, the team will correct deficiencies as they are discovered if within their capability. Upon completion of the visit, a formal report will be issued listing discrepancies discovered, status of each, correction responsibility and recommended alterations. The TYCOM will utilize this report to conduct follow-up shipchecks to track completion of discrepancies.

16.4.2 Enhanced Quality Of Life Program.

a. The Enhanced Quality Of Life (EQOL) Program was developed to achieve and maintain high standards of material and operational readiness of food and hotel services equipment through intensified work definition, configuration analysis, corrective maintenance, and programmed and emergent equipment replacements.

b. The EQOL program is a cooperative effort involving the Aircraft Carrier TYCOMs, Ship's Material and Supply Divisions, and SUPSHIP NN, Code 1800 (Nuclear Powered Aircraft Carriers only). TYCOM Ship Material Officers and Supply Officers provide overall program direction and funding. Ship's Force is instrumental in determining the requirements and opportunity for correction of material deficiencies. SUPSHIP NN, Code 1800 (Nuclear Powered Aircraft Carriers)/TYCOM (other Aircraft Carriers) provide program management and administers material procurement.

c. The EQOL program key objectives are:

(1) Advance planning.

(2) Technical expertise and continuity.

(3) Standardization of approved shipboard food/hotel service equipment.

(4) Achievement of full Allowance Parts List supportability.

(5) Maintenance and grooming support planning.

d. All desired habitability improvements which require a permanent change to the basic characteristics of a ship require approval from higher authority. The general method of obtaining approval is through the submission of an alteration request, as outlined in Chapter 3 of this volume. The EQOL program is not intended to supplant alteration requests or to accomplish any configuration changes. Repair, general refurbishment and maintenance, or replacement, that is within Ship's Force capability, normally does not require approval from higher authority.

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APPENDIX A

SAMPLE HABITABILITY OPTAR AUGMENT FUNDING REQUEST

From: Commanding Officer, USS (Ship's Name and Hull No.)
To: TYCOM (as appropriate)

Subj: HABITABILITY OPTAR AUGMENT FUNDING REQUEST

Ref: (a) (Cognizant Fleet and TYCOM Instructions)

1. Request approval of a special OPTAR augmentation per reference (a) in the amount of (dollar amount) for the quality of life improvement project(s) as follows:

PRIORITY	NOMENCLATURE/NSN	QTY	COST EST
1	(Item description, location, etc.)		
2			
3			

TOTAL COST EST:

2. JUSTIFICATION (Conditions necessitating accomplishment of projects)

3. POINT OF CONTACT (Name, AUTOVON/Comm telephone number)

COPY TO:
ISIC (as appropriate)

SAMPLE

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APPENDIX B

ADVANCE PLANNING MILESTONES

MILESTONE (A-MO)	ACTION	EVENT
A - 23	TYCOM	ESTABLISH PLANNING ESTIMATE. TASK FTSC WITH DESIGN SHIPCHECK
A - 22	TYCOM	SEND HABITABILITY SELF-HELP PROJECT ADVANCE PLANNING LETTER
A - 21	SHIP	INDICATE CONCURRENCE/ COMMITMENT TO PROJECT(S) TO TYCOM. ENTER PROJECT(S) IN CSMP
A - 21	TYCOM	CONFIRM PROJECT
A - 21	FTSC	SHIP VALIDATION AND COMMENCE DESIGN
A - 18	FTSC	PREPARE MATERIAL REQUISITIONS
A - 16	FTSC	SEND REQUISITIONS TO FLEET INDUSTRIAL SUPPORT CENTER
A - 10	SUPSHIP NN, Code 1800 (CVNs)/TYCOM (other Aircraft Carriers)/SHIP	PRELIMINARY SCREENING CONFERENCE
A - 9	SUPSHIP NN, Code 1800 (CVNs)/TYCOM (other Aircraft Carriers)	ENTER PROJECTS IN WORK PACKAGE
A - 8	SUPSHIP NN, Code 1800 (CVNs)/SHIP/TYCOM	WORK DEFINITION CONFERENCE
A - 2	FTSC/SHIP	PROJECT KICK-OFF BRIEFING
A	SHIP	START AVAILABILITY/PROJECTS
COMP	SHIP	SEND COMPLETION REPORT

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VOLUME VI

CHAPTER 17

IMPRESSED CURRENT CATHODIC PROTECTION

REFERENCES.

(a) NAVSEA S9086-VF-STM-010 - NSTM Chapter 633 (Cathodic Protection)

17.1 PURPOSE. To provide guidance for the submission of Cathodic Protection Logs, as required by reference (a) and post dry-docking system activation.

17.1.1 Applicability. The contents of this chapter are applicable to Surface Force and Naval Air Force ships only.

17.2 CATHODIC PROTECTION LOGS. Logs shall be maintained as part of the system operating procedures and be retained by the ship for a period of two years.

17.2.1 Surface Force Ships. All ships with installed Impressed Current Cathodic Protection (ICCP) systems shall submit monthly logs per reference (a), using Naval Sea Systems Command (NAVSEA) Form 9633/1 or equivalent, no later than 15 days after the last day of the reporting month to NAVSEA.

17.2.2 Naval Air Force Ships. All aircraft carriers having ICCP systems are required to submit their monthly ICCP logs to Naval Surface Warfare Center, Carderock Division (NSWCCD), Philadelphia Code 6244 via message no later than ten days after the last day of the reporting month (info Type Commander and NAVSEA). NSWCCD will review the ICCP log data and provide a message to each ship within seven working days indicating ICCP log receipt and system operational status.

17.3 POST DRYDOCKING ACTIVATION. Guidance on the activation of the ICCP systems after undocking is as follows:

a. The Cathodic Protection System should be activated as soon as electrical power is available. Early activation is encouraged to counteract stray electrical currents from waterborne welding or other industrial activity evolutions which may cause hull deterioration by electrolysis. If the ICCP system cannot be actuated within two hours following undocking; the Type Commander/Immediate Superior In Command must be notified.

b. If the cathodic protection components have been removed or power to all components is not available within 24 hours after undocking, alternate provisions should be made for activating part of the system if possible. Hull potentials can be monitored using the ship's controller reference electrode (silver-silver chloride) in conjunction with a portable volt-ohm meter.

NOTE: ALL VOLTAGES REFERENCED ARE DIRECT CURRENT.

c. If the system cannot be activated within three days of undocking, provisions should be made to ensure hull integrity by taking daily hull potential readings. Without cathodic protection the acceptable hull potential range is 0.60 to 0.80 volts with respect to a silver-silver chloride reference cell. If daily readings are more electropositive than 0.55 volt or if changes in hull potentials greater than 0.1 volt occur, welding practices should be checked and/or a temporary system capable of maintaining the hull at 0.85 plus or minus 0.05 volts should be provided.

d. Where major underwater hull painting (not including touch up) has been performed less than seven days before undocking, caution should be exercised to avoid hull potentials greater than 1.00 volt to a silver-silver chloride reference cell until after the seven-day curing period. During the seven-day curing period, if the hull potential exceeds 1.00 volt, secure part or all of the system to avoid any effect on the hull coating. After a seven-day cure, proper navy hull coating systems are not affected by the higher hull voltages attainable with ICCP systems.

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CHAPTER 18

INFLATABLE LIFE RAFTS

REFERENCES.

(a) NAVSEA S9086-TX-STM-010 - NSTM Chapter 583 (Boats and Small Craft)
(b) NAVSEA S9008-AA-PRO-010 - Lifeboat, Inflatable, MK5, MK5 MOD2, and MK6 Inspection, Test and Repair Procedures
(c) NAVAIR 13-1-6.1 - Aviation Crew Systems, Chapter 7 (LRU 13/A)
(d) NAVSEA TW024-AA-ORD-010 - Unserviceable, Suspended, and Limited Use Ammunition
(e) NAVSUP 485 - Afloat Supply Procedures

18.1 PURPOSE. To provide guidance for the maintenance, repair, certification and procurement of life rafts used onboard naval ships and craft.

18.1.1 Discussion. An inflatable life raft is one constructed of a coated fabric and inflated to its design shape by air or other gas. The raft is stowed aboard ship for use only as a life raft, when and as directed by the Commanding Officer/Officer In Charge.

18.2 FLEET LIFE RAFT PROGRAM. The Fleet Life Raft Program Manager designated by the Fleet Maintenance Officer is responsible for establishing policy guidelines for the program. Policy will be disseminated to the Fleet and/or a Naval Sea Systems Command (NAVSEA) certified Fleet Maintenance Activity (FMA) for scheduling, planning and management of life raft contingency pools and conducting Planned Maintenance System (PMS) recertification of fleet assets. Designated Fleet Life Raft Program Managers are Commander Naval Surface Force Atlantic (Code N434) and Commander Naval Surface Force Pacific (code N4352).

18.2.1 Types of Inflatable Life Rafts. There are 3 basic Navy type inflatable life rafts for use throughout the fleet (ships and aircraft):

a. MK-6 Mod 0/Mod 1/Mod 2/Mod 3, 25 person, air inflated - currently carried by surface ships, encapsulated in a fiberglass container. The MK-6 Mod 0/Mod 1/Mod 2 are currently being upgraded to Mod 3 during recertification.

b. LRU 13/A (former MK-2), 7 person, CO_2 inflated - used on aircraft, certified to Naval Air Systems Command (NAVAIR) requirements.

c. LRU 12/A (former MK-4), 4 person, CO_2 inflated - used on submarines only.

18.2.2 Commercial Life Rafts. Various commercial Coast Guard approved life rafts are installed on board certain boats and/or Navy ships for service and in-service evaluation testing. The cognizant command is responsible for PMS recertification requirements.

18.3 RECERTIFICATION. The periodicity of recertification will be as designated by PMS requirements.

a. Recertification is based on PMS periodicity requirements starting from the recertification date stenciled on the outside of the life raft container.

b. If the certification date is not stenciled on the outside of the life raft container or verified from the ship's life raft log inspection and recertification records, life raft certification will be considered expired.

c. Submit an OPNAV 4790/2K to the Regional Support Group (RSG) for recertification.

18.4 CONTINGENCY POOLS. Designated RSGs in the Atlantic Fleet and select maintenance activities in the Pacific Fleet are responsible for coordinating the disposition of assets and maintaining contingency pools within authorized limits. Contingency pools will consist of the MK-6 and LRU 12/A life rafts (ships/boats/craft). The cognizant NAVAIR command will coordinate the disposition of LRU 13/A life rafts (aircraft) from a separate pool of assets.

a. If the contingency pool should fall below the authorized limit, restock the pool from decommissioning assets (as available). Purchase a new raft from the stock system, using Repair Other Vessel funds, only as a last option to facilitate scheduling.

b. Commands are not authorized to maintain and operate a life raft contingency pool other than those designated as fleet approved contingency pools. Contact the cognizant life raft contingency pool manager for disposition and turn-in instructions for all rafts which are removed from decommissioning ships and/or aircraft.

c. Contact the designated Fleet Life Raft Program Manager for disposition instructions if the inclusion of additional rafts into the pool will exceed authorized pool limits.

d. Location of contingency pools:

RSG Norfolk VA
RSG Mayport FL
FMA Everett WA
Shore Intermediate Maintenance Activity San Diego
Pearl Harbor Naval Shipyard
Ship Repair Facility Yokosuka Japan

18.5 AUTOMATED TRACKING SYSTEM. A data base is maintained by Naval Surface Warfare Center, Carderock Division (NSWCCD) Detachment, Norfolk VA, for tracking the Navy MK-6 life raft population. Inputs on each life raft are provided by all certified life raft repair facilities. Access is restricted; therefore, for reports or data retrieval, contact the respective Fleet Life Raft Repair Facility (e.g., FMA, Fleet Life Raft Program Manager or Data Base Manager).

18.6 RESPONSIBILITIES.

18.6.1 Commanding Officer/Officer In Charge.

a. Submitting an OPNAV 4790/2K to the RSG for any life raft requiring replacement or recertification. For recertification, the OPNAV 4790/2K should be submitted no sooner than 6-months prior to the expiration date stenciled on the outside of the life raft container (or date verified by the ship's life raft log). Arrange with the FMA for transfer and shipping of rafts to facilitate schedules.

b. Maintaining a log or data base of all life rafts on board, to include the following:

(1) The Inflatable Life Raft Recertification Record (ILRRR) for each raft. ILRRRs are issued with each life raft at recertification. Ships should not accept any life raft from a recertification/repair facility without the ILRRR provided. If the ship does not have the required ILRRR, contact NSWCCD Detachment Norfolk VA.

(2) Record the station location and serial number of each life raft. Annotate this information on the top of each ILRRR in the log.

c. Send a report to NSWCCD Detachment Norfolk VA, the Type Commander (TYCOM) (N43) and the respective recertification/repair facility if any life raft is lost or transferred to another ship. Reports should include the life raft serial number, manufacturer's name, recertification facility and a description of the circumstances.

d. Ensure life raft fiberglass containers are handled with care using appropriate slings. Life rafts are not to be rolled or stood on-end. Life rafts will be placed with the top up, in racks, with the container seal in the horizontal position.

e. Contact the TYCOM for disposition instructions concerning the unit's life raft inventory whenever the unit is scheduled for decommissioning and not designated for foreign military sales.

f. Requisition a replacement raft whenever a life raft is lost or determined to be unserviceable and Beyond Economical Repair by the FMA, using the ship's Operating Target (OPTAR) funds only when contingency pool assets can not support the replacement.

18.6.2 Regional Support Group/Designated Maintenance Activity.

a. RSGs/designated maintenance activities are responsible for establishing the priorities of work, scheduling and coordinating PMS recertification, and any repair service to support fleet life rafts unless otherwise directed by the Fleet Life Raft Program Manager. The RSG/designated maintenance activity functions are as follows:

(1) Management and disposition of all life raft contingency pool assets.

(2) Upon receipt of an OPNAV 4790/2K, screen the request as follows:

(a) For replacement of lost life rafts or rafts considered to be Beyond Economical Repair, replace with contingency pool asset. If contingency pool assets are unavailable, notify the ship to requisition replacement raft(s) using the ship's OPTAR funds.

(b) For repair and recertification, screen OPNAV 4790/2Ks to the respective FMA for action. Issue an immediate replacement from contingency pool assets, if available, and/or recertify within the defined schedule. If the FMA is temporarily overloaded and contingency assets cannot fulfill the requirements, screen the repair or recertification to a NAVSEA certified industrial activity.

(c) When contingency pool assets cannot support requirements, notify the Fleet Life Raft Program Manager. In cases where requirements cannot be supported due to the non-availability of materials, notify NSWCCD Detachment, Norfolk VA, for assistance. As a last option for non-deployers, notify the ship to submit a Departure From Specification per Volume V, Part I, Chapter 8 of this manual. Request the cognizant TYCOM grant a six month extension of PMS periodicity. Subject Life raft must be recertified or replaced prior to expiration of the PMS periodicity extension.

NOTE: ASSETS MAY BE AVAILABLE AT ANOTHER FLEET CONTINGENCY POOL.

b. Inform the Fleet Life Raft Program Manager and cognizant TYCOM (N43) of any problems encountered.

18.6.3 Fleet Maintenance Activity.

a. Upon receipt of screened OPNAV 4790/2K, repair or recertify life rafts to a Level "C" Plan in accordance with references (a), (b), (c), PMS and/or Volume V of this manual, as applicable.

b. Maintain an equipped life raft facility with qualified repair personnel to conduct repairs and/or recertification of life rafts as indicated below:

NOTE: FACILITY CAPABILITIES AND PERSONNEL QUALIFICATIONS WILL BE AUDITED BY NSWCCD AND TYCOM REPRESENTATIVES ON AN ANNUAL BASIS OR AS A SITUATION DICTATES.

(1) A minimum of 75 percent of all personnel assigned to the life raft shop shall have received formal NSWCCD training and certification in Level "C" repair.

(2) Conduct and document annual training and/or the level of On the Job Training in Level "C" repair of all shop personnel.

(3) Appoint in writing, two life raft repair coordinators, E-6 or above, who have received formal NSWCCD training in Level "C" repair.

(4) Appoint in writing, a signal flare coordinator, E-4 or above, who is trained in handling ordnance and is responsible for the coordination and installation of signal flares in all life rafts.

(5) Maintain copies of all technical manuals, maintenance bulletins, correspondence and messages pertaining to life raft maintenance and repair.

(6) Maintain accountability of signal flare kits in accordance with reference (d).

18.7 UNSERVICEABLE/REJECTED LIFE RAFTS. FMAs shall process unserviceable/rejected life rafts as follows:

a. The Quality Assurance Officer shall verify the condition of the rejected life raft.

b. Survey the rejected life raft in accordance with reference (a). Upon completion of the survey, turn in the carcass to the Defense Re-utilization Marketing Office in accordance with reference (e).

c. Report survey results to NSWCCD, Detachment, Norfolk VA.

d. Issue a replacement life raft to the customer ship/boat/craft from the contingency pool. If none are available, the ship will requisition a new life raft using OPTAR funds.

18.8 RECORDS. Activities with the responsibilities defined in section 18.6 of this chapter shall maintain an auditable record for 5 years of all life raft transactions, including repairs, replacements, and recertification. These records must include:

a. Copies of all ILRRRs issued for recertified life rafts.

b. JSNs, serial numbers, and the manufacturer's name of each rejected life raft.

c. The condition of the rejected life rafts.

d. The disposition of the rejected life rafts and components salvaged.

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CHAPTER 19

MAINTENANCE AND MATERIAL MANAGEMENT

REFERENCES.

(a) OPNAVINST 4790.4 - Ships' Maintenance and Material Management (3-M) Manual
(b) NAVEDTRA 43241 - Personnel Qualification Standard for Ship's Maintenance and Material Management (3-M) System
(c) NAVSEA S9810-AA-GTP-010 - Intermediate Maintenance Activity (IMA) Work Center Requirements Manual

LISTING OF APPENDICES.

A 3-M System Assessment/Evaluation Procedures
B Listing of Standard Work Center Codes for Aircraft Carriers
C Listing of Standard Work Center Codes for Submarine Force Ships
D Listing of Standard Work Center Codes for Small Boat and Service Craft Managers (Submarine Force Only)
E Listing of Standard Work Center Codes for Tugs and Retrievers (Submarine Force Only)
F Listing of Standard Work Center Codes for Master Job Catalog Items Contained in Ship's CSMP (Surface and Submarine Forces Only)
G Sample Situational Requirement Reference Sheet
H Sample Accountability Log
I Format for Reporting 3-M Assessments

19.1 PURPOSE. To provide guidance for the implementation of policies for the Maintenance and Material Management (3-M) system, set forth in reference (a).

19.1.1 Policy. Operational readiness must be maintained as high as possible. Material readiness, one element of operational readiness, is founded on accomplishing high quality maintenance on every piece of equipment. Producing quality maintenance is a function of identifying the required maintenance and technical standards to the technicians and then motivating those technicians to accomplish the maintenance to the best of their ability. The goal of maintenance management is to identify requirements and standards to people throughout the chain of command so that the maintenance can be properly accomplished.

19.1.2 Scope. This chapter applies to all ships, service craft, small boats, Type Commander (TYCOM) cognizant shore activities, and non-aviation fleet test and support equipment, except as exempted in paragraph 19.1.2.b below. This includes, but is not limited to, Navy Meteorological Equipment, equipment of the Naval Air Traffic Control, Air Navigation and Landing Systems, Aviation Launch and Recovery Equipment, Commander Naval Reserve Force, and Chief of Naval Education and Training activities.

a. If conflicts exist between this chapter and reference (a), reference (a) shall take precedence. Any departure from the policies, procedures or responsibilities delineated in reference (a) are not authorized without prior Naval Sea Systems Command (NAVSEA) approval and Chief of Naval Operations (CNO) concurrence.

b. This chapter does not apply to Fleet Ballistic Missile systems under the cognizance of Submarine Strategic Program, nuclear power plants and associated test equipment under the cognizance of Naval Sea Systems Command Nuclear Propulsion Directorate (NAVSEA 08) or aeronautical equipment used in support of the aviation maintenance mission. Also excluded are civilian operated and maintained ships, small boats, and service craft, unless specifically included in a Base Operating Contract or other similar document.

19.2 SHIP MAINTENANCE AND MATERIAL MANAGEMENT.

19.2.1 Responsibilities.

19.2.1.1 Type Commander. Exercises primary responsibility for the effective operation and support of the 3-M System. The areas of responsibility include but are not limited to the following:

a. Maintenance Data System (MDS).

b. Planned Maintenance System (PMS).

c. Alteration Management System.

d. (Submarines only) Technical Feedback Report History/Tracking (TFBR H/T) Program.

e. Maintenance Resource Management System (MRMS).

f. Periodic Maintenance Requirement (PMR) Scheduling System.

g. Current Ship's Maintenance Project (CSMP).

h. Ship's Non-Tactical Automated Data Processing System (SNAP) I/II/III Organizational Maintenance Management System (OMMS).

i. TRIDENT Logistical Data System/MRMS Interface.

j. Master Job Catalog (MJC).

19.2.1.2 Immediate Superior In Command.

a. The Immediate Superior In Command (ISIC) will designate a 3-M Officer. The 3-M Officer is responsible for the satisfactory administration of 3-M programs for subordinate units. Specific responsibilities include Supervision of maintenance management programs resident at the Maintenance Document Control Office (MDCO), if applicable.

b. The ISIC organization will centralize maintenance management programs in the MDCO, if applicable. The MDCO will report to the ISIC 3-M Officer and be manned with trained personnel to accurately and expeditiously process data in support of maintenance management.

19.2.1.3 In-Service Engineering Activity. In-Service Engineering Activities (ISEA) are those activities designated by NAVSEA as the technical expert for specific systems and/or equipments. Naval Surface Warfare Center, Carderock Division (NSWCCD), for example, is the ISEA for the majority of Hull, Mechanical and Electrical equipment installed on most ships. ISEA responsibilities include but are not limited to the following:

a. Development of PMS documentation.

b. Maintenance of PMS documentation.

c. Providing timely responses to Technical Feedback Reports (TFBR).

d. (Submarines only) Providing copies of TFBR responses to Submarine Maintenance Engineering, Planning and Procurement Activity (SUBMEPP) for incorporation into the TFBR H/T Program.

e. Providing copies of critical TFBR resolutions to all holders of the affected Maintenance Index Page (MIP)/MRC. All other resolutions will be integrated into the Periodic Force Revision (PFR) distribution.

19.2.1.4 Fleet Technical Support Center. Responsibilities associated with this chapter are as follows:

a. Receive, screen and process TFBRs.

b. Resolve TFBRs within their technical capability.

c. Provide PFRs.

d. Provide copies of all submarine TFBRs to SUBMEPP for incorporation into TFBR H/T System.

e. Maintain the Navy PMS Database.

19.2.1.5 Submarine Maintenance Engineering, Planning and Procurement Activity. SUBMEPP is a NAVSEA engineering activity chartered to support NAVSEA and the submarine TYCOMs in maintaining the submarine fleet. In support of 3-M, SUBMEPP is tasked by NAVSEA and the TYCOMs with the following.

a. Establish, maintain, update and distribute all requirements as MJC Items in support of TYCOM Alteration Management System, PMR, Baseline Overhaul Work Packages/Selected Restricted Availability (SRA) Routines and Standard Availability Routines.

b. Provide semi-annual analysis of NAVSEA Logistics Center historical MJC originated data and distribute updated planning and estimating data to include changes in estimated MJC manhours.

c. Provide semi-annual analysis of NAVSEA Logistics Center historical PMR originated data and distribute updated manhour and material requirements to the PMR scheduling and Technical Repair Standards.

d. (Submarines only) Maintain the TFBR H/T Program.

e. Liaison with ISEA and FTSC to ensure accuracy of responses to submarine TFBRs prior to distribution.

f. Assist with PMS installation on all new construction submarines.

19.2.1.6 Ship's Maintenance and Material Management Coordinator. The duties and responsibilities of the ship's 3-M Coordinator are well defined in reference (a). Specifically the 3-M Coordinator is the functional manager of the 3-M System and is responsible to the Executive Officer for the administrative facets of the ship's 3-M program. In addition to the requirements of reference (a) the following applies:

a. Develop and administer the Ship's PMS Spot Check Program. Section I-E of Appendix A of this chapter may be used as a spot check evaluation sheet.

b. Monitor the Ship's 3-M Personnel Qualification Standard (PQS) Program and maintain an auditable record of personnel qualified in 3-M PQS.

c. Ensure that all Equipment Status Log/Ship's Force Work List (SFWL) items outstanding for more than 30 calendar days are converted to 3-M deferrals.

19.2.1.7 Ship's Fleet Maintenance Activity Availability Coordinator. The Ship's FMAV Coordinator will be responsible for the coordination of all FMA repairs and coordinate closely with the 3-M Coordinator. The FMAV Coordinator will also provide a single working level point of contact and coordinate the command's requirements with the requirements of the FMA. These duties include:

a. Technical review of work requests submitted for FMA accomplishment.

(1) Ensure readability and technical correctness.

(2) Prevent duplication of work requests for Ship Alterations/Unrestricted Operation/Integrated Maintenance and Modernization Planning and other MJC originated deferrals.

(3) Ensure corrective maintenance described in Block 35 (Remarks) of the Ship's Maintenance Action Form OPNAV 4790/2K includes reference to the associated Integrated Maintenance and Modernization Planning procedure(s) when applicable.

(4) Collect supplemental form OPNAV 4790/2L requests for routine work (i.e., lagging, painting, label plates, tiling, etc.) from all Work Centers (WC) and prepare an integrated priority list for each type of routine work to maximize the FMA's effectiveness.

b. (Non-SNAP ships only) Ensure all FMA level work included on the Equipment Status Log is documented on OPNAV 4790/2K deferrals.

c. Ensure ship's preparations for an FMA availability are conducted in accordance with Volume II, Chapter 4 of this manual.

d. Meet daily, during an availability, with the assigned Ship Superintendent to discuss the status of all active jobs and to tour the ship.

e. Attend all FMA production, night work, and management meetings.

f. Provide a daily FMA job status to each Department Head, Division Officer, and Leading Petty Officer.

19.2.1.8 Afloat Training Group (Surface Force Only). Afloat Training Groups are under the technical administration of the Fleet Training Commands. They provide TYCOM designated platforms with the following:

a. Technical and personnel support for 3-M training.

b. 3-M training services as needed.

19.2.2 Qualifications. All personnel assigned to billets associated with the 3-M system, must be 3-M PQS qualified for the assigned billet in accordance with reference (b).

19.2.3 Maintenance and Material Management Operation and Administration.

19.2.3.1 Standard Force Work Center Numbering System. The production automated products in support of the 3-M system such as automated List of Effective Pages (LOEP) and list of Library Issue Documents, as well as applications of the MRMS, dictate that a standard force WC organization be maintained. Commanding Officers will designate their shipboard organization and applicable WC codes as listed in Appendices B and C of this chapter, for Aircraft Carriers and Submarine Force (except for units addressed in paragraph 19.2.3.1.c and e. below) respectively. FMAs will designate their organization and applicable WC codes as listed in reference (c). Additionally:

a. Ship's 3-M Coordinator, ISIC, and Air Maintenance Document Control Office/MDCOs must not allow the use of any WC codes not authorized by reference (a) or this manual.

b. Requests to change WC designation codes will not be approved unless they are applicable to all ships of a class and supported by detailed justification. Standardization is required to support the developing interfaces between the Weapons System File, Planning Yards, PMS, SNAP systems, Supervisor of Shipbuilding Newport News, Code 1800 and SUBMEPP. This does not affect the re-assignment of a MIP to another WC (shift of maintenance responsibility). Reference (a) provides guidance for the shift of maintenance responsibility.

c. (Submarine Force only) Small boat and service craft managers will use the specific WCs identified in Appendix D of this chapter for MDS documentation, however, for PMS management they may assign a "**00" WC to consolidate PFRs, MIPs, scheduling, etc., (e.g., PY30 through PY84 may consolidate PMS under WC PY00, or PY01-Mechanical, PY02-Electrical, etc.). The Unit Identification Code will be that of the parent command.

d. (Submarine Force only) WC designations for tugs and retrievers are reflected in Appendix E of this chapter.

e. (Surface and Submarine Forces only) Standard MJC assigned WC codes are reflected in Appendix F of this chapter.

19.2.3.2 Scheduling. PMS is a portion of the ship's 3-M system and provides, in one authoritative system, the scheduling information and technical procedures governing planned maintenance for Ship's Force accomplishment. PMS provides a simple method for scheduling, and documenting the execution of planned maintenance procedures. TYCOM policy is as follows:

NOTE: WHERE THE GOAL OF 100% ACCOMPLISHMENT CANNOT BE REACHED, THE UNIT'S CHAIN OF COMMAND SHALL BE KEPT INFORMED OF THE CIRCUMSTANCES WHICH PREVENT ACCOMPLISHMENT OF SCHEDULED MAINTENANCE.

a. (Submarine Force only) An asterisk (*) will be inserted on the cycle, quarterly and weekly schedule after each Maintenance Requirement (MR) which is a safety of ship item. The following notation will be made on the bottom of the schedule, "* = Safety of Ship Item". A "Safety of Ship Item" is defined, in Volume IV, Chapter 10, paragraph 10.4.10 of this manual, as any maintenance action vital to the maintenance of a submarine's watertight integrity or it's ability to return safely to the surface.

b. A CNO Maintenance Availability of 12 months or greater restarts the Cycle PMS schedule. Cycle schedules are not restarted following industrial availabilities of shorter duration, such as an SRA.

c. Equipment Guide Lists (EGL) are not required for Ship's Force PMS PMR Scheduling system or similar authorized automated system which provides each WC with reports of components due for inspection, testing, or calibration.

d. Situational reference sheets will be maintained/posted in the WC PMS Manual (formerly known as 43P1). These sheets will contain a brief description of the situation and the maintenance action for all situational requirements listed in the right hand column of the weekly schedule. Appendix G of this chapter provides a typical situational reference sheet.

19.2.3.3 Accountability. The credibility of the Navy PMS program is the individual accomplishing the maintenance. The required dedication and integrity of that individual cannot be overstressed. With shrinking budgets, maintenance evaluation reviews, Reliability Centered Maintenance and "fewer individuals to do more" the accurate, complete and quality performance of assigned maintenance tasks is of paramount importance. To maintain accountability, all maintenance personnel are required to sign, for the completion of assigned maintenance actions, in an Accountability Log shown in Appendix H of this chapter. All entries in the log shall be reviewed for completeness and accuracy weekly by the Work Center Supervisor (WCS). Accountability sheets will be maintained in the WC PMS Manual for a period of not less than 13 weeks.

19.2.4 Technical Feedback Report Reporting. The PMS TFBR is used to notify FTSC Atlantic Fleet/FTSC Pacific Fleet, as appropriate, and/or the TYCOM of matters related to PMS. The TFBR form is composed of an original and four copies. Instructions for preparation and submission of the form are printed on the back of the last copy.

19.2.4.1 Technical Feedback Report History Tracking Program (Submarine Force Only). The TFBR H/T system is a Personal Computer based database containing summary information taken from TFBRs initiated by COMSUBLANT/COMSUBPAC units and support activities. Each TFBR is presented with a header identifying the feedback report, a summary of the action request and a summary of the resolution. The TFBR H/T system is supported with Compact Disk - Read Only Memory (CD-ROM) disks containing the original TFBRs and supporting documents.

a. The system provides a centrally controlled, comprehensive TFBR history, intended to improve response time, problem resolution and reduce redundant TFBRs.

b. Monthly updates of the computer files are provided to TYCOMs, Submarine Squadrons and appropriate ISEAs involved in resolving TFBRs.

19.2.4.2 Technical Feedback Report Screening with Technical Feedback Report History Tracking System (Submarine Force Only).

a. By screening the summaries of previously submitted TFBRs, the Squadron/TYCOM 3-M Coordinator can determine:

(1) If an answer currently recorded in the program satisfies the proposed TFBR.

(2) If a similar request has already been submitted and its current status.

b. If the summary of previously submitted TFBRs does not provide enough information for the determination of similarity between the proposed and previously submitted TFBRs, a complete copy of all information pertaining to that particular request (indexed by its associated TFBR serial number) is available in the CD-ROM disks for further review.

c. If the proposed TFBR is identical to one currently in the resolution process, it need not be submitted. However, the following exceptions apply: If the proposed TFBR requests a change of periodicity, the addition or deletion of a maintenance action, or is in any way safety related, it shall be forwarded to the appropriate FTSC.

d. If the ship, squadron or TYCOM 3-M Coordinator have any question as to whether a proposed TFBR is similar to a previously satisfied request, forward the proposed TFBR for resolution. The intent of this program is to reduce duplicate feedbacks. It is not intended to place the technical responsibility for resolving TFBRs upon the Squadron/TYCOM 3-M Coordinator.

19.2.5 Submarine Safety/Safety of Ship (Submarine Force Only).

a. MRCs which require work that violates the SUBSAFE boundary certification, require Re-Entry Control. In order to ensure that these controls are invoked, the MRC requiring work within SUBSAFE boundaries shall be overstamped with the word "SUBSAFE" in red ink.

b. An asterisk (*) will be inserted after each MR which is a safety of ship item per paragraph 19.2.3.2.a. of this chapter.

19.2.6 Evaluation.

19.2.6.1 Assessments.

a. Goal/Intent. To ensure that the ship's 3-M program is functioning at maximum efficiency and per the requirements of reference (a).

b. Method for Assignment of Numerical Evaluations. Planned maintenance is the foundation of a well executed, effective maintenance program. Therefore PMS must be vigorously prosecuted and thoroughly monitored. The standards of PMS performance must remain high. The minimum performance requirements are identified below. Assessments will be conducted when determined to be necessary by either the TYCOM, ISIC or unit's Commanding Officer and shall be conducted in accordance with the criteria and format established in Appendix A of this chapter.

(1) 3-M Performance Rate (3-MPR) shall be 80% or better.

(2) PMS Performance Rate (PPR) shall be 80% or better.

(3) MDS Performance Rate (MPR) shall be 80% or better.

(4) The Accomplishment Confidence Factor (ACF) shall be 90% or better.

(5) The Recorded Accomplishment Rate (RAR) shall be 80% or better.

19.2.6.2 Assessment Reporting. Significant deficiencies and numerical assessments are reported to the assessed unit's Commanding Officer, ISIC and TYCOM using the format shown in Appendix I of this chapter. Reporting may be accomplished on the entire unit or on a departmental basis.

a. Significant deficiencies require a report of corrective actions taken by the unit to be forwarded to the ISIC within 30 days following the assessment.

b. Any department receiving an overall evaluation of unsatisfactory in either PMS or MDS should be re-evaluated within a reasonable period of time to ensure unsatisfactory areas have been corrected.

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APPENDIX A

3-M SYSTEM ASSESSMENT/EVALUATION PROCEDURES

1. The purpose of this Appendix is to provide a means for evaluating the 3-M programs aboard each ship and shore command. These procedures are used to conduct 3-M assessments.

2. These procedures are written in such a manner as to permit PMS and MDS assessments to be conducted independently on an individual department basis. The only requirements are that all departments on each unit be evaluated within a 24 month period and that the determination of the Recorded Accomplishment Rate and PMS Performance Rate for a given department be conducted during the same evaluation. This method permits a continuing assessment of each unit throughout the period and reduces crew disruption during a given availability. These procedures are divided into three sections:

a. Section I - Assessment of PMS

b. Section II - Assessment of MDS

c. Section III - Overall 3-M Assessment

3. 3-M Assessments for each unit will be scheduled on a limited or no advance notice basis. Time in major CNO Maintenance Availabilities should be counted in determining when these inspections are to be done. A PMS and MDS Evaluation Summary Sheet will be maintained for each unit. As each department is evaluated, the individual evaluations (Sat/Unsat and calculated values) will be recorded on the appropriate Evaluation Summary Sheet and a copy of the rough administrative evaluation sheet will be provided to the unit. Sections I, II, and III of this Appendix provide the specific criteria to be used in the assessment of each unit and its departments.

4. The following criteria will be used in determining PMS and MDS Administration assessments:

a. PMS or MDS WC Administration for a department will be evaluated as unsatisfactory if more than 25% of the WCs in the department are evaluated as UNSAT.

b. A department will be evaluated as unsatisfactory overall in PMS if more than 25% of assigned WCs are assessed UNSAT, or if Departmental RAR is less than 80%, or ACF is less than 90%, or PPR is less than 80%. A department will be evaluated as unsatisfactory in MDS if more than 25% of assigned WCs are assessed UNSAT.

c. The ship will be evaluated as unsatisfactory overall in PMS if two or more major departments (as defined by Section II - A) are UNSAT overall; or if ship wide RAR is less than 80%, or ACF is less than 90%, or PPR is less than 80%. The ship will be evaluated as UNSAT overall in MDS if two or more major departments are UNSAT in MDS.

SECTION I

ASSESSMENT OF PMS

1. Complete the administrative checks for Executive level and each WC per Sections I-A and I-B of this Appendix respectively. Enter a narrative evaluation of overall effectiveness (e.g., above average, average, below average) and evaluate PMS Administration in each area as Sat or Unsat.

2. Using the basic definitions and guidelines described below, determine PMS RAR for each department.

   a. Using each WC quarterly schedule for the quarter immediately preceding the period of inspection:

      (1) Count the number of MRs scheduled for accomplishment (monthly and above, but not including situational MRs.

      (2) Then count the number of MRs marked as accomplished (monthly and above, but not including situational MRs or MRs rescheduled from the previous quarter).

      (3) From the back of the schedule, determine the number of MRs considered to have had significant maintenance accomplished, but the MR was not marked as fully accomplished.

   b. Calculate for all WCs the total number of MRs scheduled, recorded as accomplished, and considered as partially accomplished. Enter the values determined in Section I-C.

3. Enter significant comments from Sections I-B in Section I-C of this Appendix.

4. Enter the overall Departmental PMS Administration assessment on the PMS Assessment Summary Sheet, Section I-H of this Appendix. Departmental WC Administration will be evaluated as Unsat if more than 25% of WCs in the department are evaluated as Unsat.

5. Using the basic definitions and guidelines described below, determine the PMS ACF for each department. Enter the values determined on a Department ACF Summary Sheet, Section I-D of this Appendix.

   a. Using current WC quarterly schedules for the department, randomly select MRCs that have been recorded as accomplished until at least 2% of the total number of MRCs scheduled have been selected. Surface Forces shall ensure that half of the required spot checks are Damage Control spot checks.

   b. Complete an MRC Evaluation/Spot Check Sheet, Section I-E of this Appendix, for each MRC selected. Based on the results, evaluate the overall effectiveness of the accomplishment of each MR selected. Enter significant comments from the MRC Evaluation Sheets on the Departmental ACF Summary Sheet, Section I-D. Summarize spot check results of each department and ship on the Spot check Summary Sheet, Section I-F.

   c. Calculate departmental ACF to 2 decimal places by using the formula in Section I-D.

6. Calculate the WC and Departmental PPR, Section I-G, to two decimal places by use of the following formula:

$$PPR = RAR \times ACF$$

7. Enter the values calculated for Departmental RAR (Section I-C), ACF (Section I-D), and PPR (Section I-G) on the PMS Assessment Summary Sheet (Section I-H).

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SECTION I-A

EXECUTIVE LEVEL PMS ADMINISTRATION

Ship _____ Date _____

Department _____ Work Center _____

			Sat/Unsat
1.	Does the 3-M Coordinator maintain an updated:		
	a.	Record of MIP changes (ALID-1)?	
	b.	MIP to WC File (PMS-4)?	
	c.	Master LOEP (PMS-5)?	
	d.	Change Accountability Log?	
	e.	TFBR Accountability Log? (Note 1)	
	f.	File of unanswered TFBRs (Blue)?	
	g.	File of PMS Service Briefs?	
	h.	PMR Inventory/Schedule of Test Equipment/Weight Handling Equipment? (As applicable)	
2.	Does the 3-M Coordinator have an effective system for routing and explaining PMS documentation changes (PFRs, Document Input Transmittals, Advance Change Notices, TFBR answers) to all concerned?		
3.	Is an effective system in use whereby supervisory personnel periodically and routinely monitor PMS performance in accordance with the requirements of reference (a)?		
4.	Does the 3-M Coordinator have a file of Master EGLs, confidential MRCs and the current PMS CD-ROM?		

Overall effectiveness of Executive level PMS is evaluated as:_____

PMS Administration: Sat_____Unsat_____

Remarks: (Required for UNSAT findings) _____

_____

_____
(Inspector/Activity)

Note 1: May be combined with Change Accountability Log.

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SECTION I-B

WORK CENTER PMS ADMINISTRATION

Ship _____ Date _____

Department _____ Work Center _____

			Yes/No
1.	Does the WC PMS file contain:		
	a.	Correction Sheet?	
	b.	Supplementary information (if applicable)?	
	c.	Current LOEP (check PFR Number)?	
	d.	All current MIPs (check MIP Control Numbers against LOEP)?	
	e.	Current Service Brief?	
	f.	13 weeks of Accountability Sheets?	
2.	Does the correction sheet indicate that all changes (SFRs/Advance Change Notices/Document Input Transmittals) applicable to the WC are being properly entered?		
3.	Are all pen-and-ink changes on the LOEP and MIPs (except as allowed by management aids) annotated with the reference for the change (TFBR serial, Document Input Transmittal serial, etc.) and properly noted by the Department Head?		
4.	Are all Accountability Sheets properly filled out and reviewed weekly by the WCS?		
5.	Is the WC deck of MRCs complete and current, including EGLs (check Systems Command MRC Control Number against MIPs and EGLs)?		
6.	Is a WC file of unresolved TFBRs (Green) maintained?		
	a.	Are all unresolved Category B TFBRs listed on the latest PMS 22 Report?	
	b.	Has the ship submitted a Follow-up TFBR to resolve Category B TFBRs older than one year ?	
7.	From the cycle schedule:		
	a.	Is the heading complete?	
	b.	Are all applicable MIPs listed?	
	c.	Are all MRs listed with proper periodicities?	
	d.	Are all monthly, quarterly, and situational MRs listed in EACH QUARTER column?	

			Yes/No
	e.	Are safety of ship MRs identified? (Submarine Force Only)	
	f.	Are EGLs properly indicated?	
8.	From the current and previous quarterly schedules:		
	a.	Have required approvals and reviews been completed?	
	b.	Are all MRs for the current quarter properly scheduled?	
	c.	Are all MRs which were not accomplished as scheduled circled and rescheduled if still within periodicity?	
	d.	Are all lost and partial checks annotated on the back of the schedule ?	
	e.	Is the RESCHEDULE column used to indicate scheduling into the next quarter?	
	f.	Is the back of the schedule used to indicate all incomplete or unaccomplished MRs and the reasons therefore?	
	g.	Is the Department Head's signature on the back of the previous schedule indicating awareness of incomplete or unaccomplished MRs?	
	h.	Are MRs rescheduled from a previous quarter but still within periodicity entered on the current schedule in red to indicate priority attention is indicated?	
	i.	Are safety of ship MRs identified? (Submarine Force Only)	
9.	From the weekly schedule:		
	a.	Is the heading complete?	
	b.	Are all MRs for the current week properly scheduled?	
	c.	Are all situational MRs listed in the right-hand column?	
10.	Is there a situational reference sheet listing a brief description of the situation and the maintenance action ?		

Overall effectiveness of WC _____PMS is evaluated as: _____

PMS Administration: Sat_____Unsat_____

Remarks: (Required for Unsat Findings)_____

_____

_____

_____

(Inspector/Activity)

SECTION I-C

SAMPLE DEPARTMENTAL RAR SUMMARY

Ship_____ Department _____ Date _____

Work Center	Total MRs Scheduled (S)	Total MRs Accomplished (A)	Total MRs Partially Accomplished (P)	RAR (Note 1)	RAR Evaluation (Sat/Unsat) (Note 2)
Total Department					

Notes:

1. RAR = (A + (P /2)) / (S)
2. Sat RAR = 80% or better
3. Comments:

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SECTION I-D

SAMPLE DEPARTMENTAL ACF SUMMARY

Ship _____Department _____Date _____

Work Center	Total MRs Evaluated (E)	Total MRs Evaluated as Partially Accomplished (P)	Total MRs Evaluated as Not Accomplished (N)	ACF (Note 1)	ACF Evaluation (Sat/Unsat) (Note 2)
Total Department					

Notes:

1. ACF = (E - (P/2) - N)/(E)
2. Sat ACF = 90% or better
3. Comments:

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SECTION I-E

MRC EVALUATION AND PMS SPOT CHECK SHEET

Ship _____ Date of Spot Check _____

WC _____ MIP _____ MRC _____

Equipment _____ Date PMS performed _____

1. Contact the maintenance person assigned responsibility for the accomplishment of the MRC, have the individual deliver MRC (and EGL if applicable), and determine the following by questions and/or personal observation.			(Circle One)
a.	Is the maintenance person PQS qualified to perform the MR.		YES/NO*
b.	Presenter validated MRC using the WC PMS record. (Change page to LOEP to MIP to MRC).		YES/NO
c.	Maintenance person reviewed the MRC before accomplishment of the MR.		YES/NO
d.	Discussed the appropriate safety precautions including hazardous material, Personal Protective Equipment, Tagout etc.		YES/NO
e.	Presented the correct tools, parts (NSN), material (Military Specification (MILSPEC)) and test equipment (Calibrated).		YES/NO*
f.	Properly identified the equipment by using location block, Location Guide List, or EGL.		YES/NO
g.	Demonstrated all steps of MR including all notes, warnings and cautions according to the MRC.		YES/NO
	1)	Followed all steps of the MRC.	YES/NO
	2)	Can the procedure be followed exactly as written?	YES/NO
	3)	Correctly demonstrated use and disposal of Hazardous Material.	YES/NO/NA
	4)	Correctly performed equipment Tagout.	YES/NO/NA*
	5)	Followed all safety precautions.	YES/NO/*
	6)	Are the safety precautions complete as listed?	YES/NO
	7)	Is the manhour estimate correct? If not, what is the correct estimate?	YES/NO
	8)	Is the tool/material list complete as written? If not, what should be changed?	YES/NO
	9)	Was the MRC within the capability of the assigned individual to perform as written?	YES/NO
	10)	If an EGL is used, was the MRC performed on all equipments?	YES/NO/NA

h.	Does the equipment condition reflect accomplishment of the MRC?	YES/NO
i.	Maintenance person reports status of MR to the WCS if Completed or Not Fully Accomplished, and takes the proper corrective action. (i.e., enters discrepancy in Work Center Work List (WCWL)/Job Sequence Number (JSN) LOG or SNAP, submit TFBR).	YES/NO

2. Overall effectiveness of the accomplishment of the MRC is evaluated to be _____.

A - Fully accomplished.

P - Partially accomplished.

N - Not accomplished.

Notes:

a. If all answers to spotcheck sheet are YES or NA, then the spot check is considered FULLY accomplished. If any item annotated with an (*) is answered NO, the spotcheck is considered automatically NOT ACCOMPLISHED.

b. Partial accomplishment will be awarded when a significant portion of the maintenance is accomplished, but the maintenance person was unable to fully accomplish the MR. Secondly there was no violation of items that would have made the MR automatically considered not accomplished.

3. Comments: _____

_____

_____

_____

_____
(Inspector/Activity)

For Shipboard Self Inspection:
Evaluator _____
WCS _____
Div Off _____

SECTION I-F

MRC EVALUATION AND PMS SPOT CHECK SUMMARY SHEET

Ship _____ Department _____

1. Contact the maintenance person assigned responsibility for the accomplishment of the MRC, have the individual deliver MRC (and EGL if applicable), and determine the following by questions and/or personal observation.	Number of "NO" Occurrences
a. Is the maintenance person PQS qualified to perform the MR?	
b. Presenter validated MRC using the WC PMS record. (Change page to LOEP to MIP to MRC).	
c. Maintenance person reviewed the MRC before accomplishment of the MR.	
d. Discussed the appropriate safety precautions including hazardous material, Personal Protective Equipment, Tagout etc.	
e. Presented the correct tools, parts (NSN), material (MILSPEC) and test equipment (Calibrated).	
f. Properly identified the equipment by using location block, Location Guide List, or EGL.	
g. Demonstrated all steps of MR including all notes, warnings and cautions according to the MRC.	
1) Followed all steps of the MRC.	
2) Can the procedure be followed exactly as written?	
3) Correctly demonstrated use and disposal of Hazardous Material.	
4) Correctly performed equipment Tagout.	
5) Followed all safety precautions.	
6) Are the safety precautions complete as listed?	
7) Is the manhour estimate correct? If not, what is the correct estimate?	
8) Is the tool/material list complete as written? If not, what should be changed?	
9) Was the MRC within the capability of the assigned individual to perform as written?	
10) If an EGL is used, was the MRC performed on all equipments?	

h. Does the equipment condition reflect accomplishment of the MRC?	
i. Maintenance person reports status of MR to the WCS if Completed or Not Fully Accomplished, and takes the proper corrective action. (i.e., enters discrepancy in WCWL/JSN LOG or SNAP, submit TFBR).	

2. Total MRs Sampled: _____

   Total MRs Fully Accomplished: _____

   Total MRs Partially Accomplished: _____

3. Comments:

SECTION I-G

SAMPLE DEPARTMENTAL PPR SUMMARY

Ship _____ Department _____ Date _____

Work Center	RAR	ACF	PPR (Note 1)	PPR Evaluation (Sat/Unsat) (Note 2)
Total Department				

Notes:

1. PPR = RAR x ACF
2. Sat PPR = 80% or better
3. Comments:

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SECTION I-H

SAMPLE PMS ASSESSMENT SUMMARY SHEET

Ship _____ Date _____

Department	Date	PMS Administration (Sat/Unsat)	RAR	ACF	PPR (Note 1)	PPR Evaluation (Sat/Unsat) (Note 2)
Executive Level			NA	NA	NA	
Navigation						
Operations						
Weapons						
Engineering						
Reactor						
Air						
Supply						
Medical/Dental						
Communications						
Deck						
Repair						
Weapons Repair						
Ship						

Notes:

1. PPR = RAR x ACF
2. Sat PPR = 80% or better
3. Comments:

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SECTION II

ASSESSMENT OF MDS

1. The following definitions are used when evaluating MDS performance:

a. MDS Confidence Factor (MCF). The ability of ship's maintenance personnel to initiate complete and accurate MDS documents is the cornerstone of the program. Random spot checks will be conducted as a means to gage the ability of the ship to properly submit MDS documents. MCF is defined by the following formula:

$$MCF = \frac{\text{Total Number of Satisfactory Tasks}}{\text{Total Number of Tasks}}$$

b. Confidence Management Factor (CMF). The ability of ship's maintenance personnel to conduct equipment validations and submit accurate database corrections. CMF is defined by the following formula:

$$CMF = \frac{\text{Total Number of Satisfactory Validations}}{\text{Total Number Sampled}}$$

c. Reporting and Automated Shore Interface (ASI) Processing Confidence Factor (RAF). The ability of ship's maintenance and logistic personnel to make sure upline reporting and ASI processing is done correctly and promptly. RAF is defined by the following formula:

$$RAF = \frac{\text{Total Number of Points Awarded}}{\text{Total Points}}$$

d. CSMP Validity Factor (CVF). The overall qualitative measure of the accuracy and completeness of ship's material deficiencies and deferred corrective maintenance as represented by the complete CSMP. The CVF is defined by the following formula:

$$CVF = \frac{\text{Total Number of Valid Entries}}{\text{Total Number of Entries Sampled}}$$

e. MPR . The overall quantitative evaluation of the accuracy and completeness of the ship's MDS program. MPR is defined by the following formula:

$$MPR = (MCF \times 0.3) + (CMF \times 0.3) + (RAF \times 0.1) + (CVF \times 0.3)$$

f. MDS Documentation. MDS forms required by reference (a) to report maintenance or configuration including logistics requirements.

g. Equipment Validation. Process of comparing installed equipment to the Coordinated Shipboard Allowance List (COSAL) for non-automated ships or the Ship's Equipment File (SEF) for automated ships. The equipment record, whether found in a COSAL, Shipboard Navy Identification Technical Configuration Handbook, or in an OMMS data base, is the sole source for the Ship's Configuration and Logistics Support Information System (SCLSIS) information used to accurately describe a piece of installed equipment. This data record has both configuration and logistics data elements used to functionally describe a piece of equipment. This record is also used to complete the identification section (Section I) of the OPNAV 4790/2K.

h. CSMP. The CSMP is the sole source of work to be accomplished by industrial activities, FMAs, and organizational level activities. The complete CSMP consists of:

(1) A computer-produced list of deferred repairs, alterations and INSURV deficiencies.

(2) Copies of MDS documents submitted, but not yet reflected in the computer produced list. (Non-automated ship).

(3) WCWL/JSN Log (Non-automated ship) or SFWL (OMMS ship).

2. Determining the MCF.

a. Select ten percent (Surface and Submarine Forces) or two percent (Air Forces) of the crew who have access to MDS functions for functional MDS evaluation. The sample will include maintenance personnel, WCS, group supervisor, Repair Parts Petty Officer (RPPO), Division Officers, and Department Heads.

b. Selected personnel will demonstrate their ability to accomplish selected MDS tasks. These tasks are based on PQS qualifications of each person selected. The tasks will be evaluated using Section II-A (Automated) or II-B (Manual) of this Appendix for each person evaluated.

c. Section II-C (Automated) or Section II-D (Manual) of this Appendix are used to compute and summarize the final MCF for the ship and each department.

NOTE: WCWL/SFWL ITEMS MUST BE CONVERTED TO CSMP DEFERRALS AFTER 30 CALENDAR DAYS.

3. Determining the CMF.

a. Select two completed equipment validation forms per WC for validation.

b. Verify validation forms to the ship's equipment record and to the installed equipment, verifying the data collected is accurate and complete and that the SEF record is updated.

c. Record the results of the validation on Section II-E of this Appendix. Both the equipment validation form and SEF update must be graded Satisfactory for an overall grade of SAT.

4. Determining the RAF. Section II-F (Automated) or Section II-G (Manual) of this Appendix will be used to evaluate the RAF and record the results.

5. Determining the CVF.

   a. Select 2 entries per WC from the automated portion of the CSMP (Ship's Force generated) for validation. In addition all Casualty Report (CASREP) JSNs for the ship will be validated.

   b. Verify the selected entries from the CSMP to the installed equipment to determine the following:

      (1) CSMP entry matches the installed equipment.

      (2) CSMP deficiency matches the actual deficiency with the installed equipment.

   c. Record the results of the validation on Section II-H of this Appendix. Both the equipment validation and the deficiency validation evaluations for each Job Control Number (JCN) must be Satisfactory for an Overall evaluation of SAT.

6. Determining the MPR.

   a. Enter scores from Section II-C through II-H of this Appendix in the appropriate spaces on Section II-I of this Appendix.

   b. Perform computations as indicated in the equations and enter the results.

   c. Sum all percentage results, and round to nearest tenth, to determine the ship/department MPR.

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SECTION II-A

MDS CONFIDENCE FACTOR WORKSHEET (AUTOMATED)

Name:_____ **PQS Qualification Level:**_____

Department: _____ **Work Center:**_____

POSITIONS:

M P	R P P O	W C G S	D O	D H			
X	X	X	X	X	3-M PQS Qualification completed.	YES	NO
X	X	X	X	X	Able to Log-on.	YES	NO
					CSMP ACTIONS:		
X	X	X	X		Add Maintenance Action: 4790/2K	YES	NO
X	X	X			SFWL/WCWL	YES	NO
X	X	X	X		Close Maintenance Action: 4790/2K	YES	NO
X	X	X			SFWL/WCWL	YES	NO
X	X	X	X		Change Maintenance Action: 4790/2K	YES	NO
X	X	X			SFWL/WCWL	YES	NO
X	X	X	X	X	Display Maintenance Action: 4790/2K	YES	NO
X	X	X	X	X	SFWL/WCWL	YES	NO
					CONFIGURATION MAINTENANCE ACTION:		
X	X	X			Report installation of equipment:	YES	NO
X	X	X			Report modification of equipment:	YES	NO
X	X	X			Report removal of equipment:	YES	NO

POSITIONS:

MP	RPPO	WCGS	DO	DH			
					UPDATE SEF:		
X	X	X	X	X	Review on-line equipment records:	YES	NO
		X			Add equipment records:	YES	NO
		X			Modify equipment records:	YES	NO
		X			Delete equipment records:	YES	NO
					UPDATE LOGISTICS SUPPORT DATA (LSD) FILE:		
X	X	X	X	X	Review on-line LSD records:	YES	NO
		X			Add LSD data elements:	YES	NO
		X			Change LSD data elements:	YES	NO
		X			Delete LSD data elements:	YES	NO
					SUPPLY REQUISITIONING:		
	X	X			Order maintenance parts:	YES	NO
	X	X			Order non-maintenance related items:	YES	NO
	X	X			Create Fleet COSAL Feedback Reports (FCFBR):	YES	NO
					PRINT REPORTS:		
	X	X			SEF summary reports:	YES	NO
	X	X	X	X	CSMP reports:	YES	NO
					PRE-TRANSMITTAL REVIEW:		
		X	X	X	Review CSMP transactions:	YES	NO
		X	X	X	Review SEF transactions:	YES	NO
		X	X	X	Review FCFBR transactions:	YES	NO

SECTION II-B

MDS CONFIDENCE FACTOR WORKSHEET (MANUAL)

Name: _____ **PQS Qualification Level:**_____

Department: _____ **Work Center:**_____

POSITIONS:

MP	RPPO	WCGS	DO	DH			
X	X	X	X	X	3-M PQS Qualification completed.	YES	NO
X	X	X	X	X	Use SFWL/JSN Log.	YES	NO
					CSMP ACTIONS:		
					Add Maintenance Action:		
X	X	X	X		4790/2K	YES	NO
X	X	X			SFWL/WCWL	YES	NO
					Close Maintenance Action:		
X	X	X	X		4790/2K	YES	NO
X	X	X			SFWL/WCWL	YES	NO
					Change Maintenance Action:		
X	X	X	X		4790/2K	YES	NO
X	X	X			SFWL/WCWL	YES	NO
					CONFIGURATION MAINTENANCE ACTION:		
X	X	X			Report installation of equipment:	YES	NO
X	X	X			Report modification of equipment:	YES	NO
X	X	X			Report removal of equipment:	YES	NO
					SUPPLY REQUISITIONING:		
	X	X			Order maintenance parts:	YES	NO
	X	X			Order non-maintenance related items:	YES	NO
	X	X			Create FCFBRs:	YES	NO
					MDS DOCUMENT REVIEW:		
		X	X	X	Review CSMP transactions:	YES	NO
		X	X	X	Review configuration transactions:	YES	NO
		X	X	X	Review FCFBR transactions:	YES	NO

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SECTION II-C

SAMPLE MCF SUMMARY (AUTOMATED)

Ship _____ Department _____ Date _____

Work Center or Department	MP (#pts/15)	RPPO (#pts/20)	WC/GS (#pts/29)	DO (#pts/13)	DH (#pts/10)
Total Department or Ship	(average of above)	(average of above)	(average of above)	(average of above)	(average of above)

MP Confidence Factor = (Average from MP column above)
RPPO Confidence Factor = (Average from RPPO column above)
WC/GS Confidence Factor = (Average from WC/GS column above)
DO Confidence Factor = (Average from DO column above
DH Confidence Factor = (Average from DH column above)
Dept Confidence Factor = (Average of above Confidence Factors)

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SECTION II-D

SAMPLE MCF SUMMARY (MANUAL)

Ship _____ Department _____ Date _____

Work Center or Department	MP (#pts/11)	RPPO (#pts/14)	WC/GS (#pts/17)	DO (#pts/8)	DH (#pts/5)
Total Department or Ship	(average of above)	(average of above)	(average of above)	(average of above)	(average of above)

MP Confidence Factor = (Average from MP column above)
RPPO Confidence Factor = (Average from RPPO column above)
WC/GS Confidence Factor = (Average from WC/GS column above)
DO Confidence Factor = (Average from DO column above)
DH Confidence Factor = (Average from DH column above)

Dept Confidence Factor = (Average of above Confidence Factors)

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SECTION II-E

SAMPLE CMF SUMMARY SHEET

Ship _____ Department _____ Date _____

Work Center	Equipment	Equipment Validation (Sat/Unsat)	Equipment File Updated (Sat/Unsat)	CMF Evaluation (Sat/Unsat) (Note 1)

Total number of SAT equipment validations:_____

Total number of updated SNAP files (if applicable):_____

CMF = (Total Number of SAT Validations)/(Total Sampled) =_____
(Sat = 80% or better)

Note:

1. CMF Evaluation = SAT, if both Equipment Validation and Equipment File Updated receives a score of Satisfactory.

Comments:

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SECTION II-F

RAF COMPUTATION SHEET (AUTOMATED)
(Executive Level Only)

SUSPENSE FILE SUMMARY STATISTICAL REPORT:	PTS MAX	ALL
Average age of all configuration transactions was 7 days or less. Points are awarded based on number of days as follows:	10	
Average age of CKs awaiting review: _____ days		
Average age of SEF corrections awaiting review: _____ days		
Average age of FCFBR awaiting review: _____ days		
Average age of all configuration transactions awaiting review: _____ days		
7 days or less - 10 pts 8 - 14 days - 8 pts 15 - 20 days - 4 pts 21 - 30 days - 2 pts over 30 days - 0 pts		
CSMP Transmittal (Upline Reporting).		
Average time between upline reports is 7 days or less.	1	
Maintains copies of the CSMP Upline Reports until reporting activity acknowledge processing.	1	
Configuration Management.		
Monthly follow-up action had been initiated with the Configuration Data Managers for CKs awaiting response in excess of 180 days.	1	
ASI Processing.		
Latest ASI tape received from the Navy Management System Support Office has been processed. Points are awarded based on the backlog of ASI tapes as follows:	10	
Up to date in ASI processing - 10 points 1 ASI tape behind - 8 points 2 ASI tapes behind - 6 points 3 ASI tapes behind - 4 points 4 ASI tapes behind - 2 points 5 or more ASI tapes behind - 0 points		
ASI Input and Summary Report kept until all processing of the ASI has been completed.	1	
ASI error reports are mailed to the Configuration Data Managers after processing.	1	
RAF = Total Points Awarded / 25 = _____		

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SECTION II-G

RAF COMPUTATION SHEET (MANUAL)
(Executive Level Only)

	PTS MAX	ALL
3-M COORDINATOR.		
3-M Coordinator properly maintains the ship's master WCWL/JCN Log.	1	
3-M Coordinator properly maintains MDS transmittal file of all MDS maintenance actions awaiting processing by Automated Data Processing (ADP) facility.	1	
Average age of MDS documents awaiting transmittal is 7 days or less. Points are awarded based on backlog of MDS documents as follows: 7 days or less - 10 points 8 - 14 days - 8 points 15 - 20 days - 6 points 21 - 30 days - 4 points over 30 days - 2 points	10	
3-M Coordinator properly processes the error reports received from the ADP facility.	1	
RAF = Total Points Awarded / 13 =		

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SECTION II-H

SAMPLE CVF SUMMARY SHEET

Ship _____ Department _____ Date _____

JCN	Equipment	Identification (Sat/Unsat)	CSMP Deficiency (Sat/Unsat)	CVF Evaluation (Sat/Unsat) (Note 1)

Total number of CSMP entries w/installed equipment correctly identified:_____

Total number of CSMP entries w/correctly described deficiencies:_____

CVF = (Total Number of SAT Entries)/(Total Sampled) =_____
(Sat = 80% or better)

Note:

1. CVF Evaluation = SAT, if both Equipment Identification validation and CSMP Deficiency validation receive a score of Satisfactory.

Comments:

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SECTION II-I

SAMPLE SHIP MDS SUMMARY SHEET

Ship _____ Date _____

Department	Date	MCF	CMF	RAF	CVF	MPR (Note 1)	Overall MDS Evaluation (Sat/Unsat) (Note 2)
Executive Level		NA	NA		NA		
Navigation				NA			
Operations				NA			
Weapons				NA			
Engineering				NA			
Supply				NA			
Medical/Dental				NA			
Communications				NA			
Deck				NA			
Repair				NA			
Weapons Repair				NA			
Reactor				NA			
Air				NA			
Ship							

Note:

1. MPR = (MCF x 0.3) + (CMF x 0.3) + (RAF x 0.1) + (CVF x 0.3)

2. SAT = 80% or better

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SECTION III

OVERALL 3-M ASSESSMENT

1. The results of Sections I and II are combined in Section III-A to determine the 3-MPR. 3-MPR is defined by the following formula:

3-MPR = (PPR x 0.5) + (MPR x 0.5)

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SECTION III-A

SAMPLE OVERALL 3-M ASSESSMENT SUMMARY

Inspecting Activity_____

Ship _____ Date_____

****

PPR (from Section I-D)

RAR: _____ ACF:_____

PPR = RAR x ACF x 100

PPR = _____ (SAT = 80% or better)

****

MPR (from Section II-I)

MCF: _____ CMF: _____ RAF: _____ CVF:_____

MPR = (MCF x 0.3) + (CMF x 0.3) + (RAF x 0.1) + (CVF x 0.3)

MPR = _____ (SAT = 80 or better)

****

3-MPR

3-MPR = (PPR x 0.5) + (MPR x 0.5)

3-MPR = _____ (SAT = 80% or better)

****

Comments:

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APPENDIX B

LISTING OF STANDARD WORK CENTER CODES FOR AIRCRAFT CARRIERS

1. Afloat Departmental Codes.

	WC CODE	SHIP TYPE*
Safety	A	
Chaplain	B	
Communication	C	
Deck	D	
Engineering	E	
Flag/Embarked Staff	F	
Aviation Intermediate Maintenance Department (AIMD)	I	
Legal	L	
Medical and Dental	M	
Navigation	N	
Operations	O	
Maintenance	P	
Reactor	R	
Supply	S	
Air	V	
Weapons	W	
Executive	X	
Administrative	Y	
Embarked Airwing	Z	

2. Afloat Professional WC Codes

a. Safety Department. AS01

b. Chaplain Department. BC01

c. Communication.

Message Processing	CR01
Copier/Teletype Repair	CR02
Signal Communication	CV01

d. Deck Department.

1st Division	DA01
2nd Division	DB02
3rd Division	DC03
Boat Division	DD01
Sail Loft	DE01

* Ship type CV/CVN unless otherwise noted.

	WC CODE	SHIP TYPE*

e. Engineering Department.

(1) Auxiliaries.

Hydraulics	EA01
Steam Heat/Galley/Laundry	EA02
Air Conditioning & Refrigeration	EA03
Diesels	EA04
Machine Shop	EA05
Oxygen & Nitrogen	EA06
Boats	EA07
Outside Repair	EA08

(2) Boiler Division.

1 Group Boilers	EB01
2 Group Boilers	EB02
3 Group Boilers	EB03
4 Group Boilers	EB04
Oil and Water Lab	EB14
Catapult Shop	EB15
ACC Shop	EB16
Boiler Repair Shop	EB17

(3) Damage Control Division.

Damage Control Training	ED01
Prof. Fire Party (0-3 Level and above)	ED11
Prof. Fire Party (Main Deck to 0-2 Lev)	ED12
Prof. Fire Party (DC Deck)	ED13

(4) Electrical Division.

Lighting/General	EE01
Rewind	EE02
Power (Non-nuclear)	EE03
Distribution	EE04
Forward Interior Communications & Sound Power Phones	EE05
After Interior Communications	EE06
Announcing Systems	EE07
Alarms	EE08

* Ship type is CV/CVN unless otherwise noted.

	WC CODE	SHIP TYPE*
Flight Deck Electrical	EE09	
Movie/Copy Machine	EE10	
Battery Locker	EE11	
Electrical Safety	EE12	
Fwd Plant (Nuclear (E-1))	EE31	
Aft Plant (Nuclear (E-1))	EE32	
400 HZ Nuclear	EE33	

(5) Machinery Division.

#1 Engine Room	EM01	
#2 Engine Room	EM02	
#3 Engine Room	EM03	
#4 Engine Room	EM04	
#1 Auxiliary Machinery Room	EM05	
#2 Auxiliary Machinery Room	EM06	
#1 Turbo Gen/Pump Room	EM21	
#2 Turbo Gen/Pump Room	EM22	
#3 Turbo Gen/Pump Room	EM23	
#4 Turbo Gen Pump Room	EM24	

(6) Repair Division.

Sheet Metal	ER01	
Carpenter	ER02	
Pipe	ER03	
Damage Control	ER04	
Collection, Holding and Transfer	ER06	
Compressed Gas	ER07	
Locksmith	ER08	
AFFF	ER10	
Firemain	ER12	

f. AIMD Department.

PC/QA division	IM01	
Mechanical Repairs	IM02	
Avionics	IM03	
Ground Support	IM04	

g. Legal Department.

Legal	LN01	

* Ship type is CV/CVN unless otherwise noted.

	WC CODE	SHIP TYPE*
h. Medical/Dental Department.		
Dental	MD01	
Medical	MH01	
i. Navigation.		
Navigation	NN01	
Signal Bridge	NS01	
j. Operations Dept.		
(1) Electronics Repair.		
Main Communications	OE01	
HF Communications	OE02	
UHF Communications	OE03	
Aux Support Systems	OE05	
General Purpose Electronic Test	OE06	
Metrology Equipment	OE07	
Tool Issue	OE08	
Copier/Word Processor	OE09	
Search Radars	OE10	
Acquisition Radars	OE11	
ACLS	OE12	
IFF	OE13	
Navigation System/NAVAIDS	OE14	
Modular Test and Repair	OE15	
NTDS/ACDS	OE20	
ASWM	OE21	
NIPS/CVIC	OE22	
SNAP	OE23	
Television Systems	OE24	
Micro Computers	OE25	
CIWS MT 21	OE30	
CIWS MT 22	OE31	
CIWS MT 23	OE32	
CIWS MT 24	OE33	
NSSMS #1	OE34	
NSSMS #2	OE35	
NSSMS #3	OE36	

* Ship type is CV/CVN unless otherwise noted.

	WC CODE	SHIP TYPE*
(2) CDS/CS Division.		
CDC	OI01	
CS	OI04	
(3) Photographics Division.		
General photo	OP01	
Intelligence	OP02	
(4) Communication Intelligence.		
Electronic Warfare	OW01	
Intelligence	OZ01	
Air Ops/CATCC	OC01	
Meteorological	OA01	
Comm Intel/SESS	OS01	
k. Maintenance Department.		
3-M	PM01	
MDS	PM02	
Quality Assurance (QA)	PA01	
Production Control	PC01	
l. Reactors Department.		
(1) Reactors Auxiliaries Division. (where authorized under re-organization of CVN-68 Class nuclear propulsion plants)		
Emergency Diesels	RA01	CVN only
Catapult Steam	RA02	CVN only
(2) Reactor Controls Division.		
#1 Reactor Plant	RC11	CVN only
#1 Reactor Plant (Non-Nuclear equip)	RC12	CVN only
#2 Reactor Plant	RC21	CVN only
#2 Reactor Plant (Non-Nuclear equip)	RC22	CVN only

* Ship type is CV/CVN unless otherwise noted.

	WC CODE	SHIP TYPE*
(3) Reactor Electrical Division.		
#1 Reactor Plant	RE11	CVN only
#1 Reactor Plant (Non-Nuclear equip)	RE12	CVN only
#2 Reactor Plant	RE21	CVN only
#2 Reactor Plant (Non-Nuclear equip)	RE22	CVN only
(4) Reactor Laboratory Division.		
#1 Reactor Plant	RL11	CVN only
#1 Reactor (Non-Nuclear equip)	RL12	CVN only
#2 Reactor Plant	RL21	CVN only
#2 Reactor (Non-Nuclear equip)	RL22	CVN only
Dosimetry	RL30	CVN only
(5) Reactor Mechanical Division.		
Reactor Room #1	RM11	CVN only
Reactor Room #1 (Non-Nuclear equip)	RM12	CVN only
Reactor Room #2	RM21	CVN only
Reactor Room #2 (Non-Nuclear equip)	RM22	CVN only
Technical Support	RM30	CVN only
Turbine Test/QA	RM31	CVN only
(6) Reactor Propulsion Division. (where authorized under re-organization of CVN-68 Class nuclear propulsion plants)		
#1 Main Machinery Room	RP01	CVN only
#2 Main Machinery Room	RP02	CVN only
Oil/Water/Auxiliary Boiler	RP05	CVN only
#1 Reactor Auxiliary Room	RP21	CVN only
#2 Reactor Auxiliary Room	RP22	CVN only
Calibration	RP31	CVN only
(7) Reactor Training/Admin Division.		
Training/Admin	RT01	CVN only

* Ship type is CV/CVN unless otherwise noted.

	WC CODE	SHIP TYPE*
m. Supply Department.		
Stock Control S1 Division	SS01	
Food Service S2 Division	SS02	
Ship's Store S3 Division	SS03	
Disbursing S4 Division	SS04	
Wardroom S5 Division	SS05	
Aviation Support S6 Division	SS06	
ADP S7 Division	SS07	
Material S8 Division	SS08	
Supply QA S10 Division	SS10	
CPO Mess S11 Division	SS11	
n. Weapons Department.		
Weapons Handling G1 Division	WG01	
Ship's Armory GZ Division	WG02	
Weapons Magazine G3 Division	WG03	
Weapons Elevator G4 Division	WG04	
Weapons Control G5 Division	WG05	
Marine Detachment/Security	WM01	
Forward SAS	WW01	
After SAS	WW02	
o. Air Department.		
(1) V1 Division.		
Flight Deck	VA01	
Crash and Salvage	VA02	
(2) V2 Division.		
#1 Catapult	VB01	
#2 Catapult	VB02	
#3 Catapult	VB03	
#4 Catapult	VB04	
#1 Arresting Gear	VB05	
#2 Arresting Gear	VB06	
#3 Arresting Gear	VB07	
#4 Arresting Gear	VB08	
Barricade	VB09	
Fresnel Lens Optical System	VB10	
Pilot Landing Aid TV	VB11	

* Ship type is CV/CVN unless otherwise noted.

		WC CODE	SHIP TYPE*
	Maintenance Control	VB20	
	QA	VB21	
	Maintenance Support	VB22	
(3)	V3 Division.		
	Hanger Deck	VC01	
(4)	V4 Division.		
	JP-5 Hanger Deck/Flight Maintenance	VF01	
	JP-5 Below Deck Equipment Maintenance	VF02	
	JP-5 Tank Maintenance	VF03	
	JP-5 QA/Testing Lab	VF04	
(5)	V5 Division.		
	PRIFLY	VX01	
p.	Executive Department.		
	Executive Officer X1 Division	XX01	
	Training Div X2 Division	XX02	
	PAO X3 Division	XX03	
	Educational Services	XX04	
	Special Services	XX05	
	Chief Master at Arms	XC01	
	Brig	XC02	
q.	Administration Department.		
	Captain's Office	YA01	
	Administration	YA02	
	Personnel	YA03	
	Postal	YA04	
	Legal	YA05	
	Print Shop	YP01	
r.	Airwing.		
	CAG	ZW00	
	Reserved for Assignment to Embarked Airwings	ZW01 thru ZW11	

* Ship type is CV/CVN unless otherwise noted.

	WC CODE	SHIP TYPE*
s. Flag/Embarked Staff.		
As assigned	FA00	
	FB00	
	FC00	
	FD00	
3. Afloat DC WC Codes.		
a. Safety Department.	AS40	
b. Chaplin Department.	BC40	
c. Communication Department.		
CR Division	CR40	
CS Division	CV40	
d. Deck Department.		
1st Division	DA40	
2nd Division	DB40	
3rd Division	DC40	
Boats Division	DD40	
Sail Loft	DE40	
e. Engineering Department.		
Auxiliaries Division	EA40	
Boilers Division	EB40	
Damage Control Division	ED40	
Electrical Division	EE40	
E1 Division	EE41	CVN Only
E2 Non-Nuclear Division	EE42	CVN Only
Machinery Division	EM40	
Repair Division	ER40	
f. AIMD Department.		
AIMD Department	IM40	
IM1 Division	IM41	
IM2 Division	IM42	
IM3 Division	IM43	
IM4 Division	IM44	

* Ship type is CV/CVN unless otherwise noted.

		WC CODE	SHIP TYPE*
g.	Legal Department.		
	Legal	LN40	
h.	Medical/Dental Department.		
	Medical	MD40	
	Dental	MH40	
i.	Navigation Department.		
	Navigation Division	MN40	
j.	Operations Department.		
	OA Division	OA40	
	OC Division	OC40	
	OE Communications Division	OE41	
	OE Data Division	OE42	
	OE Missile Division	OE43	
	OE Repair Division	OE44	
	OI Division	OI40	
	OP Division	OP40	
	OS Division	OS40	
	OW Division	OW40	
	OZ Division	OZ40	
k.	Maintenance Department.	PM40	
l.	Reactors Department.		
	RA Division	RA40	CVN Only
	RC Division	RC40	CVN Only
	RE Division	RE40	CVN Only
	RL Division	RL40	CVN Only
	RM Division	RM40	CVN Only
	RP Division	RP40	CVN Only
	RT Division	RT40	CVN Only
m.	Supply Department.		
	S1 Division	SS41	
	S2 Division	SS42	
	S3 Division	SS43	
	S4 Division	SS44	

* Ship type is CV/CVN unless otherwise noted.

		WC CODE	SHIP TYPE*
	S5 Division	SS45	
	S6 Division	SS46	
	S7 Division	SS47	
	S8 Division	SS48	
	S9 Division	SS49	
	S10 Division	SS50	
	S11 Division	SS51	
n.	Weapons Department.		
	G1 Division	WG41	
	G2 Division	WG42	
	G3 Division	WG43	
	G4 Division	WG44	
	G5 Division	WG05	
	Marine Detachment	WM40	
	W Division	WW40	
o.	Air Department.		
	V1 Division	VA40	
	V2 Division	VB40	
	V3 Division	VC40	
	V4 Division	VF40	
	V5 Division	VK40	
p.	Executive Department.	XX40	
q.	Administrative Department.	YA40	
r.	Airwing.	ZW40	
s.	Flag/Embarked Staff.	FA40	

4. Shore Station Departmental Codes.
   (Under Development)

5. Shore Station WC Codes.
   (Under Development)

* Ship type is CV/CVN unless otherwise noted.

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APPENDIX C

LISTING OF STANDARD WORK CENTER CODES FOR SUBMARINE FORCE SHIPS
Standard Submarine Work Center Codes

Description	Used by Submarine Type	Code
Executive		
Executive/Administration (ADM – Functional Area Supervisor - SNAP)	All	XX00
Chief of the Boat	All	XX03
3-M Coordinator (SNAP OMMS Functional Area Supervisor)	All	XM01
Safety Petty Officer	All	SP01
Engineering		
Auxiliary	All	EA01
Damage Control Petty Officer (Note 1)	All	EDC1
Electrical (Main Power - SS)	All	EE01
Auxiliary Power	AGSS	EE02
Machinery	All	EM01
Aft Engine Room	SS	EM02
Engineering Administration	All	EX00
Engineering Log Room	All	EX02
FCA (Note 1)	All	FCA1
Reactor Controls	All Nuclear	RC01
Engineering Laboratory	All	RL01
Medical		
Medical	All	MH01
Navigation/Operations		
Navigation/Electronics	All	NE01
Radio/Communications	All	OC01
Afloat Information Systems/Automated Data Processing Coordinator (AIS/ADP)	All	OC02
Navigation/Operations Administration	All	OX00

Description	Used by Submarine Type	Code
Supply		
General Stores	All	SS01
Food Services	All	SS02
Supply Administration (SNAP Functional Area Supervisor)	All	SX00
Weapons		
Divers	All	DV01
Central Computer (Tactical/Strategic)	SSN 688/SSN 21/SSBN/SSGN	WC01
Fire Control	All	WF01
Missile Fire Control	SSBN/SSGN	WF02
First Lieutenant	All	WK01
Dry Deck Shelter	DDS Hulls Only	WK02
Sonar	All	WQ01
Torpedo	All	WI01
Aft Torpedo Room	SS	WI02
Missile Technicians	SSBN/SSGN	WM01
Missile Launcher	All	WS01
Weapons Administration	All	WX00

Notes:

1. WC EDC1 replaces ER09 and FCA1 replaces EX03 for COMSUBPAC units.

2. The following WC codes are used when Squadrons must originate submarine CSMP deferrals:

3. WC WK02 is applicable to Dry Deck Shelter (DDS) Hulls only.

Description	Used by Submarine Type	Code
Engineering Department	All	EX01
Navigation/Operations Department	All	OX01
Supply Department	All	SX01
Weapons Department	All	WX01
Executive Department	All	XX01

Standard Submarine Force Surface Ship Work Center Codes

Description	Used by Ship Type	Code
Deck		
1st Division	AS/ARDM	DA01
2nd Division	AS/ARD/AFDM	DA02
3rd Division	AS/AFDM	DA03
Bos'n Locker	AS	DA04
Boat Division	AS/ARDM	DB01
Boat and Crane Repair	AS	DB02
Engineering		
Hydraulics	AS	EA01
Emergency Diesel	AS/AFDM	EA02
Steam Heat	AS	EA03
Auxiliary Equipment	AS/ARDM/AFDM	EA04
AC&R	AS	EA05
O_2N_2	AS	EA06
Boat Shop	AS	EA07
Machine Shop	AS/AFDM	EA09
#1 Fire Room	AS	EB01
(To Be Defined)		EB02
Fuel and Water	AS	EB14
#1 Engine Room	AS/ARDM	EM01
#2 Engine Room	AS/ARDM	EM02
#1 Auxiliary Machinery Room	AS	EM03
#2 Auxiliary Machinery Room	AS	EM04
Evaporators	AS	EM05
Lighting and Power	AS/ARD/ARDM	EE01
Battery	AS/ARDM	EE02
IC Shop	AS/AFDB	EE03
CCTV	AS	EE04
Pipe/Metal Shop	AFDB/ARD/ARDM/AFDM	ER01
Carpenter/Docking	AFDB/ARD/ARDM/AFDM	ER02
(To be defined)		ER03
HT Shop	AS	ER04
CO_2 Shop	AS	ER06

Description	Used by Ship Type	Code
Ventilation (Filter Cleaning Shop)	AS	ER07
Damage Control Petty Officer	All	EDC1
Engineering Administration	All	EX00
Engineering Log Room	All	EX02
FCA	All	FCA1
Medical		
Medical	All	MH01
Dental	AS	MD01
Navigation/Operations		
Navigation (QM)	AS	NN01
Sonar	All	OA01
Radio/Communications	AS/ARDM	OC01
Afloat Information Systems/Automated Data Processing Coordinator (AIS/ADP)	All	OC02
Electronics	AS	OE01
Electronic Navigation	AS	OE02
Radar	AS/ARD/AFDM	OI01
Supply		
Supply Administration	All	SX00
General Stores	All	SS01
Food Service	All	SS02
Ship's Store	AS	SS03
Disbursing	AS	SS04
Supply QA	AS	SS05
Inventory Control	AS	SS06
SUBSAT	AS	SS07
ROVSS	AS	SS09
Weapons		
(To Be Defined)	ARD/ARDM	WA01
(To Be Defined)	ARDB	WA11
Armory/Magazine	AS	WK02
Weapons Cranes & Elevators	AS	WK04
Fire Control	AS	WI01
Gunnery	AS/ARDM	WI05
Weapons Administration	All	WX00

Description	Used by Ship Type	Code
Executive		
Executive Administration	AS	XX00
3-M Coordinator	AS	XM01
Safety Petty Officer	All	SP01
Personnel Office	AS	XX02
Educational Services	All	XX03

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APPENDIX D

LISTING OF STANDARD WORK CENTER CODES FOR SMALL BOAT AND SERVICE CRAFT MANAGERS (Submarine Force Only)

Name	Code	Name	Code
COMSUBRON ONE	PS	SUBASE PEARL HARBOR (IMF)	PK
COMSUBRON SIX	TQ	TRIDENT Refit Facility BANGOR	PM
COMSUBRON SEVEN	PW	TRIDENT Refit Facility KINGS BAY	TM
COMSUBRON EIGHT	TW	USS SIMON LAKE (AS-33)	TF
COMSUBRON ELEVEN	PQ	USS McKEE (AS-41)	PA
COMSUBRON SEVENTEEN	PV	USS EMORY S. LAND (AS-39)	TJ
COMSUBRON TWENTY	TX	USS FRANK CABLE (AS-40)	TA
COMSUBRON TWENTY-TWO	TS		
NAVSUBSUPPFAC NLON	TK		
SUBASE BANGOR	PY		
SUBASE KINGS BAY	TY		
SUBASE NLON	TC		

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APPENDIX E

LISTING OF STANDARD WORK CENTER CODES FOR TUGS AND RETRIEVERS (Submarine Force Only)

Description	Used by Ship Type	Code
Engineering	TWR/YTB/YTM	TE01
Other	TWR/YTB/YTM	TD01
Safety Petty Officer	TWR/YTB/YTM	SP01

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APPENDIX F

LISTING OF STANDARD WORK CENTER CODES FOR MASTER JOB CATALOG ITEMS CONTAINED IN SHIP'S CSMP (Surface and Submarine Forces Only)

Submarine Forces:

Description	Code
Overhaul, SRA, Baseline routines	EXSY
NAVSEA Issued Alterations	*XSA
NSWCCD Machinery Alteration	*XMA
TYCOM Issued Alterations	*XTY
DIRSSP Issued Strategic Systems Program Alterations (SSBN/SSGN)	**SP
Submarine Extended Operating Cycle PMRs	**JC
Test and Measurement System Repair Routines	**CR
MJC Service Routines	**MC

*=Department
**=Department/Division

Surface Forces:

Description	Code
Overhaul, SRA, Baseline routines	EXSY
Engineering Cycle	**EC

First character identifies the requesting Department.
Second character identifies the Administrative Procedure ("X").
Third character indicates catalog routine ("C").
Last character denotes the maintenance source code as follows:

A - Planned Maintenance Subsystem
B - Unassigned
C - Corrective
D - Upkeep
E - Miscellaneous

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APPENDIX G

SAMPLE SITUATIONAL REQUIREMENT REFERENCE SHEET

PERIODICITY	SITUATION	MR DESCRIPTION
D-1R	(Prior to getting underway)	(Lubricate)
W-3R		
M-1R		
Q-6R	(Accomplish at sea prior to submergence)	(Test Operate)
A-5R		
R-1W		

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APPENDIX H

SAMPLE ACCOUNTABILITY LOG
Work Center Accountability Record Sheet

Work Center: [ ] Work Center Supervisor Week of: [ ] to [ ]

MIP	MRC	EGL/ID SERIAL #	EQUIP NOUN NAME	MAINT MAN (PRINT)	MAINT MAN (SIGNATURE)	DATE ACCOMPLISHED
A-083/904	8ZYU	1-A2	SNORKEL VENT VLV			

Work Center Supervisor's Signature _____

Division Officer's Signature _____

1. Record all partially accomplished/non-accomplished MRs on the reverse. All checks listed on the reverse will include the steps not done, requisition numbers or a complete explanation why the PMS could not be accomplished.

2. The WCS/Leading Petty Officer will maintain this log and shall ensure that the maintenance is logged the day the PMS was completed.

3. Retain in the WC PMS Manual for a period of 13 weeks .

Work Center Accountability Record Sheet

MIP	MRC	EGL	DATE SCHED/PERFORMED

Reason for partial or non-accomplishment.

MIP	MRC	EGL	DATE SCHED/PERFORMED

Reason for partial or non-accomplishment.

MIP	MRC	EGL	DATE SCHED/PERFORMED

Reason for partial or non-accomplishment.

APPENDIX I

FORMAT FOR REPORTING 3-M ASSESSMENTS

4790
Ser
Date

From: Accomplishing Activity
To: Commanding Officer USS (Ship's Name and Hull No.)

Subj: REPORT OF 3-M EVALUATION OF USS (SHIP'S NAME AND HULL NO.)

Ref: (a) OPNAVINST 4790.4; Issue of Ship's Maintenance and Material Management (3-M) Manual

(b) COMFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual, Volume VI, Chapter 19

Encl: (1) (as required)

1. In accordance with references (a) and (b), a PMS and MDS Assessment of USS (Ship's Name and Hull No.) (Department if applicable) was conducted during the period (Date) to (Date).

2. During this assessment, the following significant deficiencies were discovered:

a. (List)

Specific department and WC deficiencies are provided in enclosure(s) (1) through ( ).

3. The following overall ship/department numerical assessments are assigned:

a. 3-M Performance Rate _____

b. 3-M Assessment _____
(Sat/Unsat)

c. PMS Performance Rate _____

d. PMS Assessment _____
(Sat/Unsat)

e. MDS Performance Rate _____

f. MDS Assessment _____
(Sat/Unsat)

Copy to:
ISIC/TYCOM (as applicable)

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VOLUME VI

CHAPTER 20

WEIGHT AND MOMENT CONTROL

REFERENCES.

(a) NAVSEA S9086-C6-STM-000 - NSTM Chapter 096 (Weights and Stability)
(b) NAVSEAINST C9096.2 - Weight and Stability Requirements for Active Submarines

20.1 PURPOSE. This chapter provides basic information and guidance concerning submarine ballast changes, including mandatory authorization and reporting requirements.

20.1.1 Discussion.

a. The use of ballast is important in maintaining a submarine's stability. Ballast, in most cases lead, is installed in submarines for the following purposes:

(1) To improve transverse stability.

(2) To adjust trim.

(3) To provide adequate immersion.

(4) To eliminate an inherent list.

(5) To permit submarines to submerge with neutral buoyancy and zero trim.

b. An inclining experiment is performed in accordance with the requirements of reference (a). This experiment provides the basic data concerning weight and center of gravity for use in all considerations of stability, reserve buoyancy, immersion, trim, and in determining compliance with the requirements of the weight control program. An inclining experiment is the only satisfactory method of accurately determining the location of the center of gravity of the submarine. Inclining experiments are conducted on each submarine in new construction, after conversion or overhaul and when authorized by Naval Sea Systems Command (NAVSEA) for some Selected Restricted Availabilities.

c. Initial ship design provides for adequate stability from a light load through full load condition. The design allows a margin for growth, but experience has shown that the margin is quickly used up for several reasons:

(1) The on-going process of modernization over the life of the ship.

(2) The accumulation of an assortment of personal gear and equipment.

(3) Weight removal for compensation being accorded a low priority.

20.2 BALLAST CHANGES. NAVSEA maintains a record of the solid ballast installed in each submarine. These records are valuable in evaluating the ship's stability and seaworthiness, in determining the deadweight and space available for cargo, and in locating valuable material such as lead or iron in the ballast installation when a ship is scheduled for disposal. NAVSEA maintains a system of checks and balances on weight and moment changes when approving alterations. Accomplishment of an alteration involving a weight reduction does not make this saving available to the ship for use when requesting new alterations. NAVSEA expects to utilize this weight savings as compensation for future alterations. New and unexplored sources must be found when recommending weight and moment compensation.

20.2.1 Naval Sea Systems Command Notification. Occasionally, the permanent ballast on a ship may be increased, decreased, relocated, or replaced. Changes in ballast may result from alterations issued by NAVSEA or may become necessary in connection with other repairs or alterations. In order to maintain the accuracy of NAVSEA records, each activity installing or rearranging ballast shall furnish NAVSEA a report, with copies to the Type Commander (TYCOM), Immediate Superior In Command (ISIC) and the Commanding Officer of the ship involved, containing the following data pertaining to the ballast installed, removed or relocated.

a. Material and approximate density.

b. Weight installed at each location.

c. Vertical, longitudinal, and transverse position of center of gravity of ballast at each location.

d. Principal dimensions of each ballast location.

20.2.2 Changes in Ballast. Submarines of the active fleet shall be maintained within stability and buoyancy limits for a state of war readiness. Deviations from this principle are not authorized.

a. Changes in permanent or cargo (temporary) ballast, which includes adding, removing or relocating, **shall not be accomplished by Ship's Force, Fleet Maintenance Activities (FMA) or any industrial activity without prior TYCOM approval and NAVSEA written guidance.**

b. Additional guidance and procedures concerning the installation or removal of cargo ballast is available in reference (b).

20.3 UNUSUAL CONDITIONS. NAVSEA requires reports to be submitted of any unusual conditions which are considered dangerous or seriously affect the operation of the ship. Report the following situations to NAVSEA, via the ISIC and TYCOM, in accordance with the requirements of reference (a).

a. Excessive rolling.

b. Heeling due to rudder action.

c. Excessive pounding.

d. Inadequate propeller immersion.

VOLUME VI

CHAPTER 21

SUBMARINE STORAGE BATTERIES

REFERENCES.

(a) NAVSEA S9223-AF-MMO-010 - Submarine Main Storage Battery Technical Manual
(b) NAVSEA S9313-AM-MMO-010 - Lead-Calcium Alloy Acid Type U.S. Submarine Main Storage Battery TRIDENT 1 Type SCC-57
(c) GNB-3572 – Technical Manual for Battery, Submarine Main Storage, Type DSB-45C, DOLPHIN Class
(d) NAVSEA S9086-G1-STM-010 - NSTM Chapter 223, Volume 1 (Submarine Storage Batteries - Lead Acid Battery)
(e) NWP 1-03.1 - Naval Warfare Publication Operational Report
(f) PMS EL-018/032 U-1

LISTING OF APPENDICES.

A General Battery Precautions, Limitations and Normal Operating Conditions
B Preparations and Conduct of Battery Charges/Test Discharge
C Miscellaneous Battery and Associated Battery Support System(s) Operating Procedures
D Temperature Versus TVG Table
E Temperature Versus MCV Table
F TCV Calculation Table
G Sample Battery Charge Line Up Check-Off Sheet
H Capacity Test Discharge Data Sheet
I Instructions for Completing Submarine Battery Quarterly Reports - NAVSEA 9320/3
J Main Storage Battery Inspection Check-Off
K Instructions for Maintaining the Submarine Battery Record Book - NAVSEA 9320/1 (3-92)

21.1 PURPOSE. To emphasize the necessity for proper operation and maintenance of submarine main storage batteries and to provide instructions for:

a. Operation of submarine main storage batteries.

b. Completing Submarine Quarterly Battery Reports (QBR).

c. Maintaining the Submarine Battery Record Book – Naval Sea Systems Command (NAVSEA) 9320/1 (3-92).

21.1.1 Background. Records of prior submarine batteries indicate that, with proper operation and maintenance, the batteries will provide relatively trouble free service throughout their expected life. The primary factors in obtaining reliable performance are:

a. Strict compliance with maintenance and charging instructions.

b. Accomplishment of periodic meter checks ensuring the accurate indication of parameters monitored.

c. Proper operation and maintenance of electrolyte agitation systems.

d. Proper operation of battery ventilation systems.

e. Strict adherence to the Trickle Discharge Routine.

21.1.2 Discussion. Although there are a wide variety of problems which can develop in batteries, previous experience has shown that there are specific causes of problems which can be eliminated.

a. Nuclear Powered Submarines. Improper electrolyte agitation is the most frequent cause of problems with submarine batteries. Failure of airlift pumps causes stratification, sulfation, internal shorts, low gravities, and low Individual Cell Voltages (ICV). The end result is failed cells and decreased capacity. Improper maintenance of the agitation system can cause problems to exist for up to six months before becoming evident as capacity reductions below 90% during a test discharge.

b. Improper maintenance of the battery will shorten its service life and result in an unscheduled battery replacement or inability of the ship to perform its mission until the battery is replaced. For example, inaccurate voltmeters and ammeters can cause the battery to be overcharged or undercharged. Allowing this condition to go uncorrected can result in permanent damage to the cell plates with a subsequent decrease in service life.

c. Operating the main storage battery and support systems in accordance with established procedures is essential. The consequences of improper operation can range from a reduction in battery life with subsequent rescheduling of ship operations to a major ship casualty.

21.2 ACTION.

a. All submarines having flooded lead acid cells installed shall comply with the procedures in this chapter for the operation, maintenance, and inspection of main storage batteries.

b. Since the main storage battery can be operated safely and efficiently by using reference (a), (b) or (c), as applicable, and reference (d) directly, individual ship main storage battery operating procedures, which may require changes because of changes to source documents, are not required except as specified in this chapter. Where conflicts exist, reference (a), (b) and (c) takes precedence over reference (d).

c. NAVSEACRANE, through the battery manufacturer and with Type Commander (TYCOM) approval, will conduct on-site battery inspections between 9 and 15 months since the last submarine inspection and in situations warranting closer scrutiny. An inspection report will be prepared by the manufacturer and forwarded to the submarine Commanding Officer by NAVSEACRANE.

d. Immediate Superior in Command (ISIC) shall ensure that attached units operate and maintain installed main storage batteries in accordance with established procedures. When deemed appropriate, promulgate lessons learned concerning battery operation and maintenance among units and provide feedback to the TYCOM.

e. Submarine Commanding Officers shall implement the provisions of this instruction as follows:

(1) Maintain a copy of references (a), (b) or (c), as applicable, and (d) in the Maneuvering Area (or normal controlling station for battery charges).

(a) For all pre-SSN 688/SSBN/SSGN 726 Class nuclear submarines, insert copies of Appendices A through F of this chapter directly behind the front cover of reference (a).

(b) For diesel electric submarines, insert copies of Appendices A through C of this chapter directly behind the front cover of reference (c).

(c) SSN 688, SSN 21, SSBN/SSGN 726 and later Class submarines shall operate the main storage battery and support system in accordance with the Ship's Systems Manual (SSM). These submarines may insert copies of Appendices D through F of this chapter in the Battery Technical Manual if desired. Appendices A, B, C, and G of this chapter do not apply.

(2) Appendices A and B of this chapter should be used directly for submarines equipped with TLX-39-B main storage batteries. Ships with other type batteries installed, or unique shipboard installations, should modify Appendices A and B of this chapter to comply with actual shipboard configuration. Each ship should modify Appendix C of this chapter as necessary in order to accurately describe infrequent operations associated with the main storage battery.

NOTE: **SSN 688, SSN 21 AND SSBN/SSGN 726 CLASS SUBMARINES SHALL USE PROCEDURES PROMULGATED IN THE SSMs IN LIEU OF APPENDICES A, B, C, AND G OF THIS CHAPTER.**

(3) Validate and/or modify a copy of Appendix G of this chapter for each ship's specific equipment layout and then promulgate as a formal ship's (Engineering Department) instruction/form.

(4) Require Battery Charging Electrician (BCE) and Battery Charging Electrician Forward (BCEF) qualifications to include familiarity with this chapter.

(5) Incorporate familiarity with references (a), (b), or (c), as applicable, this chapter, and reference (d) as part of the formal qualification procedures for Officer Of the Deck (OOD)/Duty Officer (DO), Chief of the Watch/Inport Duty Chief, Engineering Officer Of the Watch (EOOW)/ Engineering Duty Officer (EDO), and Engineering Watch Supervisor/ Engineering Duty Petty Officer.

(6) Perform battery planned maintenance as specified by Planned Maintenance System (PMS) and references (a), (b), or (c), as applicable. Where conflicts exist, PMS takes precedence over references (a), (b) and (c).

(7) Conduct battery charges at the frequency and in the manner specified in references (a), (b) or (c), as applicable.

(8) Operate and maintain battery ventilation including minimum air flow requirements, as specified in reference (d).

(9) Maintain battery test discharge data using Appendix H of this chapter. A copy of Appendix H of this chapter shall be included with the Submarine QBR when a test discharge is conducted during a reporting quarter.

(10) Maintain records in accordance with references (a), (b) or (c), as applicable, and reference (d). The Battery Record Book (BRB) for SSBN/SSGNs is to be updated and certified by the Engineer Officer during each crew turnover.

(11) Submit Submarine QBR as specified in reference (d).

(12) Pursue a battery well maintenance and cleaning program. With proper care and maintenance, a battery resistance to ground with the battery isolated (i.e., battery circuit breakers open) can easily be maintained greater than 500,000 ohms. DC bus grounds must be above 100,000 ohms to conduct a battery charge.

(13) Ensure that electric plant logs show a minimum specification of 50,000 ohms for AC and DC bus grounds and battery charging logs show a minimum specification of 100,000 ohms for DC bus grounds.

(14) Upon battery replacement, and annually, use Appendix J of this chapter to evaluate the material condition of the battery and determine accuracy and completeness of battery records. Material deficiencies will be recorded in the Equipment Status Log for correction and the Job Sequence Number recorded in the margin of the inspection checklist next to the appropriate article. Record the completion date of the most recent Appendix J inspection and correction of deficiencies in the remarks section of the QBR. Only the most recent complete copy of Appendix J of this chapter need be retained with battery records.

(15) Request technical assistance from higher authority via ISIC or TYCOM for correction of abnormal conditions not within Ship's Force capability.

21.3 CASUALTY REPORTING

21.3.1 Purpose. To provide guidance for Casualty Reporting (CASREP) requirements for the submarine main storage battery. CASREPs are in addition to, and do not replace the reporting requirements of other documents (e.g., Naval Reactors Technical Bulletins, Operational Orders, Mishap Reports, etc).

21.3.2 Background. The significance of a submarines emergency and backup power supplies cannot be overstated. Reference (e) defines the CASREP types, requirements and format. CASREP requirements of Out of Commission power generating or storage equipment require additional clarification.

21.3.3 SSN Class Submarine Main Storage Battery. Battery CASREPs shall be submitted as follows:

a. C-2 when battery capacity falls below 80 percent of rated capacity.

b. C-3 when battery capacity falls below 65 percent of rated capacity.

c. C-4 when battery capacity falls below 50 percent of rated capacity.

21.3.4 SSBN/SSGN Class Submarine Main Storage Battery. Report low battery capacity casualties by message as allowed by operational constraints.

APPENDIX A

GENERAL BATTERY PRECAUTIONS, LIMITATIONS AND NORMAL OPERATING CONDITIONS

1. Precautions:

a. Never work alone in the battery well except during battery monitoring (i.e., inspections, lineups, and obtaining Specific Gravities (SG)).

b. Personnel entering the battery well will be fully clothed.

c. Do not, under any circumstances, enter the battery well while a charge is in progress.

d. Minimize the time that the battery well hatch remains open. Leaving the hatch open degrades the cleanliness of the battery well and causes improper ventilation airflow through the battery well. The Engineer Officer's permission is required to work with the battery well hatch open. Notify the Shutdown Electrical Operator/Electrical Operator prior to entering the battery well.

e. Prior to entering the battery well:

(1) Obtain permission of the OOD/DO and the EOOW/EDO.

(2) If any work is to be performed, take a battery bus ground reading. No work other than clearing of the ground is permitted if the corrected battery resistance to ground is less than 50,000 ohms.

(3) Remove all pens, collar devices, tools, keys and other metal objects from person and pockets.

(4) Ensure all tools to be used in the well are insulated to preclude short circuiting terminals of opposite polarity. Uninsulated working surfaces of tools should not exceed three inches. Use only flashlights with non-metallic bodies.

(5) If any work, other than preventive maintenance, is to be performed on battery well wiring, bussing, switches or connections, place the battery on open circuit in accordance with Appendix C of this chapter. SSN 688/SSN 21/ SSBN/SSGN 726 Class submarines shall use procedures promulgated in the applicable SSMs.

f. Use electrical insulating blankets or rubber sheeting, as necessary, to cover cell tops and ship's structure in the vicinity of any work being done in the battery well.

g. When jumpering out cells, adequately insulate lugs on one end of the jumper cable prior to connecting the other end. Remove insulation just prior to actual hook up.

h. No smoking, welding or open flames are permitted in the battery well. When repair work involving welding or burning is scheduled for adjacent compartments or near battery well bulkheads, ensure adequate precautions are taken to prevent open flame from reaching the battery well.

i. Keep cell tops and battery well clear of loose articles. Do not store hydrometer boxes, cleaning gear or similar items in the well.

j. Observe the following precautions when handling electrolyte:

(1) Wear rubber aprons, rubber boots, rubber gloves and goggles to protect skin and eyes from contact with acid. Accomplish in accordance with reference (f).

(2) Avoid spilling electrolyte on cell tops, walking/crawling flats or decks.

(3) If eye wash facilities are not available near the battery well hatch, have two plastic squirt type bottles (of at least one quart capacity each) filled with fresh water, in the vicinity of the hatch.

(4) Flush electrolyte burns with large quantities of water. Summon medical help immediately.

k. When a cell is open, use extreme caution to prevent the entry of any foreign material.

2. Limitations:

a. During charge, the following values must not be exceeded:

(1) DC Bus voltage - 355 volts.

(2) Electrolyte temperature - 130°F.

(3) Hydrogen detector reading:

(a) All ships (except SSN 688 Class) - 1.5%.

(b) SSN 688 Class only - 1.2% with a K factor of 2.5.

b. If any of the following events occur during a battery charge, the charge shall be immediately secured:

(1) Loss of ventilation, any change in battery ventilation line up, or if the minimum battery air flow required by reference (d) cannot be attained.

(2) Hydrogen detector reading exceeds applicable limits in paragraph 2.a.(3) above.

(3) Battery grounds drop below 100,000 ohms.

(4) Any ship's casualty or general emergency.

c. Dampers in the ship's installed battery ventilation system should not be throttled. Exception: The outlet damper may be throttled as necessary during battery airflow meter and transmitter calibration checks (in accordance with PMS). The outlet damper should be checked fully open upon completion of PMS.

3. Normal Operating Conditions:

a. Battery disconnect links shut.

b. Battery breakers shut.

c. Hydrogen detector(s) energized.

d. Electrolyte agitation system in operation.

e. Ventilation line up in accordance with ship's operating procedures.

f. Maintain trickle discharge with the applicable section of the Battery Technical Manual.

NOTE: AN UNEXPECTED DECREASE IN BATTERY CAPACITY HAS BEEN OBSERVED IN SHIPS WHERE INADERTENT FLUCTUATIONS BETWEEN CHARGE AND DISCHARGE AS INDICATED ON THE TRICKLE CHARGE AMMETER WERE ALLOWED TO OCCUR. TO PREVENT ANY SUCH DROP IN AVAILABLE BATTERY CAPACITY, CAREFUL MONITORING OF DISCHARGE RATE IS REQUIRED TO HOLD, AS PRACTICAL, A CORRECT AVERAGE TRICKLE DISCHARGE RATE. CAREFUL ANALYSIS OF DAILY PILOT CELL SG TO ASSURE A THREE POINT (.003) DROP PER DAY IS BEING OBTAINED WILL SIGNIFICANTLY REDUCE THE OCCURRENCE OF SERIOUS TEMPORARY CAPACITY LOSS.

g. Airflow detector energized.

h. Inport, take and record the SG, temperature and electrolyte level of the pilot cells daily.

i. Underway, take and record pilot cell SG, temperature and electrolyte level daily and following a significant discharge such as a reactor scram. Report results to the OOD and EOOW.

j. Maintain a minimum airflow of 252 Cubic Feet per Minute (CFM) any time the battery is on trickle discharge or open circuit. Since the battery airflow indicating system is insensitive at low values, it is desirable to maintain airflow above 450 CFM.

k. Hourly take and record the following readings:

(1) DC bus ground.

(2) Percent hydrogen.

(3) Battery airflow.

(4) Charge/discharge rate.

(5) Agitation system airflow.

l. The battery exhaust fan will normally be operated in accordance with the SSM.

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APPENDIX B

PREPARATIONS AND CONDUCT OF BATTERY CHARGES/TEST DISCHARGE

1. Preparations for Conducting Battery Charges.

a. Permission to commence a battery charge will be obtained from the Commanding Officer by the OOD/DO. The OOD/DO will be notified upon starting the charge, upon reaching the finishing rate and upon completion of the charge.

b. The approach to battery charging will be done in a deliberate and careful manner as generated hydrogen is neither readily expelled nor consumed. The ship's promulgated Battery Charge Line up Check-off Sheet will be strictly observed. No deviation from this check-off is permitted without the express consent of the Commanding Officer.

NOTE: THE ENGINEER OFFICER SHALL DESIGNATE THE BATTERY CHARGING VENTILATION LINE UP MODE TO BE COMPLETED.

c. All battery charges will be supervised by a qualified EDO or EOOW. He will be familiar with the provisions of references (a), (b), or (c), as applicable, reference (d) and the battery procedures of this chapter. He will supervise the operation of the Electric Plant Control Panel (EPCP) at the commencement of the charge, be aboard and be up and about for the duration of the charge.

d. A qualified BCE shall conduct the charge from the EPCP. He shall remain at this station throughout the charge or until relieved by another qualified BCE. A Shutdown Electrical Operator need not be stationed in addition to the BCE as long as the BCE is a qualified Shutdown Electrical Operator.

e. Prior to commencing a battery charge, a qualified BCEF shall complete the ship's promulgated Battery Charge Line up Check-off Sheet. A second, independent check (using the same check-off sheet) shall then be completed by an officer approved by the Engineer Officer.

f. During the battery charge, the BCEF will assist the BCE in taking charge readings and making prescribed inspections. Inport, this duty shall be assigned to a qualified BCEF who has no other watchstanding duties during the duration of the battery charge from before charge line ups to after charge readings.

g. Prior to starting the charge:

(1) Determine type of charge to be performed. Take and record the SG, temperature and height of electrolyte of the pilot cells. Calculate Temperature Voltage Gassing (TVG) and Maximum Corrected Voltage (MCV) in accordance with the battery technical manual. Appendices D and E of this chapter may be used in determining TVG and MCV.

(2) Inspect the battery well for the following items:

(a) Cleanliness of cell tops and terminals.

(b) Inspect the battery electrolyte agitation system by removing the flash arrestor and visually observing the airlift pump discharge. The flow of electrolyte should be as specified on the applicable Maintenance Requirement Card (MRC). Ten different cells in addition to the pilot cells should be checked for each charge. Whenever no flow is observed, correct the condition and check the operation of the airlift pumps in all cells.

(c) Ensure that all flash arresters are in place and in good condition. The seal between cell and flash arrestor dome should be hand tight.

(d) Ensure that all service caps are in place.

(e) Check that battery well deck flats are properly secured.

(f) Check that no unauthorized gear is stowed in the well.

(g) Check that the pilot cell electrolyte levels are above the minimum required by the battery technical manual.

(3) Shut and dog the battery well hatch. Install "Charge in Progress" sign over the hatch.

(4) Check that the hydrogen detector is operating and has been in operation for at least 20 minutes prior to the charge.

(5) Check that the battery intake duct is clear.

(6) Test the battery exhaust fan in fast and slow speed. Leave running in fast and ensure airflow exceeds the minimum requirements of reference (d).

WARNING: UNDER NO CIRCUMSTANCES SHOULD A BATTERY CHARGE BE ATTEMPTED WHEN THE DC GROUND RESISTANCE IS LESS THAN 50,000 OHMS, SINCE THIS MAY CAUSE A POINT SOURCE OF HEAT GREAT ENOUGH TO RESULT IN A FIRE.

(7) Check grounds on the battery and the circuits and equipment connected to it above 100,000 ohms with the installed ground detector on the EPCP. If grounds are less than 100,000 ohms, emergency charging procedures in accordance with reference (d) must be utilized. The Commanding Officer will be informed and his permission obtained in order to conduct the charge.

(8) Check CO-H_2 burner(s) in operation at operating temperature if charging in a recirculation ventilation line up.

(9) Ensure battery ventilation precipitator and heaters are deenergized prior to commencing charge.

(10) Ensure that a copy of the battery charging instructions and references are available at the battery charging station during the charge.

(11) EOOW/EDO review Battery Charge Line up Check-off Sheet. Obtain permission from the OOD/DO and direct start of the battery charge.

(12) Reset the ampere-hour meter to zero immediately prior to commencing the battery charge (select charge/discharge switch position as appropriate).

2. Battery Charging Procedures. Battery charges shall be performed at the specified frequency and method in accordance with the battery technical manual with the following additions:

a. Ship sound quiet conditions permitting, pass the following word on the 1MC immediately after commencing the battery charge; "There is a battery charge in progress, do not alter any ventilation line up."

b. Initial charging rate shall not exceed the number of amp-hours discharged prior to the charge. This charging rate shall be recorded as the initial set of Log Readings. The charging rate should then be increased until TVG or the generating equipment limits are attained.

NOTE: ADDITIONAL LOG READINGS ARE REQUIRED TO INDICATE ALL STEP CHANGES IN CHARGING RATE, MAXIMUM CHARGING RATE AND TVG REACHED.

c. If TVG is initially not attained within the capacity of the Ship's Service Motor Generator sets, maintain maximum charging rate until the voltage increases to TVG.

d. Battery airflow shall be greater than the minimum required in accordance with reference (d).

e. Ventilation rates will be maintained at the same rate as during the battery charge for a minimum of 20 minutes following completion of the battery charge. This ventilation rate will be further maintained until hydrogen detector readings are less than 0.5%.

NOTE: WHEN THE DIESEL IS BEING USED TO SUPPLEMENT SHORE POWER DURING A BATTERY CHARGE AND CAN BE SECURED WITHOUT ALTERING BATTERY AIRFLOW, IT MAY BE SECURED WHILE CONTINUING THE BATTERY CHARGE.

f. If changes are required in the ventilation line up while charging due to ship's operation, stop the charge, change the line up, and recheck the ventilation line up prior to recommencing the battery charge. Operation of topside hatches or fan room doors which do not affect ventilation are not considered as changing the ventilation line up. Interruption of the charge for greater than one hour will result in a partial charge.

g. If the hydrogen detector reading reaches 1.5% (1.2% for SSN 688 Class) during a charge, secure the charge. The charge may be resumed when the cause of excessive hydrogen reading has been corrected and the concentration has decreased to 1.0% or less. Interruption of the charge for greater than one hour will result in a partial charge.

h. At least one CO-H_2 burner will be in operation at all times during a charge when the ventilation system is in a recirculation mode.

i. Inspections during the charge:

(1) The ventilation line up shall be checked every half hour until reaching the finishing rate and every 15 minutes thereafter. If inspection of the battery well becomes necessary during the charge, secure the charge and ventilate at the same rate for at least five minutes. Ensure the hydrogen detector is reading less than 1.0% before entering the battery well. Interruption of the charge for greater than one hour will result in a partial charge.

(2) The EOOW/EDO shall review and initial the battery charging logs frequently (approximately hourly) during the charge, noting trends or abnormal readings which could indicate a problem.

(3) Use the permanently installed ground detector system at 15 minute intervals during the charge to check for grounds on the battery and the circuits and equipment connected to it. Stop the charge if the battery resistance to ground falls below 100,000 ohms. Do not restart the charge until it is shown that battery resistance to ground is more than 100,000 ohms. Refer to reference (d) for the procedure to be used in determining when these conditions are met.

j. The following readings will be taken at the end of the charge, using pilot cells only or all cells, as dictated by specific charge requirements:

(1) SG.

(2) Electrolyte Height.

(3) ICV.

(4) Cell Temperature.

(5) Total Corrected Voltage (TCV).

k. The SG shall be corrected for cell temperature as follows: Add one point for each three degrees above 80°F. Subtract one point for each three degrees below 80°F. The TCV may be determined by adding the appropriate value from Appendix F of this chapter to the EPCP battery voltage recorded just prior to completing the charge.

3. Battery Test Discharge. Battery test discharges shall be conducted in accordance with the frequency and procedure specified in the battery technical manual, with the following additions:

a. Shortly prior to the test discharge, inspect the battery cells for loose cell connections, cracked jars, or loose battery wedging. Confirm torque requirements on the battery intercell connectors are within periodicity in accordance with PMS.

b. During the discharge, ICV readings will be taken and plotted each half hour. When any cell voltage drops to 1.75 volts, the ICVs will be taken and plotted continuously for the remainder of the test discharge.

c. A sheet similar to that contained in Appendix H of this chapter is to be maintained at the EPCP during the test discharge. A copy of this sheet will be included with the next Submarine QBR.

APPENDIX C

MISCELLANEOUS BATTERY AND ASSOCIATED BATTERY SUPPORT SYSTEM(S) OPERATING PROCEDURES

1. Battery Watering.

   a. Only water from the ship's demineralized water header will be used for adding water to any of the battery's cells. The purpose is to replace water lost because of evaporation.

CAUTION: ATMOSPHERIC PRESSURE CHANGES WHILE SNORKELING CAN CHANGE ELECTROLYTE LEVEL CONSIDERABLY WITHOUT WARNING. IN GENERAL, DECREASING AND THEN RESTORING PRESSURE WILL CAUSE THE LEVEL TO DROP. THE LEVEL WILL NOT RETURN TO NORMAL UNTIL THE BATTERY DEVELOPS REPLACEMENT GAS BUBBLES THROUGH CHARGING AND DISCHARGING.

   b. Electrolyte level shall be maintained as specified in the Battery Technical Manual.

   c. Battery water will be tested by Silver Nitrate Turbidity prior to watering. The demineralizer shall never be bypassed.

   d. The battery watering hose shall be labeled, ends covered, and stowed in a dry location when not in use. This hose should not be used for any other purpose.

2. Ion Exchanger. Ion exchanger resin should be replaced in accordance with PMS requirements.

3. Battery Procedures for Compartment Pressure Testing. The following procedures apply to pressure test of the compartment in which the battery is located:

   a. Ensure the hydrogen detector has been in operation for at least 20 minutes prior to commencement of the test.

   b. Maintain the battery on normal trickle discharge throughout the test.

   c. Line up battery ventilation to recirculate to the compartment.

   d. Ensure that the electrolyte agitation system is vented to the battery compartment during the period of the test to prevent carryover of electrolyte into the air supply system.

   e. Upon completion of the test, do not exceed a compartment pressure reduction rate of 0.5 psi per minute. Do not allow hydrogen concentration to exceed 1.5% (1.2% on 688 Class ships) and wait until indicated hydrogen is less than 1.0%. If necessary, simultaneous "Feed and Bleed" may be initiated to maintain constant pressure on the compartment while ventilating hydrogen.

4. Procedures for Loss of Battery Ventilation During Charge. If battery exhaust airflow is lost during a charge:

a. Stop the charge.

b. Determine the cause of the loss of ventilation.

(1) If the loss is due to a mispositioned damper or other mechanical blockage, correct the condition and proceed with step 4.c below.

(2) If the loss is due to failure of the battery exhaust fan, ventilate the battery by other means as delineated in step 4.c below.

c. Ventilate the battery well for at least five minutes with a minimum indication of 252 CFM on the battery airflow meter. If, after five minutes, the hydrogen detector shows no increase and is less than the maximum allowable concentration, reverify the ventilation line-up and resume the charge. Should the hydrogen detector be inoperative, the emergency ventilation procedures must be continued for a minimum of 30 minutes.

5. Procedure for Opening or Shutting the Battery Disconnects.

a. Ensure Number One and Number Two battery breakers are open and danger tagged.

b. Ensure DC battery exhaust fan is secured and danger tagged.

c. Place the DC control power switch in the port or starboard DC bus position and danger tag it.

NOTE: ONCE BATTERY DISCONNECTS ARE OPEN AND DANGER TAGGED (OR SHUT) THE ABOVE EQUIPMENT MAY BE RESTORED TO SERVICE.

d. If the disconnect links have been opened, clean and inspect the links in accordance with PMS.

6. Upkeep, Interim Docking Periods and Extended Yard Periods. Operation of the battery during upkeep, interim docking periods and extended yard periods shall be in accordance with references (a), (b) or (c), as applicable, and reference (d). The following is provided as additional guidance:

a. The battery well is to be kept as clean as possible during these periods due to high levels of industrial debris. Ship's Force is responsible for battery well cleanliness during upkeeps and Interim Docking periods. If the battery and support systems have been turned over to the industrial activity for operational control or maintenance, the industrial activity will assume cleanliness responsibility until the battery and support systems are officially turned over to Ship's Force.

b. During CNO Maintenance Availabilities after Ship's Force takes operational control of the battery, Ship's Force is responsible for ensuring that battery operations are in accordance with references (a), (b) or (c), as applicable, and reference (d). When industrial facility conditions necessitate deviations from these procedures, the industrial activity will request the concurrence of NAVSEACRANE.

c. Minimum requirements for temporary battery ventilation shall be strictly adhered to and are noted in reference (d).

d. The electrolyte agitation system may be secured when the battery is maintained fully charged on open circuit with battery disconnects open or with battery disconnects closed and battery in intermittent service. This system shall be in continuous operation during any other battery mode. If the normal source of agitation air is not available to support this requirement, a temporary filtered air source must be provided.

e. Generally, the only charges conducted during CNO Maintenance Availabilities are equalizing charges. In the open circuit mode an equalizing charge must be given between the sixth and seventh month. Normal charge requirements are to be followed if the battery is in-service in trickle discharge mode. Semiannual battery capacity test discharges are not to be performed during these periods. The industrial activity is responsible for providing services needed to support the conduct of all charges until battery and support systems are turned over to Ship's Force.

f. Hydrogen monitoring requirements during these periods will be in accordance with reference (d).

g. Any combined DC bus ground less than 500,000 ohms as read on the EPCP ground detector shall be investigated. The Commanding Officer's approval shall be obtained for continued operation.

h. Submarine QBRs are required while the battery is on open circuit or intermittent operation.

7. Shipping, Storing, Preparing, and Installing Batteries.

a. The installing activity shall follow the instructions contained in references (a), (b), or (c), as applicable, and reference (d).

b. The ISIC Material Officer shall ensure that an air pressure test has been performed on all replacement cells prior to and after installation to determine the integrity of the cover-to-cover-to-liner seal.

c. After battery removal and prior to replacement, an inspection shall be made of battery bussing from the battery disconnects up to the DC switchboards. This inspection shall include a close visual check of all cable penetrations. Any indications of corrosion, water leakage or overheating shall be reported to the Engineer Officer. All discrepancies must be corrected prior to battery installation.

d. Unrestricted Operation (URO) MRC 003 requires inspection of the battery compartment and common boundary surfaces located in the built-in tanks surrounding the battery compartment. The following is provided for clarification of URO 003 (Equipment Guide List (EGL) item 15) requirements:

(1) Accomplishment of EGL item 15 is tasked to the parent ISIC. Prior to installation of replacement battery, the ISIC Material Officer will verify to the installing activity that this requirement has been accomplished.

(2) Fleet Maintenance Activity will inspect all URO MRC 003 areas and tanks that have a common interface with the battery compartment. This includes all pressure hull plating and framing within battery compartment and interfacing tanks. These tanks need only be inspected on the sides adjoining the battery compartment. Periodicity requirements of EGL item 6 do not supersede the interface tank inspections required by EGL item 15.

(3) Tank inspections designated by EGL item 15 shall be accomplished during the refit/upkeep prior to battery replacement. Necessary repairs are to be made during the battery replacement availability after battery removal. Safety aspects of battery compartment integrity dictate that these tank inspections occur and reasonably coincide with battery replacement.

(4) Hull Structural Reports (Partial) will be forwarded in accordance with URO MRC 003 within thirty days of completion.

8. Miscellaneous Procedures. Ships may include additional miscellaneous battery associated procedures here as desired.

APPENDIX D

TEMPERATURE VERSUS TVG TABLE

N = Number of cells in battery circuit (not jumpered out).
T_c = Average pilot cell temperature prior to charge.
TVG = $(2.62 - (0.003 \times T_c))N$

T_c(°F)	N								
	126	125	124	123	122	121	120	119	118
50	311	309	306	304	301	299	296	294	291
51	311	308	306	303	301	299	296	294	291
52	310	308	306	303	301	298	296	293	291
53	310	308	305	303	300	298	295	293	290
54	310	307	305	302	300	297	295	293	290
55	309	307	304	302	300	297	295	292	290
56	309	307	304	302	299	297	294	292	289
57	309	306	304	301	299	296	294	291	289
58	308	306	303	301	298	296	294	291	289
59	308	305	303	300	298	296	293	291	288
60	307	305	303	300	298	295	293	290	288
61	307	305	302	300	297	295	292	290	288
62	307	304	302	299	297	295	292	290	287
63	306	304	301	299	297	294	292	289	287
64	306	304	301	299	296	294	291	289	287
65	306	303	301	298	296	293	291	289	286
66	305	303	300	298	295	293	291	288	286
67	305	302	300	298	295	293	290	288	285
68	304	302	300	297	295	292	290	288	285
69	304	302	299	297	294	292	290	287	285
70	304	301	299	296	294	292	289	287	284
71	303	301	298	296	294	291	289	286	284

T_c(°F)	N								
	126	**125**	**124**	**123**	**122**	**121**	**120**	**119**	**118**
72	303	301	298	296	293	291	288	286	284
73	303	300	298	295	293	291	288	286	283
74	302	300	297	295	293	290	288	285	283
75	302	299	297	295	292	290	287	285	283
76	301	299	297	294	292	289	287	285	282
77	301	299	296	294	291	289	287	284	282
78	301	298	296	293	291	289	286	284	282
79	300	298	295	293	291	288	286	284	281
80	300	298	295	293	290	288	286	283	281
81	300	297	295	292	290	288	285	283	280
82	299	297	294	292	290	287	285	283	280
83	299	296	294	292	289	287	285	282	280
84	298	296	294	291	289	287	284	282	279
85	298	296	293	291	289	286	284	281	279
86	298	295	293	291	288	286	283	281	279
87	297	295	293	290	288	285	283	281	278
88	297	295	292	290	287	285	283	280	278
89	296	294	292	289	287	285	282	280	278
90	296	294	291	289	287	284	282	280	277
91	296	293	291	289	286	284	282	279	277
92	295	293	291	288	286	284	281	279	277
93	295	293	290	288	286	283	281	279	276
94	295	292	290	288	285	283	281	278	276
95	294	292	290	287	285	283	280	278	276
96	294	292	289	287	285	282	280	278	275
97	293	291	289	286	284	282	279	277	275
98	293	291	288	286	284	281	279	277	274

T_c(°F)	N								
	126	**125**	**124**	**123**	**122**	**121**	**120**	**119**	**118**
99	293	290	288	286	283	281	279	276	274
100	292	290	288	285	283	281	278	276	274

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APPENDIX E

TEMPERATURE VERSUS MCV TABLE

N = Number of cells in battery circuit (not jumpered out).
T_c = Average pilot cell temperature prior to change.
MCV = $(2.86 - (0.003 \times T_c))N$

T_c(°F)	N								
	126	**125**	**124**	**123**	**122**	**121**	**120**	**119**	**118**
50	341	339	336	333	331	328	325	322	320
51	341	338	336	333	330	328	325	322	319
52	341	338	335	333	330	327	324	322	319
53	340	338	335	332	330	327	324	321	319
54	340	337	335	332	329	326	324	321	318
55	340	337	334	331	329	326	323	321	318
56	339	337	334	331	328	326	323	320	318
57	339	336	333	331	328	325	323	320	317
58	338	336	333	330	328	325	322	320	317
59	338	335	333	330	327	325	322	319	317
60	338	335	332	330	327	324	322	319	316
61	337	335	332	329	327	324	321	319	316
62	337	334	332	329	326	324	321	318	316
63	337	334	331	329	326	323	321	318	315
64	336	334	331	328	325	323	320	317	315
65	336	333	330	328	325	322	320	317	314
66	335	333	330	327	325	322	319	317	314
67	335	332	330	327	324	322	319	316	314
68	335	332	329	327	324	321	319	316	313
69	334	332	329	326	324	321	318	316	313
70	334	331	329	326	323	321	318	315	313
71	334	331	328	326	323	320	318	315	312

T_c(°F)	N								
	126	**125**	**124**	**123**	**122**	**121**	**120**	**119**	**118**
72	333	331	328	325	323	320	317	315	312
73	333	330	327	325	322	320	317	314	312
74	332	330	327	324	322	319	317	314	311
75	332	329	327	324	321	319	316	314	311
76	332	329	326	324	321	318	316	313	311
77	331	329	326	323	321	318	315	313	310
78	331	328	326	323	320	318	315	312	310
79	330	328	325	323	320	317	315	312	310
80	330	328	325	322	320	317	314	312	309
81	330	327	325	322	319	317	314	311	309
82	329	327	324	322	319	316	314	311	308
83	329	326	324	321	319	316	313	311	308
84	329	326	323	321	318	316	313	310	308
85	328	326	323	320	318	315	313	310	307
86	328	325	323	320	317	315	312	310	307
87	327	325	322	320	317	314	312	309	307
88	327	325	322	319	317	314	312	309	306
89	327	324	322	319	316	314	311	309	306
90	326	324	321	319	316	313	311	308	306
91	326	323	321	318	316	313	310	308	305
92	326	323	320	318	315	313	310	307	305
93	325	323	320	317	315	312	310	307	305
94	325	322	320	317	315	312	309	307	304
95	324	322	319	317	314	312	309	306	304
96	324	322	319	316	314	311	309	306	303
97	324	321	319	316	313	311	308	306	303
98	323	321	318	316	313	310	308	305	303

T_c(°F)	N								
	126	**125**	**124**	**123**	**122**	**121**	**120**	**119**	**118**
99	323	320	318	315	313	310	308	305	302
100	323	320	317	315	312	310	307	305	302

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APPENDIX F

TCV CALCULATION TABLE

N = Number of cells in battery circuit (not jumpered out).
T_c = Average pilot cell temperature prior to end of charge.
V = Switchboard voltage just prior to end of charge.
TCV = (0.003(N)) x (T_c-80) + (V) (Add or subtract as indicated to switchboard voltage)

T_c(°F)	N								
	126	**125**	**124**	**123**	**122**	**121**	**120**	**119**	**118**
60	-7.6	-7.5	-7.4	-7.4	-7.3	-7.3	-7.2	-7.2	-7.1
61	-7.2	-7.1	-7.1	-7.0	-7.0	-6.9	-6.8	-6.8	-6.7
62	-6.8	-6.8	-6.7	-6.6	-6.6	-6.5	-6.5	-6.4	-6.4
63	-6.4	-6.4	-6.3	-6.3	-6.2	-6.2	-6.1	-6.1	-6.0
64	-6.0	-6.0	-6.0	-5.9	-5.9	-5.8	-5.8	-5.7	-5.7
65	-5.7	-5.6	-5.5	-5.5	-5.5	-5.4	-5.4	-5.4	-5.3
66	-5.3	-5.3	-5.2	-5.2	-5.1	-5.1	-5.0	-5.0	-5.0
67	-4.9	-4.9	-4.8	-4.8	-4.8	-4.7	-4.7	-4.6	-4.6
68	-4.5	-4.5	-4.5	-4.4	-4.4	-4.4	-4.3	-4.3	-4.2
69	-4.2	-4.1	-4.1	-4.1	-4.0	-4.0	-4.0	-3.9	-3.9
70	-3.8	-3.8	-3.7	-3.7	-3.7	-3.6	-3.6	-3.6	-3.5
71	-3.4	-3.4	-3.3	-3.3	-3.3	-3.3	-3.2	-3.2	-3.2
72	-3.0	-3.0	-3.0	-3.0	-2.9	-2.9	-2.9	-2.9	-2.8
73	-2.6	-2.6	-2.6	-2.6	-2.6	-2.5	-2.5	-2.5	-2.5
74	-2.3	-2.3	-2.2	-2.2	-2.2	-2.2	-2.2	-2.1	-2.1
75	-1.9	-1.9	-1.9	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8
76	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.4	-1.4	-1.4
77	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
78	-0.8	-0.8	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7

T_c(°F)	N								
	126	**125**	**124**	**123**	**122**	**121**	**120**	**119**	**118**
79	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
81	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
82	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7
83	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
84	1.5	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4
85	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8
86	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1
87	2.6	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.5
88	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9	2.9
89	3.4	3.4	3.3	3.3	3.3	3.3	3.2	3.2	3.2
90	3.8	3.8	3.7	3.7	3.7	3.6	3.6	3.6	3.5
91	4.2	4.1	4.1	4.1	4.0	4.0	4.0	3.9	3.9
92	4.5	4.5	4.5	4.4	4.4	4.4	4.3	4.3	4.2
93	4.9	4.9	4.8	4.8	4.8	4.7	4.7	4.6	4.6
94	5.3	5.3	5.2	5.2	5.1	5.1	5.0	5.0	5.0
95	5.7	5.6	5.6	5.5	5.5	5.4	5.4	5.4	5.3
96	6.0	6.0	6.0	5.9	5.9	5.8	5.8	5.7	5.7
97	6.4	6.4	6.3	6.3	6.2	6.2	6.1	6.1	6.0
98	6.8	6.8	6.7	6.6	6.6	6.5	6.5	6.4	6.4
99	7.2	7.1	7.1	7.0	7.0	6.9	6.8	6.8	6.7
100	7.6	7.5	7.4	7.4	7.3	7.3	7.2	7.1	7.1
101	7.9	7.9	7.8	7.7	7.7	7.6	7.6	7.5	7.4
102	8.3	8.3	8.2	8.1	8.1	8.0	7.9	7.9	7.8
103	8.7	8.6	8.6	8.5	8.4	8.3	8.3	8.2	8.1

APPENDIX G

SAMPLE BATTERY CHARGE LINE UP CHECK-OFF SHEET

Date: _____ Type of Charge: _____ Planned Charge Start Time:_____

	Initials	
	BCEF	**Officer**
1. Hydrogen Indicating Systems Operational:		
a. Hydrogen detector in operation (at least 20 minutes prior to commencement of charge).	_____	_____
b. Central Atmosphere Monitoring Station in operation at least two hours prior to charge (where installed).	_____	_____
2. Pilot Cell ICVs:		
Cell_____ ICV_____ VOLTS	_____	_____
Cell_____ ICV_____ VOLTS	_____	_____
3. Battery Precipitator secured.	_____	_____
4. Battery Well intake clear:		
Required **Actual**		
Damper D-1 Open _____	_____	_____
Damper D-12 Shut _____	_____	_____
5. Agitation System operating:		
CFM Actual_____	_____	_____

NOTE: PILOT CELL GRAVITIES NEED ONLY BE TAKEN ON INITIAL LINE UP.

6. Pilot Cell Gravities:		
Cell_____ Ht_____Temp_____ Grav_____	_____	
Corr Grav_____	_____	
Cell_____ Ht_____Temp_____ Grav_____		
Corr Grav_____		

	Initials	
	BCEF	**Officer**
7. Check agitation of pilot cells and ten other cells in accordance with PMS. Cell No:		
_____	_____	_____
_____	_____	_____
8. Battery Well clear. Service tube caps in place, no loose or damaged flash arresters, no gear adrift and battery well deck flats secure.	_____	_____
9. Battery Well hatch secured and "Charge in Progress" sign posted.	_____	_____

10. Ventilation Line Up: (Damper/fan numbers are for example only, actual designators will vary among classes and type of submarine)

Component	Recirc	Surface Ventilation	Snorkel	Initials	
				BCEF	**Officer**
a. Battery Well Exhaust Damper D-2	Open	Open	Open		
b. Battery Well Exhaust Damper D-3	Pos 1	Pos 1	Pos 1		
c. Torpedo Room Exhaust Damper D-4	Shut	Shut	Shut		
d. Bow Compt Emerg Exh Damper D-5	Open	Shut	Shut		
e. Bow Compt Emerg Exh Damper D-14	Shut	Shut	Shut		
f. Bow Compt Emerg Exh Valve VH-14	Open	Open	Open		
g. Ops Compt Emerg Exh Damper - D-6	Shut	Shut	Shut		
h. Main Induction Fans 1 and 2	Fast	Fast	Fast		

Component	Recirc	Surface Ventilation	Snorkel	Initials	
				BCEF	**Officer**
i. Main Induction Damper D-8	Pos 1	Pos 3	Pos 2		
j. Induction Head Valve VH-1	Shut	Open	Open		
k. Outboard Induction Valve VH-2	Shut	Open	Open		
l. Inboard Induction Valve VH-3	Shut	Open	Open		
m. After Supply Valve VH-5	Open	Open	Open		
n. After Exhaust Valve VH-6	Open	Open	Open		
o. AMR-2 Exhaust Valve VH-9	Open	Open	Open		
p. AMR-2 Supply Valve VH-8	Open	Open	Open		
q. CO-H_2 Burner(s)	On	Off	Off		

BCEF Signature	Time Completed	Inspecting Officer Signature	Time Completed

NOTE: THE FOLLOWING STEPS ARE TO BE COMPLETED BY THE BCE IN MANEUVERING AND CHECKED BY THE EOOW/EDO IMMEDIATELY PRIOR TO COMMENCING CHARGE.

	Initials BCE	Initials Officer
11. Battery Exhaust Fan. Test in slow and fast; leave in fast.	_____	_____
12. Battery Recirc Fans (three) on, if installed.	_____	_____
13. Battery Intake Heaters off, if installed.	_____	_____
14. Battery Airflow above minimum. Actual CFM _____	_____	_____
15. Battery Ground Reading _____ (Minimum 100,000 ohms).	_____	_____
16. Hydrogen Detector on (Maneuvering).	_____	_____
17. TVG _____ Volts (May be determined from tables provided in Appendix D of this chapter.)	_____	_____
18. MCV _____ Volts (May be determined from tables provided in Appendix E of this chapter.)	_____	_____
19. Five KW Static Invertor secured for equalizing battery charge, (where installed).	_____	_____

_____
Completed and Reviewed:
BCE Signature

_____
Completed and Reviewed:
EOOW/EDO Signature

APPENDIX H

CAPACITY TEST DISCHARGE DATA SHEET

USS _____ DATE:_____

	TEMP BEFORE/AFTER	SPECIFIC GRAVITY BEFORE/AFTER/PT DROP
PILOT CELL # _____	____/_____	_____/_____/_____
PILOT CELL #_____	____/_____	_____/_____/_____
AVERAGE	____/_____	AVG PT DROP _____

	TIME (ACTUAL)	TIME DIFFERENCE (MINUTES)	BATTERY DISCHARGE RATE	CALCULATED AMP-HOURS DISCHARGED	TOTAL BATTERY VOLTAGE	AMPERE-HOUR METER READING
START						
FINISH						

TIME DIFFERENCE (MINUTES)_____ = (____) X 100 = _____=_____% CAPACITY

NOTE (1) REQUIRED TIME (MINUTES CORRECTED) ( )

NOTE (2) AVG DISCH RATE X (TIME DIFF MIN) = (____) X (____) = _____ CALCULATED
(60 MIN) (60) AMP-HRS

_____ X NOTE (3) _____ = _____ THEORETICAL AMP-HRS
(AVG PT DROP) (AMP-HRS/PT)

(1) OBTAINED FROM DISCHARGE CHARACTERISTICS AND TEMPERATURE CORRECTION TABLE.
(2) REFER TO NSTM CH 223 PARA 223-5.5.4.2.
(3) BASED ON ACTUAL LABORATORY TESTS USING 3 HOUR DISCHARGE RATE (6 HR RATE FOR DSC-45C)

BATTERY TYPE	DISCHARGE RATE	AMP-HR/PT
MOD C (TLX39B)	1750	43
MOD E (ASB49)	2400	49
SEAWOLF (LLL-69)	2700	54
TRIDENT (PDX/SCC57)	3450	91
DOLPHIN DSC-45C	425	-

NOTE: COMPARISON OF TOTAL AMP-HR VALUES (METER, CALCULATED AND THEORETICAL) WILL GIVE INDICATION OF CALCULATION ERRORS OR INACCURACIES/NEED FOR CALIBRATION OF BATTERY AMP-METER. (>10% BETWEEN METER AND CALCULATED OR >20% BETWEEN METER OR CALCULATED AND THEORETICAL INDICATES INACCURACIES OR ERRORS.)

NOTE: PILOT CELL AVG TEMPERATURES AND ACTUAL AND REQUIRED TIMES SHOULD BE ROUNDED TO THE NEAREST WHOLE NUMBER AND THE ROUNDED VALUES USED FOR ALL CALCULATIONS.

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APPENDIX I

INSTRUCTIONS FOR COMPLETING SUBMARINE BATTERY QUARTERLY REPORTS - NAVSEA 9320/3

1. General. Accurate battery reports are an absolute requirement. These reports enable reviewing activities to recognize a specific problem or to change the scheduled battery replacement date based on the history and performance of a particular battery installation. These reports provide vital information for assessing submarine readiness, predicting future funding requirements, and scheduling battery renewals. The NAVSEA form 9320/3 is designed to facilitate the automatic data processing of specific information reported. Therefore, all blocks must be completed correctly.

2. Frequency. This section is applicable to all submarines with installed storage batteries, including those in pre-commissioning status.

a. Submarine QBRs shall be submitted each calendar quarter that a battery is installed in the ship. The report shall be submitted within five working days of the quarter just ending, operations permitting.

b. When a battery is being replaced, submit a "final" report on the date the battery is removed. Submit a "first" report on the date a new battery is installed. If no battery is installed on the end of a reporting quarter (such as during overhaul) no report is required. First reports shall contain the date of initial filling, the date of installation, and data on the installing activity acceptance test discharge. Ampere-hours and cycles of charge from the initial charge and developing cycle shall not be included as part of the total ampere-hours and cycles.

c. A "special" report shall be submitted whenever the battery capacity falls below 90%, whenever battery capacity decreases more than 10 percentage points from the previous capacity test discharge or anytime unusual or unexplained changes occur.

3. Distribution.

a. NAVSEACRANE (Code 6095).

b. One copy to the applicable TYCOM. (Commander Submarine Force Atlantic Code N4024/Commander Submarine Force Pacific Code 4512).

c. One copy to the ISIC.

d. One copy to the GNB Industrial Power.

e. One copy for ship's file..

4. Instructions. (See Sample Report).

a. Submarine QBRs will be submitted on form NAVSEA 9320/3 (provided by TYCOM) as a word document.

b. Title Section. Insert ship's name and hull number on FROM line. Fill in the date of submission (must be 1 January, 1 April, 1 July, or 1 October, except Special Reports), and the date of installation (the battery completely bussed and fully ready for service). Place an "X" in the appropriate box to indicate individual meters/detectors are currently in calibration.

Block #(s)	Required Format	Remarks
1-5	Five digits, no blanks.	Unit Identification Code (UIC).
6-11	Letters and numbers. Do not use hyphens. Block 11 may be blank.	Battery type (TLX-39-B, ASB-49, PDX-57, SCC-57, LLL-69, DSB-45C).
12-13	Two digits, no blanks.	Battery age in months to the nearest whole month computed from the date of initial filling (02, 05, 32, 55, etc.).
14	One digit.	Fiscal Quarter (either 1, 2, 3, or 4) (Note: Oct, Nov, Dec is Fiscal Quarter 1).
15-16	Two digits.	Fiscal Year (01, 02, etc.).
17	Either X or blank.	Mark with an X if this is the first report after a new battery installation. Otherwise leave blank.
18	Either X or blank.	Mark with an X if battery has been removed or inactivated. Otherwise leave blank.
19-20	Two digits, no blanks.	Months (to nearest whole month) on open circuit since initial filling. Months on open circuit is defined as any calendar month in which an onboard charge is not conducted and the battery is only used intermittently for supplemental power or not used at all.

c. Battery Upkeep (Section A). Fill in data as indicated for battery charges, cycles and watering. Amount of water shall be to the nearest gallon. Ampere-hours shall be to the nearest ampere-hour. Under "Amp-Hours Charged (A-H Meter)" and "Amp-Hours Discharged (A-H Meter)" columns, "Last Report" and "Total" entries are not required (see Sample Report).

Block #(s)	Required Format	Remarks
21-24	Four digit, no blanks	Total cycles to the nearest tenth of a cycle since initial charge (127.8, 002.1, etc.). Freshening charges are included but ampere-hours charged during the initial charge and developing cycle are not to be included in computing cycles. Amp-Hrs Charged (Calculated) = # of cycles X (see note)

NOTE: FOR TLX-39B X=5000; ASB-49 X=6500; LLL-69 X=7000; DSB-45C X=2400; SCC-57 X= 10,000; PDX-57 X=10,000.

25-27	Three digits, no blanks.	Total number of normal charges completed (000, 016, 238, etc.).
28-30	Three digits, no blanks.	Total number of equalizing charges completed (000, 083, 192, etc.).
31-33	Three digits, no blanks.	Total number of partial charges (000, 008, etc.).

d. Data at End of Equalizing Charge (Section B). Enter data for equalizing charges only. Battery volts and ICVs are to be corrected to 80°F. To obtain corrected average SG, correct each cell for its temperature and compute the average of corrected specific gravities.

Block #(s)	Required Format	Remarks
34-37	Four digits or leave blank.	Total corrected battery voltage to the nearest tenth of a volt (339.0, 344.2, etc.). ICV readings are rounded off to two significant digits (2.72, 2.51 etc.).
42-45		
50-53		
58-61		

e. Battery Capacity Tests (Section C). If no test discharge was conducted during the reporting quarter, enter data from previous test discharge. A completed copy of Appendix H of this chapter will be included with this report when a test discharge was conducted during the reporting quarter.

Block #(s)	Required Format	Remarks
66-71	Six digits or the letters "INYARD"	Month, day and year of the capacity test discharge (02/25/01, 11/03/02, etc.). For ships that are in CNO Maintenance Availabilities for more than six months, put the words "INYARD" in blocks 66-71 and report the date and information of the last capacity test discharge on the line below blocks 66-71.
72-75	Four digits, no blanks.	Percent capacity to the nearest tenth (088.5, 101.2, etc.).

f. Other Data and Signature Lines (Section D). Use this section to include remarks such as:

(1) Date of the most recent Appendix J Main Storage Battery Inspection Check-Off.

(2) Cells noted during PMS, inspection or battery charging lineups that had insufficient air agitation.

(3) Cell or cells jumpered this quarter and reason.

(4) Any other information that would affect life or performance of the battery.

(5) Report completion of manufacturer's battery inspection recommendations and plan for completion of any recommendations not yet accomplished.

(6) Meter calibration problems, battery open circuited, and other pertinent information.

(7) Results of electrolyte analysis performed as a result of battery manufacturer's recommendation.

SAMPLE REPORT

SUBMARINE BATTERY QUARTERLY REPORT
NAVSEA 9320/3 (REV 1-78) 0116-LF-093-2016

NAVSEA PRT 9320-1

From:

Commanding Officer, USS (Ship's Name and Hull No.)

To: Commander, Code 6095
Bldg. 3287
NAVSURFWARCENDIV
300 Highway 361
Crane, IN 47522-5001

Requiring Document:

Naval Ships Technical Manual Chapter 223, Vol. 1

DATE OF SUBMISSION: 05 Oct 95

DATE OF INITIAL FILING: 09 Dec 93

DATE OF INSTALLATION: 12 Feb 94

DATE OF ELECTROLYTE ANALYSIS (SEMI-ANNUAL): 15 Apr 95

QUARTERLY CHECK (Check One)	YES	NO
PROP. MTR. & GEN. AMMETERS	■	□
BATTERY AMMETERS	■	□
BATTERY A-H METERS	■	□
PROP. MTR. & GEN. VOLTMETERS	■	□
BATTERY VOLTMETERS	■	□
INDIVIDUAL CELL VOLTMETERS	■	□
BATTERY AIRFLOW METERS	■	□
HYDROMETERS	■	□
HYDROGEN DETECTORS	■	□

UIC	BATTERY TYPE	AGE (MONTHS)	FY RPT QTR	FISCAL YEAR	FIRST RPT	FINAL RPT	MONTHS ON OPEN CIRCUIT
0 5 5 5 5	T L X 3 9 8	2 2	4	9 5			0 4
1 2 3 4 5	6 7 8 9 10 11	12 13	14	15 16	17	18	19 20

A- BATTERY UPKEEP

	WATER USED (GALLONS)	AMP HOURS CHARGED (CALCULATED)	CYCLES (1)	NUMBER OF CHARGES: NORMAL	NUMBER OF CHARGES: EQUALIZING	NUMBER OF CHARGES: PARTIAL	AMP HOURS CHARGED (A-H METER)	AMP HOURS DISCHARGED (A-H METER)
LAST REPORT	265	141989	028.4	080	018	005	NA	NA
FIRST MONTH	70	8773	001.8	005	001	000	8882	8067
SECOND MONTH	62	13959	002.8	007	001	001	14121	14690
THIRD MONTH	53	17808	003.6	010	001	000	16	17317
TOTAL	450	182529	0 3 6 6 / 21 22 23 24	1 0 2 / 25 26 27	0 2 1 / 28 29 30	0 0 6 / 31 32 33	NA	NA

(2)

B-DATA AT END OF EQUALIZING CHARGE

DATE MO.	DATE DA.	DATE YR.	BATTERY VOLTS CORRECTED TO 80°F (3)	CORRECTED SP. GR. (AVERAGE) (4)	CELLS 10 POINTS BELOW OR ABOVE AVERAGE SP. GR (CONTINUE IN REMARKS SECTION)				FOUR LOWEST CORRECTED INDIVIDUAL CELL VOLTAGE (5)				
07	23	95	3 4 3 2 / 34 35 36 37	1.274	CELL	NONE	NONE	NONE	CELL	81	74	77	75
					SP. GR.				VOLTS	2.72	2.72	2.72	2.73
08	25	95	3 4 3 3 / 42 43 44 45	1.280	CELL	104	NONE	NONE	CELL	81	104	47	101
					SP. GR.	1.270			VOLTS	2.69	2.71	2.72	2.72
09	28	95	3 4 2 1 / 50 51 52 53	1.280	CELL	NONE	NONE	NONE	CELL	81	41	104	58
					SP. GR.				VOLTS	2.69	2.70	2.71	2.71
					CELL				CELL				
			58 59 60 61		SP. GR.				VOLTS				

DATE MO.	DATE DA.	DATE YR.	BATTERY DISCHARGE RATE (6) (AMPERES)	ACTUAL TIME (MIN) (7)	AGE IN CYCLES (6)	AVG. PILOT CELL TEMP AT START AND END: START	END	RATED TIME (MIN) (9)	ACTUAL CAPACITY (PERCENT) (10)	NO. OF CELLS JUMPERED	FINAL VOLTS: TOTAL	THREE LOWEST CELLS			
0 6 1 2 9 5 / 8 6 8 6 9 7			1750	186	26.7	CELL NO. 78	96	179	1 0 3 9 / 72 73 74 75	0	212	CELL	91	102	47
												VOLTS	1.51	1.53	1.63
												CELL			
												VOLTS			

D-OTHER DATA AND SIGNATURE LINES

REMARKS: (11)

COPY TO:
FORCE COMMANDER (Self Explanatory)
COMSUBRON (Self Explanatory)
BATTERY MFGR (As appropriate)
FILE

ENGINEERING OFFICER

APPROVED BY

COMMANDING OFFICER

(Numerals in parentheses refer to instructions on reverse side)

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APPENDIX J

MAIN STORAGE BATTERY INSPECTION CHECK-OFF

Battery Inspection of USS _____ Date_____

NOTE: USE THE MAIN STORAGE BATTERY INSPECTION CHECK-OFF TO EVALUATE THE MATERIAL CONDITION OF THE BATTERY AND DETERMINE ACCURACY AND COMPLETENESS OF BATTERY RECORDS. MATERIAL DEFICIENCIES WILL BE RECORDED IN THE EQUIPMENT STATUS LOG FOR CORRECTION AND THE JOB SEQUENCE NUMBER RECORDED IN THE MARGIN OF THE INSPECTION CHECKLIST NEXT TO THE APPROPRIATE ARTICLE. RECORD THE COMPLETION DATE OF THE MOST RECENT APPENDIX J INSPECTION AND CORRECTION OF DEFICIENCIES IN THE REMARKS SECTION OF THE QUARTERLY BATTERY REPORT. ONLY THE MOST RECENT COMPLETE COPY OF THE INSPECTION NEED BE RETAINED WITH BATTERY RECORDS.

NOTE: IF ANY CONFLICT EXISTS BETWEEN THIS CHECK-OFF AND THE REFERENCE DOCUMENTS, THE REFERENCE DOCUMENTS TAKE PRECEDENCE.

1. Battery Records and Documentation:

   a. Cycles _____

   b. Age in months _____

   c. Date battery installed _____

   d. Date of last capacity test discharge _____

   e. Capacity of battery at last test discharge _____

   f. List cell which reached minimum final cell voltage during test discharge _____

   g. Next four lowest cells at the end of test discharge Cell/Voltage **Cell Voltage**

   _____ ____

   _____ ____

   _____ ____

   _____ ____

   h. Battery ground reading, (isolated, battery circuit breakers open) _____

   i. Total battery voltage at the end of test discharge _____

   j. Pilot cells are numbers ____ and ____.

   k. List cells jumpered out ___ , ___ , ___ , ___ , ___ , ___.

Yes No

2. Does the ship use standard submarine battery log (NAVSEA 9320/6 (4-90), National Stock Number 0116-LF-010-4100)? _____ ____

	Yes	No
3. Does a review of the completed battery logs indicate the following:		
a. Does the first set of battery charge log readings indicate that the initial charging rate (amps) did not exceed the total number of ampere-hours discharged prior to the charge?	_____	____
b. Subsequent Log Readings indicate:		
(1) When maximum Charging Rate was obtained?	_____	____
(2) When TVG was reached?	_____	____
NOTE: BOTH (1) AND (2) ABOVE MAY BE WRITTEN AS ONE LOG READING IF TVG IS REACHED FIRST.		
c. Charge/discharge data completed correctly?	_____	____
d. SG data completed correctly?	_____	____
e. Is data recorded in accordance with reference (d)?	_____	____
f. Did the EOOW/EDO review and initial the battery charging log approximately hourly during the battery charge?	_____	____
g. Is there an effective system utilized to ensure that logs are reviewed and data entered in the BRB promptly?	_____	____
4. Does the BCE comply with reference (a), (b) or (c), and reference (d)? (e.g., take ground readings at fifteen minute intervals during charge)	_____	____
5. Does a review of completed Individual Cell Record Sheets indicate the following:		
a. ICV/SG section completed correctly?	_____	____
b. SG averages computed?	_____	____
c. Log reviewed and signed?	_____	____
6. At the completion of equalizing charges and prior to SG readings, does the ship check the hydrometers in use against reference hydrometers and record these readings to ensure accurate hydrometer readings? (N/A for digital thermometers)	_____	____
7. Does the ship use and forward QBR NAVSEA 9320/3?	_____	____
a. Is the QBR being maintained in accordance with Appendix I of this chapter?	_____	____
b. Is Appendix H of this chapter being sent with QBR as appropriate?	_____	____
c. Are the battery manufacturer's inspection recommendations reported as complete and status of non-completed recommendations addressed?	_____	____

	Yes	No
8. Does the ship have an effective system to ensure that different cells are checked for agitation before each battery charge?	_____	____
9. Does the ship have a set of calibration curves for the venturi air-flow meter showing pressure (inches of water) versus airflow (CFM)?	_____	____
10. Capacity Test Discharges:		
a. Was a two ohm resistance check completed? (If applicable)	_____	____
b. Are ICVs being plotted at 30 minute intervals?	_____	____
c. When any cell drops to 1.75 volts are the ICVs being taken and plotted continuously?	_____	____
11. Are the ship's charging instructions available in Maneuvering to the BCE?	_____	____
a. Are they in accordance with reference (d)?	_____	____
12. Are BRB entries in accordance with the instructions contained in Appendix K of this chapter?	_____	____
a. Are BRB entries neat, legible and correct?	_____	____
b. Does the Engineer Officer review and sign the BRB at monthly intervals and at each crew turnover for SSBN/SSGNs?	_____	____
c. Are there monthly and grand totals at the end of each month's charges?	_____	____
d. Are battery electrolyte sample results being recorded?	_____	____
e. Is discharge data being recorded properly?	_____	____
13. Has corrective action been taken in any case where the battery capacity has dropped 10% or below 90% (80% for diesel electric submarines)?	_____	____
14. PMS:		
a. Could a BCEF/BCE demonstrate the ability to properly check battery air agitation?	_____	____
b. Could a BCEF/BCE properly inspect the air agitation system?	_____	____
c. Does the ship complete the proper agitation filter MRCs?	_____	____
d. Is the two ohm resistance check done within 24 hours prior to each equalizer? (If applicable)	_____	____
e. Are all cells with ICV readings of .10 volts below battery average checked for loose, dirty or corroded connections and completion recorded on ICV Sheet?	_____	____

	Yes	No
f. Have the following been calibrated:		
(1) Ammeters:		
(a) Propulsion motor ammeters?	_____	____
(b) Main storage battery ammeters?	_____	____
(c) Main storage battery ampere-hour meter?	_____	____
(d) Ship's Service Motor Generator DC ammeters?	_____	____
(2) Voltmeters:		
(a) Propulsion motor voltmeters?	_____	____
(b) Main storage battery voltmeters?	_____	____
(c) Main storage battery individual cell voltmeter?	_____	____
g. Have the following had calibration checks performed:		
(1) Hydrometer?	_____	____
(2) Thermometers?	_____	____
(3) Battery Airflow Meter?	_____	____
(4) Hydrogen detector?	_____	____
(a) Is the proper equipment onboard for completion of this calibration?	_____	____
(b) Do both meters read within 1/2% H2 of each other?	_____	____

NOTE: METER ACCURACY IS +1/4%. IF INDIVIDUAL METERS INDICATE BELOW A READING OF -1/4% H_2 CIRCUIT INACCURACY SHOULD BE SUSPECTED.

		Yes	No
h.	Are the flash arrestors cleaned and checked in accordance with PMS?	_____	____
i.	Were failed flash arrestors replaced or treated for water repellency by Ship's Force or Fleet Maintenance Activity?	_____	____
j.	Is the battery cleaned and inspected at specified periodicity?	_____	____
k.	When the isolated battery ground decreases to 50,000 ohms, does the ship pursue the cleaning/correction of battery grounds?	_____	____
l.	Was inspection of individual cell voltmeter and intercell connection completed?	_____	____
m.	Was torquing of intercell connectors completed?	_____	____

15. Battery Well and Material Items:

a.	During the last two equalizing charges, did all of the cells have a SG within .010 points of the average SG?	_____	____

(1) If no, list cells and gravities.

Date	Chg #	Cell	SG	Cell	SG	Date	Chg #	Cell	SG	Cell	SG

		Yes	No
	(2) Were these cells inspected for proper agitation, SG verified and the results recorded on back of the individual cell record sheet in accordance with reference (a), (b) or (c)?	_____	____
b.	Does the location of the pilot cells meet the criteria defined in reference (d)?	_____	____
c.	Does the ship have a "Charge in Progress" sign to install over the battery hatch during battery charges?	_____	____
d.	During inspection of the battery well was it free of any loose or unauthorized gear?	_____	____
	(1) Is the battery well hatch free, latch works, and gasket not deteriorated?	_____	____
	(2) Are the cell tops cleaned?	_____	____
	(3) Are the flash arrestors free of electrolyte?	_____	____
	(4) Are jumpered cells properly jumpered out?	_____	____
	(5) Is agitation being maintained for isolated cells?	_____	____
	(6) Is electrolyte level being maintained for isolated cells? (N/A for cells due to grounds)	_____	____
	(7) Are jumpered cell terminals painted red?	_____	____
	(8) Spot check several cells throughout the battery well. Is electrolyte height and air agitation proper?	_____	____
	(9) Are the battery deck flats properly secured? (Note missing or damaged fastener hardware)	_____	____
	(10) Is the battery well deck and area between cells clean, dry and free of foreign material?	_____	____
	(11) Are meter leads on the shunt tight?	_____	____
e.	Are the air hoses and fittings in the air agitation system free of deterioration and cracks?	_____	____
f.	Is the lighting sufficient?	_____	____
g.	Are the support bracket nuts either self locking or lockwired? (Trolley, disconnect links, etc.)	_____	____
h.	Are the ICV leads properly bundled and securely fastened in standoffs to prevent sagging or rubbing?	_____	____
i.	Do ICV conductors have the proper clearance from bussing?	_____	____
j.	Are ICV fuses of the proper type and are ICV connections tight?	_____	____
k.	Are the plastisol covers on connections and bussing free of cuts and in good condition?	_____	____

		Yes	No
l.	Are ventilation ducts and filters clean:		
	(1) Battery Precipitator Filter?	_____	____
	(2) Battery Outlet Plenum?	_____	____
m.	Does the ship have rubber matting available for working in the battery well?	_____	____
n.	Are battery water hose ends and battery water guns capped or covered when not in use to prevent entry of foreign matter?	_____	____
o.	Is the battery watering hose tagged for "Battery Watering Only"?	_____	____
p.	How many hydrometers are onboard? (Allowance is six for each range, including reference hydrometers, two if ship uses digital hydrometers)		

	Number	Range
(1) Low Range	_____	(_____SG to _____SG)
(2) Mid Range	_____	(_____SG to _____SG)
(3) High Range	_____	(_____SG to _____SG)
(4) Digital	_____	

q.	Are the reference hydrometers labeled as such and segregated from the remaining hydrometers?	_____	____
r.	Are the in use hydrometers cleaned after use?	_____	____
s.	Does the ship have a current copy of Allowance Equipage List - 1-911393001?	_____	____
t.	Does the ship have the required operating space items in accordance with Allowance Parts List – 09066045 (ASB-49), T090660026 (PDX-57), or 090660046 (LLL-69)?	_____	____
u.	Does the ship have the required number of jumper cable assemblies available for use onboard?		
	(1) 60 inch cables (four) [72 inch cables on SSBN/SSGN-726 Class]	_____	____
	(2) 30 inch cables (eight) [36 inch cables on SSBN/SSGN-726 Class]	_____	____
	(3) 36 inch cable assemblies (six) on SSN-21 Class	_____	____
	(4) 72 inch cable assemblies (three) on SSN-21 Class	_____	____

		Yes	No
	(5) Eighteen LLX terminal plates on SSN 21 Class ships	_____	____
	(6) Are these assemblies complete?	_____	____
	(7) Are these assemblies stowed in a dry place?	_____	____
	(8) Are these assemblies cleaned in accordance with applicable PMS?	_____	____
v.	Are the leads for cell and battery testing in the ICV panel tight?	_____	____
w.	Do they fit properly into the female connectors?	_____	____
x.	Are eye wash facilities, with a minimum 2 quart capacity, available near the battery well hatch?	_____	____
y.	Does the ship have the torque wrenches (two) required for intercell torquing?	_____	____
	(1) Are they calibrated?	_____	____
	(2) Are the sockets six point?	_____	____
z.	Are the battery well heaters:		
	(1) Turned on when injection temperature is less than 55°F?	_____	____
	(2) Turned off whenever the battery well hatch is open?	_____	____

Results and Recommendations:

Submitted: _____
Inspector Officer

Title_____

Noted:_____
Commanding Officer

Date_____

APPENDIX K

INSTRUCTIONS FOR MAINTAINING THE SUBMARINE BATTERY RECORD BOOK NAVSEA 9320/1 (3-92)

1. GENERAL. Accurate battery records are an absolute requirement. These records enable reviewing activities to identify problem areas or to change the scheduled battery replacement based on the performance of a particular battery installation. These records provide the data necessary to complete NAVSEA form 9320/3, Submarine Battery Quarterly Report. Therefore, proper maintenance of the BRB is essential.

2. INSTRUCTIONS.

a. Remarks Section: This section should include information of a general nature. Information such as the following should be included: Date and manner of installation; lifting of a cell for examination and results thereof, electrolyte "spiking" to include reason for action, quantities involved, authority granted, etc.; initial pilot cells selected, as well as any change of pilot cells; any change, transfer or removal of cells; pertinent data concerning the isolation of cells; completion of battery manufacturers recommendations from battery inspection reports; other abnormal or unusual information that is pertinent to the battery. The following should not be included in the remarks section: waterings; two ohm load checks; PMS checks; water purity test results performed by Ship's Force; battery well inspections or other information of a repetitive nature unless different or unusual conditions exist.

b. Electrolyte Analysis Section:

(1) Laboratory - enter the name of the laboratory where the analysis was performed.

(2) Serial or file number of report - enter the number assigned to the report by the laboratory.

(3) Date - the date on which the sample was taken from the cell (vice the date the analysis was performed by the laboratory).

(4) Cells analyzed - enter the battery cell number from which the sample was drawn.

(5) Remarks - enter either satisfactory or unsatisfactory based on the analysis record. If unsatisfactory, enter the reference covering the action taken.

NOTE: THE "DATE" AND "CELLS ANALYZED" INFORMATION SHOULD BE ENTERED IMMEDIATELY AFTER THE SAMPLE IS DRAWN. ALL OTHER INFORMATION SHOULD BE ENTERED UPON RECEIPT OF THE LABORATORY REPORT.

c. Equalizing Charge Data Section:

(1) Date - enter the date on which the equalizing charge was commenced. (This should match the date on the Submarine Battery Log (NAVSEA 9320/6)).

(2) Charge number - enter the charge number for the equalizing charge being logged.

(3) Average SG - for all nuclear submarines, the average SG of the battery (all battery cells in the circuit) following the equalizing charge is recorded in block 1. (This should never be the pilot cell averages, but an average of the entire battery). Block 2 will only be used on diesel submarines.

(4) Cells - list all cells with a SG greater than or equal to ten points (0.010 SG) above or below the battery average SG. List the following: cell number, corrected SG of the cell, corrected ICV. If no cells are beyond the ten point parameter, write "None."

d. Summary of Test Discharges and Trial Runs:

(1) Date - enter the date in which the test discharge was performed.

(2) Battery rate including average auxiliary load - capacity test discharges are conducted at the six hour rate for the Dolphin-type battery. A three hour rate is used for all other submarine battery types. The discharge rates are as follows for each battery type:

Dolphin (DSB-45C)	425 amps (six hr rate)
Guppy 1, Mod C (TLX-39B)	1750 amps (three hr rate)
Guppy 1, Mod E (ASB-49)	2400 amps (three hr rate)
TRIDENT (PDX-57/SCC-57)	3450 amps (three hr rate)
SEAWOLF (LLL-69)	2700 amps (three hr rate)

(3) Limiting voltage allowed - enter the total battery voltage limit and the ICV limit allowed for the discharge rate maintained (as noted in the Battery Rate block). These values are noted in reference (a), (b), or (c) for each battery type and discharge rates.

(4) Temperature - enter the average pilot cell temperature at the start and at the finish of the test discharge cycle in the appropriate block. (Round to whole number).

(5) Required length of discharge corrected for temperature - enter the rated length of time (in minutes) to attain 100% capacity. This value must be corrected for temperature. Temperature corrections are accomplished utilizing the applicable Curve and Data table contained in reference (a), (b) or (c). The average temperature of the pilot cells is used in the temperature correction. For example: If pilot cell temperatures are 83°F and 86°F, average temperature equals 84.5°F. This number is rounded to 85°F. Required length of discharge for the 3 hour rate would be 182.5 minutes. This number is rounded to 183 minutes.

(6) Discharge maintained - enter the actual time (in whole minutes). This will be the duration of the discharge to the limiting voltage (either total battery voltage, ICV or average ICV). Limiting voltages are listed on the appropriate Curve and Data table in reference (a), (b) or (c).

(7) Total volts at end of discharge - enter the actual switchboard voltage (recorded at the EPCP) immediately prior to securing the test discharge.

(8) Actual capacity - enter the actual capacity in percent. Capacity is always logged to the nearest tenth (i.e., 100.5%). Capacity is computed as follows:

$$\text{Percent capacity} = \frac{\text{Actual time (min)}}{\text{Rated time (min)}} \times 100$$

(9) Ten lowest voltage cells at end of discharge - list ten individual cells with the lowest end of discharge voltage. Cells should be listed in ascending (lowest to highest) voltage order for trending purposes.

(10) Remarks - enter any pertinent data, event or condition with regards to the test discharge. If comments are too extensive to fit in the space provided, write "See Remarks Section" and enter the data in the "Remarks" section of the BRB.

e. Condensed Summary of all Charges and Waterings:

NOTE: LIST PILOT CELLS IN AN ASCENDING ORDER, WITH THE LOWEST NUMBERED PILOT CELL LISTED FIRST.

(1) Pilot Cell Numbers - enter, in the space provided at the top of each page, the current pilot cell numbers. If the pilot cell(s) are changed, draw a single line through the old pilot cell number(s) and write in the new pilot cell number(s). The change need only be made on the page in which the pilot cell(s) are changed.

(2) Date - enter the date entered on the Submarine Battery Log (NAVSEA 9320/6). This should reflect the date in which the charge was begun.

(3) Type of charge - enter the code, as designated below, that reflects the type of charge conducted. The following codes apply:

N = Normal charge
E = Equalizing charge
P = Partial charge
EE = Extended or non-tapering charge

(4) Charge number - enter the charge numbers in sequential order. Charge numbering begins with the first on board charge.

(5) SG and temperature-pilot cells - the data to be entered in this section should match the data entered in the "Specific Gravity Data" block in the lower right hand corner of the Submarine Battery Log (NAVSEA 9320/6). As noted at the top of each page of this section, all SG entries must be the temperature corrected values (height corrections are not used for the current batteries). Before change/after change number - enter the pilot cell number for the data to be entered in that column. As previously noted, enter the pilot cells in an ascending order, with the lowest numbered pilot cell listed first.

(6) End of charge voltage - entries in this section are required to be temperature corrected. The data to be entered can be retrieved from the Submarine Battery Log (NAVSEA 9320/6).

(a) Pilot cells - enter the end of charge corrected ICV for both pilot cells. To facilitate entering both pilot cells, evenly split the column using a black pen. Extend the line into the "Pilot cells" header. Enter the pilot cell numbers above each newly created column (enter the numbers in the header area, beneath the

words "Pilot cells"). (Pilot cell numbers should be entered in ascending order). Individual cell temperature corrections can be accomplished by using the TCV formula. Enter a value of "1" for the "N" (number of cells) value.

(b) Total voltage corrected to 80°F - enter the TCV value. TCV is calculated using the formula in reference (a), (b), or (c). (The last on charge battery voltage reading entered on the Submarine Battery Log (NAVSEA 9320/6) must be used in this calculation). This value need only be entered for equalizing and non-tapering equalizing charges. This value is contained in block 4 of the Submarine Battery Log (NAVSEA 9320/6).

(7) Minutes on charge after reaching TVG at finishing rate - enter the total time (in whole minutes) from the point at which the finishing rate is reached at TVG until the charge is completed. This value need only be entered for equalizing and non-tapering equalizing charges. This data is contained in block 5 of the Submarine Battery Log (NAVSEA 9320/6).

(8) Hours of charge to nearest tenth (this charge) - enter the total number of hours (to the nearest tenth) to complete the charge (time from the first on charge log readings, until the last on charge log reading). This data is contained in block 6 of the Submarine Battery Log (NAVSEA 9320/6).

(9) Amp-hours of charge per battery (this charge) - enter the calculated ampere hours of charge. (Calculate as indicated in reference (a), (b), or (c)). This number should be rounded to the nearest whole number. This data is contained in block 8 of the Submarine Battery Log (NAVSEA 9320/6).

(10) Total cycles of charge to nearest 0.1 - enter the value for total cycles to the nearest tenth. This data is contained in block 9 of the Submarine Battery Log (NAVSEA 9320/6). These values are derived by using the following formula:

$$\text{Cycles} = \frac{\text{Ampere-hours (calculated)}}{\text{Service cycle}}$$

A service cycle is defined as follows:

Dolphin (DSB-45C)	2,400 ampere hours
Guppy 1, Mod C (TLX-39B)	5,000 ampere hours
Guppy 1, Mod E (ASB-49)	6,500 ampere hours
TRIDENT (PDX-57/SCC-57)	10,000 ampere hours
SEAWOLF (LLL-69)	7,000 ampere hours

(11) Number of gallons of water used - enter the amount of water (in gallons) actually added to the cells. The amount used to flush out the watering hose and piping prior to sampling the filling water is not included in this figure. The value should be rounded to the nearest whole number. This data is contained in block 13 of the Submarine Battery Log (NAVSEA 9320/6).

(12) Percent charge back - enter the percentage of ampere hours charged back. The data is contained in block 12 of the Submarine Battery Log (NAVSEA 9320/6). This value is calculated using the following formula:

$$\text{Percent charge back} = \frac{\text{Ampere hour meter charged}}{\text{Ampere hour meter discharged}} \times 100$$

(13) Ampere hours by meter - enter the values as read directly from the ampere hour meter. Discharged values are the ampere hours as read immediately prior to the start of charge. Charged values are the ampere hours from the beginning (following resetting (zeroing) the ampere hour meter) of the charge to the charge completion. The mode selector switch must be placed in the appropriate position (depending on ampere hour meter type used). The values for discharge and charge ampere hours are contained in blocks 10 and 11 respectively of the Submarine Battery Log (NAVSEA 9320/6).

(14) Totals - both monthly and grand totals must be calculated at the end of the calendar month. Quarterly totals need not be maintained, but may be calculated if desired. If quarterly totals are maintained, entries should coincide with the submission date of the QBR. The following values must be computed for monthly and grand totals (and quarterly, if maintained).

(a) Hours of charge to nearest tenth (this charge) - computed by adding the hours of charge values for each individual charge.

(b) Ampere hours of charge per battery (this charge) - computed by adding the ampere hours of charge values per battery for each individual charge.

(c) Total cycles for charge to nearest 0.1 - computed by dividing the appropriate (monthly, grand totals or quarterly) ampere hours of charge by the appropriate service cycle as listed below.

$$\text{Cycles} = \frac{\text{Ampere-hours (calculated)}}{\text{Service cycle}}$$

A service cycle is defined as follows:

Dolphin (DSB-45C)	2,400 ampere hours
Guppy 1, Mod C (TLX-39B)	5,000 ampere hours
Guppy 1, Mod E (ASB-49)	6,500 ampere hours
TRIDENT (PDX-57/SCC-57)	10,000 ampere hours
SEAWOLF (LLL-69)	7,000 ampere hours

(d) Number of gallons of water used - computed by adding the water addition values for each individual charge.

(e) Ampere hours by meter - computed by adding the ampere hours of discharge/charge for each individual charge.

NOTE: ONLY MONTHLY TOTALS ARE REQUIRED FOR AMPERE HOURS BY METER. GRAND TOTALS NEED NOT BE MAINTAINED.

(15) BRB audits/records reviews - between 9 and 15 months since last inspection, through a NAVSEA contract, a battery manufacturer's representative will conduct an on-site battery inspection. The BRB will be signed and dated following the representative's review. Where possible, the dated signature will be placed after the last month of the inspection period in the "Condensed Summary of All Charges and Waterings" section. Battery records should be made available for overnight off-ship review by the battery manufacturer's representative.

f. Certification by Engineer Officer:

(1) This section certifies that the Engineer Officer has reviewed the battery records (including the BRB) for accuracy and legibility. The Engineer should review and sign the BRB on a monthly basis and at each crew turnover for SSBN/SSGNs.

(2) Period - from date/to date - enter the period/time frame of the records being reviewed.

(3) Signature - signature of the reviewing officer (Engineer Officer).

(4) Rank - rank of the reviewing officer (Engineer Officer).

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CHAPTER 22

TRIDENT SYSTEM AND EQUIPMENT MAINTENANCE PLANS

22.1 PURPOSE. To provide information and guidance concerning TRIDENT submarine system and equipment maintenance plans and associated programs.

22.2 TRIDENT SYSTEM AND EQUIPMENT MAINTENANCE PLANS. Maintenance plans have been prepared for all maintenance worthy configuration items onboard SSBN/SSGN 726 Class Submarines. These maintenance plans are written to the system, equipment and/or component and list all of the planned maintenance required by a configuration item during its life cycle. These Maintenance Requirements are derived through the conduct of a maintenance engineering and a logistics support analysis process. Maintenance plans list the job description, periodicity, maintenance level (organization, intermediate, or industrial) and the applicable maintenance procedures. Unrestricted Operation (URO), TRIDENT Planned Equipment Replacement (TRIPER), Major Shore Spares (MSS), Maintenance Standards (MS) and Performance Monitoring applications are included in maintenance plans as appropriate. Technical management of these plans is assigned to the Submarine Maintenance Engineering, Planning and Procurement Activity. An SSBN/SSGN 726 Class Submarine Maintenance Plan comprising all individual maintenance plans is issued periodically by NAVSEA. Programs and requirements supporting the SSBN/SSGN 726 Class operating cycle are discussed in the following paragraphs.

22.2.1 TRIDENT Planned Equipment Replacement. The purpose of the TRIPER program is to accomplish an incremental overhaul of a submarine over several refit periods. Shipboard equipment which requires significant maintenance during the planned operating cycle between overhauls, which is beyond the capability of Ship's Force, and which cannot be accomplished during the refit period (without unacceptable impact on other refit requirements), will be supported by this program. TRIPER equipment will be removed from the ship for refurbishment ashore, replaced with pre-tested, ready for issue units and the affected system restored to full operational condition prior to completion of the refit period. Replacement will be accomplished on a planned basis at intervals designed to preclude the failure of the equipment or significant degradation of its associated system. Deviations of greater or less than one refit from established TRIPER change-out periodicities shall require Type Commander concurrence. A planned change to shelf stock TRIPER equipment will be accomplished only when sufficient change kits are available to effect the change in all units of a given model of the equipment held in shelf stock. Shelf stock TRIPER equipment is represented in configuration status accounting databases maintained by Submarine Maintenance Engineering, Planning and Procurement Activity Hull, Mechanical, Electrical, Ordnance and Electronic and Naval Underwater Warfare Center Division Newport and transitions to the configuration database of the receiving ship upon installation.

22.2.2 Major Shore Spares. The purpose of the TRIDENT MSS Program is to maintain a supply of designated major equipment candidates in a certified, tested, ready-for-issue condition to effect replacement of equipment experiencing catastrophic failure, without jeopardizing refit completion. The employment of MSS assets shall require Type Commander authorization. Typically, MSS equipments include ship's propeller, Ship's Service Turbine Generators, towed arrays, towed buoys, Integrated Radio Room cabinets, etc. Like TRIPER, MSS equipment is managed by NAVSEA (PMS 392). Configuration tracking is under the cognizance of the applicable Participating Manager and is identified in the TRIDENT MSS Catalog published by NAVSEA (PMS 392). Equipment under the cognizance of the Strategic System Project Office and Naval Sea Systems Command Nuclear Propulsion Directorate (NAVSEA 08) is not included in the TRIPER or MSS programs.

22.2.3 Fleet Logistics Agent. The function of the fleet logistics agent for SSBN/SSGN 726 Class Submarines has been assigned to the TRIDENT Refit Facility (TRIREFFAC). TRIREFFAC provides refit and configuration management support. These functions involve:

a. Staging and delivering updated Logistics Technical Data (LTD) applicable to the ship's current configuration.

b. Providing available interim technical documentation and logistic support elements for emergent changes installed during refit.

c. Assessing the logistic impact and reporting of, configuration changes effected by all sources in SSBN/SSGN 726 Class Submarines.

22.2.4 Updating of Submarine Logistics Technical Data. TRIREFFAC will stage and deliver LTD Advance Change Notices (ACN) and revisions to SSBN/SSGN 726 Class Submarines during refit and shall assist Ship's Force in the removal and disposal of LTD that is no longer applicable to the ship's current configuration. Upon request, TRIREFFAC will also provide training to Ship's Force in the proper techniques for identification, procurement and maintenance of TRIDENT LTD.

22.2.5 Planned Refit Work Lists. Planned Refit Work Lists (PRWL) define all the planned work required for each SSBN/SSGN 726 Class ship for a one year period or four refits. The PRWL includes scheduled TRIPER replacements, URO and Performance Monitoring requirements. In addition, alterations approved for accomplishment will be incorporated into the PRWL. The PRWL will be issued periodically, each for a one year period. Subsequent PRWLs will include rescheduling of requirements identified on previous work lists which were not reported complete. Each PRWL will allocate specific work items to a proposed refit based on the Class Maintenance Plan scheduled requirements and projected manpower requirements.

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CHAPTER 23

SUBMARINE NOISE REDUCTION

REFERENCES.

(a) NAVSEA S9073-AW-SNC-010 - Ship Acoustical Surveys for Submarines
(b) NAVSEA S9073-A4-SNC-010 USS LOS ANGELES (SSN 688) Class Acoustic Stealth Manual
(c) NSWCCD-71-TR-2001/020 February 2001 USS SEAWOLF (SSN 21) Class Acoustic Stealth Manual
(d) NAVSEAINST C9073.2 - Acoustical Survey of Submarines
(e) COMSUBLANTINST C9460.3A - Coordinated Submarine Radiated Noise Analysis
(f) COMSUBPACINST 9460.5 - Coordinated Submarine Radiated Noise Analysis
(g) NAVSEA S9073-AF-SNC-010(C) - Ship Noise Control
(h) NAVSEA S0600-AA-PRO-230 - Underwater Ship Husbandry Manual, Chapter 23: Submarine Predeployment Noise Inspections
(i) NAVEDTRA 10500 - Catalog of Navy Training Courses
(j) COMSUBLANT/COMSUBPACINST C3500.1 - Submarine Force Training Manual

LISTING OF APPENDICES.

A Supplemental Noise Measurements
B Beartrap Acoustic Radiated Trials (BART)
C Shipboard Noise Reduction Instruction
D Predeployment Noise Inspection
E Submarine Silencing Publications
F Sample Propeller Changeout Message

23.1 PURPOSE. This chapter provides the requirements for an effective onboard noise reduction program during the ship's operating cycle. It identifies the acoustic surveys required to assess the radiated noise signature of a ship and summarizes the responsibilities and requirements for the onboard surveys necessary to be performed on a regular basis to maintain the submarine in its most quiet configuration.

23.1.1 Scope. Reference (a) discusses the various acoustic surveys to be conducted on ships in order to establish their baseline noise signatures and to monitor those signatures throughout the operating cycle. Surveys discussed in reference (a) are briefly summarized, as well as several additional survey techniques available and essential to an effective noise reduction program. In addition, a discussion of the model shipboard noise reduction program and available training programs are presented. References (b) and (c) provide class specific and comprehensive documentation on submarine noise reductions, including discussion of acoustic surveys, shipboard noise reduction program, acquisition systems, and procedures, data analysis and trending, and detailed write-ups with photographs and audio clips of typical noise sources. In addition, the manual contains an extensive library of documents and training aids.

23.1.2 Background. Reduction of the radiated noise signature of a submarine platform is a key element to the tactical employment of the ship. As a ship begins its operating cycle, a series of acoustic surveys are conducted to characterize the baseline noise signature. Then, throughout the remainder of its operating cycle, the ship requires the tools and procedures necessary to monitor its signature against the baseline. As deficiencies are identified, Ship's Force needs to have an understanding of the extent to which an identified deficiency can affect the ship's radiated noise signature and the procedures required to effect corrective action. It should be kept in mind that although the implications of a degraded noise signature are fundamentally tactical in nature, the primary method of preserving a ship's acoustic advantage is through an aggressive and effective planned and corrective noise reduction maintenance program. Because of an increased emphasis in recent years, a number of new initiatives are being pursued within the technical community to develop new and improved measurement procedures and equipment that will assist Ship's Force in more effectively assessing the effects of noise deficiencies on their radiated noise signature. These efforts should lead to improved survey procedures and will be incorporated into future changes to this chapter.

23.2 NOISE REDUCTION PROGRAM ELEMENTS.

23.2.1 Radiated Noise Surveys.

23.2.1.1 Naval Sea Systems Command Acoustic Trials. These trials are conducted at the beginning of and at various times throughout each ship's operating cycle in accordance with reference (d) and provide a broad range of baseline measurements for the ship. In particular, the radiated noise signature of the ship is measured under various operating conditions. A determination is made of the controlling radiated noise offenders including those which are speed and depth dependent. While the principal objective of these trials is to assess the radiated noise signature of the submarine, platform and machinery and hull vibration measurements are also made to provide baseline and supporting data in these areas for continued ship monitoring.

23.2.1.2 Coordinated Submarine Radiated Noise Analysis Exercise. This test shall be conducted in accordance with references (e) and (f), for Commander Submarine Force Atlantic (COMSUBLANT) units and Commander Submarine Force Pacific (COMSUBPAC) units, respectively. The primary objective of these submarine-versus-submarine exercises is to collect and analyze data to assess current acoustic vulnerabilities. These tests can be used during Pre-Overseas Movement (POM)/Deployment Preparation Period (DPP) work-ups to indicate that the deploying unit's acoustic signature is free of any unusual or highly detectable noise characteristics.

23.2.1.3 Coordinated Submarine Exercises (KILOEX/JTFEX/INT-2/TRACKEX/GUNSLINGER). While acoustic trials and surveys are the principal means to evaluate a submarine's acoustic profile, coordinated exercises provide another opportunity for the submarine force to monitor itself for noise deficiencies. Although the primary purpose of these exercises is generally tactically oriented, the noise signature obtained can and should also serve to monitor submarine radiated noise. It is incumbent upon exercise participants to note and record any unusual or excessive radiated noise being emitted by submarine exercise participants. Discrepancies noted should be reported to the cognizant Immediate Superior In Command (ISIC) for evaluation and corrective action. Initial message reports should be followed by supporting documentation including tape recordings, annotated lofargrams, and annotated frequency spectrum plots. The message report should contain the following information:

a. Description of noise signature problem.

b. Date and time of detection.

c. Range at detection.

d. Sensor/processor used for detection.

e. Own ship depth and speed.

f. Acoustic sea state.

g. Water depth.

h. Water temperature.

i. Layer depth.

23.2.1.4 Beartrap Acoustic Radiated Trials. The primary objective of these trials is to provide a cost effective means to detect and identify radiated noise sources that have caused signature degradations. Coordinated trial events are conducted with Marine Patrol Aircraft. Detected narrowband tones in the radiated noise signature are provided by naval message. Parent ISICs are responsible for requesting these trials. Specific information, including message requests and scheduling requirements, as well as Ship's Force and Type Commander (TYCOM) responsibility is provided in Appendix B of this chapter.

23.2.2 Onboard Noise Surveys. The noise surveys discussed in this section do not provide conclusive information on the actual radiated noise signature of the ship. However, when these surveys are analyzed for developing trends, they can be effective tools for monitoring overall ship effectiveness in noise reduction.

23.2.2.1 Platform Noise Survey. This survey is conducted to define own ship's noise environment and is the best means available to Ship's Force to assess the radiated noise signature of the ship using only onboard equipment. Surveys are conducted by taking periodic measurements under various ship's operating conditions using the applicable Planned Maintenance System (PMS) Maintenance Requirement Cards (MRC). In addition, at-sea watch-to-watch aural monitoring is also conducted. Analysis of this data determines the platform noise signature and also identifies the noise offenders which affect this signature. When changes in the ship's signature occur, the diagnostic procedures of the class specific platform noise manual are used to isolate the noise source. Platform Noise Surveys should be conducted in accordance with enclosure (2a) of Appendix C of this chapter. Propeller cavitation surveys, a separate survey from the Platform Noise Survey but considered an important part of platform noise monitoring analysis, should be conducted in accordance with enclosure (2b) of Appendix C of this chapter.

23.2.2.2 Topside and Housekeeping Survey. The most common and preventable sources of submarine noise are rattles emanating from improperly secured topside equipment, discontinuities in the hull, and machinery noise sound shorted to the hull due to improper stowage.

23.2.2.2.1 Topside Survey. The topside survey consists of a thorough inspection to identify and eliminate potential noise sources external to the pressure hull. Particular attention should be given to ensure that rattles are not installed, built in, or created by repairs, alterations, or stowage. Topside Surveys should be conducted in accordance with enclosure (2c) of Appendix C of this chapter.

23.2.2.2.2 Housekeeping Survey. The housekeeping survey consists of a thorough visual inspection to identify and eliminate these potential noise sources internal to the pressure hull. Particular attention should be given to ensure that sound shorts are not installed, built in, or created by repairs, alterations, or stowage. Housekeeping Surveys should be conducted in accordance with enclosure (2d) of Appendix C of this chapter.

23.2.2.3 Machinery Vibration Survey. A vibration survey conducted quarterly for both machinery health assessment and noise reduction purposes. Performance of this survey alone does not provide reliable information on radiated noise. Machinery Vibration Surveys should be conducted in accordance with enclosure (2e) of Appendix C of this chapter.

23.2.2.4 Hull Vibration Survey. A shipboard hull vibration survey is conducted quarterly or as required for the purpose of noise diagnostics by Ship's Force. The purpose is to assess acoustic deficiencies related to noise sources and transmission paths, and to estimate certain slow-speed, low frequency radiated noise levels. Hull Vibration Surveys should be conducted in accordance with enclosure (2e) of Appendix C of this chapter.

23.2.2.5 Isolation System Survey. This survey consists of a visual inspection of sound isolation components throughout the ship per applicable road maps and reference (g). These components include resilient mounts, pipe hangers, ground straps, and flexible piping. This visual inspection ensures that these devices are properly installed, undamaged, and not sound shorted. Improper installation or failure of any of these devices will contribute to increasing the radiated noise signature of the ship. Isolation System Surveys should be conducted in accordance with enclosure (2f) of Appendix C of this chapter.

23.2.2.6 Damping Material Survey. This is a visual inspection of sound damping material installed in the vicinity of sonar arrays, sail, free flood spaces, and on machinery foundations. Like the isolation system survey, this inspection is designed to detect deficiencies in materials installed to limit the radiated noise signature of the ship. Damping Material Surveys should be conducted in accordance with enclosure (2g) of Appendix C of this chapter.

23.2.2.7 Predeployment Noise Inspections. Requirements and forms are contained in reference (h) and Appendix D of this chapter.

23.2.2.8 Technical Onboard Monitoring Assist. This survey consists of at sea analysis by acoustic technical experts to evaluate the acoustic signature of the ship. The survey consists of a towed array, platform noise hydrophones and machinery and hull vibration measurements taken simultaneously to identify and localize major acoustic degradation. Emphasis is placed on training the submarine's crew on own ship noise data acquisition and analysis using their available sensors. Technical Onboard Monitoring Assists should be conducted in accordance with Appendix A of this chapter.

23.2.2.9 Sound Absorption Material Survey. This is a thorough visual inspection of interior sound absorption material and sound transmission loss material conducted in all spaces. These materials are installed to assist in habitability of the ship by absorbing vibration. Sound Absorption Material Surveys should be conducted in accordance with enclosure (2h) of Appendix C of this chapter.

23.2.2.10 Airborne Noise Survey. The airborne noise survey exists to identify shipboard areas whose airborne noise levels have increased or are possibly high enough to cause hearing damage. Airborne Noise Surveys should be conducted in accordance with enclosure (2i) of Appendix C of this chapter.

23.2.3 Shipboard Noise Reduction Program. The key to a successful shipboard noise reduction program will be the ability of the ship to identify potential noise deficiencies and to initiate prompt corrective action. References listed in Appendix E of this chapter should be a part of the ship's onboard library of submarine silencing publications. Several elements of the noise reduction program are discussed in the following paragraphs.

23.2.3.1 Noise Reduction Officer. To ensure a coordinated and aggressive approach to noise reduction, each ship will assign one of its senior Department Heads, as designated by the Commanding Officer, to serve as Noise Reduction Officer. The Noise Reduction Officer will coordinate the activities of all personnel assigned to support the ship's Noise Reduction Program. This officer will ensure that all required surveys are conducted, that identified deficiencies are documented, and that corrective action is initiated. A Noise Reduction Board, chaired by the Noise Reduction Officer, will convene at regular intervals to review the status of the Noise Reduction Program. Following each meeting, formal written reports will be made to the Commanding Officer.

23.2.3.2 Noise Deficiency Log. The ship's Equipment Status Log (ESL) will be used to record and track all noise deficiencies. Deficiencies will be entered in the section for the Work Center (WC) responsible for the equipment concerned. The Critical Noise Deficiencies (NC)/Potential Noise Deficiencies (NP) code (per paragraph 23.2.3.3 below) in the deficiency description block will tag the entry as a noise deficiency. The Noise Reduction Officer will ensure the ESL is properly maintained and accurately reflects the latest status of all noise deficiencies. Items to be entered in the ESL include noise deficiencies reported during radiated noise acoustic trials as well as those discovered during onboard surveys. Ship's logs shall be maintained in a manner where all diagnostics, repairs or other evaluations performed are documented. The logs need to be maintained until noise issues are verified to be repaired by associated acoustic or vibration measurements. If Ship's Non-Tactical Automated Data Processing system is the primary means of maintaining equipment status, history and overall plan of action for repair needs to be maintained elsewhere.

23.2.3.3 Noise Related Maintenance Records. The OPNAV 4790/2K will be used to document all deferred and completed noise related maintenance actions. Block 46-G will be used to further classify noise deficiencies in one of two categories; NC and NP.

a. The NC code will be used to identify deficiencies of a critical nature identified during one of the following:

(1) Naval Sea Systems Command (NAVSEA) Acoustic Trials.

(2) Supplemental Radiated Noise Measurements.

(3) Technical Onboard Monitoring Assist.

(4) Platform Noise Monitoring Surveys.

b. The NP code will be used to identify deficiencies that could potentially be radiated noise problems identified during one of the following:

(1) Topside and Housekeeping Surveys.

(2) Machinery and Hull Vibration Surveys.

(3) Isolation System Surveys.

(4) Damping Material Surveys.

(5) Airborne Sound Absorption Material Surveys.

(6) Routine Ship Operations.

23.2.4 Training. Formal training course prerequisites and descriptions are listed in reference (i). Specific training requirements are contained in reference (j).

23.3 RESPONSIBILITIES.

23.3.1 Immediate Superior In Command.

a. Assign a Staff Noise Reduction Officer as a specific point of contact for all matters relating to noise reduction within the Squadron.

b. Oversee and supervise the Noise Reduction Program within the Squadron, ensuring that assigned units aggressively identify and correct noise deficiencies.

c. Submit requests for Beartrap Acoustic Radiated Trials (BART) to COMSUBLANT/COMSUBPAC, N454, N42N, as appropriate.

d. Schedule acoustic surveys during the operating cycle of submarines in accordance with reference (d).

e. Recommend and/or authorize corrective actions based on the findings of the surveys conducted.

f. Review Noise Reduction Program records, survey results, procedures and monitoring equipment during material readiness inspections, Tactical Readiness Evaluations and POM/DPP certification.

g. Schedule divers to conduct underwater hull and propeller surveys for noise deficiencies prior to undocking, pre-deployment, post-deployment, and during upkeep.

h. Report propeller replacements using the message format of Appendix F of this chapter.

i. Ensure that personnel tasked to support assigned submarines are adequately trained in submarine noise reduction.

23.3.2 Industrial Activity.

a. Ensure proper handling and repair of noise critical machinery.

b. Conduct in-shop and in-place balancing of all rotating equipment, both motors and coupled units, repaired by the industrial activity.

c. Conduct in-place balancing as authorized by work requests.

d. Assist ships in identifying and correcting noise problems and in conducting noise surveys in accordance with approved work requests.

e. Establish new baseline machinery and hull vibration measurement data for repaired units.

f. Ensure that all applicable personnel are adequately trained in submarine noise reduction.

g. Conduct underwater hull and propeller surveys for noise deficiencies in accordance with reference (h).

23.3.3 Submarine Commanding Officer.

a. Establish and maintain a ship's Noise Reduction Program consistent with this chapter. Appendix C of this chapter provides the basis for a shipboard instruction to meet this requirement.

b. Appoint a senior Department Head as Noise Reduction Officer and establish a Ship's Noise Reduction Board.

APPENDIX A

SUPPLEMENTAL NOISE MEASUREMENTS

This Appendix provides a brief discussion of the TYCOM sponsored, noise measurements that may periodically be conducted on submarines during their operating cycle.

TECHNICAL ONBOARD MONITORING ASSIST (TOMA)

1. Purpose. TOMAs are conducted on submarines to maintain their acoustic signatures between scheduled radiated noise trials. Major acoustic degradations and their corrective actions are identified, and training is provided to Ship's Force.

2. Procedure. TOMA schedules are coordinated by the TYCOMs and the Squadrons. TOMAs are conducted by Naval Surface Warfare Center (NSWC), with assistance from on-site Performance Monitoring Team (PMT) and Ship's Force personnel. TOMAs need 18 to 30 hours of data acquisition time. Normally, TOMAs are conducted on three to seven day underways and can be scheduled concurrently with other operations. Tests consist of a series of runs in various machinery line ups to collect data required to assess the acoustic signature of the submarine. Data is collected using onboard sensors and compared to baseline signatures from previous acoustic trials. A TOMA will serve as the quarterly hull, machinery, and platform noise surveys.

3. Frequency. TOMAs are to be conducted prior to, or early in the POM/DPP cycle when no radiated noise trial is scheduled to occur within one year of the deployment date.

NOTE: A TOMA IS NOT A SUBSTITUTE FOR THE NAVAL SEA SYSTEMS COMMAND ACOUSTIC TRIAL. A TOMA MAY ALSO BE REQUESTED BY THE SUBMARINE'S ISIC.

4. Reports. NSWC will issue a "quick look" message from the submarine at the completion of the TOMA. This message will detail significant findings and recommended corrective actions, as well as the status of previous corrective actions. A separate message will be sent by NSWC detailing hull and machinery vibration data.

5. Action. Ship's Force and the submarine's ISIC should use the results and recommendations of the TOMA "quick look" message to schedule and implement corrective action. Ship's Force should use the 3-M Maintenance Data System to document deficiencies and corrective actions. For deferred items, the Noise Reduction Officer should develop and implement appropriate corrective action.

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APPENDIX B

BEARTRAP ACOUSTIC RADIATED TRIALS (BART)

1. Purpose. BARTs provide submarines with the opportunity to measure and assess their narrowband radiated noise signatures, identify problems, and provide an opportunity to correct deficiencies and evaluate their acoustic health prior to certain deployments.

2. Procedure. BARTs are initially scheduled by TYCOM prior to major deployments or upon request by the submarine's ISIC. The ISIC is then responsible for updating the TYCOM on schedule changes. BARTs are a structured Beartrap in a designated quiet ocean area in accordance with the BART agenda. The objective is to collect sufficient data to determine the radiated noise signature and mission readiness of the ship. Data collection on station is accomplished by Commander Patrol Reconnaissance Forces Pacific (COMPATRECONFORPAC) or Commander Patrol Reconnaissance Forces Atlantic (COMPATRECONFORLANT) Anti Submarine Warfare patrol aircraft and is restricted to a single eight hour period during ship operations in a designated ocean area.

3. Frequency. For COMSUBPAC units, ISICs should coordinate BART scheduling for their submarines such that each ship will be tested prior, or early in the DPP. The schedule should allow sufficient time for corrective action on noise deficiencies detected during the BART to be planned and accomplished during a DPP upkeep period. For COMSUBLANT units, ISICs should coordinate BART scheduling for their submarines as required.

4. Reports. For Pacific Fleet submarines, COMPATRECONFORPAC will issue a message within 60 days of completion of a BART. For Atlantic Fleet submarines, "quick look" message will be issued in accordance with Local Operating Instructions.

5. Action. Ship's Force and the submarine's ISIC should use the results of the BART messages to schedule and implement corrective action for noise deficiencies detected during the trial. For deferred items the Noise Reduction Officer should develop and implement appropriate corrective action.

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APPENDIX C

SHIPBOARD NOISE REDUCTION INSTRUCTION

USS (Ship's Name and Hull No.)

Subj: SHIP'S NOISE REDUCTION PROGRAM

Ref: (a) COMFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual, Volume VI, Chapter 23

Encl: (1) Quarterly Noise Reduction Program Status Report
(2) Noise Reduction Surveys
(3) Control Surface Noise Questionnaire

1. Purpose. To establish a ship's Noise Reduction Program to include: a Noise Reduction Board to advise the Commanding Officer concerning appropriate noise reduction procedures; a set of noise surveys to characterize the ship's noise signature; and procedures to ensure proper coordination of efforts in the ship's noise reduction program.

2. Discussion. A great deal of emphasis has been placed on upgrading noise reduction awareness within the submarine force. As required by reference (a), (Ship's Name) must devote continued attention to the detection, correction and prevention of increases in its radiated noise signature. Significant mission degrading radiated noise problems could not be tolerated in war time. (Ship's Name) must minimize noise to maximize our detection range of threats/targets and to reduce the possibility of hostile ships detecting (Ship's Name). Quietness is absolutely essential to our primary mission and a continuous, aggressive effort must be made in acoustic housekeeping and noise reduction to ensure a quiet ship. The acoustic surveys considered mandatory for effectively maintaining a quiet ship and improving the ship's acoustic signature during the operating cycle are discussed in this instruction. While these surveys serve as a formal means of noise reduction, each crew member's actions play an equally important role in the noise reduction consciousness of the entire ship. A quiet ship requires involvement of the whole crew. THINK QUIET!

3. Program Organization.

a. A ship's Noise Reduction Board shall be established to assist the Commanding Officer in the development and execution of long and short range plans for maintaining and enhancing the acoustic posture of the ship. The board will recommend appropriate shipboard noise reduction procedures and monitor their execution. The board will consist of the following personnel:

(1) Executive Officer.

(2) Combat Systems Officer.

(3) Engineer Officer.

(4) Sonar Officer.

(5) Electrical Officer.

(6) First Lieutenant.

(7) Sonar Division Leading Petty Officer.

(8) Electrical Division Noise Reduction Petty Officer (NRPO).

(9) Chief of the Boat.

(10) Sail Coordinator

b. To assist the board in carrying out their responsibilities, experienced Petty Officers and non-rated personnel who have completed qualification in submarines shall be assigned in the ship's collateral duties notice as NRPO. Each division will have at least one formally designated NRPO.

4. Program Management.

a. The Noise Reduction Officer will coordinate all noise reduction activities within the ship. The Noise Reduction Board will meet periodically (before and after each upkeep and at least monthly underway) and discuss actions completed and further action required to correct outstanding noise deficiencies. The Noise Reduction Officer will chair these meetings. The Noise Reduction Officer will ensure that the noise reduction portion of the ESL contains updated entries on all outstanding noise deficiencies. Each of the significant noise deficiencies will be discussed at every meeting. The Commanding Officer will be apprised of the results of the meeting and any unresolved problems shortly after the meeting. Formal written reports summarizing the status of the Noise Reduction Program will be submitted following each meeting to the Commanding Officer using the format of enclosure (1).

b. Onboard surveys will be conducted in accordance with this instruction. Noise deficiencies discovered during these surveys or detected during routine ship's operations will be reported to the Noise Reduction Officer. At sea, these reports will be made to the Officer Of the Deck (OOD) who will, in turn, inform both the Noise Reduction Officer and the Commanding Officer. The OOD will initiate corrective action for all significant noise deficiencies and ensure that these items are included in the watch turnover. All deficiencies that are not immediately correctable will be entered in the noise deficiency section of the ESL.

c. The Noise Reduction Officer shall ask the following questions during each Noise Reduction Board meeting.

(1) Have we effected all corrective action recommendations from our latest acoustic trials? Have on board measurement surveys conclusively proven that outstanding noise deficiencies were corrected? Report all unresolved items to the Commanding Officer using the format of enclosure (1).

(2) Have any noise sources, especially rattles or control surface transients, been aurally detected during the conduct of the platform noise survey of enclosure (2a)? If rattles or transients are present, have tape recordings or data packages been accomplished in accordance with platform noise or maintenance manual guidance for submission?

(3) Have we conducted a propeller tip cavitation survey in accordance with enclosure (2b)? Are the measured tip cavitation points acceptable? If cavitation is not acceptable, has a tape package been prepared in accordance with reference (a)?

(4) Have any signature degradations been identified from the latest set of towed array, platform noise hydrophone or machinery and hull vibration measurements? If so, have the noise sources been identified? Report unresolved items to the Commanding Officer using the format of enclosure (1).

5. Action.

a. The Executive Officer shall:

(1) Attend all Noise Reduction Board meetings.

(2) Implement a comprehensive, all hands training program to elevate the awareness of Ship's Force personnel to the importance of noise reduction.

b. The Noise Reduction Officer shall:

(1) Coordinate and administer the ship's Noise Reduction Program.

(2) Schedule Noise Reduction Board meetings and chair their meetings.

(3) Report the status of noise deficiencies to the Commanding Officer following meetings of the Noise Reduction Board. Submit written summary reports to the Commanding Officer using the format of enclosure (1).

(4) Ensure that cognizant divisions enter all noise reduction deficiencies in the ESL, that prompt corrective action is taken by responsible divisions and that work requests are submitted for deficiencies beyond the capability of Ship's Force.

(5) Ensure that acoustic trial deficiencies are entered in the ESL and that appropriate corrective action is initiated.

(6) Assess the tactical implications of noise deficiencies detected during underway operations and make recommendations to the Commanding Officer as to tactical limitations and required corrective action.

(7) Ensure that cognizant divisions have men properly trained in Ship's Force acoustic surveys, noise reduction equipment, proper bearing replacement, and in-place balancing of rotating equipment.

(8) Ensure that surveys are being conducted by cognizant divisions and that deficiencies are reported to the Commanding Officer.

(9) Conduct spot reviews of acoustic survey results.

(10) Be inventory manager of all publications required by reference (a), to support the Noise Reduction Program and ensure that divisions have applicable MRCs.

(11) Assist the Engineer Officer with the implementation and maintenance of the ship's quiet bills.

(12) Ensure action is taken, to the maximum extent possible, to complete enclosure (3) for all identified control surface noises.

c. The Sonar Officer shall:

(1) Ensure that the Platform Noise Survey is accomplished, recorded, and analyzed in accordance with enclosure (2a).

(2) Perform Propeller Cavitation Noise Surveys as required in accordance with enclosure (2b).

(3) Develop propeller cavitation curves in accordance with enclosure (2b) and forward results to the Commanding Officer via the Noise Reduction Officer.

(4) Direct the use of the installed sonar systems to assist in the identification and isolation of noise related material deficiencies detected in Topside, Housekeeping, Machinery and Hull Vibration, and Isolation System Surveys. (Enclosures 2c, 2d, 2e, and 2f respectively refer).

(5) Ensure that Damping Material Surveys are accomplished, recorded, and analyzed in accordance with enclosure (2g).

(6) Ensure the Airborne Noise Surveys are accomplished, recorded, and analyzed in accordance with the applicable Maintenance Index Page (MIP). The Sonar Officer shall ensure that airborne noise levels in all shipboard areas remain within permissible limits. An Airborne Noise survey shall be conducted when increased airborne noise levels are suspected of exceeding permissible limits. A written report in memorandum form shall be submitted for each watch station and shall include, as a minimum, the date of inspection, names of personnel conducting the survey, and the discrepancies noted in the ESL. Review the status of noise level measurements and any affected watch station and report this information to the Commanding Officer and the ship's corpsman.

(7) Report immediately any abnormal increase in own ship's noise to the OOD and the Noise Reduction Officer.

(8) Ensure that all survey deficiencies are entered in the noise reduction section of the ESL and reported to the Noise Reduction Officer. Ensure that prompt corrective action is taken and that work requests are submitted for deficiencies beyond the capability of Ship's Force.

(9) Ensure that personnel assigned to conduct noise reduction surveys under his cognizance are properly trained.

d. The Electrical Officer shall:

(1) Ensure that the Machinery and Hull Vibration Surveys are accomplished, recorded, and analyzed in accordance with enclosure (2e).

(2) Ensure that in-place balancing is conducted on an assembled unit at any time that repairs are made by Forces Afloat that would affect the balance of the equipment.

(3) Determine the cause of out of specification machinery and hull vibration readings and initiate corrective action.

(4) Ensure that prompt corrective action is taken and that work requests are submitted for deficiencies beyond the capability of Ship's Force.

(5) Ensure that personnel under his cognizance assigned to conduct noise reduction surveys are properly trained.

e. The First Lieutenant shall:

(1) Ensure that the Topside and Housekeeping Surveys are accomplished, recorded, and analyzed in accordance with enclosure (2c) and (2d).

(2) Ensure that the Sound Absorption Material Survey is accomplished, recorded, and analyzed in accordance with enclosure (2h).

(3) With the assistance of the Supply Officer, ensure that equipment, stores, personal effects, and consumables are stowed in a manner that will not produce noise or transmit noise to the ship's hull or structure.

(4) Ensure that all survey deficiencies are entered in the noise reduction section of the ESL and reported to the Noise Reduction Officer. Ensure that prompt corrective action is taken and that work requests are submitted for deficiencies beyond the capability of Ship's Force.

(5) Ensure that personnel under his cognizance assigned to conduct noise reduction surveys are properly trained.

f. The NRPO shall:

(1) Promote the Noise Reduction Program in their respective divisions.

(2) Perform or assist in the performance of noise reduction surveys under their respective division's cognizance in accordance with enclosure (2).

(3) Enter all survey deficiencies in the noise reduction section of the ESL and report deficiencies to the cognizant Division Officer.

g. The OOD shall:

(1) Remain aware of the status of critical noise deficiencies and operate the ship in a manner that will minimize its radiated noise signature.

(2) Report all new noise deficiencies and the correction of existing deficiencies to the Noise Reduction Officer and the Commanding Officer. Ensure new deficiencies are recorded in the noise reduction section of the ESL.

(3) Ensure sonar watchstanders conduct aural monitoring of own ship's noise signature upon initial dive and once per watch.

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From: Noise Reduction Officer
To: Commanding Officer
Via: Executive Officer

Subj: QUARTERLY NOISE REDUCTION PROGRAM STATUS REPORT FOR PERIOD ENDING (DATE)

Encl: (1) Noise Reduction Section of ESL

1. The following MRCs associated with the Noise Reduction Program were not accomplished, partially accomplished, or deferred:

   MRC No./Deficiency reason/Corrective Action

2. The following noise deficiencies were identified during the current period:

   Deficiency/Source/ESL No./Plan of action for identification and repair

3. The following previously identified noise deficiencies were corrected during the current period:

   Deficiency/Corrective Action

4. The following noise deficiencies from the previous period are outstanding:

   Deficiency/Source/ESL No./Diagnostics and repairs performed/Plan of action for identification and repair

5. Enclosure (1) summarizes all currently outstanding deficiencies associated with the Noise Reduction Program.

Submitted:_____

Noise Reduction Officer

Copy to:
Engineer Officer

Enclosure (1)

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NOISE REDUCTION SURVEYS

1. This enclosure contains a description of the onboard surveys conducted in support of the Noise Reduction Program. For each survey, applicable references are cited and a summary of procedures and reporting requirements are presented. Surveys included are:

Enclosure	2a	Platform Noise Survey
	2b	Propeller Cavitation Noise Survey
	2c	Topside Survey
	2d	Housekeeping Survey
	2e	Machinery and Hull Vibration Survey
	2f	Isolation System Survey
	2g	Damping Material Survey
	2h	Sound Absorption Material Survey

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PLATFORM NOISE SURVEY

Reference: (a) Class Applicable Technical Manual for Platform Noise Monitoring Analysis for Noise Reduction
(b) Class Applicable SO-544 MIP/MRCs
(c) OPNAVINST 5513.5A Department of the Navy (DON) Security Classification Guidance for Undersea Warfare Programs

1. Responsibility. Sonar Officer.

2. Procedure.

a. Platform Noise Surveys shall be conducted as specified in references (a) and (b).

b. Sonar supervisors shall monitor each hydrophone for objectionable noises at least once each watch while underway and report results to the OOD. Problems detected shall also be recorded in the Noise Reduction section of the ESL. Problem investigation and corrective action shall be initiated as soon as possible within the current operations schedule.

c. As soon as feasible, after diving, following an inport period, accomplish the following:

(1) Monitor each platform hydrophone for objectionable noise while changing speed in five knot increments up to Flank speed (monitor all frequency bands/where applicable). At slow speed, monitor hydrophones nearest the rudder/stern planes and fairwater planes while each control surface is cycled. Monitor the hydrophone nearest the sail while each mast and antenna is cycled. If control surface deficiencies are found complete the applicable portions of the Control Surface Noise Questionnaire, enclosure (3), to report control surface noise. This questionnaire assists in troubleshooting.

(2) Check at least one point of the propeller cavitation curve. If results are significantly different from the previous data, establish a new cavitation curve at the earliest opportunity as discussed in enclosure (2b).

(3) If operations preclude complete accomplishment of (1) and (2) above, speeds/areas not monitored should be noted and carried forward in the sonar supervisor's log until they can be monitored.

(4) Results of this monitoring will be reported to the OOD and deficiencies recorded in the ESL.

d. For any abnormal noises, magnetic tape recordings should be made in accordance with reference (a). These tape recordings together with complete supporting data shall be forwarded by priority registered mail second day delivery to:

For COMSUBLANT units:	Carderock Division Naval Surface Warfare Center Bethesda, Maryland 20084-5000 Attn: Code 713 For: New London Units, data packages should be forwarded to: SUBRONSUPPU NEW LONDON CT, N42
For COMSUBPAC units:	Director, Naval Surface Warfare Center Carderock Division Detachment Puget Sound Attn: Code 713 Bremerton, Washington 98314-5215

Units should request analysis and recommendations for corrective action from NSWC. The response will be provided by message within 72 hours of receipt of the data package. If the package needs to be expedited, contact TYCOM Noise Reduction Officer prior to submission.

e. Platform noise hydrophone recordings are classified **CONFIDENTIAL** in accordance with reference (c), (Encl 55). If recordings include towed array signature data, then the classification is **SECRET**.

3. Frequency. Surveys will be conducted as specified within this instruction, reference (a) and applicable MRCs. Additional surveys will be conducted as required to support noise reduction efforts related to other shipboard surveys or whenever such monitoring is required for the identification of noise degradations or to verify the effectiveness of corrective actions.

4. Record. Survey results will consist of platform noise spectra, cavitation data, and entries to the ESL and Sonar Line Log. Records will be kept as specified within this instruction, in reference (a) or as required to meet the needs of noise reduction efforts aboard ship.

5. Review. The Sonar Officer will review results of all surveys weekly and the Noise Reduction Officer will review all records in conjunction with Noise Reduction Board meetings monthly.

PROPELLER CAVITATION NOISE SURVEY

Reference: (a) Class Applicable Technical Manual for Platform Noise Monitoring Analysis for Noise Reduction
(b) COMSUBDEVRON TWELVE, Submarine Tactics, Vol VII, No. 1, March 1986

1. Responsibility. Sonar Officer.

2. Procedure. Propeller cavitation surveys and diagnostic procedures will be conducted as specified in reference (a). Propeller cavitation curves will be developed using the procedural guidance of reference (a), for the various tactical considerations specified in reference (b).

3. Frequency. Since the ship's operating schedule dictates the frequency at which propeller cavitation surveys can be made, no specific frequency can be assigned. However, a complete cavitation survey should be made after any CNO Maintenance Availability or upkeep period. One point of the current cavitation curve should be verified at the beginning of each underway period. If results are significantly different, a complete new curve should be developed.

4. Unacceptable Propeller Tip Cavitation Performance. Propeller replacement due to poor acoustic performance is often based on unacceptable tip cavitation. Naval Surface Warfare Center, Carderock Division (NSWCCD) personnel verify the ship recorded cavitation points and provide feedback to the TYCOM and the ship. Ships with emergent poor cavitation performance should immediately record and forward cavitation curve tapes in accordance with the Platform Noise Survey Section of this Appendix.

5. Reports. The original and the five most recent cavitation curves will be retained and compared for trend analysis until the propeller is changed.

6. Review. The Sonar Officer shall compare new cavitation curves to previous ones and forward the results to the Commanding Officer via the Noise Reduction Officer.

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TOPSIDE SURVEY

Reference: (a) MRC SO-591-R1

1. Responsibility. First Lieutenant.

2. Procedure. The First Lieutenant shall ensure that the following items are accomplished in accordance with reference (a):

   a. Open and inspect all line lockers and free flood areas for loose gear and other sources of noise, such as loose zincs, rattling pipes, loose grates, etc.

   b. Check all deck hatches to ensure they shut properly and will not rattle.

   c. Check that all towed array fairing plates are properly secured (if applicable).

   d. Check all cleats for proper operation and ensure that they do not rattle when stowed.

   e. Check stowage of all portable equipment topside to ensure that proper gasket material is installed, all bolts and wing nuts are present, and equipment is securely held in place when mounted.

   f. When required, inspect sail area for loose gear and sources of rattles. Particular attention should be given to the mast bearings and operating equipment to ensure that masts will not be damaged or fouled. Before reinstalling sail plates, the sail should be inspected by the Noise Reduction Officer.

3. Frequency. A complete Topside Survey, including the sail, shall be conducted after any major upkeep or inport period, or whenever major topside work is completed. A sail closeout inspection shall be conducted by an officer prior to the reinstallation of any sail plate removed. Surveys should be completed as far in advance of underway as possible. Other inspections shall be conducted as directed by the First Lieutenant.

4. Reports. A written report in memorandum form shall be submitted to the Commanding Officer at the completion of each inspection. This report shall include, as a minimum, the date the inspection was made, names of personnel conducting the inspection and uncorrected discrepancies noted in the ESL. Reports shall be routed via the Noise Reduction Officer, with copies to cognizant Department Heads.

5. Review. The results of each inspection shall be reviewed by the First Lieutenant and retained until all discrepancies are corrected.

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HOUSEKEEPING SURVEY

Reference: (a) MRC SO-591-R2

1. Responsibility. Noise Reduction Officer.

2. Procedure. It is the responsibility of the NRPO to inspect their division's spaces in accordance with reference (a) for sound shorts or other silencing discrepancies which may result from improper stowage of loose gear.

3. Frequency. Improper stowage is a continuous problem and should be monitored as such. It is the responsibility of all hands to monitor the stowage of all gear and to ensure that sound shorts are not created by improper stowage. OODs, EOOWs and all watchstanders are required by other instructions to inspect various spaces. These inspections should include monitoring for proper stowage and possible sound shorts. Prior to getting underway, all divisions must inspect their spaces for proper stowage at sea. Division Officers should acknowledge by signature on respective pre-underway check sheets that their spaces are stowed for sea.

4. Reports. Potential sound short discrepancies will be reported to the OOD who will inform the Commanding Officer and responsible Department Heads, to ensure that problems are corrected. Discrepancies not immediately corrected shall be noted in the ESL.

5. Review. The Noise Reduction Officer shall review all pre-underway check sheets and maintain a record of all noise discrepancy items until corrected.

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MACHINERY AND HULL VIBRATION SURVEY

Reference: (a) Class Applicable Technical Manual for Machinery and Hull Vibration Testing and Monitoring of SSN/SSBN/SSGN Auxiliary Machinery
(b) MIP EL-035/903 Vibration Noise Monitoring

1. Responsibility. Electrical Officer.

2. Procedure. Machinery and hull vibration surveys shall be conducted as specified in reference (a) and in accordance with applicable PMS (reference (b)). Items found to be out-of-specification will be logged in the ESL as potential noise deficiencies. Machinery and hull vibration surveys are conducted on all submarines.

3. Frequency. A comprehensive machinery and hull vibration survey should be conducted quarterly by Ship's Force. Results are submitted to PMT, who in turn forwards the packages to the applicable NSWC Detachment . Specific machinery and hull vibration monitoring surveys shall be conducted by Ship's Force bi-weekly on selected equipment identified in the NSWC, machinery Vibration Deficiency Message and as required to support onboard noise reduction efforts.

4. Reports.

   a. NSWC evaluates and maintains machinery and hull vibration data collected by Ship's Force. They report out-of-specification equipment or hull vibration levels via message.

   b. During each machinery and hull vibration survey, a report is submitted to NSWC via the local PMT. This report shall include the sound cut data and a feedback package.

   c. For the Hull Vibration Monitoring Program, a message should be sent from the submarine to NSWC within 45 days of receipt of the NSWC hull vibration deficiency message or when operationally feasible. This message should include the results of actions taken to identify and correct the sources of excessive hull vibration levels and to identify platform noise sources.

5. Noise Reduction Training. Crew training in noise awareness and noise reduction is absolutely essential to maintaining a quiet ship. The Submarine Force Training Manual discusses formal training courses and requirements pertaining to noise reduction as well as materials available for onboard training.

6. Review. The Electrical Officer shall review and forward the results of all machinery and hull vibration measurements to the Commanding Officer via the Noise Reduction Officer and Executive Officer. This report shall be submitted within five working days of the survey and shall include a listing of which noise measurements have been taken and any out-of-specification equipment.

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ISOLATION SYSTEM SURVEY

Reference: (a) NAVSEA S9073-AW-SNC-010/(U) Ship Acoustical Surveys
(b) NAVSEA S9073-AF-SNC-010/(C), Ship Noise Control
(c) Appropriate Noise Control Guidelines, Road Maps, and Equipment Guide Lists
(d) Appropriate MIP SO-593 MRCs

1. Responsibility. Noise Reduction Officer.

2. Procedure. The Noise Reduction Officer shall require Ship's Force to conduct a visual inspection of silencing equipment and components such as resilient mounts, flexible pipe, pipe hangers, ground straps, electrical connections, etc., to ensure they are properly installed, within periodicity, undamaged and not sound shorted. References (a), (b), (c) and (d) apply. When funded, these inspections will be conducted by a NAVSEA designated activity, however, the ship is still responsible for conducting the survey regardless of NAVSEA funding.

3. Frequency. An Isolation System Survey shall be conducted as specified by reference (d) in accordance with reference (a). Additionally, a localized isolation system survey shall be conducted in the area of sound isolated equipment changeouts and in the area of work accomplished on sound isolated systems. When requested and funded, a NAVSEA designated activity shall provide training and assist in the performance of an isolation system survey.

4. Reports. The Noise Reduction Officer shall ensure that all defects found are logged in the ESL and shall report survey results to the Commanding Officer within five working days of completion of the inspection.

5. Review. The Noise Reduction Officer shall maintain a record of all discrepancies noted until corrected.

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DAMPING MATERIAL SURVEY

Reference: (a) NAVSEA S9073-AW-SNC-010/(U), Ship Acoustical Surveys
(b) MIP SO-592/001 Damping Material Survey
(c) NAVSEA S9073-AF-SNC-010/(C), Ship Noise Control

1. Responsibility. Sonar Officer.

2. Procedure. The Sonar Officer shall ensure that a thorough inspection is conducted of all damping material installed in sonar array areas, fairwater, main ballast tanks, and free flood areas, to ensure that no deterioration has taken place in accordance with the guidance provided in references (a) and (b). Reference (c) provides specific information relating to these materials.

3. Frequency. A Damping Material survey shall be conducted as specified with reference (b) or at each dry-docking, in accordance with reference (a).

4. Reports. A written report in memorandum form shall be submitted for each inspection and shall include, as a minimum, the date of inspection, names of personnel conducting the inspection, and the discrepancies noted in the ESL.

5. Review. The Sonar Officer shall review the results of each inspection and forward them to the Commanding Officer via the Noise Reduction Officer within five working days of the completion of the inspection. This report shall be retained by the Noise Reduction Officer until all discrepancies have been corrected.

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SOUND ABSORPTION MATERIAL SURVEY

Reference: (a) NAVSEA S9073-AW-SNC-010/(U), Ship Acoustical Surveys
(b) NAVSEA S9073-AF-SNC-010/(C), Ship Noise Control

1. Responsibility. First Lieutenant.

2. Procedure. The First Lieutenant will ensure that a thorough inspection of the interior sound absorption and sound transmission loss material is conducted in all spaces. This inspection ensures that no deterioration of these materials has taken place. This inspection is accomplished with guidance from reference (a), while reference (b) provides specific information relating to these materials.

3. Frequency. A Sound Absorption Material Survey shall be conducted prior to each major CNO Maintenance Availability. An inspection of any system affected by maintenance or other work shall be conducted following completion of the work.

4. Reports. A written report in memorandum form will be submitted to the Noise Reduction Officer for each inspection and will include, as a minimum, the date of the inspection, names of personnel conducting the inspection, and discrepancies noted in the ESL.

5. Review. The First Lieutenant will review the results of each inspection and forward them to the Commanding Officer via the Noise Reduction Officer within five working days of the completion of the inspection. This report will be retained by the Noise Reduction Officer until all discrepancies have been corrected.

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CONTROL SURFACE NOISE QUESTIONNAIRE

1. The purpose of this questionnaire is to provide more accurate and definitive information than reports of "noise in the fairwater" or "noise in the mud tank". This information can reduce troubleshooting time, prevent unnecessary maintenance, and perhaps prevent an unnecessary and unscheduled dry-docking. It can also furnish vital data to assist in the resolution of a problem and prevent its recurrence. It is very important to monitor the audio during the greasing operations; the effects of greasing for worn bearings can be short.

2. Record audio of all platform noise evaluations in accordance with reference (a).

3. Perform all evaluations in all modes (Normal, Emergency and Automatic where applicable).

4. Note how long greasing effects the noise characteristics of the control surface (minutes, hours, days or months).

Hull Number: _____ Date:_____

Check the appropriate box or fill in the blanks in response to the questions below:

1. Give the date when the noise was first noticed:	
2. Which control surface is suspected of causing the noise?	
a. Fairwater/Bow Planes	Yes ~ No ~
b. Stern Planes	Yes ~ No ~
c. Rudder	Yes ~ No ~
3. Was the noise observed upon leaving port?	Yes ~ No ~
a. If not observed upon leaving port, after how many days at sea?	_____
4. Was the noise first observed during the first high speed run?	Yes ~ No ~
5. Was any work performed on this system, associated systems, or in its vicinity during the last refit/upkeep period (including welding or sandblasting)?	Yes ~ No ~
a. If yes, describe work ____ _____ _____	
6. How was the noise first detected?	
a. Audible to crew	Yes ~ No ~
b. Self noise monitoring system	Yes ~ No ~
(1) If yes, which system?	_____
c. Other? (Describe) _____ _____	

(CONFIDENTIAL when filled in)

Enclosure (3)

7. Is the noise detected on any hydrophones?	Yes ~ No ~
a. If so, which hydrophone displayed the highest levels?	_____
b. How does this hydrophone level compare to the most recent acoustic trial report or more recent baseline?	_____ _____
8. Is the noise:	
a. Barely audible?	Yes ~ No ~
b. Moderate?	Yes ~ No ~
c. Loud?	Yes ~ No ~
9. Since it was first detected, has the noise level:	
a. Increased?	Yes ~ No ~
b. Decreased?	Yes ~ No ~
c. Remained constant?	Yes ~ No ~
d. Fluctuated?	Yes ~ No ~
10. During cycling of the control surface, is the noise:	
a. Constant?	Yes ~ No ~
b. Intermittent?	Yes ~ No ~
11. If intermittent, has the frequency of the occurrence of the noise:	
a. Increased?	Yes ~ No ~
b. Decreased?	Yes ~ No ~
c. Remained constant?	Yes ~ No ~
12. Describe the type of noise heard.	
a. Clanking?	Yes ~ No ~
b. Thudding?	Yes ~ No ~
c. Groaning?	Yes ~ No ~
d. Rubbing?	Yes ~ No ~
e. Squealing?	Yes ~ No ~
f. Chattering?	Yes ~ No ~
g. Galloping?	Yes ~ No ~
h. Hydraulic flow?	Yes ~ No ~
i. Other? (Describe) _____	
13. When, during the motion of the cycle of the planes is the noise heard (check all that apply):	
a. At start of motion towards rise/right?	Yes ~ No ~
b. At start of motion towards dive/left?	Yes ~ No ~

(CONFIDENTIAL when filled in)

Enclosure (3)

c. At the end of motion towards rise/right?	Yes ~ No ~
d. At the end of motion towards dive/left?	Yes ~ No ~
e. Entering the rise/right hardstop?	Yes ~ No ~
f. Entering the dive/left hardstop?	Yes ~ No ~
g. Leaving the rise/right hardstop?	Yes ~ No ~
h. Leaving the dive/left hardstop?	Yes ~ No ~
i. The entire length of travel towards rise/right?	Yes ~ No ~
j. The entire length of travel towards dive/left?	Yes ~ No ~
k. At some intermediate point(s) while moving towards rise/right?	Yes ~ No ~
(Indicate degrees of rise/right when heard):	_____
l. At some intermediate point(s) while moving towards dive/left?	Yes ~ No ~
(Indicate degrees of dive/left when heard):	_____
14. Is there any unusual hesitancy or motion during operation of the planes:	
a. Leaving the rise/right hardstop?	Yes ~ No ~
b. Leaving the dive/left hardstop?	Yes ~ No ~
c. At any other point(s) in the motion cycle?	Yes ~ No ~
(1) If yes, describe giving direction of movement and degrees of rise, dive, left, or right when noise occurs:	____ ____
15. Does ship's speed or depth have any effect on whether or not the noise is generated?	Yes ~ No ~
a. If yes, describe:	
16. Does ship's speed or depth have any effect on when the noise is detected during the movement cycle as described in question 13?	Yes ~ No ~
a. If yes, describe:	
17. Is the noise audible:	
a. Surfaced, underway?	Yes ~ No ~
b. At periscope depth?	Yes ~ No ~
c. Below periscope depth?	Yes ~ No ~
18. Does sea state effect the degree of noise?	Yes ~ No ~
19. Does simultaneous operation of the stern planes and rudder cause or increase the degree of noise?	Yes ~ No ~
20. Are any of the following components very warm to the touch while operating the control surface suspected of causing the noise?	
a. Hydraulic tail rod (if installed)?	Yes ~ No ~

(CONFIDENTIAL when filled in)

b. Hydraulic piston rod?	Yes ~ No ~
c. Through hull connecting rod?	Yes ~ No ~
21. On the control surface suspected of causing the noise, perform the appropriate quarterly greasing MRC for the components listed in question 22, below. Operate the control surface while greasing (except the guide cylinder). Listen to determine if greasing causes any change in the occurrence or loudness of the noise.	Greasing Performed? Yes ~ No ~
22. Did the noise diminish after greasing the following components?	
Fairwater/Bow Planes:	
a. Hull gland:	Yes ~ No ~
b. Lower end of connecting rod: see Note 1	Yes ~ No ~
c. Upper end of connecting rod: see Note 1	Yes ~ No ~
d. Port stock bearing:	Yes ~ No ~
e. Starboard stock bearing:	Yes ~ No ~
Stern Planes:	
f. Hull gland:	Yes ~ No ~
g. Forward end of connecting rod: see Note 1	Yes ~ No ~
h. Aft end of connecting rod: see Note 1	Yes ~ No ~
i. Port stock bearing: see Note 2	Yes ~ No ~
j. Starboard stock bearing: see Note 2	Yes ~ No ~
k. Port pintle bearing:	Yes ~ No ~
l. Starboard pintle bearing:	Yes ~ No ~
Rudder:	
m. Hull gland:	Yes ~ No ~
n. Forward end of connecting rod: see Note 1	Yes ~ No ~
o. Aft end of connecting rod: see Note 1	Yes ~ No ~
p. Port stock bearing: see Note 2	Yes ~ No ~
q. Starboard stock bearing: see Note 2	Yes ~ No ~
r. Upper rudder stock bearing: see Note 2	Yes ~ No ~
s. Lower rudder stock bearing: see Note 2	Yes ~ No ~
t. Rudder carrier bearing (two fittings): see Note 2	Yes ~ No ~
23. Pump one pound of grease into the guide cylinder grease fitting while the control surface is in the neutral position. Then operate the control surface about five cycles from full rise to full dive or left to right, as appropriate, while listening for the noise. Repeat this procedure for the guide cylinder until the specified amount of grease has been applied.	Greasing Performed? Yes ~ No ~

(CONFIDENTIAL when filled in)

Note 1: Grease underway if the appropriate alteration is installed to permit remote greasing of the stern planes and rudder connecting rods. The fairwater/bow planes connecting rod may be greased locally while underway on the surface even if remote greasing alteration is not installed.

Note 2: If the stern planes are suspected of causing the noise and the noise did not diminish after greasing the stern plane components, grease the rudder components. If the greasing did not help a suspected noisy rudder, grease the stern planes.

Deliver this questionnaire to:

For COMSUBLANT units:

Carderock Division
Naval Surface Warfare Center
Bethesda, Maryland 20084-5000
Attn: Code 713

For New London Units data packages should be forwarded to:
SUBRONSUPPU, NEW LONDON, CT, N42

For COMSUBPAC units:

Director, Naval Surface Warfare Center
Carderock Division Detachment Puget Sound
Attn: Code 713
Bremerton, Washington 98314-5215

The NSWC will provide appropriate distribution to NAVSEA PMS 350, SEA 07T, PMS 392, TYCOM, and ISIC.

(CONFIDENTIAL when filled in)

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APPENDIX D

PREDEPLOYMENT NOISE INSPECTION

1. Purpose. To provide requirements for Predeployment Noise Inspections.

2. Policy. This Appendix establishes the requirements for the Under Hull Sound Silencing Survey of all submarines.

3. Under Hull Sound Silencing Surveys. Under Hull Sound Silencing Surveys of submarines (using reference (h)) will be done at the following times:

a. Prior to the ship leaving dry-dock.

b. Waterborne Under Hull Inspection during the first week of a scheduled upkeep, normally accomplished by the inspecting facilities divers.

c. Waterborne Under Hull Inspection prior to deployments of 30 days or greater, normally accomplished by the inspecting facilities divers.

4. Reports. The Senior Hull Inspector of the inspecting facility will conduct an inspection critique for the ship's Noise Reduction Officer and ISIC Material Officer. Copies of the final survey report (a format is provided on the following page) or reference (h) data sheets will be supplied by the inspecting facility to the submarine and cognizant ISIC Material Officer.

SOUND SILENCING SURVEY REPORT

1. Inspection performed by:

   Senior Inspector: _____

   Inspector #1 _____

   Inspector #2 _____

   Inspector #3 _____

   Inspector #4 _____

2. The following deficiencies were noted:

3. Submitted by:

_____

Senior Inspector

APPENDIX E

SUBMARINE SILENCING PUBLICATIONS

X-Applicability

PUBLICATION Note 1	**637**	**688**	**726**	**21**	**774**	**AS**
PLATFORM NOISE S9073-A4-SNC-010/(C) USS LOS ANGELES (SSN 688) Class Acoustic Stealth Manual		X				X
NSWCCD-71-TR-2001/020 February 2001 USS SEAWOLF (SSN 21) Class Acoustic Stealth Manual				X		
S9073-AS-PNM-010/(C) Platform Noise Monitoring Analysis for Noise Reduction	X					X
S9073-AT-PNM-010/(C) Platform Noise Monitoring Analysis for Noise Reduction			X			X
NAVSEA SE 394-NO-MMA-030/(C) AN/BSQ-7 Platform Noise Manual	X					X
(TBD) Platform Noise Monitoring Analysis for Noise Reduction				X(4)	X(4)	
MACHINERY AND HULL VIBRATION S9073-AL-SBV-010/(C) Structureborne Noise Criteria for Auxiliary Machinery (U) Operation and Maintenance Instructions			X	X(4)	X(4)	X
S9073-AM-SBV-010/(U) Structureborne Noise Acceptance Tests and Monitoring Program for Submarine Auxiliary Machinery (U) Volume I, Procedure (U)	X	X		X(4)	X(4)	X
S9073-AM-SBV-020/(C) Structureborne Noise Acceptance Tests and Monitoring Program for Submarine Auxiliary Machinery (U) Volume II, Criteria	X	X		X(4)	X(4)	X
SUBMARINE SONAR DOMES S9165-AC-HBK-010/(U) Submarine Sonar Dome Handbook; Description and Maintenance	X	X	X	X(4)	X(4)	X
SE300-AY-MMA-010/(U) TRIDENT Glass Reinforced Plastic Bow Sonar Dome			X			X
MISCELLANEOUS NAVSEA NOISE REDUCTION MANUALS S6360-AD-HBK-010 Special Hull Treatment, Maintenance and Repair for Submarines	X	X	X	X(4)	X(4)	X
S9311-AM-MME-010/(U) Microbalancing of Ship Service Turbine Generator Sets on SSN/SSBN Submarines		X	X	X(4)	X(4)	X
S9561-AQ-MMA-010/(U) Low Noise Electrohydraulic Flow Control Servo Valve Model SV-438-10P; Service Instructions	X					X
S9073-AW-SNC-010/(U) Ship Acoustical Surveys for Submarines	X		X	X	X	X
S9073-AF-SNC-010/(C) Ship Noise Control	X	X	X	X(4)	X(4)	X

X-Applicability

PUBLICATION Note 1	**637**	**688**	**726**	**21**	**774**	**AS**
S9073-AP-HBK-010/(C) Fairwater Noise Handbook For SSN 637 Class	X					X
S9SSB-X9-SSM-09A/(U) SSBN 726 Class Ship System Manual, Volume II, Part IV, Monitoring Subsystem Note 2			X			X
0900-LP-060-2010(U) Electrical Machinery Repair Manual, Volume I, Electric Motor Repairs (Rev 2)						X
0900-LP-060-2020(U) Electrical Machinery Repair Manual, Volume II, Vibration Analysis and Rotor Balance						X
S0600-AA-PRO-230(U) Underwater Ship Husbandry Manual, Chapter 23, Submarine Pre-Deployment Noise Inspection	X	X	X	X(4)	X(4)	X
MIPs FOR NOISE MONITORING Platform Noise Monitoring, MIP SO-544/001	X					
Platform Noise Monitoring MIP SO-544/002		X				
Platform Noise Monitoring MIP SO-544/003 (AN/BSQ-7 data analysis vice AN/BQR-22)	X	X				
Platform Noise Monitoring (TBD)				X	X	
TRIDENT Monitoring Subsystem 4190/011-11 (contains platform monitoring)			X			
Topside and Housekeeping Surveys, reference (h)	X	X	X	X(4)	X(4)	
Damping Material Survey, MIP SO-592/001	X	X	X	X(4)	X(4)	
Isolation System Survey, MIP SO-593/004	X					
Topside and Housekeeping Surveys MIP SO-591/901-A0				X	X	
Airborne Noise Survey, MIP SO-594/001	X	X	X	X(4)	X(4)	
Vibration Noise Monitoring MIP EL-035/903, See Note 3 (Machinery and Hull)	X	X	X	X(4)	X(4)	
NOISE CONTROL GUIDELINES 0900-LP-097-5010/(C) Noise Control Guide for SSN 637 Class	X					X
0900-LP-093-9010/(C) Noise Control Guide for SSBN 640 Class						X
Specifically Applicable Noise Road Maps (Selected Record Drawings)	> 678	X	X	X	X	X

X-Applicability

PUBLICATION Note 1	**637**	**688**	**726**	**21**	**774**	**AS**
TRIAL REPORTS NSWCCD or NSWCCD DET BREMERTON: Latest Detection & Detectability Report	X	X	X	X	X	
NSWCCD or NSWCCD DET BREMERTON: Latest Acoustical Trial Summary Report	X	X	X	X	X	
LETTERS AND INSTRUCTIONS NAVSEAINST C9073.2 (Series) Acoustical Surveys of Submarines (U)	X	X	X	X	X	X
COMFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual Volume VI, Chapter 23, Submarine Noise Reduction	X	X	X	X(4)	X(4)	X
NAVSEA SILENCING FILMS 34547 DN Training Film - Submarine Sound Shorts						X
35350 DN Training Film - Noise Control Guidelines, Running Silent						X
35050 DN Training Film - Shipboard Noise Isolation Devices						X
SAVPIN 803414 DN Sound Silencing Show (Video Tape) - consists of the three films listed above.						X
SVT - ST - 9427 - Submarine Rattles	X	X	X	X	X	X
SVT - ST - 9428 - Submarine Sound Silencing (SSN 637)	X					X
SVT - ST - 9429 - Submarine Sound Silencing (SSN 688)		X				X
SVT - ST - 9430 - Submarine Sound Silencing (SSBN 726)			X			X
SVT - ST - (TBD) - Submarine Sound Silencing (SSN 21)				X		X
SVT - ST - (TBD) - Submarine Sound Silencing (SSN 774)					X	X

Note 1: The stocking/ordering point for all publications can be found using Technical Data Information Management System (TDMIS)

Note 2: The ordering point for the item with this Note is Supervisor of Shipbuilding Groton

Note 3 : Specific Maintenance Requirements for consideration in this listing are for:

a. Inspect, clean & replace sound washers.

b. Record machinery vibration levels.

c. Record hull vibration levels.

Note 4: Applicable, but may not contain all applicable information until updated for specific class

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APPENDIX F

SAMPLE PROPELLER CHANGEOUT MESSAGE

FM COMSUBRON (AS APPROPRIATE)//
TO COMNAVSEASYSCOM WASHINGTON DC//05F3/393/396//
INFO COMSUBPAC PEARL HARBOR HI//N42N/N402//
COMSUBLANT NORFOLK VA//N42N/N402//
USS (SHIP'S NAME AND HULL NO.)//
BT
UNCLAS //N09245//
MSGID/GENADMIN/COMSUBRON (AS APPROPRIATE)//
SUBJ/(SUBS) PROPELLER CHANGEOUT//
REF/A/DOC/COMFLTFORCOMINST 4790.3//
NARR/REF A IS JOINT FLEET MAINTENANCE MANUAL/VOL VI, CH 23 PROVIDES GUIDANCE FOR MONITORING PROPELLER VIBRATION DATA AND PROPELLER CHANGE OUT//
RMKS/1. IAW REF A, FOL PROPELLER DATA REPORTED
A. SERIAL NO. OF PROPELLER REMOVED
B. SERIAL NO. OF PROPELLER INSTALLED
C. REASON PROPELLER REPLACED
(POOR PERFORMANCE, EXCESSIVE CAVITATION, GOUGED/NICKED, SINGING SCREW, ETC.)
2. REQUEST DISPOSITION INSTRUCTIONS FOR REMOVED PROPELLER//
BT

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

SAMPLE

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VOLUME VI

CHAPTER 24

PERIODIC MAINTENANCE REQUIREMENT PROGRAM

REFERENCES.

(a) OPNAVINST 4790.4 - Ships' Maintenance and Material Management (3-M) Manual
(b) NAVSUP 485 - Afloat Supply Procedures
(c) NAVSEAINST 4790.19 - Submarine Engineered Operating Cycle (SEOC) Program
(d) OPNAVINST 3120.33 - Submarine Extended Operating Cycle (SEOC) Program

LISTING OF APPENDICES.

A SUBMEPP Maintenance and Shipwork Planning (MSWP) Periodic Maintenance Schedule - I Level
B SUBMEPP Maintenance and Shipwork Planning (MSWP) Inventory of Periodic Maintenance Requirements - I Level
C SUBMEPP Maintenance and Shipwork Planning (MSWP) Inventory of Periodic Maintenance Requirements - I/D Level
D Submarine Periodic Maintenance Requirement (PMR) Management Process
E Work Package Supplement - Shipyard Planning and Feedback Report
F Work Package - Ship's System Work Description, Part 4.13

24.1 PURPOSE. This chapter defines the functions and responsibilities of the submarine Periodic Maintenance Requirements (PMR) Program, and applies to all submarines. Details of PMR documentation are described in Appendix C of reference (a). Unrestricted Operation (URO) PMR guidance is provided in Chapter 25 of this Volume. Accomplishment of all PMRs is **mandatory**.

a. The Integrated Maintenance and Modernization Planning (IMMP) Program defines the Maintenance Requirements (MR) to support the Submarine Engineered Operating Cycle (SEOC) for SSN 637 and SSN 688 Class nuclear attack submarines' 120 month operating cycle. IMMP is a PMR Program which defines a series of planned periodic tests, inspections and component restorations using Fleet Maintenance Activity (FMA) and industrial activity resources. It is designed to ensure the execution of the Class Maintenance Plans (CMP) as well as safe, reliable and continued submarine operations.

b. The SSBN/SSGN 726 Class and SSN 21 Class CMPs form the basis of a PMR Program which takes the place of the IMMP Program for these classes and defines the planned, corrective and inactive equipment MRs for all levels of accomplishment.

c. PMR work requires detailed planning and long lead time material procurement; therefore, all PMR work has been assigned to the FMA. Ship's Force is not expected to be called upon for PMR work other than the normal responsibilities for approving, inspecting, monitoring, interference removal, delivery of ship to shop items, retesting and accepting work. Ship's Force 991 Work Center (WC) will not be assigned as Lead Work Center (LWC) for "I" level PMR work but may be assigned as an assist WC (991).

24.2 TYPE COMMANDER SCHEDULING SYSTEM. PMR program management has been assigned to Submarine Maintenance Engineering, Planning and Procurement Activity (SUBMEPP) who develops CMPs, Maintenance Requirement Cards (MRC), Maintenance Repair Standards (IMMP MRCs, Technical Repair Standards (TRS) and Maintenance Standards (MS), URO MRCs, and provides PMR configuration and scheduling information to the Submarine Force. Appendices A and B of this chapter show examples of the SUBMEPP PMR Inventories and Schedules provided in support of the Type Commander (TYCOM) PMR Scheduling System. A description of the data elements utilized is provided in each issue of the PMR Inventories and Schedules, which is issued quarterly, or as requested by the Immediate Superior in Command (ISIC). These Inventories and Schedules aid in decisions concerning PMR scheduling and accomplishment during upkeep, provide visibility to problem areas and facilitate auditing and assessing the material condition of a ship.

a. For Non-SSBN/SSGN 726 Class submarines. The quarterly inventories and schedules include a section of "I"-Level PMRs coming due within the next xxx months (number of months as requested by ISIC). Additionally, they provide a combined inventory of "I" and "D"-Level PMRs shown in Appendix C of this chapter. This inventory identifies the availability for which the "D" level PMRs are planned for accomplishment.

b. For SSBN/SSGN 726 Class submarines. This inventory provides all "I" and "D" level requirements, with their due dates.

24.2.1 Periodic Maintenance Requirements Schedule. The PMR Inventories and Schedules, scheduling/configuration files (M79EII), and a Master Job Catalog (MJC) update file are distributed automatically by SUBMEPP to the parent ISIC every three months or as requested. SUBMEPP informs the ISIC of the latest update information. Appendix D of this chapter provides a flow chart of the Submarine PMR Management System.

24.2.2 Scheduling Periodic Maintenance Requirements Work. The PMR scheduling system is based on calendar periods starting with the month following the completion month of a scheduled Chief of Naval Operations (CNO) Availability, or starting with the month following PMR completion for TYCOM availabilities. It is designed to ensure reliable equipment operation during the unit's extended operating cycle. The ISIC, in conjunction with the FMA, will have to smooth the work load by spreading the work over several availabilities by re-planning the scheduled start and completion dates of individual Job Control Numbers (JCN) to ensure they are accomplished prior to the due dates. Once the actual completion dates are reported, subsequent scheduling for the future periods will retain the same relative time frames based on the periodicity of the requirement. The current PMR Inventories and Schedules provided by SUBMEPP shall be maintained by the parent ISIC.

24.2.3 Periodic Maintenance Requirements Calldown/Brokering. PMRs which are due for accomplishment are called down from the local scheduling systems, and brokered to the FMA. JCNs for PMRs consist of ship's Unit Identification Code (five characters) plus WC (Department/Division + □JC□) (four characters) plus Job Sequence Number (four characters, sequentially assigned, alphanumeric).

24.2.4 Calculating Adjusted Last Maintenance Action Date.

a. TYCOM Availabilities. When a PMR is accomplished during a TYCOM availability (Fleet Maintenance Activity (FMA)/Refit, Voyage Repair, Planning), the adjusted Last Maintenance Action (LMA) date will be the first of the month following actual completion.

b. CNO Availabilities. When a PMR is accomplished during a CNO Availability (Selected Restricted Availability, Interim Drydocking, Extended Refit Period, Depot Modernization Period (DMP) or Engineered Refueling Overhaul), the adjusted LMA date will be the first of the month following the scheduled availability's actual completion date. ISICs operating with the on-site PMR Scheduling System must ensure that Availability Dates are accurately maintained so that completed Automated Work Request (AWR) reported data reflects the adjusted LMA and on-site PMR scheduling records calculate the proper next due date.

24.2.5 Calculating Due Dates. Next Due Dates are calculated based on an Adjusted LMA date. Due dates are calculated, for scheduling purposes, by taking the adjusted LMA date month/year (number) and adding the periodicity months (number) to show the month/year due (i.e., an item with an adjusted LMA date of February 2003 (2/03) with a six month periodicity would be due in August 2003 (8/03). The PMR will be accomplished prior to midnight of the last calendar day of the month due.

24.3 PERIODIC MAINTENANCE REQUIREMENTS ACCOMPLISHMENT. Accomplishment of all PMRs is **mandatory.** Only by accomplishing PMR maintenance on schedule and in accordance with specifications can safe and reliable operation be ensured and the period between CNO Availabilities be extended. Therefore:

a. PMR requirements are to be accomplished on or before the scheduled due date listed in the SUBMEPP TYCOM PMR Scheduling System Inventories and Schedules.

b. PMR requirements which are not accomplished by their scheduled due date will be rescheduled and identified to the TYCOM in accordance with paragraph 24.7.3.j of this chapter.

24.4 MATERIAL SUPPORT FOR FLEET MAINTENANCE ACTIVITY ACCOMPLISHED PERIODIC MAINTENANCE REQUIREMENTS.

24.4.1 Mandatory Parts. Parent FMAs requisition mandatory parts as specified on TRS/MRC/MS documentation for PMRs that are scheduled to be accomplished by that FMA. Material requisitioning is accomplished by the FMA using standard supply procedures. Material is not normally stocked by the FMA and is requisitioned from the nearest stocking point.

24.4.2 Contingency Parts. Contingency parts will not be procured in advance for PMR requirements and will be ordered only upon determination that a contingency part is required based on observed equipment condition. Parent FMAs may have some high usage contingency material available in stock, as identified by the Tender Load List supplements, **(not applicable to SSBN/SSGN 726 Class submarines)** however, low usage contingency material is stocked only at designated stock points or not at all.

24.4.3 Requisitioning Procedures. SEOC PMR material requisitions shall be submitted through normal channels and shall use a Project Code of "732". Appendix 6 of Reference (b) refers. Contingency material requisitions shall be forwarded by message or telephone, and shall include appropriate "work stoppage" indicator/codes. Forward Contingency Material requisitions directly to, Fleet Industrial Support Center San Diego, Pearl Harbor or Submarine Base New London by message or telephone as appropriate; use the phrase "SEOC Requisition" as the subject line on message requisitions.

24.4.4 Material Support Provided by the Advance Equipment Repair Program. Shore based spares are available for replacing some critical equipment, such as seawater system pumps and motors, during CNO Maintenance Availabilities. The Advanced Equipment Repair Program (AERP) is managed by SUBMEPP under the direction of Naval Sea Systems Command (NAVSEA) and both TYCOMs. AERP equipment scheduled for change-out will be specifically authorized in the ship's Availability Work Package (AWP). Although originally intended to support CNO Availabilities, AERP assets, when available, are used to support Casualty Reports (CASREP). In these instances, a CASREP requisition must be submitted to Naval Inventory Control Point and the shipment of equipment is monitored and tracked until the condition "F" off-load has been returned to the refurbishment activity/vendor identified by Naval Inventory Control Point. The expedited return of an AERP off-load is essential to ensure adequate restoration turnaround time is afforded and to minimize AERP impact.

24.4.5 Material Support Provided by the TRIDENT Planned Equipment Replacement Program.

a. TRIDENT Planned Equipment Replacement (TRIPER) is a rotatable pool program for SSBN/SSGN 726 Class submarines. TRIPER equipments are removed from the ship via pre-planned access routes and six-foot diameter Logistics and Escape Trunks, using specifically designed handling attachments and procedures. Removed equipments are replaced with fully interchangeable, tested, ready for issue units which can be rapidly installed and made fully operational within a refit period. Equipment replacement periodicity is determined by maintenance and reliability analysis and engineering judgments intended to preclude equipment failure or significant degradation during operational periods. Removed equipments are refurbished by approved Designated Overhaul Points, tested and returned to ready for issue condition for use on another SSBN/SSGN 726 Class submarine.

b. Safety spares are made available for CASREPs which are considered as unplanned change outs. The TRIPER Program rotatable pool is managed by NAVSEA (PMS 392) and supported by various agencies and activities. Hull, Mechanical, Electrical, Ordnance and Electronics and Command and Control System equipment comprise the TRIPER inventory pool. Items under the cognizance of the Director, Strategic Systems Project Office and the Deputy Commander, NAVSEA Nuclear Power Directorate are excluded.

24.5 CORRECTIVE MAINTENANCE OF EQUIPMENT USING PERIODIC MAINTENANCE REQUIREMENTS. Scheduled restoration of equipment by the FMA or industrial activity is done in accordance with specified Maintenance Standards (IMMP MRC, MS, TRS, Technical Manual, etc.). Whenever corrective maintenance is required on Hull, Mechanical and Electrical equipments, the SUBMEPP combined "I" and "D" Level PMR inventory shall be reviewed by the ISIC and FMA. The ISIC and FMA will determine whether to limit repairs to those described by the ship or to have the Maintenance Standard accomplished. If the corrective maintenance is to include the criteria of the IMMP MRC, MS or TRS, the work request shall be processed in accordance with paragraph 24.7.3 and 24.7.4 of this chapter.

NOTE: IN ORDER TO RECEIVE ACCOMPLISHMENT CREDIT, THE ISIC SHALL ENSURE PROMPT COMPLETION REPORTING OF THE PMR AS DESCRIBED ABOVE. THIS WILL ENSURE THE CORRECT SCHEDULING OF PMRs FOR FUTURE ACCOMPLISHMENT.

NOTE: EQUIPMENT IS CONSIDERED TO HAVE BEEN RESTORED IN ACCORDANCE WITH PMR CRITERIA WHEN THE FOLLOWING SOFTWARE (IMMP MRC, MS, TRS) REQUIREMENTS HAVE BEEN SATISFIED.

(1) THE EQUIPMENT IS RESTORED TO PLAN SPECIFICATIONS.

(2) THE COMPONENTS SATISFACTORILY PASS THE TEST REQUIREMENTS WITHIN THE IMMP MRC/MS/TRS.

(3) ALL MATERIAL LISTED ON THE IMMP MRC/MS/TRS AS MANDATORY HAS BEEN REPLACED.

(4) COMPONENTS AND EQUIPMENT ARE REPLACED WITH SUPPLY SYSTEM, AERP, OR TRIPER ASSETS.

24.6 PERIODIC MAINTENANCE REQUIREMENTS ACCOMPLISHMENT DURING CHIEF OF NAVAL OPERATIONS MAINTENANCE AVAILABILITIES. PMRs to be accomplished by the industrial activity will be included in the SUBMEPP PMR Inventories and Schedules.

a. For SEOC and SSN 21 Class submarines:

(1) The AWP prepared by SUBMEPP will reflect all PMRs authorized for shipyard accomplishment during the CNO Availability period at the AWP Ship Work List Item Number (SWLIN) level. The Work Package Supplement (WPS) accompanying the AWP will identify a specific PMR to the applicable AWP SWLIN paragraph. Appendix E of this chapter provides an example of the WPS format. In addition, the DMP and overhaul AWPs will contain an "I"-Level PMR work package cross-index. This cross-index will enable maintenance planners to readily determine the "I"-Level PMRs accomplished incidental to accomplishing higher "D"-Level PMRs or other industrial activity authorized work. The cross-index will also identify "I"-Level PMRs which will become overdue by availability completion plus six months. These "I"-level PMRs should only be listed in the cross index as a reference and not listed in the body of the AWP. Appendix F of this chapter provides an example of the cross-index format. This ISIC will report any "I"-level PMRs from the cross-index that will not be completed prior to the arrival conference for adjudication.

(2) Upon receipt of Issue Two of a DMP or overhaul AWP the ISIC will review the AWP against the schedules and inventories and add those PMRs not covered by the Work Package (WP) coming due within 6 months after availability completion that aren't assigned to shipyard to an FMAV prior to the CNO period, to a concurrent availability, or to a future availability with TYCOM concurrence.

(3) For I-Level PMRs assigned to the depot, or I-Level PMRs covered by higher level maintenance assigned to the depot, the ISIC will enter "Assigned to <depot name> by AWP <AWP number>" in the Remarks/Completion block of the PMR Schedule/Inventory, Part 2 Section III and in the local scheduling system.

(4) Completions and MCA data for PMRs accomplished by the industrial activity during CNO Availabilities will be retrieved from Advanced Industrial Management in conjunction with Historical Information Tool Kit and or the Technical Information Management module by SUBMEPP. The WPS, or comparable report, annotated by SUBMEPP to show PMR completions and material condition feedback categories, will be retained by SUBMEPP upon completion of the availability. The PMR Schedule/Inventory and local scheduling system will be updated by SUBMEPP.

b. For SSBN/SSGN 726 Class submarines:

(1) The Engineered Overhaul Work Package prepared by SUBMEPP will reflect all PMRs authorized for accomplishment during the CNO Maintenance Availability period at the SWLIN level. For each SWLIN, the specific PMRs will be identified to the applicable component level. The Engineered Overhaul Work Package preparation process ensures all PMRs due prior to the first availability following the subject availability period are included in the Engineered Overhaul Work Package. The preparation process also includes review and inclusion of appropriate items from the ship's Current Ship's Maintenance Project (CSMP), Ship's Force originated deficiencies, and alterations screened for industrial activity accomplishment.

(2) Completions and Material Condition Assessment data for PMRs accomplished by the industrial activity during CNO Availabilities will be reported by the industrial activity, as a function of the Submarine Maintenance Programs Coordinator as established by reference (c), or equivalent. PMR completions and material condition feedback will be returned to SUBMEPP and the parent squadron upon completion of the availability. The PMR inventories and schedules and local scheduling system will be updated by SUBMEPP.

(3) Completions and MCA data for PMRs accomplished by TRIDENT Refit Facility Kings Bay/NAVIMFAC PACNORWEST during CNO availabilities will be called down and reported using their local scheduling system as identified in paragraph 24.2.3 of this chapter.

24.6.1 Operating Cycle/Interval Extension. An audit plan to assess the material condition of a ship prior to extending their operating cycles/intervals beyond IMMP PMR periodicity due to changing CNO Maintenance Availability dates is addressed in reference (d). Procedures and responsibilities are contained in Volume II, Chapter 3 of this manual.

24.7 RESPONSIBILITIES.

24.7.1 Type Commander.

a. The TYCOM is responsible for providing an overall scheduling system for the accomplishment of PMRs for assigned ships.

b. Perform periodic audits of ISICs and FMAs to verify full compliance with the provisions of this chapter.

c. Provide guidance to the ISICs, obtaining NAVSEA concurrence as appropriate, when deviations in scheduling or accomplishment of maintenance or repairs is required.

24.7.2 Submarine Maintenance Engineering Planning and Procurement Activity.

a. Receive reports of the completion of PMRs from industrial activities and extract Maintenance and Material Management (3-M) data from NAVSEA Logistics Center, Mechanicsburg PA of all Forces Afloat accomplished PMRs containing "JC" WC.

b. Review completion reports for any change in material condition status and analyze 3-M data for Material Condition Assessment to determine validity of requirements.

c. Update schedules to reflect new LMA and next due dates.

d. Provide updated PMR inventories and schedules to each ISIC and the SUBMEPP representative at TYCOM. Notify the SUBMEPP Representative at TYCOM and each ISIC when products will not be provided as scheduled.

e. Provide quarterly or more frequent (if requested) MJC and PMR update files to each parent ISIC/FMA and TYCOM.

f. Provide updated combined inventories of "I" and "D"-level PMRs on a quarterly basis or as requested by TYCOM/ISIC.

g. (SEOC ships only) Adjust the due dates for any PMRs that are accomplished within ten months of the major CNO availability start date that will come due again during the availability by the number of months of the availability duration.

h. (SSBN/SSGN 726 Class submarines) Provide Refit Work Package electronic files which reflect PMR scheduling to the NAVIMFAC PACNORWEST at the arrival minus 60 day milestone.

i. Prepare and issue AWPs in support of CNO availabilities.

j. Manage AERP/TRIPER programs.

k. Extract PMR completion verification and documentation for SEOC availabilities from Advanced Industrial Management/Technical Information Management and Historical Information Tool kit. Subsequently annotate WPS.

24.7.3 Immediate Superior In Command.

a. Although the responsibility for the accomplishment of PMRs must rest with the ship's Commanding Officer, the ISIC is responsible for scheduling and ensuring completion of all PMR work within the planned periodicity in the CMP. Normally, PMR work is accomplished by the FMA which maintains the unit's CSMP. However, when submarines are assigned availabilities to other than the parent FMA, and that FMA is authorized by the TYCOM to perform PMRs, an agreement between the parent ISIC and the accomplishing FMA will identify the PMRs to be accomplished and any associated logistics.

b. Calldown all PMRs planned for accomplishment into the CSMP by availability dates. For SSBN/SSGN 726 Class submarines this shall be 45 days prior to refit start. For non-726 Class submarines, 60 days prior to FMAV. This ISIC Maintenance Document Control Officer (MDCO) must be proficient in these procedures to preclude erroneous or duplicate data from entering the CSMP. If the inventories and schedules contain errors/omissions, report the discrepancies to SUBMEPP.

c. Conduct periodic audits of assigned FMAs to verify full compliance with the provisions of this chapter.

d. Maintain auditable records of PMR accomplishment for each submarine. These records will include the current SUBMEPP Quarterly PMR Inventories and Schedules and the last completed AWR for PMRs completed by the parent FMA, whether or not reflected in the SUBMEPP Quarterly PMR Inventories and Schedules.

e. At Naval Intermediate Maintenance Facility Pacific Northwest, PMR and non-controlled URO inspection scheduling, completion, LMA date establishment and next due date scheduling shall be maintained in the automated database of the Logistic Data System, Planned/Refit Maintenance Management System for SSBN/SSGN 726 Class submarines. This database will contain the complete history for all occurrences (past), dates of completion, frequency of occurrence, next due dates and future scheduling data for each PMR/non-controlled URO inspection. Data will be entered from Objective Quality Evidence from refit close out processes and the selected job management report.

f. Notify the SUBMEPP representative at TYCOM of non-receipt of SUBMEPP Quarterly PMR Inventories and Schedules.

g. Contact SUBMEPP if a PMR has been completed prior to receipt of the inventories and schedules with the date the PMR was completed and JCN under which completed. This JCN must be a "JC" series. Instruct MDCO to do the calldown of PMRs for the applicable ship and commence production of AWRs.

h. Keep the local scheduling system correct and accurate. This should be done by periodically doing a check of the data against the inventories and schedules, and the ship's CSMP.

i. Report to the TYCOM, by letter or email, all instances of "I"-level PMR, that have not or will not be accomplished within scheduled periodicity. This report must include the due date, the reason for non-accomplishment, number of times rescheduled and plans for accomplishment.

j. Ensure PMRs which are not accomplished by the SUBMEPP scheduled due date are replanned. A Departure From Specification must be submitted for PMRs which are overdue by two FMAVs/Refits.

k. Ensure that all "I"-level PMRs, which will become due during a scheduled CNO Availability (but not authorized for industrial activity accomplishment), are scheduled for accomplishment by the FMA prior to the end of the availability. The PMRs may be assigned to an FMA concurrent availability with an end date the same as the CNO availability. This will allow for a more appropriate Adjusted LMA Date.

(1) Any "I"-level PMR that is overdue by the availability start date minus 6 months and is identified in the AWP/WPS by SUBMEPP to be accomplished by the industrial activity does not have to be done prior to the availability start. This includes "I"-level PMRs for which the higher tier "D" level PMR is authorized in the AWP/WPs.

(2) Notify the TYCOM representative at the Pre-Arrival Conference of any "I"-level PMRs that will either not be accomplished prior to the availability start date or will become due during the availability.

(3) Any PMR accomplished within ten months prior to start of a scheduled CNO Availability that becomes due again during the availability, will have their scheduled due date adjusted by SUBMEPP by the number of months of the availability duration.

l. Review completed AWRs prior to close-out of the AWRs by Analysis, Records and Reports Section (ARRS) and resolve any discrepancies.

m. Transferring Periodic Maintenance Requirements to other Fleet Maintenance Activities for Accomplishment. When submarine availabilities are accomplished by other than the parent FMA (whether another FMA in the same geographic area or due to deployment), the parent ISIC will take the following action:

(1) Coordinate with the parent FMA to select only those PMRs for accomplishment for which all plans and materials will be available and ready for shipment prior to the availability or deployment of the submarine.

(2) Dispatch a message to the submarine, the recipient squadron and FMA identifying by JCN the PMRs to be accomplished, confirming that plans and materials are being shipped or will be carried by the deploying submarine and that the submarine's total CSMP tape will be either retained by the parent ISIC or transferred to the recipient squadron/Regional Support Group as mutually agreed prior to the availability or deployment.

(a) If the CSMP is retained by the parent ISIC, an AWP tape (MM6031) will be provided to the recipient FMA which will maintain it as "I"-level (only AWR completions for the tended submarine accomplished by the FMA will be passed upline). The submarine will forward all 3-M transactions to the parent ISIC.

(b) If the total CSMP is transferred, the recipient FMA will maintain it as level II (the submarine will pass all 3-M transactions to the availability FMA). In addition, the PMR configuration and scheduling file will be transferred to the recipient FMA for URO/PMR/Calibration scheduling purposes.

(c) When the submarine departs from the tending FMA, the CSMP and PMR data files will be updated and returned to the parent ISIC with the letter of transfer. FMAs receiving only the work package tape will create a CSMP transfer out tape and transmittal letter for return to the parent ISIC. The parent ISIC MDCO will reconcile the master CSMP with the returning submarine's 3-M coordinator.

(3) Ensure that the FMA properly packages by JCN all materials, plans, drawings, etc., for dispatch to the receiving FMA or for custodial turnover to the submarine's Engineer Officer for delivery to the deployed FMA.

(4) Ensure MDCO/ARRS takes coordinated action to provide a correct CSMP tape and letter of transmittal. The parent ISIC MDCO must retain copies of transfer-out and in letters for MJC Job Sequence Number control.

NOTE: ONCE A DEFERRAL HAS INITIALLY BEEN ENTERED IN THE COMPUTER AT THE ORIGINATING FMA, IT IS AUTOMATICALLY PASSED TO THE TYCOM MASTER CSMP. SUBSEQUENT TAPE TRANSFERS BETWEEN FMAs WILL NOT CAUSE THE DEFERRAL TO PASS AGAIN TO THE TYCOM PROVIDING THAT MDCO INPUTS THE TRANSFER TAPE (MM6031) TO MAINTENANCE RESOURCE MANAGEMENT SYSTEM (MRMS) PROGRAM 173 NOT 174.

n. Non-Scheduled Repairs of PMR components. The ISIC must add to the ship's CSMP those PMRs to be accomplished in conjunction with a repair action, in lieu of a repair action, or to be credited subsequent to a repair or replacement action. One of the following actions must be taken by the ISIC and MDCO:

(1) When a ship's submitted deferral references a PMR for concurrent accomplishment with the repair action, or if ISIC or FMA planners recommend a PMR, the ISIC must make the decision whether or not to invoke the PMR in conjunction with or in lieu of the requested repair. This will result in two AWRs being created. The planner will have work accomplished under one JCN (EA01) and use the second JCN (EAJC) for administrative completion crediting of the PMR.

(2) If the repair job has resulted in replacement of the PMR component or if the maintenance standard requirements were completely accomplished prior to retrieving the PMR from the MJC, calldown the item from the local scheduling system. The ISIC should instruct FMA to report it's completion including the added narrative to identify the originally assigned ship's JCN. Though the materials used cannot be re-identified to the PMR JCN, it is recommended that the total manhours expended also be reported on the PMR AWR or subsequent analysis of required PMR support.

o. Training. The parent ISIC is responsible to provide assigned ship's training in the TYCOM PMR Scheduling System. Such training should include an overview of the SEOC Program, PMR scheduling products. MS Library, and PMR program accomplishment and reporting systems. Emphasis should be placed on the ship's responsibilities to the PMR program as identified in paragraph 24.7.5 of this chapter.

24.7.4 Fleet Maintenance Activity.

a. The FMA is responsible for accomplishing all PMR work as scheduled to the required repair standards.

b. Commence the planning and material procurement function when the PMR is called down by the ISIC from the local scheduling system and brokered to the FMA.

c. Progress the job, ensuring that the LWC coordinates with ship superintendent and all Assist WCs and that production time and current status is reflected in the local scheduling system.

d. Complete the job, report its accomplishment and as found material condition feedback code on the AWR. Any significant findings should also be documented on the AWR. FMA LWCs completing AWRs are to ensure that all participating WCs document their manhours and provide action taken codes, that the Final Action Taken (the most appropriate overall action) and Date Completed have been recorded, and that the acceptance signatures from Ship's Force are obtained before returning the completed AWR to ARRS. The material condition feedback codes are described in Appendix B of reference (a) as part of the action taken code, and are as follows:

NOTE: THE BELOW MATERIAL CONDITION FEEDBACK CODES SHALL DESCRIBE THE "AS FOUND" CONDITION OF THE COMPONENTS AND NOT THE AFTER REFURBISHED CONDITION OF THE COMPONENTS.

(1) Code "A" means the material condition of the component being refurbished could have allowed the PMR to be deferred (extend the periodicity).

(2) Code "B" means the material condition of the component being refurbished justified the scheduled PMR.

(3) Code "C" means the material condition of the component being refurbished should have mandated an earlier completion of the PMR (shorten the periodicity).

NOTE: VARIATIONS TO THESE CODES MAY BE DESCRIBED IN INDIVIDUAL PMR MJC NARRATIVES.

e. ARRS will verify that all participating WCs have documented completion of assigned tasks, Ship's Force acceptance signature is on AWR and the final action taken code (2 character) is entered. Prior to close-out of the AWR, ARRS will pass the AWR to the ISIC for review. For MRMS FMA sites, it is essential that ARRS verify that the MRMS Availability file has the proper scheduled completion date and code to identify that it is a scheduled availability. This is done by showing a "Y" in answer to "Is this a CNO Availability" on the appropriate screen.

f. Adjustments of scheduled start and completion dates of the PMR and factual reporting of status codes.

g. Review corrective action request submitted by Ship's Force via an OPNAV 4790/2K to determine if the corrective action is to include the criteria of IMMP MRC, MS or TRS requirements.

h. If the PMR maintenance procedure has a material condition feedback form, fill out the form and submit in accordance with the reporting requirements defined in the procedure.

i. Report to the ISIC when PMRs are met in accordance with paragraph 24.5 of this chapter, due to the expansion of work boundaries.

24.7.5 Submarine Commanding Officer.

a. The ship's Commanding Officer is responsible for the execution of PMR work on the ship.

b. All discovered maintenance deficiencies which affect the equipments and systems covered by the PMR program should be documented to reflect the possible PMR with which the deficiency is associated. This will provide the ISIC with the alternative of simultaneously imposing repairs to the criteria of the specified Maintenance Standard and credit PMR accomplishment.

c. All maintenance deficiencies will reflect in Block 46 (TYCOM SPECIAL PURPOSE), of the OPNAV 4790/2K whether or not quality control and Quality Assurance standards are required.

d. Review Depot Availability Work Packages and provide comments to the TYCOM and SUBMEPP representatives during the work package review.

e. Review the status of PMR maintenance in the SUBMEPP Quarterly PMR inventories and schedules and CSMP reports with parent ISICs prior to upkeep periods in order to assist in planning for accomplishment of required PMR maintenance.

f. All maintenance deficiencies which affect the equipments and systems covered by the PMR program should be documented to reflect the possible PMR with which the deficiency is associated. Review ship's submitted deferrals of corrective maintenance for FMA accomplishment against the PMR inventory and record any applicable Maintenance Standard numbers on the OPNAV 4790/2K. If a component or piece of equipment is listed in the inventory but a Maintenance Standard number is not identified, annotate the OPNAV 4790/2K with "PMR applies".

g. Ensure that the current SUBMEPP Quarterly PMR Inventories and Schedules CD, IMMP MRCs, MRs and TRSs applicable to the ship class are carried on board.

h. Ensure that IMMP MRCs, MSs and TRSs, which provide detailed information and repair guidance are referenced and used during equipment maintenance. Additionally, SUBMEPP PMR inventories provide useful guidance in preparing maintenance documents and planning work (i.e., component identification, Equipment Identification Codes, Allowance Parts Lists, Maintenance Standards, etc.).

i. If Ship's Force accomplishes a repair of a PMR component to an IMMP MRC, MS or TRS, report same to the ISIC Material Officer so that the SUBMEPP Inventory and Schedules may be updated and follow-up reporting action may be initiated.

j. Ensure all completed AWRs for PMRs are signed as accepted by Ship's Force.

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PERIODIC MAINTENANCE REQUIREMENTS
SCHEDULED MPS REQUIREMENTS I-LEVEL

REPORT DATE: 16 Jan 2003
CUTOFF DATE: 01 Oct 2003

SSSU NLON
NSSF NLON 68316

COMPID / HSC	LINE ITEM / RIC	COMP SERIAL	MJC NO / EIC	PROC TYPE	MAINTENANCE INSTRUCTION	STAT	DD	LAST WRK CTR JSN	MCC	LMA DATE	DUE DATE	PER	ALT	REMARKS/COMPLETION INFO JSN	DATE
SYSTEM: 1110 SUPERSTRUCTURE AND FAIRWATER															
DAVIT	001256	P10004	N002WKCC6132	MS	1510-081-006	IS		WKJC1319		Jan 2001	Jul 2003	30M			
1111X1000G	X90613CM001		A600000												
SAFE TRACKS	001259	P10003	N0000WXCN0012	NONE		IS		WXJC1320	X	May 2001	May 2003	24M			
1111X2090B	X90613STRAK		A000000		SUBMEPP HM&E TEST PROCEDURE 111-5387										
SYSTEM: 2070 MAIN STEAM (NON-NUCLEAR)															
GMS8A01	001489	P10267	N0002EMCC6141	MS	2530-081-017	IS		EMJC1969	A	Aug 2002	Aug 2003	12M			
2071X1003A	X90613PIP01		F704000												
SMS8A01	001518	P10266	N0002EMCC6142	MS	2530-081-017	IS		EMJC1970	A	Aug 2002	Aug 2003	12M			
2071X1005A	X90613PIP01		F704000												
SMS8A02	001519	P10265	N0002EMC06142	MS	2530-081-017	IS		EMJC1971	A	Aug 2002	Aug 2003	12M			
2071X1007	X90613PIP01		F704000												
SYSTEM: 2080 FEEDWATER (NON-NUCLEAR)															
GCF8A01	001590	P10344	N0002EMCC6145	MS	2550-081-049	IS		EMJC1972	A	Jul 2002	Jul 2003	12M			
2081X1001C	X90613PIP01		F704000												
SCF8A01	001598	P10343	N0002EMCC6146	MS	2550-081-049	IS		EMJC1973	A	Jul 2002	Jul 2003	12M			
2081X1001E	X90613PIP01		F704000												
SCF8A02	001599	P10342	N0002EMCC6146	MS	2550-081-049	IS		EMJC1974	A	Jul 2002	Jul 2003	12M			
2081X1001G	X90613PIP01		F704000												
SCF8A03	001600	P10341	N0002EMCC6146	MS	2550-081-049	IS		EMJC1975	A	Jul 2002	Jul 2003	12M			
2081X1001J	X90613PIP01		F704000												
SCF8A04	001601	P10340	N0002EMCC6146	MS	2550-081-049	IS		EMJC1976	A	Jul 2002	Jul 2003	12M			
2081X1001L	X90613PIP01		F704000												
SYSTEM: 2090 MAIN SEAWATER															

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PERIODIC MAINTENANCE REQUIREMENTS
I-LEVEL INVENTORY SORTED BY SYSTEM

REPORT DATE: 16 Jan 2003

SSSU NLON
NSSF NLON 68316

COMPID HSC	LINE ITEM RIC	COMP SERIAL	MJC NO EIC	PROC TYPE	MAINTENANCE INSTRUCTION DOC	STAT	DD	LAST WRK CTR JSN	MCC	LMA DATE	DUE DATE	PER	ALT	REMARKS/COMPLETION INFO JSN	DATE
SYSTEM: 1110 SUPERSTRUCTURE AND FAIRWATER															
DAVIT	001256	P10004	N0002WKCC6132	MS	1510-081-006	IS		WKJC1319		Jan 2001	Jul 2003	30M			
1111X1000G	X90613CM001		A600000												
SAFE TRACKS	001259	P10003	N0000WXCN0012	NONE		IS		WXJC1320	X	May 2001	May 2003	24M			
1111X2090B	X90613STRAK		A000000		SUBMEPP HM&E TEST PROCEDURE 111-5387										
SYSTEM: 1310 PRESSURE HULL															
CAT PROT DEV	001262	P10031	N0002EACC7703	MS	6330-081-007	IS	D	EAJC1321		Jan 2001	Jan 2005	48M			
1311X1024A	X90613CAT01		1106000												
PRESERVATION	001279	P10033	N0002WKCC6140	MS	6310-081-015	IS	D	EAJC1322		Jan 2001	Jan 2005	48M/R			
1311X1020A	X90613P0001		UF03000		ATCH 5					R=W46IMA accomplish this job during drydock availability (SRA).					
PRESERVATION	001279	P10033	N0002WKCC6143	MS	6310-081-015	IS	D	EAJC1323		Jan 2001	Jan 2005	48M			
1311X1020A	X90613P0001		UF03000		ATCH 3										
SPHERE MHCOV	001282	P10032	N0002WQCC4238	MS	1200-081-001	IS		WQJC1968	B	Nov 2002	Nov 2005	36M			
1311X1002Z	X90613CM031		A600000												
SYSTEM: 1320 NON-PRESSURE HULL															
BATHTUB AREA	006709	P10003	N0002WKCC6141	MS	6310-081-015	IS		WKJC1324		Jan 2001	Jan 2005	48M			
1321X10B1C	X90613CM216		A000000		ATCH 5										
CAT PROT DEV	005613	P10001	N0002EACC7704	MS	6330-081-007	IS	D	EAJC1458	B	Jan 2001	Jan 2005	48M			
1321X10E1C	X90613CAT01		1106000												
PRESERVATION	001290	P10043	N0002WKCC6146	MS	6310-081-015	IS	D	WKJC1327		Jan 2001	Jan 2005	48M			
1321X0001B	X90613P0001		A000000		ATCH 3										
PRESERVATION	001290	P10043	N0002WKCC6145	MS	6310-081-015	IS	D	WKJC1326		Jan 2001	Jan 2005	48M/R			
1321X0001B	X90613P0001		A000000		ATCH 5					R=W46IMA accomplish this job during drydock availability (SRA)					
SYSTEM: 1780 PLATFORMS, WALKING FLATS AND NON-STRUCTURAL BULKHEADS															

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TOTAL PERIODIC MAINTENANCE REQUIREMENTS INVENTORY
SORTED BY SYSTEM

REPORT DATE: 04 Nov 2002

CSMP LOCATION - SSSU NLON
NSSF NLON 68316

COMPID / HSC	LINE ITEM / RIC	COMP SERIAL	MJC NO	PROC TYPE	MAINTENANCE INSTRUCTION DOC (STATUS)	MC C	LMA DATE	DUE DATE	PER	ALT	DD	UPK01	SRA11	SRA21	DMP01	SRA12	SRA22	EOH01	SRA13	SRA23
SYSTEM: 0611 AUDITS AND CERTIFICATION																				
SOE DOCUMENT	005716	P10001	N0008EXCKS036	URO	036 (IS)	A	Sep 02						o	o	o	o	o	o	o	o
0611X5000B	X90613CM140									R=T34 Complete at the end of each depot availability but not to exceed 48 months.										
VITAL EQUIP	001252	P10001	N0008EXCKS029	URO	029 (IS)	X	Jan 01						o	o	o	o	o	o	o	o
0611X1000A	X90613V0001									R=T34 Complete at the end of each depot availability but not to exceed 48 months.										
SYSTEM: 111 SUPERSTRUCTURE AND FAIRWATAER																				
CAT PROT DEV	001254	P10009	N0002EACC7702	MS	6330-081-007 (IS)	Z	Feb 94				D				D			D		
1111X1050A	X90613CAT01																			
CAT PROT DEV	001254	P10009	N0002WKCC1054	NONE	(IS)	Z	Feb 94				D									
1111X1050A	X90613CAT01				NSTM CHAPT 633 AND NAVSEA DWG 803-921865					R=003 This maintenance requirement will not be scheduled. The associated maintenance standard is available for use.										
COVERS	001255	P10007	N0002WKCC6241	MS	1510-081-004 (IS)	Z	Feb 94													
1111X1000Q	X90613CM004									R=003 This maintenance requirement will not be scheduled. The associated maintenance standard is available for use.										

SRA99: Jan 1980 - Feb 1980 PSA01: Jun 1993 - Dec 1993 SRA11: Feb 1997 - Apr 1997 SRA21: Oct 2000 - Dec 2000 DMP01: Jan 2004- Feb 2005

SRA12: Feb 2009 - Apr 2009

01/23/03

INVENTORY OF MAINTENANCE REQUIREMENTS

FEBRUARY 2003

SSBN/SSGN 726 Class I/D Inventory

Component ID	Itm Ref Name	Fgc	Mrn	Mjfcn	Procedure	Trp	Per	Rml	Due	Maintenance Description
#1 CO FLTR/REG V DR	HOSE,FLEX 5IN	3410210100	393019	B04213410P004	3410-081-015		144	I	10/2005	Replace SSTG lube oil system flexible hoses.
#1 CO FLTR/REG V DR	HOSE,FLEX 5IN	3410210300	393019	B04213410P004	3410-081-015		144	1	10/2005	Replace SSTG lube oil system flexible hoses.
#1 TG AIR CLR DISCH	HOSE,FLEX 3IN	536A140900	393031	B0421536AP038	5360-081-006		144	I	01/2006	Replace engine room fresh water cooling flexible hoses.
#2 CO FLTR/REG V DR	HOSE,FLEX 5 IN	3410210200	393019	B04213410P004	3410-081-015		144	I	09/2008	Replace SSTG lube oil system flexible hoses.
#2 CO FLTR/REG V DR	HOSE,FLEX 5 IN	3410210400	393019	B04213410P004	3410-081-015		144	I	10/2005	Replace SSTG lube oil system flexible hoses.
#2 TG AIR CLR DISCH	HOSE,FLEX 3 IN	536A141100	393031	B0421536AP038	5360-081-006		144	I	10/2005	Replace engine room fresh water cooling flexible hoses.
104/105 STBD	HATCH,ACCESS TY F	1510150900	000A87	B0421PMR2P017	1510-081-005		R	I	00/0000	Inspect non-watertight access hatches and covers for damage and wear. R=Accomplish in conjunction with URO 003 MRNs 000-179 and 184 as applicable.
125# CPRSR DISCH	HOSE,FLEX 1 IN	551B210600	393107	B0421551BP016	5510-081-139		144	I	10/2010	Replace service air system polyester reinforced flexible hoses. (critical)
125# DYHR DISCHARGE	HOSE,FLEX 1IN	551B210500	393107	B0421551BP016	5510-081-139		144	I	09/2008	Replace service air system polyester reinforced flexible hoses. (critical)
12K DISTILLATE PUMP	MOT,AC 2 HP	531A010402	117063	B0421OVHL026B	5310-081-040	T	U	I	00/0000	Overhaul low pressure brine pump and distillate pump motors.
12K DISTILLATE PUMP	MOT,AC 2HP	531A010402	117415	B0421531AP044	5310-081-094		R	I	00/0000	Clean and inspect SD plant distillate pump motor. R=Accomplish every planned/unplanned pump changeout thru 96M. After 96M, overhaul of motor is required.
12K DSTLT	PMP,CNTFGL 10GPM	531A010401	101050	B0421OVHL026A	5310-081-051	T	U	I	00/0000	Overhaul steam distilling plant distillate pump.
12K DSTLT	PMP/MOT ASSY	531A010400	101166	B0421CBM1P026	TIN 026	R	084	I	02/2006	Remove and replace steam distilling plant distillate pump and motor assembly. R=Accomplish based on results of SMMS monitoring.
12K DSTLT	PMP/MOT ASSY	531A010400	101239	B0421OVHL026A		T	084	I	02/1991	Overhaul steam distilling plant distillate pump motor assembly. R=Accomplish based on results of SMMS monitoring.
12K LP BRINE	PMP,CNTFGL 18GPM	531A010301	101048	B0421OVHL027A	5310-081-055	T	U	I	00/0000	Overhaul low pressure brine pump.
12K LP BRINE	PMP/MOT ASSY	531A010300	101174	B0421CBM1P027	TIN 027	R	084	I	04/2008	Remove and replace low pressure brine pump and motor assembly. R=Accomplish based on results of SMMS monitoring.
12K LP BRINE	PMP/MOT ASSY	531A010300	101238	B0421OVHL027A		T	084	I	02/1991	Overhaul low pressure brine pump and motor assembly. R=Accomplish based on results of SMMS monitoring.
12K LP BRINE PUMP	MOT,AC 2HP	531A010302	117063	B0421OVHL027B	5310-081-040	T	U	I	00/0000	Overhaul low pressure brine pump and distillate pump motors.
12K UNIT	UNIT,DISTILLING	531A320100	295002	B0421531AP052	5310-081-061		144	I	03/2007	Overhaul steam distilling unit. NOTE: Overhaul to include requirement for seawater heater, after condenser and distiller condenser.
12K UNIT	UNIT,DISTILLING	531A320100	295013	B0421531AP045	5310-081-100		R	I	00/0000	Acid clean steam distilling unit. R=When dictated by operating parameters.

01/23/03

INVENTORY OF MAINTENANCE REQUIREMENTS

FEBRUARY 2003

SSBN/SSGN 726 Class I/D Inventory

Component ID	Itm Ref Name	Fgc	Mrn	Mjfcn	Procedure	Trp	Per	Rml	Due	Maintenance Description
12K UNIT	COND,DSTLT STEAM	531A320101	295017	B0421531AP013	5310-081-106		R	I	00/0000	Conduct internal visual inspection of sea water side of steam distilling unit heat exchangers. R=Perform based on results of performance test.
1B	SWBD,DC DISTR	320A010100	122099				R	D	00/0000	Inspect DC switchboards. R=Accomplish during any depot availability lasting longer than 6 months. NOTE: Accomplish IAW NAVSEA INST 4730.1.
1S	SWITCHBOARD,DISTR	320C020100	122101				R	D	00/0000	Inspect AFT AC power distribution switchboards. R=Accomplish during any depot availability lasting longer than 6 months. NOTE: Accomplish IAW NAVSEA INST 4730.1.
1SA	SWITCHBOARD,DISTR	320C020200	122100				R	D	00/0000	Inspect AFT AC power distribution switchboards. R=Accomplish during any depot availability lasting longer than 6 months. NOTE: Accomplish IAW NAVSEA INST 4730.1.
1SF	SWBD,CONT & DISTR	320B010100	122012		3240-081-024		180	I	10/2013	Overhaul 400 HZ S.S. switchboard 1SF and circuit breakers.
1SFA	SWITCHBOARD,DISTR	320B010200	122034	B0421320BP001	3240-081-026		180	I	10/2013	Overhaul navigation switchboard (1SFA).
1ST DNSTR (LCTN Q)	PIPE,BEND45(LCTN R)	2580051700	000483	B0421PMR2P023	2580-081-003		120	I	01/2004	Conduct ultrasonic inspection of high pressure steam drain system piping. (Monel portion)
1ST DNSTR (LCTN V)	PIPE,BEND90(LCTN W)	2580052200	000483	B0421PMR2P023	2580-081-003		120	I	01/2004	Conduct ultrasonic inspection of high pressure steam drain system piping. (Monel portion)
1ST DNSTR CORD F13	45DEG LAT (LCTNCL)	5640349000	000787	B04215640P088	5640-081-056		120	I	10/2003	Inspect trim and aft drain system piping.
1ST DNSTR FLG CONN	ELB,90 (LCTN G)	2580050700	000A85	B0421PMR2P027	2580-081-006		036	I	08/2003	Conduct ultrasonic inspection of high pressure steam drain system piping. (Carbon steel portion)

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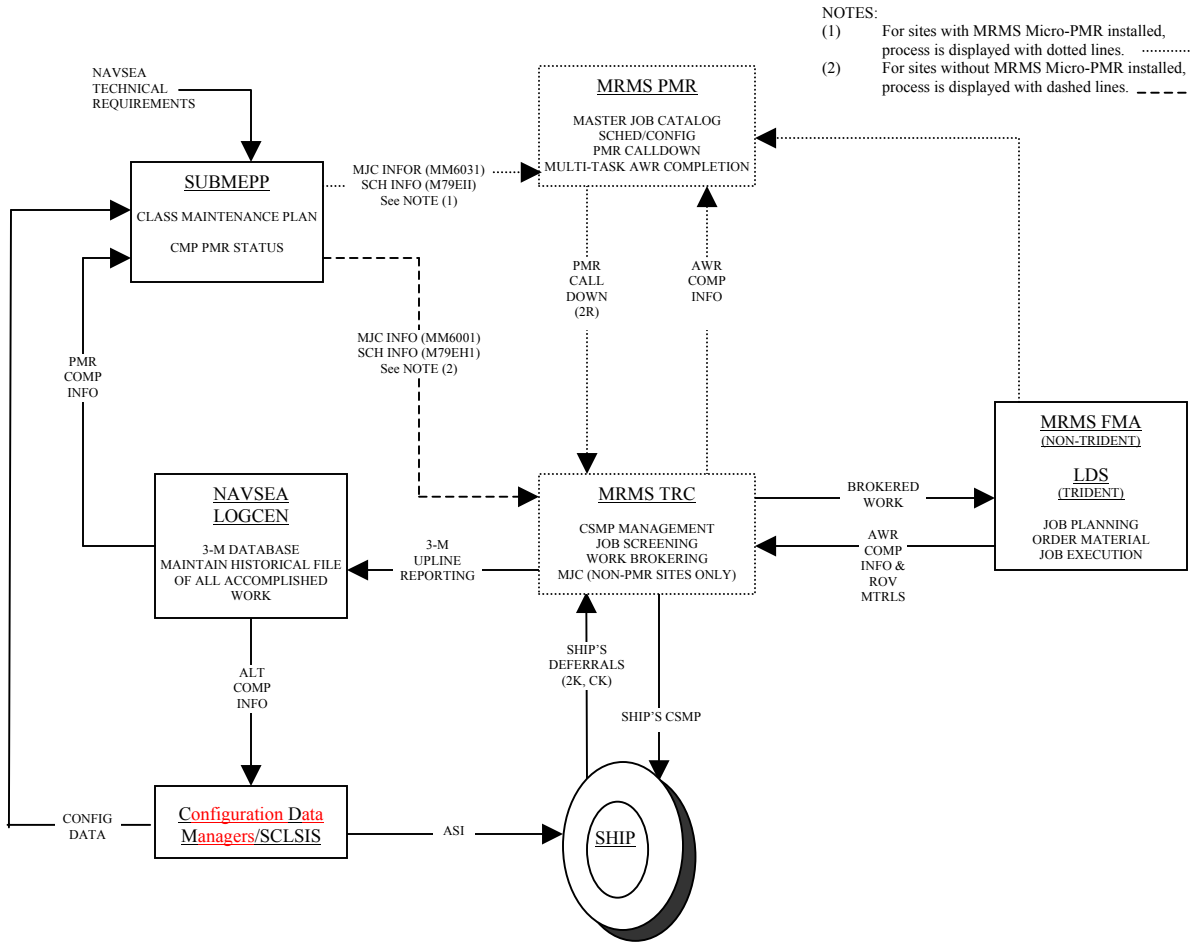
APPENDIX D

SUBMARINE PERIODIC MAINTENANCE REQUIREMENT (PMR) MANAGEMENT PROCESS



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USS (SHIP'S NAME AND HULL NO.) PART 1 – SWLIN 204A01

OWP ISSUE: ISSUE 02

WORK PACKAGE SUPPLEMENT

URO CHANGE NO. 074

SHIPYARD PLANNING & FEEDBACK REPORT

09DEC92

SWLIN 204A01: SNORKEL

WP ALIGN	COMP IDENT	APL/RIC	HSC	COMPONENT DESCRIPTION	SS	DD	PMR NUMBER	MAINTENANCE STANDARD	R/D	CONDITION			REMARKS
DRAIN VALVES													
WP	(CONTINUED)												
WP	WP SECTION	44.0200.2100		MAINT ACTION: RESTORE				LVL: SY					
				APPLIES ONLY TO THOSE VALVES INSPECTED BY URO MRC 008									
	DE-005	884246532	2041X3K888VI	VALVE GLB X AML COMBN 1.50IPS BT	SS	DD	204-C008-01	TRS 4820-086-113		A	B	C	
	DE-007	884245532	2041X3K008VI	VALVE GLB X AML COMBN 1.50IPS BT	SS	DD	204-C008-01	TRS 4820-086-113		A	B	C	
	DE-008	884245532	2041X3K0FVBI	VALVE GLB X AML COMBN 1.50IPS BT	SS	DD	204-C008-01	TRS 4820-086-113		A	B	C	
	TD-032	884305400	2041X5K1TBVE	VALVE B.150IPS 700PSI SWLDG X F	SS		204-S017-01	TRS 4820-086-053		A	B	C	
	TD-033	884305400	2041X5K1VBVE	VALVE B.150IPS 700PSI SWLDG X F	SS		204-S017-01	TRS 4820-086-053		A	B	C	
SNORKEL HEAD VALVE (INCLUDING HEAD VALVE ELECTRODES)													
WP	WP SECTION	44.0300.2100		MAINT ACTION: RESTORE				LVL: SY					
	HEAD VALVE	071070010	A 2041X1K01BJ3	MAST SNKL INO			204-0006-81	TRS 0204-086-021		A	B	C	
TRANSITION PIECE & ACCESS COVER													
WP	WP SECTION	70.0760.1325		MAINT ACTION: INSPECT: REPAIR/REPLACE				LVL: SY					
	TRAN PC/COVER	NONE	2041X1010AXY				204-0026-01	TRS 0204-086-038		A	B	C	

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APPENDIX F

WORK PACKAGE – SHIP'S SYSTEM WORK DESCRIPTION
PART 4.13

USS (SHIP'S NAME AND HULL NO.)
SHIP SYSTEM WORK DESCRIPTION – ISSUE TWO
PART 4.13 FMA SCHEDULE PERIODIC MAINTENANCE REQUIREMENTS

WORK PACKAGE STATUS
(AUTHORIZED BY)

CHG	WPS SWAB GCMA	MA DESCRIPTION WPS COMPID	PER	LMA VIT	DUE DATE	MJC#	SWLIN SECT	ASSN
059	5520 79.0280.2100	RESTORE ACC IND LEAD		JUL85 3		02EECC5309	552A01 79.0280.2100	SY
	REMARKS:	Restoration of contents indicator is required because lead accumulator maintenance is being replaced by AERP in Section 38.0078.2222.						
059	5520 79.0300.2100	RESTORE ACC IND PORT		JUL85 3		02EECC5309	SEE REMARKS	
	REMARKS:	No fixed periodicity. Accomplish only if accumulator maintenance is performed.						
059	5520 79.0300.2100	RESTORE ACC IND STBD		JUL85 3	JUL93	02EECC5309	SEE REMARKS	
	REMARKS:	No fixed periodicity. Accomplish only if accumulator maintenance is performed.						
059	5610 37.0320.U006	URO REQUIREMENT ASW PUMP-1	096	JUL85 1	JUL93	08EMCKC741	561A01 37.0320.U006	SY
	REMARKS:	-						
059	5610 37.0320.U006	URO REQUIREMENT ASW PUMP-2	096	JUL85 1	JUL93	08EMCKC741	561A01 37.0320.U006	SY
	REMARKS:	-						
059	5610 37.0320.U006	URO REQUIREMENT ASW PUMP-3	096	JUL85 1	JUL93	08EMCKC741	561A01 37.0320.U006	SY
	REMARKS:	-						
059	5610 44.0020.U009	URO REQUIREMENT ASW-030	036	JAN91 1	JAN94	08EMCKC918	561A01 44.0020.U009	SY
	REMARKS:	-						
059	5610 44.4285.1300	INSPECT ASW-067	012	OCT90 1	OCT92	07EMCF0004	561A01 44.4285.1300	FMA
	REMARKS:	FMA accomplish prior to ship entering the shipyard for DMP.						

PART 4.13 FMA SCHDULED PERIODIC
MAINTENANCE REQUIREMENTS
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VOLUME VI

CHAPTER 25

UNRESTRICTED OPERATIONS

REFERENCES.

(a) NAVSEA 0924-LP-062-0010 - Submarine Safety (SUBSAFE) Requirements Manual
(b) NAVSEAINST 4790.19 - Submarine Engineered Operating Cycle (SEOC) Program
(c) OPNAVINST 3120.33 - Submarine Extended Operating Cycle (SEOC) Program
(d) COMSUBLANT/COMSUBPAC NOTE C3120 - Submarine Operating Restrictions and Depth Authorization

LISTING OF APPENDICES.

A URO MRC Automated Work Request for Ship's Force Accomplishment
B URO MRC Automated Work Request for FMA Accomplishment
C SUBMEPP URO MRC Inventory
D SUBMEPP URO MRC Schedule
E Request for URO MRC Periodicity Extension Format
F Sample Work Package Supplement

25.1 PURPOSE. This chapter provides guidance and definition for the requirements, responsibilities and actions for continued submarine Unrestricted Operation (URO) to design test depth. The URO Maintenance Requirement Card (MRC) program is invoked on all Submarine Safety (SUBSAFE) certified submarines.

25.2 UNRESTRICTED OPERATION MAINTENANCE SCHEDULING, PLANNING AND REPORTING.

25.2.1 Maintenance Requirements for Continued Unrestricted Operation to Design Test Depth. Reference (a) establishes the Maintenance Requirements and identifies the responsibilities and actions required to support continued unrestricted submarine operations to design test depth. In conjunction with reference (a), Naval Sea Systems Command (NAVSEA) has issued individual manuals containing required, periodic SUBSAFE maintenance actions for each ship/class. The URO MRCs in these publications will identify degradation of the material condition of the hull integrity boundary and of those systems affecting ship's recoverability. The requirements set forth in these publications are, in addition, defect monitoring requirements, established on an individual ship basis, for submarines in which known uncorrected deficiencies exist. SUBSAFE certification indicates that a valid recommendation for URO to design test depth can be made. Maintenance of certification is dependent on both the positive control of all re-entries into the SUBSAFE boundaries per Volume V, Part I, Chapter 5 of this manual, the satisfactory and timely completion of applicable URO MRCs as required by reference (a) and any necessary repairs. Accomplishment of the URO MRCs specified with this program identify changes within the SUBSAFE boundary which result from inadvertent error and/or from degradation caused by the service environment.

25.2.2 Scheduling and Reporting. In order for the Type Commanders (TYCOM) to carry out their responsibilities in the material certification of submarines and to aid in decisions concerning operational restrictions, an auditable system of scheduling the performance and reporting of URO MRCs has been developed. This system provides visibility to problem areas, facilitates verification and provides a permanent record of URO MRC accomplishment in the ship's Maintenance and Material Management (3-M) machinery history maintained at the NAVSEA Logistics Center.

25.2.2.1 Non-SSBN/SSGN 726 Class Ships. Submarine Maintenance Engineering, Planning and Procurement Activity (SUBMEPP) provided Periodic Maintenance Requirement (PMR) inventories and schedules and the 3-M Master Job Catalog (MJC) Programs are used for scheduling and reporting. The scheduled URO MRC requirements added to the Current Ship's Maintenance Project (CSMP) from the local scheduling system and the Automated Work Requests (AWR) produced contain unique Job Control Numbers (JCN) with Work Centers (WCs) ending in "JC" (e.g., EAJC, EMJC, etc.). Appendices A and B of this chapter show a URO AWR for Ship's Force and Fleet Maintenance Activity (FMA) accomplishment respectively. Appendices C and D of this chapter show examples of the SUBMEPP URO MRC inventories and schedules respectively.

25.2.2.2 SSBN/SSGN 726 Class Ships. SUBMEPP provided URO MRC inventories, schedules, Master Job File, as well as the Refit Work Planning System, are used for scheduling and reporting. The scheduled URO MRC requirements added to the CSMP from the local scheduling system and the AWRs produced contain unique JCNs with WCs ending in "JC" (e.g., EAJC, EMJC, etc.). Appendices A and B of this chapter show a URO MRC AWR for Ship's Force and FMA accomplishment respectively. Appendices C and D of this chapter show examples of the SUBMEPP URO inventories and schedules respectively.

25.2.2.3 Submarine Maintenance Engineering Planning and Procurement Activity Inventories and Schedules. The SUBMEPP inventories and schedules are provided quarterly. The SUBMEPP schedules reflect all URO MRC requirements coming due within the next 12 months. A description of the data elements used in the inventories and schedules is provided with each issue.

25.2.3 Baseline and Due Dates. The baseline date for determining URO MRC due dates is the Last Maintenance Action (LMA) date. LMA dates for new requirements will be based on the Change Issue Date of the URO MRC invoking the new requirement unless otherwise directed from NAVSEA. Due dates are calculated based on LMA dates in accordance with paragraph 25.2.3.2 of this chapter. It is recognized that upkeep and docking schedules for ships which are well into the operating cycle may not permit full compliance with the scheduled due dates. In such cases, a Departure From Specification (DFS) for the URO MRC will be addressed on a case-by-case basis as specified in Volume V, Part I, Chapter 8 of this manual. LMA dates and URO MRC due dates are determined as follows:

25.2.3.1 Last Maintenance Action Date. For new construction ships, all URO MRCs have an initial LMA date established at delivery from new construction or from Post Shakedown Availability to start the operating cycle in accordance with the applicable URO MRC manual. During the operating period between commissioning and start of Post Shakedown Availability and during the operating cycle following Post Shakedown Availability, an adjusted LMA, as discussed below, is used for URO MRCs. Calculate the adjusted LMA date as follows:

a. If the PMR is accomplished during a period other than a scheduled Chief of Naval Operations (CNO) Availability (e.g., voyage repair periods, at sea, port calls, FMA Availability, refit, upkeep, Technical Availability, etc.) the adjusted LMA date will be the first of the month following the PMRs completion date.

b. If the PMR is accomplished during a scheduled CNO Availability (e.g., Selected Restricted Availability, Extended Refit Period, Depot Modernization Period, Engineered Refueling Overhaul, Interim Dry Docking and other CNO Availabilities), the adjusted LMA date will be the first of the month following the scheduled availability's actual completion date.

NOTE: IMMEDIATE SUPERIORS IN COMMAND (ISIC) OPERATING WITH THE ON-SITE PMR SCHEDULING SYSTEM MUST ENSURE THAT AVAILABILITY DATES ARE ACCURATELY MAINTAINED SO THAT COMPLETED AWR UPLINE REPORTED DATA REFLECTS THE ADJUSTED LMA DATE AND ON-SITE PMR SCHEDULING RECORDS CALCULATE THE PROPER NEXT DUE DATE.

25.2.3.2 Calculating Due Dates. Next due dates are calculated based on an adjusted LMA date. Due dates are calculated, for scheduling purposes, by taking the adjusted LMA date month (number) and adding the periodicity months (number) to show the month due (i.e., an item with an adjusted LMA date of February 2003 (2/03) with a six month periodicity would be due in August 2003 (8/03)). The PMR will be accomplished prior to midnight of the last calendar day of the month due.

25.2.4 Periodicity Extensions. When determining the due date for URO MRC inspections 001, 004, and 005 for an individual submarine, inactive time (defined as the number of days pierside plus the number of days in dry-dock) may be excluded from the time elapsed since the last inspection. When determining the due date for URO MRC 002, 003 (certain portions) and 035, only the time in dry-dock may be excluded from the elapsed time. The ship's deck log, engineering log or the ship's coolant discharge log will be used to determine the number of days pierside or the number of days in drydock. Ship's Force will perform this review and provide the applicable dry-dock and/or inactive time via official correspondence to the ISIC. Extensions of periodicity from the next due date identified in the SUBMEPP PMR inventory for these URO MRCs can be authorized by the TYCOM without further NAVSEA approval. However, they are not automatic and such requests shall be submitted by letter, in the format of Appendix E of this chapter, to SUBMEPP via the TYCOM. Upon receipt of TYCOM authorization, SUBMEPP will reflect the periodicity extension and the revised due date in the next issue of the ship's PMR inventories and schedules.

25.2.5 Scheduling, Planning and Reporting Unrestricted Operation Accomplishment at Ship/Fleet Maintenance Activity Level.

25.2.5.1 Scheduling. The TYCOM PMR Scheduling System Inventories and Schedules is distributed by SUBMEPP to the appropriate ISIC every quarter. Except at NAVIMFAC PACNORWEST, along with this PMR CD, electronic update files are provided to keep the local scheduling systems up to date with the Class Maintenance Plan (CMP). A copy of each CD is to be provided to each applicable ship by the ISIC. As a minimum, ISICs will schedule applicable URO MRCs 45 days (SSBN/SSGN 726 Class submarines) or 60 days (non-SSBN/SSGN 726 Class submarines), as applicable prior to Refit Fleet Maintenance Activity Availability. Those URO MRC AWRs requiring work packages or other planning are forwarded to the FMA Planning Section. In the case of operational type URO MRCs, the AWRs are sent to Ship's Force Lead Work Center (LWC) 991.

25.2.5.2 Planning. FMA Planners will requisition materials, obtain plans and drawings, prepare Formal Work Procedures and/or Controlled Work Packages and coordinate the scheduling with the Ship Superintendent, Production Officer and ISIC Material Office. Then the job will be turned over to the production WC for accomplishment. For Ship's Force accomplishment of URO MRCs, the ISIC will provide an AWR to the ship. The Maintenance Document Control Office (MDCO) will adjust the scheduled start and completion date within the local scheduling system.

25.2.5.3 Reporting to the Maintenance and Material Management (3M) System. Each URO MRC AWR contains specific instructions on reporting the completed action and on use of a special feedback code to identify the material condition or that a change in inspection frequency is required. In order to ensure URO MRCs are correctly accomplished and reported to SUBMEPP, the following actions are to be taken prior to closeout of the AWR by Analysis, Records and Reports Section (ARRS):

a. Submarines completing URO MRC AWRs are to fill-in the AWR with action taken codes and suffix of A, B, or C for material condition assessment, if applicable. Ship will sign for completion, ISIC will sign for acceptance. Include a narrative statement, if required, and return the original AWR to the ISIC. The ISIC will review the AWR and forward to ARRS to close out the computer AWR and update SUBMEPP inventories and schedules. Note that because of the Auto-Close features, the completed AWR will automatically close the deferral in the CSMP.

b. FMA LWCs completing URO MRC AWRs must ensure that all assist WCs have completed their work. The LWC then completes the AWR by filling in action taken codes, signing for completion and obtains acceptance signature from Ship's Force. The AWR is then returned to ARRS. The ARRS will verify that all participating WCs have documented completion of their assigned tasks and then pass the AWR to the ISIC for review and updating of SUBMEPP inventories and schedules prior to close-out of the AWR by ARRS.

25.2.6 Unrestricted Operation Maintenance Requirement Card Accomplishment During Chief of Naval Operations Maintenance Availabilities.

a. The Availability Work Package (AWP) prepared by SUBMEPP will reflect all URO MRCs authorized for accomplishment during the availability at the AWP Ship Work List Item Number (SWLIN) level. The Work Package Supplement (WPS), accompanying the AWP, will identify a specific URO MRC requirement to the applicable AWP SWLIN paragraph. Appendix F of this chapter provides an example of the WPS format.

b. For URO MRCs assigned to the depot, the ISIC will enter "Assigned to <depot name> by AWP <AWP number>" in the Remarks/Completion block of the URO MRC Schedule/Inventory and in the local scheduling system.

c. URO MRC completions by an industrial activity during CNO Availabilities will be, for non-SSBN/SSGN 726 Class submarines, retrieved from AIM (shipyard information system) by SUBMEPP. For SSBN/SSGN 726 Class submarines, completions will be reported by the industrial activity as a function of the Submarine Maintenance Program Coordinator as established by reference (b). The WPS, annotated by the Submarine Maintenance Program Coordinator to show URO PMR completions and material condition feedback categories, will be returned to SUBMEPP and forwarded to parent ISIC upon completion of the availability. The ISIC will verify that all URO MRCs assigned to the shipyard were reported and subsequently updated by SUBMEPP.

25.2.7 Unrestricted Operation Maintenance Requirement Card Completion Reporting.

a. Within 30 days after the completion of an availability the activity accomplishing the URO MRC is required to provide a report of accomplishment to SUBMEPP and the ship's ISIC as well as other technical codes as designated in the URO MRC. Specific information to be included in the report is identified in the applicable URO MRC. The accomplishing activity shall retain a legible copy of the most current inspection report until the ship is disposed of or stricken from the Naval Register.

b. Prior to Fast Cruise for CNO Availabilities, the industrial activity is required to provide the ship and ISIC with a letter of certification (including final inspection categories A, B, or C when applicable) that certifies all required inspections have been satisfactorily completed. For items which must be accomplished in dry-dock, the industrial activity is required to provide such certification prior to undocking.

c. Upon identifying a material condition that would result in a reduced inspection periodicity if not restored to Category A condition during the availability in which the condition was found, a special report is required to be submitted by the accomplishing activity in accordance with the applicable URO MRC and, if applicable, the AWP. This special report shall be provided immediately to NAVSEA (SEA 07), TYCOM, ISIC, and SUBMEPP indicating:

(1) Applicable MRC.

(2) Equipment component identification.

(3) Inspection category.

(4) The reduced or deferred periodicity of each equipment component that should be inspected at less than its normal periodicity. This reduced periodicity report requirement is in addition to the completion reporting requirements of paragraphs 25.2.7.a and b above.

25.2.8 Operating Cycle/Interval Extensions. An Audit Plan to assess the material condition of ships prior to extending their operating cycle/intervals beyond URO MRC periodicities due to changing CNO Availability dates or operational schedules, is addressed in reference (c). Additional guidance and responsibilities are contained in Volume II, Chapter 3 of this manual.

25.3 RESPONSIBILITIES.

25.3.1 Type Commander.

a. Perform periodic audits of the ISICs and FMAs to verify full compliance with the provisions of reference (a), Volume V, Part I, Chapter 9 of this manual and this chapter.

b. Provide guidance to the ISICs, obtaining NAVSEA concurrence as necessary, when deviations in the scheduling or accomplishment of maintenance or repairs are required by a DFS request and resolution per Volume V, Part I, Chapter 8 or this manual.

25.3.2 Submarine Maintenance Engineering, Planning and Procurement Activity.

a. Receive reports of completion of URO MRCs from all completing activities.

b. Review completion reports for compliance with the scheduled periodicity requirements and any change in the status category.

c. Establish an LMA date per paragraph 25.2.3.1 of this chapter.

d. Revise the periodicity and next due dates in ship URO MRC inventories and schedules to reflect any NAVSEA approved periodicity change, TYCOM approved periodicity extensions for URO MRCs 001 through 005, and 035 as allowed for in paragraph 25.2.4 of this chapter and NAVSEA approval of Major DFSs for extending URO MRC requirements.

e. Notify the TYCOM via the on-site SUBMEPP Representative of any URO MRC beyond periodicity for TYCOM resolution.

f. Provide updated:

(1) URO MRC inventories and schedules CD in accordance with the distribution.

(2) For SSBN/SSGN 726 Class ships, provide Refit Work Package electronic files which reflect URO MRC scheduling to the Trident Refit Facility at the arrival minus 60 day milestone.

(3) For those ISICs using Micro-PMR, provide scheduling and configuration files to process in the local scheduling system and FMA database quarterly.

(4) Provide MJC update files which reflect URO MRC changes to the ISIC/TYCOM at least quarterly or upon request.

g. Provide, as enclosures to the quarterly inventories and schedules forwarding letter, a list of URO MRCs that appear overdue in the schedules and a list of URO MRCs that have been reported complete by the fleet but Objective Quality Evidence has not been received by SUBMEPP.

h. Receive and review URO MRC Objective Quality Evidence for technical accuracy and maintain URO MRC completion history.

25.3.3 Immediate Superior In Command.

a. Maintain auditable records of URO MRC accomplishment for each submarine. These records will include the current SUBMEPP Quarterly inventories and schedules, completed AWRs for URO MRCs completed, data report forms/reports submitted as a result of last accomplishment and all approved DFS.

b. Conduct periodic audits of assigned FMAs and units to verify full compliance with the provisions of reference (a), Volume V, Part I, Chapter 9 of this manual and this chapter.

c. In addition to the records of audits, maintain a file, by ship, of the current URO MRC inventories and schedules as provided by SUBMEPP. The schedules (Appendix D of this chapter) for each ship shall be annotated with the Job Sequence Number (JSN), the new adjusted LMA date and the next due dates for the completions and any periodicity extensions authorized.

d. Although the responsibility for the accomplishment of URO MRCs must rest with the ship's Commanding Officer, the nature and scope of the URO MRCs dictate that the ISIC coordinate the accomplishment of URO MRCs in accordance with the SUBMEPP provided PMR inventories and schedules. Accordingly, the ISIC shall assist in the preparation of, and approve each submarine's URO MRC performance schedule. In addition, the ISIC shall:

(1) Unless previously notified by SUBMEPP of delays, notify the SUBMEPP Representative at TYCOM of the non-receipt of schedules and reports.

(2) Upon receipt from SUBMEPP, review each ship's quarterly URO MRC inventory and schedule against the schedule information on the individual URO MRC to verify URO MRC scheduling/periodicity is accurate and that any rescheduling data which has been submitted to SUBMEPP has been accurately incorporated. PMRs accomplished during the month preceding the quarterly report may or may not be reflected in the issue received. Similarly, upon receipt of URO MRC changes, audit the individual URO MRC procedural and schedule information against each ship's PMR inventory and schedule to verify that the component/equipment and periodicity has not changed and that provided changes do not impact current schedules. Resolve identified deficiencies through the SUBMEPP Representative at TYCOM.

(3) Review the enclosures to the PMR procedural inventories and the schedule forwarding letter and advise SUBMEPP of the completion dates and JSNs for URO MRCs listed. Forward copies of completed Data Report Forms for these and any other URO MRC completions identified by SUBMEPP as having missing Data Report Forms.

e. Control input of the SUBMEPP scheduling file (M79EII) to the local scheduling system and resultant calldowns to the CSMP, which will produce the JCN and products for job completion.

f. Ensure that all URO MRC requirements with the appropriate screening (Ship's Force, FMA) are in the CSMP for subsequent development by SUBMEPP of forthcoming CNO Availability AWPs.

g. In the event that deviations from required periodicities or full requirements of the URO MRCs are required, request approval from the TYCOM by submitting a DFS request in accordance with Volume V, Part I, Chapter 8 of this manual. Such DFS requests will be a Major DFS for URO MRC program deviations. DFS requests are also to be submitted when repairs arising from the URO MRC inspections cannot be completely accomplished. Periodicity extension requests for URO MRC 001, 002, 003, 004, 005 and 035 shall be submitted in accordance with paragraph 25.2.4 of this chapter.

h. Establish procedures to affect routing of completed AWRs from the FMA ARRS or from the submarine (LWC 991) through the ISIC for all URO MRC transactions. The ISIC should ensure proper documentation has been completed as described in the special reporting procedures of the AWR. This must include the material condition feedback code as part of the final action, if required. A rejection series code (6A-6I) should not be accepted unless the FMA Repair Officer cannot accomplish the URO MRC at that site. Delays in accomplishment are to be reported as status changes so that the job remains in the production system and is visible as a "to-be-done" requirement. If the URO MRC requirement cannot be accomplished at the site, the ISIC must ensure update (re-screening) of the CSMP concurrently with DFS notification, if necessary. Each processed AWR is to be validated with the PMR Special Report described in the Maintenance Resource Management System section of Volume II, Chapter 2 of this manual and, if satisfactory, passed to the Automated Data Processing Center for computer input. Upon receipt of the report of maintenance action accomplishment from an assigned unit or the FMA, review the report for completeness, consistency, acceptability of conditions and material trends. Where unsatisfactory conditions are found, direct repairs. Where repairs cannot be made, submit a DFS in accordance with Volume V, Part I, Chapter 8 of this manual. Ensure SUBMEPP inventories and schedules are updated in accordance with paragraph 25.3.3(c) of this chapter. Clear URO MRC major DFS upon TYCOM or NAVSEA approval and upon receipt of the SUBMEPP Quarterly PMR inventories and schedules, and ensure they accurately reflect the new due date of the URO MRC as stated in the approved DFS.

i. Upon identifying a material condition that would result in a reduced inspection periodicity, ensure the accomplishing activity immediately reports the condition found via faxed letter to NAVSEA (SEA 07), the TYCOM and SUBMEPP in accordance with paragraph 25.2.7.c of this chapter.

j. Monitor the timely submission of URO MRC data report forms and the report of accomplishment for URO MRCs completed by the FMA and Ship's Force to ensure required documentation is submitted in accordance with paragraph 25.2.7 of this chapter. Ensure data report forms are submitted to report component replacement/repair/operation out of specification. Review all Ship's Force accomplished URO MRC data for compliance with the requirements of the URO MRC Program prior to submittal to SUBMEPP.

k. Prior to a ship's underway period, review the ship's certification continuity report, if submitted, to ensure the ISIC and ship's records (including the CSMP) accurately reflect URO MRC status.

l. The Parent ISIC of deploying ships will:

(1) Ensure that any URO MRC due for accomplishment by the ship during its deployment period is identified in the CSMP transfer file and that the ship possesses the AWRs and URO MRC data report forms (if applicable) for reporting job completion.

(2) Provide a message to the applicable deployed FMA/Squadron identifying any URO MRC expected to be accomplished by the deployed FMA and the status of required materials for each submarine deploying to cover the period of the deployment.

m. Deployed Squadrons will review the URO MRC status of deployed submarines upon in-chop. Perform the function of the Parent ISIC in ensuring all URO MRCs are accomplished and reported within the required periodicity while the submarine is deployed.

NOTE: THIS IN NO WAY RELIEVES THE PARENT ISIC OF THE RESPONSIBILITY TO ENSURE THAT THE REQUIRED URO MRCs ARE ACCOMPLISHED WITHIN THE SPECIFIED PERIODICITIES.

n. Prior to the start of a CNO availability, ISIC URO coordinators will:

(1) Assign JCNs to URO MRC items assigned to Forces Afloat in the AWP and screen them to an availability prior to the start of the CNO availability or to the concurrent availability in accordance with the directions in the AWP. Forces Afloat items are accomplished by Ship's Force or Performance Monitoring Team. Care must be taken to appropriately assign URO MRC items to the correct accomplishing activity.

(2) ISIC URO coordinators will not assign JCNs to URO MRC items assigned to the shipyard in the AWP. In the URO MRC inventories and schedules, in the remarks/completion information area, enter "assigned to (name of shipyard) by AWP (name and number of availability)". The shipyard is responsible for performing, auditing and reporting all URO MRC items assigned by the AWP.

(3) URO MRCs assigned to Forces Afloat by the AWP for accomplishment prior to the start of the depot period, but for some reason were not completed, will be reassigned to a concurrent availability or formally reassigned to the shipyard via a supplemental work request.

o. During a CNO availability, URO MRCs assigned to the shipyard by the AWP which are not accomplished during the depot period will be placed on the guarantee list or reassigned to a fleet availability by the TYCOM following the depot period provided the URO MRC does not exceed its due date. The ISIC will be notified of this reassignment by formal correspondence which will include justification and reason why the scheduled and planned requirements were not met.

p. Prior to CNO availability completion, ISICs will audit URO MRCs assigned to Forces Afloat by the AWP and ensure all have been satisfactorily completed and documented within the required periodicity. The ISIC audit will also verify that all URO MRC items coming due within six months of availability completion are complete or assigned to a follow-on fleet availability. Under no circumstances are URO MRC due dates to be exceeded. ISIC Quality Assurance Officers will not be responsible for auditing URO MRCs assigned to the depot in the AWP.

q. Following CNO availability completion, the ISIC URO coordinator will ensure that all URO MRCs assigned to the shipyard were reported and subsequently updated by SUBMEPP. ISICs will only upline the closed JCNs for URO MRCs completed by Forces Afloat.

25.3.4 Submarine Commanding Officer.

a. Ensure all URO MRCs are accomplished within the required periodicity as specified by reference (a), Volume V, Part I, Chapter 5 of this manual and this chapter.

b. Maintain auditable records of the accomplishment of URO MRCs to permit verification of compliance with reference (a), Volume V, Part I, Chapter 10 of this manual and this chapter. These records shall consist of:

(1) A copy of the TYCOM and NAVSEA SUBSAFE Material Certification message from new construction, Depot Modernization Period or overhaul until the ship's current status is reflected in reference (d). When the ship's current status is reflected in reference (d) the messages may be destroyed and the current notice will be retained.

(2) Copies of letter of completion for all URO MRC work accomplishment by other activities.

(3) Copies of letters of completion and inspection reports for work accomplished by Ship's Force. The required report forms are located at the end of the individual URO MRCs. A copy of each completed report shall be submitted to the ISIC for review a minimum of 24 hours prior to underway.

(4) One copy each of the current Quarterly URO MRC inventories and schedules as printed from the CD provided by SUBMEPP via the ISIC. Annotate the URO MRC Inventory Report when accepting completed work requests from the FMA or Ship's Force (LWC 991). It is the ship's responsibility for ensuring that the reports reflect the actual configuration, especially with regards to the equipment identity and the Allowance Parts List.

(5) Copy of outstanding URO MRC AWRs to be accomplished by Ship's Force.

(6) One copy of each approved DFS from the requirements of reference (a), Volume V, Part I, Chapter 8 of this manual and this chapter. This authority is based on the following factors and considerations:

(a) The completion of all URO MRCs, or portions thereof, will be reported on AWRs provided by the ISIC in accordance with paragraph 25.2.5.3 of this chapter. Particular care must be exercised to ensure that existing conditions found at the time of inspection and/or need for repair or replacement of components is recorded in detail as prescribed by the URO MRC.

(b) Deviations from URO MRC requirements or periodicities may result in operational restrictions being placed on a unit. In order to determine whether such restrictions are necessary, the TYCOM must be fully apprised of the number and extent of deviations involved.

(c) Allow no deviations in the scheduling or accomplishment of required URO MRC maintenance actions unless formal NAVSEA approval of such deviations has been granted by an approved DFS or as allowed in paragraph 25.2.4 of this chapter. All system disassembles, repairs, and reassemblies must be conducted in accordance with Volume V of this manual, including requests for a DFS, if necessary.

(d) Except in an emergency, refrain from submerged operations if all required URO MRC maintenance actions have not been completed within the specified periodicities unless formal authorization to deviate from these requirements has been granted by NAVSEA. NAVSEA recommendation and TYCOM authority to conduct URO MRC to design test depth are contingent upon the satisfactory completion of these maintenance actions.

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APPENDIX A

URO MRC AUTOMATED WORK REQUEST FOR SHIP'S FORCE ACCOMPLISHMENT

```
IER622                                  *** AUTOMATED WORK REQUEST ***                    03 DEC 92 (92338)
OPNAV 4790/2R/Q DEFERRAL                                                          AVAIL: P106 (01JAN93-31MAR93)
**********************SECTION I. IDENTIFICATION*************************
1. UIC: 05152          2. OWC: EAJC          3. JSN:  3171        4. APL: 520175132          AILSN: 5520
A. NAME: FINBACK          5. EQUIP: ACCUMULATOR-HYD          13. IDENT: ACCUM MNA FC
B. HULL: SSN 670          14. EIC: TV01          16. LOCATION:          15. SAFE: NO
6. WHEN DISC: 0      7. EQ STAT: 0      8. CAUSE: 0      9. DEF REA: 6      10. :      11. :      12. :
18. CAT SHIP ALT # RN      PC      F$          19. PI      20. INSURV #   21. SUF   22. MDG   23. SAF   24. P/F
18A. MJC: N0008EAEACKS026
**********************SECTION II. DEFERRAL ACTION**********************
26. DEF DATE: 23 NOV 92  27. OMA MHR REM: AUTO  28. DEALN DATE: 31 JAN 93  9. DEF REA: 6
**********************SECTION III COMPLETED ACTION*********************
29. A/T: _____                    30. OMA MHR EXP: 0000          31. DATE COMP:
SELECT EQUIPMENT                  32. AMT: _________      33. TI: 0 34. METER READING:
**********************SECTION IV. REMARKS/DESCRIPTION******************
35. REMARKS:     CHECK HYD SYS FLOOD CONTROL ACCUMULATORS IAW URO MRC 026 XXX
                 LAST COMPLETED 90001  NEXT DUE DATE 93001
                 MDCO PASS TO SHIP'S FORCE. S/F COMPLY WITH URO 026, COMPLETE
                 BLOCKS 102-104 AND RETURN THIS AWR TO MDCO FOR ADP PROCESS.
                 CONSULT THE TYCOM PMR SCHEDULING SYSTEM FOR SHIP OR COMPONENT
                 SPECIFIC INFO SUCH AS "DD", SPECIAL REQ-MTS, PERIODICITY
                 OR LEVEL OF ACCOMPLISHMENT.
37. CSMP SUMMARY: ACCOMPLISH URO MRC 026
38. 1ST CON:                              39. 2ND CON:
41. PRI: 2          42. T/A: 2          43. INT PRI:   44. IUC SCRN: 2      45. TYC SCRN:
46. SPECIAL PURPOSE:     A-     B-     C-     D-     E-     F-     G-     H-     I-     J-     K-     L-
E. CO _____                                F. TYCOM
**********************SECTION V. SUPPLEMENTARY INFORMATION***************
48. REP TM: MRC URO MRC 026          ON BRD: NO
49. PREARV:
50. PLNRMK: MRC URO MRC 026
          *** COMPLETE INSPECTION FINDINGS AND FORWARD IAW URO 026 ***
50A. IUCRMK:
50B. TYCRMK:
50C. IMARMK:
***************************SECTION VI. PLANNING**************************
51. PMR: URO MRC 026    52. PER: 000      53. ISS: 7512       54. SPEC DATA: HP JC008638
QLV:  55. QA S/S: YES      NUC L1:          1NUC WPR:      SP CLN:      SPECID:      RADCON:
                 L1:    NON DT:          SAE DIV:       SP TST:      NOISE:       OTHCON:
56. SR K E: 0091      SP INT: YES          D/D REQ:       PREOVH:      AFTOVH:      DEPART:
K.E.: UROS DUE                            K.E. DATE:                  NORMALLY DONE BY:
*********SECTION VII. REPAIR ACTIVITY PLANNING/SCHEDULING ACTION********
57. L/A RWC  58. SKD STRT 59. SKD COMP  60. PMHR 61. K/O  62. TASK
       L 991  01 JAN 93     30 JAN 93      008          001

93. RAUIC: 05851 L Y SPEAR        94. WK RTN #: _____        99. JOB ORDER NO:
95. EST M/D: _____                96. EST M/D $: _____       97. EST MATL $:
98. EST TOT $: _____    100. LEAD P&E: _____ 101. DATE OF ESTIMATE: 23 NOV 92
102. FAT: _____           103. ACT MHRS EXP: _____104. DATE COMP: _____
G. COMPLETED: _____                       H. ACCEPTED BY:
******************************SECTION VIII. SUPPLY DATA*****************
PRI                DOC NUM            NIIN/PART#            DESC              QTY   STATUS
```

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APPENDIX B

URO MRC AUTOMATED WORK REQUEST FOR FMA ACCOMPLISHMENT

```
IER622                                  *** AUTOMATED WORK REQUEST ***                    03 DEC 92 (92338)
OPNAV 4790/2R/Q DEFERRAL                                                    AVAIL: A015* (04JAN93-07FEB93)
**********************SECTION I. IDENTIFICATION*************************
1. UIC: 05152          2. OWC: EMJC       3. JSN: 3170       4. APL: 884305120          AILSN: 2090
A. NAME: FINBACK            5. EQUIP: VALVE B 3.00 IPS     13. IDENT: MSW-108
B. HULL: SSN 670     14. EIC: FB08          16. LOCATION:        15. SAFE: NO
6. WHEN DISC: 0        7. EQ STAT: 0      8. CAUSE: 0        9. DEF REA:          6      10.  :     11.  :      12.  :
18. CAT SHIP ALT #RN          PC     F$     19. PI       20. INSURV #     21. SUF     22. MDG  23. SAF 24. P/F
18A. MJC: N0008EMCKC918
**********************SECTION II. DEFERRAL ACTION***********************
26. DEF DATE: 23 NOV 92 27. OMA MHR REM: AUTO 28. DEADLN DATE:       9. DEF REA: 6
**********************SECTION III COMPLETED ACTION************************
29. A/T: _______________          30. OMA MHR EXP: 0000                    31. DATE COMP: ___________
SELECT EQUIPMENT            32. AMT: ___                33.       TI: 0       34. METER READING: _______
**********************SECTION IV. REMARKS/DESCRIPTION*******************
35. REMARKS:      INSPECT BALL VALVE STEM IAW URO MRC 009
                  LAST COMPLETED 90001                    NEXT DUE DATE 93001
                  CONSULT THE TYCOM PMR SCHEDULING SYSTEM FOR SHIP OR
                  COMPONENT SPECIFIC INFO SUCH AS "DD", SPECIAL REQ-MTS,
                  PERIODICTY, OR LEVEL OF ACCOMPLISHMENT
37. CSMP SUMMARY: ACCOMPLISH URO MRC 009
38. 1ST CON:            LPO                          39. 2ND CON:
41. PRI: 2            42. T/A: 2            43. INT PRI:    44. IUC SCRN: 2    45. TYC SCRN:
46. SPECIAL PURPOSE:    A-     B-     C-     D-     E-     F-     G-     H-     I-     J-     K-     L-
E. CO _____                          F. TYCOM
**********************SECTION V. SUPPLEMENTARY INFORMATION***************
48. REP TM: MRC URO MRC 009                ON BRD: NO
49. PREARV: *** COMP INSP FINDINGS AND FORWARD IAW URO/LID MRC 009 ***
50. PLNRMK:
            THIS DEPOT JOB IS ASSIGNED TO IMA BY TYCOM
            *** REPORT INSPECTION FINDINGS AND FORWARD IAW URO 009 ***
50A. IUCRMK:
50B. TYCRMK:
50C. IMARMK:
**************************SECTION VI. PLANNING*************************
51. PMR: URO MRC 009 52. PER: 000      53. ISS: 7302      54. SPEC DATA: HP1JC006547
QLV:    55. QA  S/S: YES          NUC L1:          NUC WPR:       SP CLN:          SPECID:        RADCON:
                L1:               NON DT:          SAE DIV:       SP TST:          NOISE:         OTHCON:
56. SR K E: 0091          SP INT: YES     D/D REQ:      PREOVH:          AFTOVH:        DEPART:
K.E.: UROS DUE                             K.E. DATE:                     NORMALLY DONE BY: 1 DEP
**********SECTION VII. REPAIR ACTIVITY PLANNING/SCHEDULING ACTION********
57. L/A RWC     58. SKD STRT   59. SKD COMP  60. PMHR        61. K/O    62. TASK
        L 10C           04 JAN 93        18 JAN 93        0002                    001            PACKAGE
        A 38A   04 JAN 93        18 JAN 93                0027                    001            INSP
        A 93A   04 JAN 93        18 JAN 93                0008                    001            INSP
        A 93B   04 JAN 93        18 JAN 93                0002                    001            QA
93. RAUIC: 05851 L Y SPEAR          94. WK RTN #: _____                99. JOB ORDER NO: _____
95. EST M/D: _____          96. EST M/D $: _____          97. EST MATL $: _____
98. EST TOT $: _____             100. LEAD P&E: _____          101. DATE OF ESTIMATE: 23 NOV 92
102. FAT: _____                  103. ACT MHRS EXP: _____          104. DATE COMP: _____
G. COMPLETED: _____                                  H. ACCEPTED BY: _____
*****************************SECTION VIII. SUPPLY DATA*****************
PRI                     DOC NUM                NIIN/PART#                DESC      QTY       STATUS
```

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PERIODIC MAINTENANCE REQUIREMENTS
INVENTORY URO/HIP SORTED BY SYSTEM

URO CHANGE NO: 119 Mar 2003

REPORT DATE: 10 APRIL 2003

SSSU NLON
NSSF NLON 68316

COMPID / HSC	LINE ITEM / RIC	COMP SERIAL / EIC	R MJC NO	M PROC TYPE	MAINTENANCE INSTRUCTION DOC	STAT	M L	D D	LAST WRK CTR JSN	C C	LMA DATE	DUE DATE	PER	ALT	REMARKS/COMPLETION INFO JSN	DATE
SYSTEM: 0611 AUDITS AND CERTIFICATION																
SOE DOCUMENT	005716	P10001	N0008EXCKS036	URO	036	IS	O		EXJC1967A		Sep 2002	Sep 2006	48M/R			
0611X5000B	X90613CM140		UE0000						R=T34 Complete at the end of each depot availability but not to exceed 48 months.							
VITAL EQUIP	001252	P10001	N0008EXCKS029	URO	029	IS	O			X	Jan 2001	Jan 2005	48M/R			
0611X1000A	X90613V0001		IC03000						R=T34 Complete at the end of each depot availability but not to exceed 48 months.							
SYSTEM: 1110 SUPERSTRUCTURE AND FAIRWATER																
FAIRWATER	001257	P1005	N0007WKCKC920	URO	003	IS	D	D			Feb 1994	Feb 2004	120M			
1111X1000J	X90613V0001		A600000													
SYSTEM: 1310 PRESSURE HULL																
ASW1/2	007333	P10035	N0007WKCKC920	URO	003	IS	D	D		X	Jan 2001	Jan 2007	72M			
1311XAB11C	X90613CM027		1108000													
ASW29/30 INS	007334	P10034	N0007WKCKC920	URO	003	IS	D	D		X	Jan 2001	Jan 2007	72M			
1311XAB12C	X90613CM027		1108000													
ASW80/81	007335	P10033	N0007WKCKC920	URO	003	IS	D	D		X	Jan 2001	Jan 2007	72M			
1311XAA73C	X90613CM027		1108000													
CD 35 INSR	007336	P10031	N0007WKCKC920	URO	003	IS	D	D		X	Jan 2001	Jan 2007	72M			
1311XA781C	X90613CM027		1108000													
CD 4 INSR	007337	P10032	N0007WKCKC920	URO	003	IS	D	D		X	Jan 2001	Jan 2007	72M			
1311XA711C	X90613CM027		1108000													
CD 1/2 INSR	007338	P10029	N0007WKCKC920	URO	003	IS	D	D		X	Jan 2001	Jan 2007	72M			
1311X8980C	X90613CM027		1108000													

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URO CHANGE NO: 119 Mar 2003

PERIODIC MAINTENANCE REQUIREMENTS
INVENTORY URO/HIP SORTED BY SYSTEM

REPORT DATE: 10 APRIL 2003
CUTOFF DATE: 01 OCT 2003

SSSU NLON
NSSF NLON 68316

COMPID / HSC	LINE ITEM / RIC	COMP SERIAL / EIC	R MJC NO	M PROC TYPE	MAINTENANCE INSTRUCTION DOC	STAT	M L	D D	LAST WRK CTR JSN	C C	LMA DATE	DUE DATE	PER	ALT	REMARKS/COMPLETION INFO JSN	DATE
SYSTEM: 5182 STEERING AND DIVING (STRUCTURAL, MECHANICAL, AND ELECTRICAL CONTROL)																
LKG STDIV DR	003361	P12140	N0008EACKS016	URO	016	IS	O/		EAJC1962A		Sep 2002	Sep 2003	9M/R	12M		
5182X1811B	X90613CM100		TL06000						R=260 Complete at the end of each depot availability but not to exceed 9 months from the last accomplishment							
SYSTEM: 5400 NORMAL AND EMERGENCY BALLAST TANK BLOW (TITLE FOR 688 CLASS IS EMBT BLOW)																
RISE BLOW	003813	P12548	N0008EACKS022	URO	022	IS	O		EAJC1963	X	Jan 2002	Jan 2003	12M			
5401X0101A	X90613BL001		TF01000													
STATBLOW LOC	003814	P12546	N0008EACKS022	URO	022	IS	O		EAJC1963	X	Jan 2002	Jan 2003	12M			
5401X0105A	X90613BL001		TF01000						R=260 Complete at the end of each depot availability but not to exceed 12 months from the last accomplishment.							
STATBLOW REM	003815	P12547	N0008EACKS022	URO	022	IS	O		EAJC1965	X	Jan 2001	Jan 2007	72M			
1311XAB11C	X90613CM027		1108000						R=260 Complete at the end of each depot availability but not to exceed 12 months from the last accomplishment.							
SYSTEM: 5520 MAIN AND VITAL HYDRAULIC (TITLE FOR 688 CLASS IS SHIP'S SERVICE HYDRAULICS)																
HULL CLOSURE	004440	P13205	N0008EACKS025	URO	025	IS	O		EAJC2188	X	Jan 2002	Jun 2003	72M			
1311XAB12C	X90613CM027		1108000						R=261 Complete at the end of each depot availability but not to exceed 7 months from the last accomplishment.							

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APPENDIX E

REQUEST FOR URO MRC PERIODICITY EXTENSION FORMAT

4790
Ser

From: Commander, Submarine Squadron
To: Commanding Officer, Submarine Maintenance Engineering, Planning and Procurement (SUBMEPP) Activity
Via: Commander Submarine Force, (Atlantic/Pacific Fleet)

Subj: REQUEST FOR EXTENSION OF PERIODICITY FOR URO MRC(S) _____ ON USS (Ship's Name and Hull No.)

Ref: (a) Applicable URO MRC
(b) COMFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual, Volume VI, Chapter 25
(c) COMSUB(LANT/PAC) ltr 4790 Ser ___of (previous letter granting extension of periodicity)

1. In accordance with references (a) and (b), request extension of URO MRC periodicity for USS (Ship's Name and Hull No.) to coincide with Selected Restricted Availability/Overhaul/Depot Modernization Period/Interim Dry-Docking as follows:

URO MRC	Equipment Guide List Item Number or Component Ident	LMA Date	Current Due Date	Inactive Time		Extension Required	Required Next Due Date
				Pierside Days *	Drydock Days		
001	All	June **82**	Apr **91**	200 days	100 days	7 months	Nov 91
002	All	June **82**	Aug **91**	N/A	100 days	3 months	Nov 91
003	4.b	June **82**	Aug **91**	N/A	100 days	3 months	Nov 91
004	INT Welds	June **84**	Apr **91**	200 days	100 days	7 months	Nov 91
005	INT Welds	June **84**	Apr **91**	200 days	100 days	7 months	Nov 91
035	All	June **84**	Aug **91**	N/A	100 days	3 months	Nov 91

* Credit for pierside days is awarded for days the ship is tied to the pier, no credit is given if the ship is underway anytime during the day.

2. Inactive time identified for the URO MRCs listed in paragraph 1 above is the actual allowable time accrued to date since URO MRC was last accomplished/previous extension of periodicity was granted by reference (c).

Copy to:
COMNAVSEASYSCOM (SEA 07) (080)
Commanding Officer, USS (Ship's Name and Hull No.)

SAMPLE

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APPENDIX F

SAMPLE WORK PACKAGE SUPPLEMENT

OWP ISSUE: PROPOSED
URO CHANGE NO. 076
SWLIN 131A01: PRESSURE HULL

USS JACKSONVILLE (SSN 699) SRA 1-2
WORK PACKAGE SUPPLEMENT
SHIPYARD PLANNING & FEEDBACK REPORT

PART 1 - SWLIN 131A01
220CT92

WP ALIGN REMARKS	COMP IDENT	APL/RIC	HSC	COMPONENT DESCRIPTION	SS DD PMR NUMBER	MAINTENANCE STANDARD	R/D CONDITION
SURVEILLANCE OF ITEM NO. 12 HULL WELDS							
WP	WP SECTION: 27.0136.U001			MAINT ACTION: PERFORM NDT SURVEILLANCE INSPECTION OF SELECTED HULL WELDS (URO MRC 001)		LVL: SY LOWEST LVL: I	
	ITEM-12 NONE				SS DD URO-001	URO MRC 001	A B C _____
EXTERNAL FRAME HULL WELD DISCONTINUITIES							
WP	WP SECTION: 27.0144.U005			MAINT ACTION: PERFORM ULTRASONIC MONITORING INSPECTION OF HULL WELDS WITH KNOWN DISCONTINUITIES (URO MRC 005)		LVL: SY LOWEST LVL: I	
	EXT WELDS NONE				SS DD URO-005	URO MRC 005	A B C _____
PRESSURE HULL (VISIBLE FROM DRYDOCK)							
WP	WP SECTION: 27.0165.U003			MAINT ACTION: CONDUCT HULL STRUCTURAL SURVEY (URO MRC 003)		LVL: SY LOWEST LVL: I	
	P/H VIS DD NONE			EGL ITEM 13A	SS DD URO-003	URO MRC 003	A B C _____
TAPPED HOLES FOR DRY DOCK CONNECTIONS & STRAINER PLATES							
WP	WP SECTION: 27.0305.1302			MAINT ACTION: INSPECT; REPAIR		LVL: SY LOWEST LVL: D	
	TAPPED HOLES NONE				131-0006-01	TRS 7650-086-001 SECT 4.2	A B C _____
SYSTEM ZINCS							
WP	WP SECTION: 74.0020.1303			MAINT ACTION: INSPECT; REPLACE		LVL: IMA LOWEST LVL:	
	ZINCS NONE				DD 131-0095-02	MRC 087-0021-02	A B C _____

SWLIN 131A01
PART 1 PAGE - 1

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VOLUME VI

CHAPTER 26

OPERATING DEPTH POLICY

REFERENCES.

(a) NAVSEA S9086-DA-STM-000 - NSTM Chapter 100 (Hull Structures)
(b) COMNAVSUBFOR OPORD 2000
(c) NAVSEAINST C9094.2 - Submarine Valve Operation Requirements for Builders and Post Overhaul Sea Trial Test Dives

26.1 PURPOSE. To provide Type Commander (TYCOM) policy with respect to the maximum allowable operating depths during trials, evolutions to be performed at the various depths, and the prescribed maximum water depth applicable in each case.

26.1.1 Background. Some deep diving submarines are limited to depths less than designed test depth pending accomplishment of certain hull and system modifications prescribed by Naval Sea Systems Command (NAVSEA) as necessary to permit certification to design test depth. As these modifications are accomplished during the availability, the integrity of the ships will be certified and they will be permitted to operate down to their design test depth either periodically or without restriction.

a. The sequence of events leading to authorization for operations at the maximum operating depth during post industrial availability or new construction trials for SUBSAFE ships is as follows:

(1) Upon completion of the authorized industrial facility work, NAVSEA reviews the scope, degree and manner of accomplishment and recommends to the TYCOM that the submarine be authorized to test hull strength and integrity at an appropriate maximum keel depth during trials. This depth may be the designed test depth or a lesser depth.

(2) Based on this recommendation the TYCOM will normally authorize operation to the NAVSEA recommended keel depth by message to the ship, information to the applicable Immediate Superior In Command (ISIC), Supervising Authority/Industrial Activity (as applicable), NAVSEA, Fleet Commander and Chief of Naval Operations.

b. In every instance where the maximum authorized operating depth is exceeded, a report shall be made in accordance with reference (a). In addition to those addressees listed in reference (a), an information copy shall be provided to the applicable TYCOM and ISIC.

26.2 INITIAL TIGHTNESS DIVE. The initial tightness dive following an industrial availability or new construction will be conducted in accordance with carefully planned procedures.

a. The initial tightness dive will be an especially deliberate, planned, step-by-step evolution using conservative angles and moderate speed, or slower, in accordance with the approved Sea Trial Agenda. Caution is required not only because the material condition of the ship is untested at any depth following major industrial facility work, but also because of the crew's lack of recent submerged operational experience. Reference (b) applies.

b. The maximum water depth allowable during the initial tightness dive will be 400 feet as specified by reference (b). The approved Sea Trial Agenda and reference (c) describe those events to be conducted during the initial tightness dive and provide the requirements of the initial tightness dive. The approved Sea Trial Agenda also describes those events immediately following the initial tightness dive. The maximum operating keel depth will be 200 feet.

26.3 DEEP DIVE/CONTROLLED DIVE. After demonstrating satisfactory hull strength and integrity during the initial tightness dive, the requirement exists to test the hull at submerged depths down to the maximum operating depth. The first approach to these depths subsequent to the repair of major hull or sea connected systems work will be made in accordance with the following paragraphs.

26.3.1 Depth Limitations. The Deep Dive/Controlled Dive shall be made to the maximum operating depth in water specifically designated for such trials and under specific water depth restrictions in accordance with reference (b), and as promulgated in the appropriate TYCOM/ISIC Operation Order.

26.3.2 Conduct of Deep Dives/Controlled Dives. Deep Dive/Controlled Dive depth changes should be conducted in no greater than 200 foot increments when above one-half the maximum operating depth and in no greater than 100 foot increments when below one-half the maximum operating keel depth. Moderate speeds (within the limits of the submerged operating envelope) and angles must be used. Trim must be continually adjusted to provide neutral buoyancy.

26.3.3 Deep Submergence Bill. The Deep Submergence Bill shall be in effect with systems in the maximum secure condition and all unnecessary sea connected systems isolated. The main ballast tank blow system shall be lined up with all banks within 200 psi of full pressure. Cycling of the rudder and planes through full travel should be limited to the maximum authorized operating depth minus 100 feet at a moderate speed.

26.3.4 Valve Operation. Seawater system valve operations during post industrial availability and new construction Sea Trials will be in accordance with reference (c).

VOLUME VI

CHAPTER 27

SCHEDULED PRESERVATION UPKEEP COORDINATED EFFORT

REFERENCES.

(a) NAVSEA S9510-AB-ATM-010 - Nuclear Powered Submarine Atmosphere Control Manual, Volume 1
(b) NAVSEA S9510-AB-ATM-020/(C) - Nuclear Powered Submarine Atmosphere Control Manual, Volume 2
(c) NAVSEA S9086-VD-STM-010/020/030 - NSTM Chapter 631 Volumes 1, 2 and 3 (Preservation of Ships In-Service)
(d) OPNAVINST 5100.19 - Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat
(e) SOBT Video SVT-GT-9336 - Submarine Preservation

LISTING OF APPENDICES.

A SPRUCE Key Event Schedule
B SPRUCE Report Form
C SPRUCE Check List

27.1 PURPOSE. The Scheduled Preservation Upkeep Coordinated Effort (SPRUCE) program has been established to ensure internal preservation is maintained at the highest possible level throughout the life of the ship. As a result of increased intervals between submarine Chief of Naval Operations Maintenance Availabilities, effective SPRUCE upkeeps are of prime importance. SSBN/SSGN 726 Class submarines are exempt from SPRUCE upkeeps. Under special circumstances, requests for SPRUCE upkeeps on SSBN/SSGN 726 Class submarines will be considered and shall be conducted in accordance with this chapter.

27.2 SCHEDULING.

a. Immediate Superiors In Command (ISIC) shall schedule a three week SPRUCE below decks every 48 months. The SPRUCE shall contain a 14 day production period which will not be scheduled to commence sooner than two days following an underway period. Per references (a) and (b), underway periods shall not be scheduled within five days of completion of the production period. In summary:

Ship returns to port	0 days
Preparation period	2 days
Production period	14 days
Gas off period	5 days
TOTAL	21 days

b. ISICs shall schedule a one week SPRUCE for the sail interior every 24 months. Sail SPRUCEs can be coincidental with routine availabilities.

c. A SPRUCE shall not be scheduled during other Ship's Force or Fleet Maintenance Activity (FMA) upkeeps with the exception of the five day gas off period which may be scheduled during a follow-on upkeep. A SPRUCE should not be scheduled within the six month period prior to a Chief of Naval Operations Maintenance Availability. A SPRUCE should not be scheduled within six months after a Depot Modernization Period (DMP), ERO, or EOH because of the industrial activity's preservation programs.

d. The initial base date for scheduling is the official completion date of the ship's last DMP, ERO, or EOH.

27.3 RESPONSIBILITIES.

27.3.1 Type Commander.

a. Administer the SPRUCE program.

b. Maintain a file of SPRUCE lessons learned and distribute to ensure that all commands concerned have the latest information available.

27.3.2 Immediate Superior In Command.

a. Schedule and coordinate SPRUCE upkeeps per the Key Event Schedule of Appendix A of this chapter.

b. Coordinate submarine crew training.

c. Monitor the effectiveness of the SPRUCE program.

d. Chair a SPRUCE debrief with Ship's Force and FMA to review the effectiveness of the SPRUCE and generate lessons learned. The results of this meeting will be included in the Ship's SPRUCE completion letter.

27.3.3 Fleet Maintenance Activity.

a. Provide training, tools, consumables, services, and required support personnel.

b. Provide technical guidance consisting of around the clock coverage by a coatings inspector trained to the requirements of reference (c). The coatings inspector will perform all inspections necessary to ensure proper preservation is accomplished and will complete Appendix B of this chapter for each area preserved. All completed forms from Appendix B of this chapter will be submitted to the ship for inclusion into their SPRUCE completion letter.

27.3.4 Submarine Commanding Officer.

a. Ensure preservation is performed by Ship's Force using the procedures contained in references (c) through (e).

b. Ensure Ship's Force personnel are relieved of all requirements other than those necessary to maintain the safety and security of the ship during the SPRUCE.

c. Designate an officer or Chief Petty Officer (CPO) to serve as the SPRUCE Manager.

d. Ensure the ship is divided into preservation zones. Each zone will have an officer or CPO in charge during the SPRUCE. Conduct a thorough preservation inspection of each zone, assisted by an FMA coatings inspector (if possible) at least 90 days prior to the start of the SPRUCE to determine and prioritize the preservation to be accomplished. Appendix C of this chapter shall be reviewed as part of this inspection.

e. Submit completion letter to the Type Commander (TYCOM) via the chain of command. This letter shall report results of the SPRUCE, problems encountered, lessons learned, and shall contain completed forms from Appendix C of this chapter.

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APPENDIX A

SPRUCE KEY EVENT SCHEDULE

1. The ISIC is responsible for ensuring adherence to the following schedule to assure the effective planning of a SPRUCE upkeep. The ISIC will act for the ship to complete items should an underway period preclude timely accomplishment. The ISIC will alert the ship's Commanding Officer and the TYCOM in the event that any of the following time frames will be exceeded.

DAY	ACTION
-90	ISIC ensure SPRUCE is on the ship's operating schedule. Schedule the SPRUCE with the FMA. Notify TYCOM (N3/N4) of planned SPRUCE dates.
-90	Commanding Officer assign SPRUCE manager and zone supervisors. Ship/FMA Conduct preservation inspection.
-90	Commanding Officer submit OPNAV 4790 2K/2L requests for powder coating services. Ships shall make effective use of these services to enhance the effectiveness of preservation for components located in hostile environments.
-90	ISIC/Commanding Officer arrange for respiratory protection physicals, initial respiratory training for the ship's Hospital Corpsman, and respirator fit-checks for crew by FMA Occupational Safety and Health personnel. The crew shall be trained in respirator use by the ship's Hospital Corpsman.
-90	ISIC/Commanding Officer make plans for crew technical training.
-30	Commanding Officer establish painting "Tiger Team" and ensure adequate number of personnel are assigned to accomplish the upkeep commensurate with ship checks. The Tiger Team should include personnel not necessary to maintain the safety and security of the ship. Promulgate a SPRUCE watchbill.
-30	Commanding Officer review and conduct training with assigned personnel and Work Center Supervisors. Establish a General Military Training program incorporating requirements of references (c), (d), and (e) and the ship's paint schedule. Provide the SPRUCE Plan of Action and Milestone to the ISIC for review.

2. Conduct a 21 Day SPRUCE as follows:

DAY	ACTION
-2	Tiger team make preparations for SPRUCE.
1-2	Ship's Force preparations for SPRUCE.
3-16	Ship's Force execute SPRUCE preservation work.

DAY	ACTION
16	ISIC, Commanding Officer, FMA conduct SPRUCE debrief. Commanding Officer submit SPRUCE completion letter.
21	Ship's first available underway date.

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APPENDIX B

SPRUCE REPORT FORM

SPRUCE REPORT FORM 4790.3 INSPECTOR

Ambient Conditions	Location Fr#	Date	Time	Date	Time	Date	Time
Air Temperature							
Wet Bulb Temperature							
Relative Humidity							
Surface Temperature							
Dew Point							
Hours Left Uncoated (Bare Metal)							

Coat #	Paint Manufacturer's Name and Description	Batch Number	Application Method	Time Allowed to Cure	DFT Before this coat	WFT Measurements	Min	Max	DFT Measurements	Min	Max

Coat #	Mixing			Holidays	Defects/Comments

Surface Preparation

Pre-Inspection Comments

Defects Corrected

Pre-Cleaning Method

Comments

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APPENDIX C

SPRUCE CHECK LIST

1. Has a Navy Occupational Safety and Health/Environmental Protection Agency representative been onboard to ensure compliance with occupational health and environmental regulations?

2. Is the ship aware of all required training (Hazardous Material, Respirator, Technical)?

3. Assess level of effort required to accomplish SPRUCE. Assess type/quantity of tools and paint required. FMA informed for planning purposes.

4. FMA coatings inspector review SPRUCE report form (Appendix A of this chapter) of this chapter requirements with the ship. Discuss why, how, and when these inspections are required.

5. Does the ship have a copy of Submarine On Board Training Video SVT-GT-9336 (Submarine Preservation)?

6. Does the ship hold the most recent revisions to NSTM Chapter 631 (Preservation of Ships In-Service)?

7. Is the ship aware of the appropriate uses of powder coatings?

8. Does the ship hold the most recent "lessons learned" distribution from the TYCOM?

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VOLUME VI

CHAPTER 28

CABLEWAY ASSESSMENT

REFERENCES.

(a) NAVSEAINST 9304.1 - Shipboard Electrical Cable and Cableway Inspection and Reporting Procedures
(b) DOD-STD-2003 - Military, Standard, Electric Plant Installation Standard Methods for Surface Ships and Submarines

LISTING OF APPENDICES.

A Sample Cableway Assessment Message

28.1 PURPOSE. The Cableway Assessment Program is a comprehensive inspection of shipboard electrical cables, conducted by Fleet Maintenance Activity (FMA) cableway assessment teams. The requirements for cableway assessments are contained in reference (a), which defines the training requirements, assessment criteria, and reporting procedures relevant to the assessments.

28.2 HAZARD CATEGORIES. The surface ship electrical cable and cableway assessment program is designed to identify and correct cable/cableway safety hazards in a prioritized, orderly manner, consistent with ship and personnel safety. The three categories of deficiencies are defined as follows:

a. Category I - IMMEDIATE HAZARD: Deficiencies which are, or have the immediate potential to be, personnel safety hazards, electrical fire hazards, or which negate firebreak integrity.

b. Category II - POTENTIAL HAZARD: Deficiencies which require corrective action to ensure continued reliable safe performance or to maintain watertight integrity, but are not an immediate danger to personnel or equipment.

c. Category III - NON-HAZARDOUS: Deficiencies which are not hazardous to personnel or equipment but are not in compliance with approved standard installation practices.

28.3 DEFICIENCY CORRECTION. The intent of this program is to ensure that deficiencies classified as Category I are corrected immediately. Deficiencies classified as Category II should be scheduled for repair during the ship's next regularly scheduled industrial availability as work priority permits. Category III deficiencies should be corrected whenever such repairs can be accomplished in conjunction with other scheduled repairs or alterations involving the cables or cableway in which the deficiencies exist.

28.4 ASSESSMENT SCHEDULING.

28.4.1 Initial Assessment. Initial cable/cableway assessments are conducted on each ship to establish a baseline configuration to ensure compliance with reference (b).

28.4.2 Follow-up Assessments. Follow-up assessments shall be conducted within 12 months prior to an industrial availability of greater than six weeks scheduled duration. The purpose of this assessment is to validate the integrity of ship's cableways, identify discrepancies that require depot or commercial level work effort, and to train responsible Ship's Force personnel to meet requirements of paragraph 28.6.5 of this chapter. Both the initial and follow-up assessments will be comprehensive, complete ship assessments.

28.4.3 Partial Assessments. Following availabilities which modify shipboard cableways, ships may request partial assessments to validate the quality of the modified or newly installed cableways.

28.5 CABLEWAY ASSESSMENT/ASSIST TEAM COMPOSITION AND PROCEDURES.

a. FMA Electrical Cableway Assessment shops ideally consist of 12 FMA personnel. The recommended shop manning is six certified personnel and six personnel in training. Certified personnel must have satisfactorily completed a cableway assessment/repair training course and satisfactorily demonstrated their practical knowledge based on enclosure (1) of reference (a). Personnel in training may assist in cableway assessments after satisfactorily completing classroom training modules per reference (a) and satisfactorily demonstrating their practical knowledge to an FMA appointed certifying assessors. Assessors should be E5 or above, with shipboard experience, and from the following source ratings: AE, EM, ET, EW, FC, FT, GM, GSE, IC, IT, STG, and STS.

b. For assessment/assist visit purposes, the FMAs should establish sub-teams of one certified assessor, one trainee, and one Ship's Force member. Assign as many sub-teams as necessary to assess the entire ship. The assessed ship will assign a minimum of one Ship's Force person per FMA sub-team from the above source ratings, for the purpose of training, and to assist in shipboard assessment and repairs. Each FMA will assign one HT (qualified welder) to assist during shipboard cableway repairs.

c. In addition to technical training, all team members shall be trained to administer Cardio-Pulmonary Resuscitation.

d. Upon completing the assessment of the entire ship, assessment teams will assist in the correction of cableway deficiencies as time and schedules permit. Repair efforts will concentrate on removal of dead-ended cables, correction of watertight integrity items, and Category I discrepancies.

28.6 RESPONSIBILITIES.

28.6.1 Immediate Superior In Command. Ensure assigned ships are scheduled to receive required cableway assessments and training.

28.6.2 Regional Support Group. Schedule assigned ships for cableway assessments/assist visits and coordinate the training effort of Ship's Force personnel by the FMA.

28.6.3 Fleet Maintenance Activity.

a. Establish the following to support the Electrical Cableway program:

(1) Electrical Cableway Assessment and Repair Teams for the accomplishment of scheduled cableway assessments.

(2) Training program to support FMA training needs.

(3) Training program for ship's personnel. Training of Ship's Force personnel will include classroom training before the assessment and shipboard practical training during the assessment.

b. Give daily progress reports (briefing, if possible) to ship's Commanding Officer, identifying Category I findings and any other areas of concern.

c. Upon completion of the assessment, submit a final report per Appendix A of this chapter to the applicable Type Commander (TYCOM) (N434), info the Immediate Superior In Command (ISIC) and the Regional Support Group. The final report should contain a list of Ship's Force personnel trained as cableway assessors/repairmen, including names, social security numbers, and rate/rank.

28.6.4 Cableway Assessment Team.

a. Locate, identify, and categorize electrical cableway discrepancies on ships.

b. Train Ship's Force to assess, repair, and maintain shipboard cableways.

c. Correct identified discrepancies which are beyond Ship's Force capability, and/or document discrepancies for future correction.

d. Provide guidance for the repair of deferred discrepancies.

28.6.5 Ship Commanding Officer.

a. Assign Ship's Force personnel (E4 or above) from source ratings listed in paragraph 28.5.a of this chapter for FMA cableway assessment repair training. After completing training, they will serve as quality assurance personnel to minimize future discrepancies by contractors and electrical installation teams. They should identify, track, and repair cableway discrepancies within their departments.

b. Correct outstanding discrepancies listed in the final cableway assessment report.

c. Within 30 days of completion of the assessment, enter all unrepaired Category I discrepancies in the Current Ship's Maintenance Project. Schedule these items for corrective action at the earliest opportunity.

28.7 REPORTS. Upon completion of the cableway assessment, the assessing agency must submit a final report using the format of Appendix A of this chapter.

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APPENDIX A

SAMPLE CABLEWAY ASSESSMENT MESSAGE

FM (FMA)//
TO USS (SHIP'S NAME AND HULL NO.)//
INFO ISIC//(AS APPROPRIATE)
RSG//(AS APPROPRIATE)
BT
UNCLAS //N04790//
MSGID/GENADMIN/(ORIGINATING FMA)//
SUBJ/ ELECTRICAL CABLEWAY ASSESSMENT REPORT FOR USS (SHIP'S NAME AND HULL NO.)//
REF/A/DOC/COMFLTFORCOMINST 4790.3//
AMPN/REF A IS JOINT FLEET MAINT MAN/VOL VI CH 28 PROVIDES GUIDANCE IN CABLEWAY INSPECTIONS//
RMKS/1. CABLEWAY ASSESSMENT OF USS (SHIP'S NAME AND HULL NO.) WAS CONDUCTED IN ACCORDANCE WITH REF A FROM (START DATE) TO (COMPLETION DATE) BY (INSPECTING UNIT). RESULTS ARE AS FOLLOWS:

	CAT I	CAT II	CAT III	TOTAL
ITEMS IDENTIFIED	_____	_____	_____	_____
ITEMS CORRECTED	_____	_____	_____	_____
ITEMS REMAINING	_____	_____	_____	_____
ITEMS DOWNGRADED	_____	_____	_____	_____

2. CABLE/CABLEWAY DISCREPANCIES.

	QUANTITY	PERCENTAGE
DEAD-ENDED CABLES	_____	_____
IMPROPER EQUIPMENT PENETRATIONS	_____	_____
COLLARS/CHAFING RINGS WITHOUT FIRE STOP	_____	_____
MISSING CABLE HANGERS	_____	_____
TUBES NOT PACKED	_____	_____
TUBES NOT BLANKED	_____	_____
CHAFED CABLES	_____	_____
EQUIPMENT IMPROPERLY MOUNTED	_____	_____
CONNECTERS MISSING TEMPSEAL	_____	_____
IMPROPER SPLICES	_____	_____
EXCESSIVE SLACK IN CABLES	_____	_____
INCORRECT BEND RADIUS	_____	_____
MISSING COVERS	_____	_____

SAMPLE

IMPROPER BANDING	_____	_____
IMPROPER CABLE RUNS	_____	_____
FIRE BOUNDARIES MISSING FIRE PROTECTIVE COATING	_____	_____

3. THE FOLLOWING ITEMS WERE CORRECTED:

	QUANTITIES
DEAD ENDED CABLES	_____
DEAD ENDED CABLES PROPERLY END SEALED	_____
NEW CABLES INSTALLED	_____
IMPROPER EQUIPMENT PENETRATIONS DOWNGRADED WITH APPROVED METHODS	_____
FIRE BOUNDARIES TREATED WITH FIRE PROTECTIVE COATING	_____

(LIST ANY OTHER TYPES OF DISCREPANCIES AND QUANTITIES CORRECTED)

4. FIRE PROTECTIVE COATING (TYPE) HAS BEEN APPLIED TO ALL ELECTRICAL PENETRATIONS THROUGH DESIGNATED FIRE ZONE BOUNDARIES (IF ALL DESIGNATED BOUNDARIES WERE NOT COATED, IDENTIFY REMAINING BOUNDARIES TO BE COATED).

5. ELECTRICAL CABLE/CABLEWAY INSPECTION IS COMPLETED (OR) ELECTRICAL CABLE/CABLEWAY INSPECTION IS COMPLETE WITH THE FOLLOWING EXCEPTIONS (LIST COMPARTMENTS OR IDENTIFY BOUNDARIES).

6. THE FOLLOWING SHIP'S FORCE PERSONNEL WERE TRAINED AND HAVE SATISFACTORILY DEMONSTRATED THEIR PRACTICAL KNOWLEDGE IN CABLEWAY INSPECTION AND REPAIR TECHNIQUE. PERSONNEL HAVE BEEN INFORMED OF THEIR RESPONSIBILITY FOR QUALITY ASSURANCE OF CABLEWAYS INCLUDING INSPECTION AND MAINTENANCE OF CABLEWAYS:

NAME	RATE/RANK	SSN
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

BT

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

SAMPLE

VOLUME VI

CHAPTER 29

HEAT STRESS CONTROL AND REPAIR OF THERMAL INSULATION

REFERENCES.

(a) NAVSEA S9086-VH-STM-010 - NSTM Chapter 635 (Thermal, Fire and Acoustic Insulation)
(b) OPNAVINST 5100.20 - Shipboard Heat Stress Control and Personnel Protection
(c) NAVSEA S9086-RQ-STM-010 - NSTM Chapter 510 (Heating, Ventilation, and Air Conditioning Systems for Surface Ships)

LISTING OF APPENDICES.

A Inspection Guide for Excessive Heat

29.1 PURPOSE. To provide guidance for reducing excessive heat generation and the control of asbestos lagging and insulation material.

29.2 HEAT STRESS.

a. Excessive temperatures not only cause discomfort to personnel and the risk of burns from hot surfaces, but also lead to inattentive or inefficient watch standing, and the inability to perform maintenance. They also lead to jury-rigging of ventilation systems, often making the situation more severe. While the principal problems are centered in the engineering spaces, these conditions also exist in other heat producing spaces (i.e., laundries, sculleries, and auxiliary machinery spaces).

b. The causes of excessive temperatures in ship machinery spaces are:

(1) Radiant heat from steam piping valves and machinery which has missing, water soaked, or deteriorated insulation.

(2) Steam and water leaks.

(3) Boiler air casing leaks.

(4) Ventilation system deficiencies, such as, inadequate cleaning, improper maintenance/grooming, and design inadequacies.

c. Several steps have been taken toward correcting the problem of heat stress.

(1) Fleet Maintenance Activities (FMA) have increased their capability to accomplish lagging of piping and machinery.

(2) Special teams have been set up in some FMAs to aid ships in inspecting for insulation deficiencies.

(3) FMAs are outfitted with heat guns.

(4) Fire room lagging repairs are priority items during Chief of Naval Operations Maintenance Availability.

29.2.1 Measurement of Insulation Surface Temperatures.

a. Check and calibrate the heat gun per the instrument directions. Checking for the proper emissivity setting is particularly important. The following emissivities apply to this procedure:

(1) Navy white paint (clean) - 0.9

(2) Navy aluminum paint (clean) - 0.4

b. Sight the heat gun on the object to be inspected. Record heat gun readings for each location tested. Measure and record ambient dry bulb readings in proximity to the surface being inspected for each location being inspected. When inspecting piping systems, scan the pipe run with the heat gun. When a location with deteriorated insulation, producing a hot spot, is passed the readings will increase significantly. Record this location as requiring insulation replacement.

(1) Items or systems being inspected shall be at normal operating conditions and temperatures.

(2) If the heat gun acts erratically (i.e., zero not adjustable), place the instrument in a cool air stream until the instrument stabilizes and then proceed with the readings.

(3) When not in use, store the heat gun in an area having an ambient temperature of less than 100 degrees F.

c. Determine the maximum allowable surface temperature, as shown in reference (a). If the recorded temperature exceeds the maximum allowed per reference (a), corrective action must be taken.

d. Appendix A of this chapter is a checklist guide to be used in locating areas of excessive heat generations.

29.2.2 Heat Stress Area Stay Times. Heat stress is measured with a Wet Bulb Globe Thermometer in accordance with the instructions contained in reference (b). Using the Wet Bulb Thermometer readings, calculate stay times from the Stay Time Tables of reference (b).

29.3 INDUSTRIAL AVAILABILITY LAGGING PLAN. For any industrial availability period where major lagging work is expected, prepare an overall lagging plan, and schedule repairs that permit coordination with other planned work. The plan must show which areas to be repaired contain asbestos. Visual inspection and use of a heat gun, when underway, is normally sufficient to reveal areas needing repair or replacement. For each piping system inspected, mark up a copy of the system piping diagram to show specific repairs needed, and attach the marked up diagram to an OPNAV 4790/2K work request.

29.4 ASBESTOS LAGGING/INSULATION.

29.4.1 Repairs to Asbestos Lagging/Insulation. Exposed asbestos thermal insulation poses a danger to personnel who may breathe in the airborne fibers. Damaged asbestos insulation shall not be left unattended. Corrective measures include:

a. Application of ARABOL (MIL-A-3316) for minor insulation damage.

b. Use of aluminized fibrous glass to protect insulation in high traffic area.

c. Use of chafing gear and other protection to reduce damage.

d. Training work center or work party personnel who may be contributing to excessive insulation damage.

e. Alerting all shipboard personnel to report any insulation damage.

29.4.2 Removal of Asbestos Lagging/Insulation.

a. If removal of asbestos lagging is required to carry out equipment repairs, request that the Type Commander arrange for a special asbestos handling team. The team will be assigned from either an FMA or contractor, depending on the size of the job.

b. If the ship is away from it's home port and damage occurs, remove minor areas of defective asbestos insulation using the methods specified in reference (a). Ship's Force must be made aware of the health hazards involved in removing asbestos, and know the measures required for personnel safety.

c. To simplify cleanup and reduce health hazards from dust, collect any debris from removed asbestos lagging in containers, in accordance with the requirements of reference (a).

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APPENDIX A

INSPECTION GUIDE FOR EXCESSIVE HEAT

1. Insulation.

   a. Visually check piping, lagging pads, and bulkhead insulation for:

      (1) Deteriorated (crushed or frayed) lagging or pads.

      (2) Wet or oil soaked lagging or pads.

      (3) Missing pads. **This is also a burn hazard!**

      (4) Surface temperature.

2. Valves.

   a. Visually check valves for:

      (1) Leaking bonnet or flexitalic gaskets.

      (2) Proper packing adjustment.

      (3) Damaged or worn valve stems.

      (4) Proper lagging.

3. Boiler Casing Joints.

   a. Visually check casing for leaks.

4. Drains.

   a. Visually check steam drains for leakage and system misalignment.

   b. Check funnel drains for overflow conditions or missing contamination covers.

   c. Periodically check orifice plates for oversize conditions.

   d. Inspect for leaking or bypassed steam traps.

5. Bilge Levels.

   a. Dry bilges. Visual, no water present.

   b. Wet bilge. Visual, minimize bilge levels to control humidity levels.

6. Deck Plates.

   a. Ensure proper deck plate types (solid or open grate) are in place. Ensure proper airflow pattern.

7. Ventilation.

   a. Visually inspect for system cleanliness in accordance with reference (c). Particular attention shall be paid to clogged exhaust screens, dirty ventilation ducting, missing or mutilated ductwork and misdirected terminals.

   b. Check system for breaks or openings due to corrosion. The system must be intact to deliver the proper velocity (minimum 250 Cubic Feet per Minute at each station). Check for closed or partially closed "Circle William" dampers and inoperative fan motors and controllers.

   c. Main spaces should have a negative air pressure differential of 1/4" to 1/2" (water) with supply and exhaust systems running at normal settings.

VOLUME VI

CHAPTER 30

PORTABLE TOOL ASSISTANCE PROGRAM

30.1 PURPOSE. To provide guidance in the acquisition of portable tools, not normally carried onboard ship, and the priorities for loaning these tools to a ship in an availability.

30.2 PORTABLE TOOL INVENTORY POLICY. Shipboard preservation conducted during a Chief of Naval Operations Maintenance Availability requires an inventory of power tools beyond a ship's daily needs or normal allowance. Ships in Naval industrial activities can borrow the necessary tools directly from the activity's tool inventory under the Fleet Support Program. Such service is not routinely available to ships undergoing availabilities in a private industrial activity, because the private activity cannot legally be funded to perform this function. For ships undergoing availabilities in private facilities, tools are available in varying degrees from most FMAs.

30.2.1 Distribution Priorities. The FMAs should maintain an adequate inventory to meet anticipated needs of assigned ships. When the demand exceeds the availability, the distribution of portable tools will be based on the following priority:

a. Priority I - Ships in availabilities in private industrial activities.

b. Priority II - Ships in Fleet Maintenance Activity Availabilities, or Technical Availabilities.

c. Priority III - Ships in availabilities in Naval industrial activities.

d. Priority IV - All other ships.

30.2.2 Borrowing Procedures.

a. The borrowing unit advises the lending FMA of the type, quantity, and date tools are required and the scheduled availability completion date.

b. FMA personnel assemble a tool package in the variety and quantity requested.

c. When the tools are picked up, an inventory receipt must be signed by an authorized representative from the borrowing command. The borrowing unit is financially responsible for the tools.

30.2.3 Borrowing Ship's Responsibilities.

a. The borrowing unit is financially responsible for the tools.

b. Routine maintenance (electrical safety check, fitting replacement, etc) must be accomplished by the borrowing command.

c. Tools and equipment must be returned promptly upon job completion or no later than the due date.

d. Upon return and inspection of the tools, charges will be levied to the borrowing ship as follows:

(1) Lost Tools (to include tools not returned when due). Ships that fail to return tools when due will be reminded by letter or message that they have overdue tools. If no response is received within 30 days, the ship will be charged for the missing tools.

(2) Damaged tools (to include missing parts).